

UNLIMITED RIGHTS IN A WATER-SCARCE WORLD? QUANTIFICATION OF DORMANT RIGHTS TO COMMON POOL GROUNDWATER

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I. INTRODUCTION

In states with a distinct culture of property ownership in groundwater, like California and Texas, finding an approach to sustainable basin management has been difficult. Although there have been successes, both states continue to struggle with the looming threat of dwindling groundwater supplies and the associated impacts. Some basins are on a path to complete destruction as a result of groundwater mining; in others, intense and sometimes devastating consequences result from continuous overpumping.¹

Although the rules governing groundwater rights in California and Texas are different, one commonality is that, because groundwater rights attach to ownership of real property, both states must sometimes confront the issue of dormant rights, i.e., rights not yet exercised but for which there is a perpetual expectation of increased pumping.² Courts and property owners have been reluctant to support attempts to quantify such rights and indeed have maintained that such quantification is precluded by the fact that dormant rights are uniquely associated with water rights that derive from ownership of real property.³ Yet scientists and policy experts increasingly recognize

1. Alexandra S. Richey et al., *Quantifying Renewable Groundwater Stress with GRACE*, 51 WATER RESOURCES RES. 5217, 5225–26 (2015), <http://onlinelibrary.wiley.com/doi/10.1002/2015WR017349/full> (identifying California’s Central Valley as one of the world’s most impacted basins); Samantha Fox, *Groundwater Depletion: Is Texas Draining Its Savings Account?*, WATER SAGE, <http://www.watersage.com/blog/list-blog/october-2015/groundwater-depletion-is-texas-draining-its-saving/> (last visited Apr. 4, 2016).

2. See *Dormant*, BLACK’S LAW DICTIONARY (10th ed. 2014) (stating that “dormant” means inactive or latent, as in existing but unexercised). In water law, these rights are sometimes also called “prospective” or “inchoate,” meaning undeveloped. See *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 81 (Tex. 1999) (Hecht, J., concurring) (stating that the common law rule of capture “entitles a landowner to withdraw an unlimited amount of groundwater”); *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 152–53 (Tex. App.—San Antonio 2013, pet. denied) (holding that the property owner was entitled to unlimited pumping from the Edwards Aquifer); cf. *Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist.*, 45 P.2d 972, 990 (Cal. 1935) (holding that dormant rights could not be defined); Wells A. Hutchins & Harry A. Steele, *Basic Water Rights Doctrines and Their Implications for River Basin Management*, 22 LAW & CONTEMP. PROBS. 276, 289 (1957) (“A major difficulty . . . is the matter of unused riparian rights. . . . [T]he water right is neither gained by use nor lost by disuse, future use stands as high as present use. . . . This right reaches into the indefinite future; there is no time limitation whatsoever.”).

3. See, e.g., *Bragg*, 421 S.W.3d at 152–53 (holding that the property owner was entitled to unlimited pumping from the Edwards Aquifer); Erica Gies, *Battle Wages for California Groundwater Rights*, CLIMATE CENT. (Aug. 30, 2014), <http://www.climatecentral.org/news/battle-for-california-groundwater-rights-17956> (describing a property owner’s characterization of groundwater rights as inviolable against government regulation).

that quantification of these rights is necessary to ensure the continued viability of heavily pumped groundwater basins.⁴ Dormant claims to a scarce supply also create economic uncertainty and risk for all pumpers, including the landowner who holds those dormant rights.⁵ Despite this, quantification is perceived as antithetical to water rights based in property ownership, and efforts to quantify future rights are routinely met with hostility and claims of government overreach.⁶

This issue is ripe for discussion in California and Texas. The California Supreme Court has concluded that, in the surface water context, quantification is authorized by the reasonable use doctrine, but California courts have previously rejected attempts to quantify dormant rights to groundwater.⁷ A statute adopted in October 2015 places the issue of quantification squarely before California courts.⁸ In Texas, the issue of as-yet unexercised property rights in groundwater is also simmering, following the 2012 and 2013 declarations of the Texas judiciary that groundwater is owned “in place,” without the necessity of capture, and that such property-based rights are considered unlimited prior to state regulation.⁹

This Article argues that the idea that a land-based right cannot be quantified is legally incorrect and that the idea of an unlimited right is illusory.¹⁰ This Article further argues that quantification of land-based rights to groundwater is consistent with the fundamental nature of these rights, rather than antithetical, due to the physicality of the owned property as a

4. See generally BRIAN GRAY ET AL., PUB. POL’Y INST. CAL., ALLOCATING CALIFORNIA’S WATER: DIRECTIONS FOR REFORM (Nov. 2015), http://www.ppic.org/content/pubs/report/R_1115BGR.pdf.

5. See Gabe Collins, *Blue Gold: Commoditize Groundwater and Use Correlative Management to Balance City, Farm, and Frac Water Use in Texas*, 55 NAT. RESOURCES J. 441, 442 (2015) (“Texans should also ask, ‘What good is a right to extract a resource from common pools if every other property owner with access to the pool also enjoys an ‘absolute’ right to extraction and use?’”); C.-Y. Cynthia Lin Lawell, *Property Rights and Groundwater Management in the High Plains Aquifer* 28 (Oct. 2015) (unpublished manuscript), http://www.des.ucdavis.edu/faculty/Lin/water_temporal_property_rts_paper.pdf (“If producers are concerned with future profits, they will treat the groundwater as a nonrenewable resource.”); cf. Justin Gillis & Matt Richtel, *Beneath California Crops, Groundwater Crisis Grows*, N.Y. TIMES (Apr. 5, 2015), http://www.nytimes.com/2015/04/06/science/beneath-california-crops-groundwater-crisis-grows.html?_r=0 (“You see the lack of regulation hurting the agricultural community as much as it hurts anybody else.” (quoting Doug Obegi, a lawyer with the Natural Resources Defense Council)).

6. See *Wright v. Goleta Water Dist.*, 219 Cal. Rptr. 740, 753–54 (Cal. Ct. App. 1985) (rejecting an attempt to quantify dormant rights); Mark Meckler, *California Laws Restrict Groundwater Use on Private Land*, BREITBART (Sept. 18, 2014), <http://www.breitbart.com/california/2014/09/18/ca-laws-restrict-groundwater-use-on-private-land/>.

7. *Tulare Irr. Dist.*, 45 P.2d at 990; *Goleta Water Dist.*, 219 Cal. Rptr. at 753–54.

8. CAL. CIV. PROC. CODE § 830 (West Supp. 2016).

9. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 828–29 (Tex. 2012); *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 152–53 (Tex. App.—San Antonio 2013, pet. denied).

10. See Craig Anthony (Tony) Arnold, *Adaptive Water Law*, 62 U. KAN. L. REV. 1043, 1046 (2014) (“A property entitlement to pump an unlimited amount of water, secured against government regulation . . . is unsustainable and is illusory . . .”); Burke W. Griggs, *Beyond Drought: Water Rights in the Age of Permanent Depletion*, 62 U. KAN. L. REV. 1263, 1309 (2014) (distinguishing between the available property right as defined by hydrology and the perceived legal status of groundwater).

depletable common pool resource.¹¹ Limits are an inherent element of the property right itself, and thus quantification should be part of a property owner's expectations.¹² Moreover, although protests to quantification are typically based on the rhetoric of protecting individual rights to groundwater, recognition of these inherent limits increases predictability and certainty, and thus tends to enhance the value of property rights in groundwater.¹³ Ultimately, this Article demonstrates that waste and destruction of a common pool resource are not part of the land-based right, and that the exercise of that right may be regulated and quantified to avoid these outcomes.

II. BACKGROUND

A. Ownership of Real Property Is Special

Among all of the rights to property, ownership of land is special. Like Scarlett O'Hara and her "red earth of Tara," people have a strong psychological connection to land.¹⁴ Emotional ties to water rights connected to property appear to be just as deep, and anecdotal evidence suggests that the connection may be even stronger for groundwater than for surface water.¹⁵ One can imagine several reasons for this. First, there is the physical

11. See *infra* Part III.B–C.

12. See Joseph W. Dellapenna, *The Rise and the Demise of the Absolute Dominion Doctrine for Groundwater*, 35 U. ARK. LITTLE ROCK L. REV. 291, 312 (2013) (referencing "the general limitation on all use of property [including water rights under absolute ownership] embedded in the law of nuisance" (quoting *State v. Michels Pipeline Const., Inc.*, 217 N.W.2d 339, 343–48 (Wis. 1974))); Dave Owen, *Taking Groundwater*, 91 WASH. U. L. REV. 253, 294 n.247 (2013) (describing a natural law theory under which a property right in groundwater is elevated above both its economic value and political control, and ultimately rejecting the theory as rhetorically powerful but with an uncertain doctrinal foundation).

13. See TEX. WATER DEV. BD., REPORT 361: 100 YEARS OF RULE OF CAPTURE: FROM EAST TO GROUNDWATER MANAGEMENT 14 (William F. Mullican, III & Suzanne Schwartz eds., 2004), <https://www.twdb.texas.gov/publications/reports/numbered-reports/doc/R361/R361.pdf> ("Quantification of groundwater rights is helpful, if not essential, to effective marketing of groundwater."); Ronald Kaiser & Frank F. Skillern, *Deep Trouble: Options for Managing the Hidden Threat of Aquifer Depletion in Texas*, 32 TEX. TECH L. REV. 249, 258 (2001) (describing the economic consequences of pumping without regard to aquifer limits); Lawell, *supra* note 5.

14. See Janice Nadler & Shari Seidman Diamond, *Eminent Domain and the Psychology of Property Rights: Proposed Use, Subjective Attachment, and Taker Identity*, 5 J. EMPIRICAL LEGAL STUD. 713, 714–16 (2008) (noting that "subjective value" associated with private property is often higher than market value due to psychological ties to property); cf. Jeremy A. Blumenthal, "To Be Human": A Psychological Perspective on Property Law, 83 TUL. L. REV. 609, 638–39 (2009) ("[P]hysical property may affect the legal system through its own influence on human psychology."). Scarlett O'Hara is the heroine of the Pulitzer Prize winning novel *Gone with the Wind* by Margaret Mitchell (published 1937) and the 1939 blockbuster film of the same name produced by Metro-Goldwyn-Mayer. Tara is the name of the O'Hara family plantation, and there are numerous references throughout the book and film to Scarlett's emotional connection to the property and its "red earth."

15. See, e.g., Lisa M. Krieger, *In California, Farmers and Senior Water Rights Under Siege*, REC. SEARCHLIGHT (June 5, 2015), <http://www.redding.com/news/in-california-farmers-and-senior-water-rights-under-siege-ep-1121832616-353450291.html> (describing farmers' strong ties to water rights);

fact that surface water can be seen moving off the property, but groundwater lies hidden, perceived as a personal storage tank, a seemingly perpetual resource.¹⁶ Second, groundwater resources have a strong connection to farming, ranching, and other agricultural activities that deepen the connection between property owners and land.¹⁷ Although some might argue that the rhetoric is less personal and more economically motivated, there is no question that some farmers have a strong, family-connected, legacy-focused emotional tie to their property rights, including their water rights.¹⁸ And in fact, whatever the motivation, governments in California and Texas have tended to exercise much earlier and stronger regulatory authority over surface water systems as compared to groundwater.¹⁹ Groundwater regulation continues to be spotty or nonexistent in key areas, particularly agricultural areas, and is heavily dominated by property-rights rhetoric.

B. Groundwater as a Common Pool Resource

Groundwater is one of the most recognizable examples of a common pool resource, consisting of a core resource and limited extractable “fringe units.”²⁰ The fringe units can be consumed but the core resource must be

Mark Lubell, *Water Psychology: Please Lie Down on My Couch*, CTR. FOR ENVTL. POL’Y & BEHAV. (Aug. 5, 2014), <http://environmentalpolicy.ucdavis.edu/node/341> (describing emotional connections to drinking water); *Conflict in Klamath*, S. POVERTY L. CTR. (Nov. 29, 2001), <https://www.splcenter.org/fighting-hate/intelligence-report/2001/conflict-klamath> (detailing protestors who used chain saws and blow torches to open gates and release irrigation water held back by the federal government, and siphoned water around head gates and into farm canals until federal marshals were called); cf. Paul Conable, *Equal Footing, County Supremacy, and the Western Public Lands*, 26 ENVTL. L. 1263, 1264–65 (1996) (describing conflict between local and federal governments over western land, as during the Sagebrush Rebellion); Nancy Langston, Opinion, *In Oregon, Myth Mixes with Anger*, N.Y. TIMES (Jan. 6, 2016), <http://www.nytimes.com/2016/01/06/opinion/in-oregon-myth-mixes-with-anger.html?r=0> (describing the anger of rural property owners regarding federal regulation and ownership of land in the West); Tay Wiles, *Malheur Occupation, Explained*, HIGH COUNTRY NEWS (Jan. 4, 2016), <http://www.hcn.org/articles/oregon-occupation-at-wildlife-refuge> (noting the connection between the recent armed occupation of federal land in Oregon and anger about perceived invasion of rights to land).

16. See Amy Hardberger, *World’s Worst Game of Telephone: Attempting to Understand the Conversation Between Texas’s Legislature and Courts on Groundwater*, 43 TEX. ENVTL. L.J. 257, 267 (2013).

17. See, e.g., *id.* at 262 (noting that in 2008, 80% of Texas groundwater was pumped for irrigation purposes); Katz v. Walkinshaw, 74 P. 766, 771 (Cal. 1903) (describing the importance of groundwater to agriculture).

18. See Krieger, *supra* note 15.

19. See *infra* Part III.A.

20. ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 109, 125 (1990); see also Christopher R. Brown & Blake Farrar, *A Hole in the Bucket: Aspermont’s Impact on Groundwater Districts and What It Says About Texas Groundwater Policy*, 39 TEX. ENVTL. L.J. 1, 5, 34 (2008) (citing Donald H. Negri, *The Common Property Aquifer as a Differential Game*, 25 WATER RESOURCES RES. 9, 9-15 (1989)) (analyzing groundwater as a common pool resource); Alan E. Friedman, *The Economics of the Common Pool: Property Rights in Exhaustible Resources*, 18 UCLA L. REV. 855, 855 (1971) (describing groundwater as a classic common pool resource).

protected to allow for continued consumption.²¹ An individual's use of a common pool resource extracts benefits that then become unavailable to others.²² For purposes of this Article, "sustainability" is defined as protection of this core resource for continued consumption, as opposed to depletion the resource entirely.²³

The common pool resource of groundwater is not necessarily, or even typically, equated with a legal system of common property or community ownership.²⁴ A common pool resource may be governed by a range of legal and institutional structures, including private property law, government regulation, community-based rules and norms, or some combination of these.²⁵ A common pool resource is also not necessarily the same as the "commons," defined as open-access natural resources used by individuals in the absence of government regulation, although specific groundwater systems may approximate commons.²⁶

For natural resources such as groundwater, the common pool may be renewable or depletable.²⁷ Depletable (alternatively, exhaustible) means that the resource is nonrenewable so that use will eventually lead to destruction of the resource.²⁸ Nonrenewable resources are characterized by limited supply, typically because replenishment only occurs over the long-term;

21. OSTROM, *supra* note 20.

22. Elinor Ostrom, *The Challenge of Common-Pool Resources*, ENV'T: SCI. & POL'Y FOR SUSTAINABLE DEV. (2008), <http://www.environmentmagazine.org/Archives/Back%20Issues/July-August%202008/ostrom-full.html>.

23. This Article focuses on minimal levels to sustain the resource itself and does not address the broader meaning of sustainability, under which decision-makers are concerned with varying degrees of economic, environmental, and equitable values for present and future generations. *See, e.g.*, Dan Tarlock, *Do Water Law and Policy Promote Sustainable Water Use?*, 28 PACE ENVTL. L. REV. 642, 644 (2011). These broader considerations are critical for quantification determinations but irrelevant to the question whether a land-based right fundamentally precludes quantification.

24. Ostrom, *supra* note 22.

25. *Id.* Even in mixed systems involving some government or public ownership interests, groundwater is often connected to the rhetoric of individual rights. Nicholas Brozović, David L. Sunding & David Zilberman, *Optimal Management of Groundwater over Space and Time*, in FRONTIERS IN WATER RESOURCE ECONOMY 2 (2006), http://are.berkeley.edu/~sunding/brozovic_groundwater.pdf.

26. Lee Anne Fennell, *Ostrom's Law: Property Rights in the Commons*, 5 INT'L J. COMMONS 9, 12 (2011).

27. Friedman, *supra* note 20 (describing groundwater as an exhaustible resource); Tom Gleeson et al., *The Global Volume and Distribution of Modern Groundwater*, 9 NATURE GEOSCIENCE 161 (2015) (concluding that most groundwater is nonrenewable because less than ten percent of groundwater is replenished and renewed within a "human lifetime" of fifty years).

28. *See, e.g.*, James Sweeney, *Economic Theory of Depletable Resources: An Introduction*, in 3 HANDBOOK OF NATURAL RESOURCE & ENERGY ECONOMY 752 (1993).

Based on the time scale of the relevant adjustment processes, we can also classify resources as expendable, renewable, or depletable. Depletable resources are those whose adjustment speed is so slow that we can meaningfully model them as made available once and only once by nature. Crude oil or natural gas deposits provide prototypical examples, but a virgin wilderness, an endangered species, or top soil also can well be viewed as depletable resources. Renewable resources adjust more rapidly so that they are self renewing within a time scale important for economic decisionmaking.

Id.

short-term heavy use will result in “mining” the resource until nothing is left.²⁹ Coal and natural gas are examples of depletable resources.³⁰ Renewable resources, in contrast, replenish naturally and over relatively short periods of time.³¹

Groundwater that recharges naturally is, in one sense, a renewable resource.³² However, groundwater recharge is highly variable depending on geography.³³ In many instances the natural recharge is so slow that the resource is essentially depletable from a human perspective, at least absent artificial recharge.³⁴ Due to a lack of effective regulation, groundwater in many basins is being pumped at rates much higher than natural recharge.³⁵ In these basins, the groundwater resource is at risk of being left practically or physically unusable; other basins may reach this state without adequate controls.³⁶ Because it is these basins and their physical vulnerability with which this Article is concerned, this Article refers to groundwater as a depletable resource, with the caveat that individual basins may be arguably renewable and other basins are potentially renewable given appropriate management and favorable hydrologic conditions (i.e., lots of rain and snow).

C. What Are Land-Based Rights and What’s So Special About Them?

Although water allocation rules vary significantly between states, as a general matter, water rights can be divided into two general categories: (1) rights acquired and exercised by virtue of ownership of real property (land-based rights) and (2) rights that depend on application of water to beneficial use (use-based rights).³⁷ Some states recognize only land-based rights, some states recognize only use-based rights, and some have created

29. *Id.*; Kaiser & Skillern, *supra* note 13 (describing groundwater mining).

30. Sweeney, *supra* note 28.

31. *Id.*

32. *See id.*

33. *See generally* BRIDGET R. SCANLON ET AL., GROUNDWATER RECHARGE IN TEXAS (2000), http://www.beg.utexas.edu/enviro/qly/vadose/pdfs/webbio_pdfs/TWDBRechRept.pdf.

34. *E.g.*, Amy Hardberger, *What Lies Beneath: Determining the Necessity of International Groundwater Policy Along the United States–Mexico Border and a Roadmap to an Agreement*, 35 TEX. TECH L. REV. 1211, 1214 (2004) (citing DAVID KEITH TODD, GROUNDWATER HYDROLOGY 13, 15–16 (2d ed. 1980)) (describing geological variation in groundwater renewability); *Review of World Water Resources by Country*, FOOD & AGRIC. ORG. UNITED NATIONS, (2003), <http://www.fao.org/docrep/005/y4473e/y4473e06.htm> (describing how water resources can be renewable or nonrenewable depending on management); *see also* Jane Braxton Little, *The Ogallala Aquifer: Saving a Vital U.S. Water Source*, SCI. AM. (Mar. 1, 2009), <http://www.scientificamerican.com/article/the-ogallala-aquifer/> (noting that scientific consensus is that the Ogallala Aquifer would take approximately 6,000 years to recharge naturally).

35. *See* Little, *supra* note 34.

36. *Id.*

37. *See* Hutchins & Steele, *supra* note 2, at 282–88.

new versions of each kind of right that incorporates elements of the other.³⁸ A few so-called hybrid states like California recognize both types of rights.³⁹

A land-based right is an ownership interest in real property that either (1) is adjacent to surface water, such as a river; or (2) sits on top of a groundwater basin and may include the right to divert or pump such water.⁴⁰ This type of right is considered “part and parcel of the land,” i.e., the water right inheres in the soil itself and is more than some other type of property right like an easement or other appurtenance.⁴¹

Land-based rights may be called by different titles depending on the source of the water. When the source of water is surface water such as a river, creek, stream, or lake, these rights are referred to as “riparian.”⁴² The word *riparian* has its roots in the Latin term *ripa*, which means bank; i.e., these rights exist when property includes the banks of rivers.⁴³

Land-based rights also extend to groundwater located beneath the surface of the property.⁴⁴ When the source is groundwater, land-based rights do not have a consistent nomenclature. In states where there are no contrasting use-based rights, land-based rights are simply referred to as groundwater rights or pumping rights.⁴⁵ In California, land-based rights to groundwater are called “overlying” rights, referencing the fact that the rights exist where property overlies, or sits on top of, a groundwater basin.⁴⁶

In contrast to land-based rights, use-based rights are created when water is applied to a beneficial use.⁴⁷ Beneficial uses vary by state and over time, but the idea generally refers to an activity that has social value, such as drinking water and other household needs, industry, agriculture, recreation, hydropower, fish, wildlife, and ecosystems.⁴⁸ Under the common law, the physical act of applying water to beneficial use was sufficient to establish the right.⁴⁹ With regard to surface water, in most states, an application must

38. See *id.* at 288, 299.

39. See *id.* at 284.

40. See *id.* at 282–84.

41. See *id.* at 282.

42. *Id.* at 282–83. Sometimes, in the case of lakes, the term used is *littoral*. See 78 AM. JUR. 2D *Waters* § 33 (2013) (defining “littoral rights” as rights that inhere in property contiguous to a lake or sea).

43. E.g., Joseph W. Dellapenna, *Adapting Riparian Rights to the Twenty-First Century*, 106 W. VA. L. REV. 539, 555 n.75 (2004) (citing *Johnson v. McCowen*, 348 So. 2d 357, 360 n.3 (Fla. Dist. Ct. App. 1977)).

44. *Katz v. Walkinshaw*, 74 P. 766, 771 (Cal. 1903); *Houst. & T.C. Ry. Co. v. East*, 81 S.W. 279, 280–81 (Tex. 1904); *Acton v. Blundell* [1843], 152 Eng. Rep. 1223, 1235 (noting “that the person who owns the surface may dig therein, and apply all that is there found to his own purposes at his free will and pleasure”).

45. See Hutchins & Steele, *supra* note 2, at 282–83.

46. See *id.*

47. E.g., Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 920 (1998) (“Beneficial use, without waste, is the basis, measure, and limit of a water right.”).

48. *Id.* at 926–28.

49. Hutchins & Steele, *supra* note 2, at 282.

typically be filed before water can be used; the grant of an application confers an inchoate right that is developed (or “perfected”) by diligence in physically diverting the water and putting it to beneficial use.⁵⁰ Some state permitting systems, like California’s, recognize the continued validity of common law rights to surface water that pre-date the permit requirement, and therefore, both common law and permit-based rights exist side-by-side.⁵¹

In the groundwater context, the concept of use-based rights is more complex. In some states, landowners may pump groundwater from overlying land and use it away from the overlying land without affecting the nature of the water right.⁵² In other states, the use of water off-tract changes the nature of the right, transforming a land-based right into a use-based right.⁵³ Other states have adopted a use-based system for all groundwater pumping.⁵⁴

In their classic common-law forms, land-based rights and use-based rights are governed by fundamentally different principles. These differences illustrate the unique nature of land-based rights and why they are considered special and valuable.⁵⁵ The following four sections describe the most fundamental differences of the common-law principles.

1. *Perpetual*

Unlike a use-based right, a right based in property ownership is not forfeited for non-use.⁵⁶ A property owner with otherwise intact land-based rights to water can choose to keep her acreage undeveloped for 100 years but may initiate pumping at any time. From this perspective, such rights exist in perpetuity; the rights do not depend on use for their existence or continuing validity.⁵⁷ In contrast, for use-based rights, beneficial use is the “basis, measure, and limit,” and failure to actually apply water to some socially acceptable purpose means that either the right never existed (failure to perfect) or that it has been lost (forfeited).⁵⁸

50. *Id.* at 283.

51. CAL. WATER CODE § 1202 (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.) (excluding vested common-law appropriative rights from the permitting system).

52. *See* Kaiser & Skillern, *supra* note 13, at 261–68 (surveying U.S. groundwater rights systems).

53. *See id.*; *see also* WELLS A. HUTCHINS, THE CALIFORNIA LAW OF WATER RIGHTS 455–58 (1956) (discussing use-based rights to groundwater in California).

54. *See* Kaiser & Skillern, *supra* note 13, at 268.

55. Land-based rights also have limits. Classic riparian rights, for example, are generally limited to use on parcels contiguous to the surface watercourse, wherein the parcel’s legal boundaries also serve as riparian boundaries, and to that portion of the contiguous parcel that is within the watershed of the relevant watercourse. Land-based rights to groundwater are sometimes similarly limited, with the boundaries for use drawn around that portion of the parcel that overlies the groundwater basin.

56. *Lux v. Haggin*, 4 P. 919, 921–24 (Cal. 1884). A land-based right may be deliberately extinguished by deed or contract. Hutchins & Steele, *supra* note 2, at 287–90.

57. *See* Hutchins & Steele, *supra* note 2, at 291.

58. *Id.* at 286–87 (describing forfeiture); *see* *Millview Cty. Water Dist. v. State Water Res. Control Bd.*, 177 Cal. Rptr. 3d 735, 749–57 (Cal. Ct. App. 2014) (describing the rules requiring perfection of

2. Shortage Allocation

Another core feature of water rights centers around allocation of water during times of shortage. Riparian rights are typically correlative, i.e., compared to each other they have equal priority.⁵⁹ Under correlative principles, riparian right holders may each take a proportional share of the available supply, provided the water is used reasonably; during a shortage, riparian right holders must “share the pain” of drought.⁶⁰

In California, the formal rule for shortage allocation of overlying rights is correlative as between each other, and priority as against appropriators, but appropriators can gain priority via prescriptive rights if they are pumping and overlying users are not.⁶¹ In Texas, unless a special district has jurisdiction, the law of the biggest pump controls shortage allocation.⁶² The remainder of the United States is divided among five general groundwater doctrines.⁶³

The experience of shortage is different in the groundwater versus surface water context because groundwater basins are, in essence, storage reservoirs.⁶⁴ This means that groundwater basins can provide a valuable water supply when surface water is in short supply.⁶⁵ A groundwater basin in constant decline during a series of wet and dry years is said to be in a state of overdraft, which occurs when pumping exceeds recharge on a long-term basis and the basin experiences adverse effects such as subsidence and decreased water quality.⁶⁶

Whether surface water or groundwater, rights based on beneficial use typically operate according to the principle of priority, under which the first water user to start the process of putting water to beneficial use is the “senior” and may take as much water as needed before the next water user in time (the

appropriative rights and forfeiture); Neuman, *supra* note 47, at 926–38 (describing the doctrine of beneficial use).

59. See *Harris v. Brooks*, 283 S.W.2d 129, 133 (Ark. 1955); *Pleasant Valley Canal Co. v. Borror*, 72 Cal. Rptr. 2d 1, 24 (Cal. Ct. App. 1998); *Hutchins & Steele*, *supra* note 2, at 284.

60. *Prather v. Hoberg*, 150 P.2d 405, 411–12 (Cal. 1944); *Pleasant Valley Canal Co.*, 72 Cal. Rptr. 2d at 24.

61. *E.g.*, *City of Santa Maria v. Adam*, 149 Cal. Rptr. 3d 491, 501–02 (Cal. Ct. App. 2012).

62. Dylan O. Drummond et al., *The Rule of Capture in Texas—Still So Misunderstood After All These Years*, 37 TEX. TECH L. REV. 1, 53 (2004) (referencing Texas’s “law of the biggest pump”).

63. *Hutchins & Steele*, *supra* note 2, at 277–78; see Joseph W. Dellapenna, *A Primer on Groundwater Law*, 49 IDAHO L. REV. 265, 269–310 (2013) (describing the five doctrines and the principles followed in each state).

64. See *Drought & Groundwater*, U.S. GEOLOGICAL SURV. (Feb. 19, 2016), <http://ca.water.usgs.gov/data/drought/groundwater.html>.

65. *E.g.*, *Drought Impacts*, U.S. GEOLOGICAL SURV. (Mar. 24, 2016), <http://ca.water.usgs.gov/data/drought/drought-impact.html> (“Unlike the effects of a drought on streamflows, groundwater levels in wells may not reflect a shortage of rainfall for a year or more after a drought begins. Despite reduced availability, reliance upon groundwater often increases during drought through increased groundwater pumping to meet water demands.”).

66. *E.g.*, CAL. DEP’T OF WATER RES., CALIFORNIA’S GROUNDWATER: BULLETIN 118 96 (2003), http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003/_bulletin118_entire.pdf.

“junior”) may take any.⁶⁷ In its classic form, this priority system contrasts sharply with the land-based correlative duty to share the pain of shortages.⁶⁸ In hybrid systems that recognize both land-based and use-based rights, such as California, land-based rights as a class may have priority over use-based rights.⁶⁹ For example, with respect to surface water, in California, riparian and overlying right holders are typically senior to appropriators.⁷⁰

3. *Quantity*

Land-based rights are not fixed in quantity.⁷¹ In Texas, the right holder may divert or pump as much as she can use without waste; in California, the right holder may divert or pump as much as can be reasonably used on the property to which the right is attached.⁷² Appropriative rights, in contrast, are tied to a specific quantity of water.⁷³

4. *Dormant Priority*

In California, a dormant land-based right to groundwater retains priority over other land-based rights and actively pumping appropriators, meaning that when the land-based right is exercised, it displaces existing uses.⁷⁴ Even in Texas, where there are no appropriative rights to groundwater, the exercise of dormant land-based rights is disruptive because new uses do not have to respect or give way to existing uses.⁷⁵

The combination of the above special attributes of land-based rights renders the exercise, or even the potential exercise, of dormant rights hugely disruptive to existing users.⁷⁶ Where dormant rights remain unquantified,

67. HUTCHINS, *supra* note 53, at 132.

68. *Id.*

69. *Id.* at 62–63.

70. *Id.* at 62–63, 441–42 (discussing surface water and groundwater).

71. *E.g.*, Hutchins & Steele, *supra* note 2, at 284.

72. *E.g.*, *id.*; *Texas Water Law*, TEX. A&M UNIV.: TEX. WATER, <http://texaswater.tamu.edu/water-law> (last visited Mar. 30, 2016) (describing five exceptions to the rule of capture).

73. *E.g.*, *Pleasant Valley Canal Co. v. Borrer*, 72 Cal. Rptr. 2d 1, 23–24 (Cal. Ct. App. 1998); Hutchins & Steele, *supra* note 2, at 284–85.

74. *See Rowland v. Ramelli (In re Waters of Long Valley Creek Stream Sys.)*, 599 P.2d 656, 666 n.10 (Cal. 1979) (“As against an appropriator, a riparian owner is accorded a fixed priority of right. But the quantity of water to which the right attaches remains unfixed. Thus, an expanded riparian use has the potential to preempt an inferior appropriative right where the supply [of] water originally was sufficient to satisfy both uses.” (quoting WATER REVIEW COMM’N, GOVERNOR’S COMMISSION TO REVIEW CALIFORNIA WATER RIGHTS LAW, FINAL REPORT 21 (1978))); *Meridian, Ltd. v. City of San Francisco*, 90 P.2d 537, 548 (Cal. 1939); *Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist.*, 45 P.2d 972, 986 (Cal. 1935); *Pleasant Valley Canal Co.*, 72 Cal. Rptr. 2d at 28 (“[U]ntil the riparian needs the water, the appropriator may use it, thus, at all times, putting all of the available water to beneficial uses.”); *see also CAL. CONST.* art. X, § 2 (discussing why water must be put to beneficial use to the fullest extent possible).

75. *See infra* Part II.D.

76. *Peabody v. City of Vallejo*, 40 P.2d 486, 494–95 (Cal. 1935); Hutchins & Steele, *supra* note 2, at 289–90.

basin management is uncertain, and existing users cannot plan or gauge risk.⁷⁷ Where unquantified and unplanned-for dormant rights are exercised, such pumping can substantially upset existing investments.⁷⁸

D. Land-Based Rights to Groundwater in Texas

In Texas, groundwater is a private property right governed by the doctrine of “absolute ownership” and the rule of capture.⁷⁹ The doctrine of absolute ownership as applied to water is generally attributed to the decision of an English court in the 1843 case of *Acton v. Blundell*.⁸⁰ In that case, the defendants were miners who sank pits on their land and drained groundwater away from their neighbor’s property.⁸¹ The court held that because the defendants owned the land, they also had a property interest in the underground water.⁸² The court held further that the defendants could not be held liable for damage to the neighboring well because the ways of groundwater were mysterious and unpredictable, and therefore, any rule imposing liability would interfere with resource development.⁸³ This principle of no liability is referred to as the “rule of capture.”⁸⁴

Texas adopted the rule of capture and the absolute ownership rule in 1904, citing the same reasons given in *Acton v. Blundell*.⁸⁵ Because the rule of capture provides that a landowner has a right to pump as much groundwater as she can, regardless of injury to neighboring landowners, *damnum absque injuriâ*, Texas water law is sometimes called the “law of the

77. *Katz v. Walkinshaw*, 74 P. 766, 771–72 (Cal. 1903). Adopting the doctrine of reasonable use, the court first recognized that “[n]o doubt there will be inconvenience from attacks on the title to waters appropriated for use on distant lands made by persons who claim the right to the reasonable use of such waters on their own [overlying] lands.” *Id.* Second, the court acknowledged that “[s]imilar difficulties have arisen . . . in surface streams, and must always be expected to attend claims to rights in a substance so movable as water.” *Id.*

78. *Id.*

79. *E.g.*, *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 828–29 (Tex. 2012) (absolute ownership); *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 75 (Tex. 1999) (rule of capture); CHARLES R. PORTER, *SHARING THE COMMON POOL: WATER RIGHTS IN THE EVERYDAY LIVES OF TEXANS* 40–41 (2014) (discussing absolute ownership and the rule of capture); *see Drummond et al.*, *supra* note 62, at 51.

80. *Acton v. Blundell* [1843], 152 Eng. Rep. 1223, 1223; *cf.* Jno B. Clayberg, *The Law of Percolating Waters*, 14 MICH. L. REV. 119, 119–20 (1915) (noting that some argue that the rule of absolute ownership for groundwater was decided first in *Chesmore v. Richards*, (1915) 7 HL 349 (Eng.)); Dellapenna, *supra* note 12, at 295 (arguing that the 1836 Massachusetts case of *Greenleaf v. Francis* was “[t]he first reported common-law case in which the court addressed the problem in terms recognizable as the absolute dominion doctrine”).

81. *Acton*, 152 Eng. Rep. at 1223–24.

82. *Id.*

83. *Id.* at 1228.

84. *Drummond et al.*, *supra* note 62, at 53–54 (describing the liability rules associated with the rule of capture).

85. *Houst. & T.C. Ry. Co. v. East*, 81 S.W. 279, 280–81 (Tex. 1904).

biggest pump.”⁸⁶ Texas law establishes various exceptions to the principle of no liability under the rule of capture: trespass, malicious conduct, waste, contamination, and causing land subsidence through negligent over-pumping.⁸⁷

For many years it was unclear whether Texas landowners held a compensable property interest in groundwater prior to pumping, or whether the property right in water attached only when the water was brought to the surface.⁸⁸ The Texas Supreme Court finally clarified the issue in 2012 in *Edwards Aquifer Authority v. Day*.⁸⁹ The Edwards Aquifer Authority (EAA) is a political subdivision of Texas charged with managing the groundwater resources of the Edwards Aquifer.⁹⁰ Property owners within the EAA’s jurisdiction applied for a permit to withdraw 700 acre-feet of water per year for irrigation purposes.⁹¹ EAA denied the application, but on administrative appeal, the property owners were awarded 14 acre-feet per year.⁹² The property owners sued EAA for taking their property without just compensation, as required by both federal and Texas law.⁹³ One issue raised in the suit was whether the property owners could claim a compensable right to underground water available to the owners, but not yet pumped by them.⁹⁴ The Texas Supreme Court took up the case and held that Texas landowners may assert a right to “groundwater in place,” i.e., groundwater as it sits in the aquifer prior to pumping.⁹⁵ In so doing, the *Day* court confirmed that property owners in Texas possess an inchoate, unquantified right to future groundwater supplies—essentially, a dormant, land-based right.⁹⁶

86. *Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 76 (Tex. 1999) (“The rule of capture essentially allows, with some limited exceptions, a landowner to pump as much groundwater as the landowner chooses, without liability to neighbors who claim that the pumping has depleted their wells.”); *Acton*, 152 Eng. Rep. at 1235 (describing the rule of capture as a rule allowing the surface owner to “dig therein, and apply all that is there found to his own purposes at his free will and pleasure,” and explaining the consequences of exercising that right fully, such that the owner “intercepts or drains off the water collected from underground springs in his neighbour’s well, this inconvenience to his neighbour falls within the description of *damnum absque injuriā* [(an injury without a remedy)], which cannot become the ground of an action”); Drummond et al., *supra* note 62 (citing terms of the law of capture, including the “law of the biggest pump”).

87. *E.g.*, KATHY WYTHE, TEX. WATER RES. INST., TXH20 28 (2014), http://twri.tamu.edu/media/574130/web_txh2o_summer2014.pdf (Q&A with Professor Tiffany Dowell); *Texas Water Law*, *supra* note 72 (describing five exceptions to the rule of capture).

88. *See, e.g.*, Marvin W. Jones & Andrew Little, *The Ownership of Groundwater in Texas: A Contrived Battle for State Control of Groundwater*, 61 BAYLOR L. REV. 578, 578–79 (2009).

89. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 814 (Tex. 2012).

90. *Id.* at 818.

91. *Id.* at 820.

92. *Id.* at 821.

93. *Id.*

94. *Id.* at 821–22.

95. *Id.* at 817, 832–33.

96. Unlike California, the Texas water right system does not recognize a separate category of use-based rights to groundwater. *See id.*; HUTCHINS, *supra* note 53, at 132. In other words, Texas property owners can use groundwater away from the overlying land. In some areas, use may be constrained by the rules of groundwater conservation districts, which were created in 1985 and today possess broad authority

E. Land-Based Rights to Groundwater in California

California also recognizes a land-based interest in groundwater for property owners that overlie a groundwater basin, but relative to Texas, California adopted very different rules to govern that interest.⁹⁷ In the 1903 case of *Katz v. Walkinshaw*, the California Supreme Court rejected the rule of absolute ownership in favor of the correlative rights doctrine and the rule of reasonable use.⁹⁸ Under the doctrine of correlative rights, no overlying property owner has priority over other overlying owners.⁹⁹ The rule of reasonable use, in turn, provides that property owners may pump groundwater despite injury to neighbors, as long as the use is reasonable relative to the injured use and other potential uses of the water.¹⁰⁰ Unreasonable use resulting in injury may be enjoined.¹⁰¹

California also recognizes rights in overlying owners to convey groundwater to non-overlying owners, and in non-overlying owners to pump from groundwater basins to which they have lawful access.¹⁰² However, any water used upon non-overlying lands is characterized as a use-based, appropriative right rather than a land-based right.¹⁰³ Appropriative rights attach only to surplus water, and *ab initio* do not include the right to pump during periods of non-surplus.¹⁰⁴ If appropriators pump for five years or more during overdraft, they may gain priority over unexercised overlying rights because those active appropriators are said to be invading the rights of overlying owners.¹⁰⁵ This pumping of nonsurplus water may ripen into a prescriptive right, thereby enabling appropriators to continue pumping during overdraft.¹⁰⁶ However, such prescriptive rights can be denied or limited via continued pumping by overlying owners during overdraft or in periods of no surplus, a practice referred to as self-help.¹⁰⁷

to regulate groundwater use. See TEX. WATER CODE ANN. §§ 36.001–124 (West 2008 & Supp. 2015). These districts may issue rules for conserving, protecting, recharging, and preventing waste of underground water. See *id.*

97. E.g., *City of Barstow v. Mojave Water Agency*, 5 P.3d 853, 860 (Cal. 2000).

98. *Katz v. Walkinshaw*, 74 P. 766, 771 (Cal. 1903). The rule of reasonable use adopted by *Katz* is distinct from the groundwater doctrine called “reasonable use” in other states, which itself does not adhere to reasonable use.

99. *City of Santa Maria v. Adam*, 149 Cal. Rptr. 3d 491, 502–04 (Cal. Ct. App. 2012); Wells A. Hutchins, *California Ground Water: Legal Problems*, 45 CAL. L. REV. 688, 689 (1957) (“No overlying owner has priority over any others solely because he used the water first.”).

100. *Katz*, 74 P. at 771–72.

101. *Id.*

102. *City of Santa Maria*, 149 Cal. Rptr. 3d at 501; Hutchins, *supra* note 99, at 690.

103. Hutchins, *supra* note 99, at 690. In addition, use of overlying groundwater for municipal purposes is deemed appropriative rather than land-based. *City of San Bernardino v. City of Riverside*, 198 P. 784, 791–92 (Cal. 1921).

104. *City of Santa Maria*, 149 Cal. Rptr. 3d at 502.

105. *Id.* at 511–12.

106. *Id.* at 511–13.

107. *Id.* at 517.

As a result of the rules developed for overlying (land-based) and appropriative (use-based) property owners, the general legal scheme for priority rules in California are as follows: first, overlying rights have equal priority; second, overlying rights are senior to all appropriative rights; and third, as between appropriators, the rule of priority applies. The priority of overlying dormant rights exists as a result of the second rule, plus the fact that overlying owners do not lose the right to pump water for lack of use. This means that an overlying owner can initiate new pumping at any time, even if there is injury to appropriators.¹⁰⁸ To take an extreme example, an appropriator might have been pumping for 100 years, and if a neighboring property owner overlying the basin decides to plant orchards on the overlying land, the overlying owner can displace the appropriator even, theoretically, to the point of taking all of the underground supply from the appropriator.

This formalistic outcome is often modified in practice by the ability of appropriative rights holders to gain prescriptive rights over dormant overlying rights, and these prescriptive rights may be quantified during adjudication.¹⁰⁹ Yet prescriptive rights and adjudication do not entirely resolve the issue of dormant rights to groundwater for several reasons. First, with luck, California's Sustainable Groundwater Management Act of 2014 (SGMA) will lead to quantitative, data-driven management at the local level without the need for adjudication.¹¹⁰ Such management efforts will require addressing dormant rights.¹¹¹ Second, even in adjudication, appropriators may not be able to establish all elements of prescription under specific facts.¹¹² Finally, the existence of overdraft is not a necessary precondition to adjudication; as a result, adjudication will not always result in extinguishment of dormant land-based rights to groundwater through prescription.¹¹³ Thus, the challenge of dormant rights remains.

III. DISCUSSION

A. *Quantification of Land-Based Rights: The Ongoing California Saga*

As demand for water has increased, the trend toward quantification of dormant land-based rights has increased as well. Many eastern states transitioned their land-based rights to permitting systems.¹¹⁴ Of the western

108. *Wright v. Goleta Water Dist.*, 219 Cal. Rptr. 740, 742 (Cal. Ct. App. 1985).

109. *See id.* at 747. Not all adjudications result in quantification. *See* Steve Saxton, *The Seaside Basin Case: Adjudication Grows Up*, 191 CAL. WATER L. & POL'Y REP. (2006).

110. *See* Sustainable Groundwater Management Act, CAL. WATER CODE §§ 10720–37.8 (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.).

111. *See id.*

112. *See id.*

113. *City of Santa Maria v. Adam*, 149 Cal. Rptr. 3d 491, 502 (Cal. Ct. App. 2012).

114. Joseph W. Dellapenna, *The Evolution of Riparianism in the United States*, 95 MARQ. L. REV. 53, 85 (2011) (“The process of modifying or abandoning traditional riparian rights continues today, with

states that have retained land-based doctrines, many tend to ultimately modify their rules to incorporate more aspects of a use-based system.¹¹⁵ This is due to both physical and economic factors.¹¹⁶ However, in important agriculture states such as California and Texas,¹¹⁷ some courts—and a great deal of rhetoric—have thus far held fast to the concept of inviolable dormant pumping rights.¹¹⁸

The California Supreme Court addressed the issue of dormant land-based rights in *Tulare Irrigation District v. Lindsay-Strathmore Irrigation District*.¹¹⁹ In that case, one irrigation district sought to quiet title to water rights against another irrigation district in the water-scarce Kaweah Delta.¹²⁰ While emphasizing the need to quantify water rights in arid California, the *Tulare* court nonetheless held that inchoate rights to water could not be limited by establishing quantities in the present.¹²¹ The court reasoned that by fixing a definite quantity, the land-based right would lose a fundamental, definitional element, the loss of which would transform the right into an (implicitly less desirable) appropriative right.¹²² The court explained that to protect the essential value of land-based rights, a trial court should declare the future water associated with riparian rights senior to any and all appropriative rights, and retain jurisdiction so that the court could supervise any new exercise of land-based rights in the future.¹²³

The rule of *Tulare* was subsequently altered in part by the California legislature, at least as the rule applies to surface water. At the time *Tulare* was decided, controversies over water were typically brought to the court in

many eastern states abandoning classic riparian rights in favor of a new permit system that is based on riparian, rather than appropriative, principles.”)

115. Hutchins & Steele, *supra* note 2, at 299–300. See generally Joseph W. Dellapenna, *Riparian Rights in the West*, 43 OKLA. L. REV. 51, 59–70 (1990) (discussing the theory of a dual system of water rights in western states).

116. See Hutchins & Steele, *supra* note 2, at 299–300. See generally Dellapenna, *supra* note 115.

117. *Farm Income and Wealth Statistics*, USDA, <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/cash-receipts-by-commodity-state-ranking.aspx> (last updated Feb. 9, 2016). In 2014, the top ten agricultural producing states in terms of cash receipts were the following (in descending order): California, Iowa, Nebraska, Texas, Illinois, Minnesota, Kansas, North Carolina, Indiana, and Wisconsin. *Id.*

118. See *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 152–53 (Tex. App.—San Antonio 2013, pet. denied) (holding that a property owner was entitled to “unlimited” pumping from the Edwards Aquifer); Gies, *supra* note 3; Meckler, *supra* note 6; Jim Nielsen, *California Seeks to Take Farm Water Rights*, SF GATE (Aug. 27, 2014, 5:14 PM), <http://www.sfgate.com/opinion/openforum/article/California-seeks-to-take-farm-water-rights-5716603.php>; Allen Young, *Farmers Fight Drought-Inspired Regulation of Groundwater Pumping*, SACRAMENTO BUS. J. (July 18, 2014, 7:06 AM), <http://www.bizjournals.com/sacramento/news/2014/07/18/farmers-fight-drought-inspired-regulation-of.html>.

119. *Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist.*, 45 P.2d 972, 975 (Cal. 1935).

120. *Id.*

121. *Id.* at 986.

122. *Id.* (explaining that the quantity for future riparian uses “cannot be fixed in amount until the need for such use arises”); see also *Seneca Consol. Gold Mines Co. v. Great W. Power Co.*, 287 P. 93, 98 (Cal. 1930) (“The moment a right in a natural stream is specifically defined in a concrete inflexible amount, at that moment the right becomes one of priority and not riparian.”).

123. *Tulare Irr. Dist.*, 45 P.2d at 986.

the form of private lawsuits between individual water users.¹²⁴ Such litigation can only bind the parties involved in a suit; given the physical reality of water as a shared resource, third parties not bound by a ruling could upset whatever balance had been struck in court.¹²⁵ Bringing every third party into court one-by-one as conflicts arose would be overly expensive and demand excessive space on courts' dockets.¹²⁶ To address this issue, in 1943, California added provisions to the Water Code authorizing the state's regulatory body for water rights—now the California State Water Resources Control Board (SWRCB)—to conduct a comprehensive adjudication of all rights to a river or stream system.¹²⁷ The Water Code provisions contain extensive notice procedures to ensure that all property owners have the opportunity to participate.¹²⁸ In issuing a final decree, the agency is required to “define the right[s]” by confirming, among other elements, quantities for all rights on the system.¹²⁹ Once the agency issues a final decree, it is binding on all water right holders, and future claimants are estopped from asserting rights not adjudicated.¹³⁰

1. *California's Long Valley Decision*

The question of how these adjudication provisions would affect dormant rights rose to the surface in California's Sierra Valley in *Rowland v. Ramelli (In Re Waters of Long Valley Creek Stream System)*.¹³¹ In that case, long-running conflicts in several counties resulted in a comprehensive stream adjudication at the SWRCB pursuant to the above-described Water Code provisions.¹³² An unhappy landowner appealed the decision, in part challenging the SWRCB's authority to quantify the dormant elements of his land-based right.¹³³

124. *Rowland v. Ramelli (In re Waters of Long Valley Creek Stream Sys.)*, 599 P.2d 656, 660–61 (Cal. 1979).

125. *Id.*

126. *See Meridian, Ltd. v. City of San Francisco*, 90 P.2d 537, 553 (Cal. 1939) (“This method of resolving controversies involving the rights of the users of water on the river is necessarily piecemeal, unduly expensive and obviously unsatisfactory.”).

127. *See* CAL. WATER CODE § 2525 (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.).

128. *Id.* §§ 2526–29.

129. *Id.* § 2769.

The decree shall in every case declare as to the water right adjudged to each party, the priority, amount, season of use, purpose of use, point of diversion, and place of use of the water; and as to water used for irrigation, the decree shall also declare the specific tracts of land to which it is appurtenant, together with such other factors as may be necessary to define the right.

Id.

130. *Id.* §§ 2773–74. Decrees issued by the SWRCB in stream system adjudications are appealable to the California courts. *Id.* § 2771.

131. *Rowland v. Ramelli (In re Waters of Long Valley Creek Stream Sys.)*, 599 P.2d 656, 658–59 (Cal. 1979).

132. *Id.* at 659.

133. *Id.* at 660.

On appeal, the *Long Valley* court sided with the SWRCB.¹³⁴ The court held that quantification of dormant rights is required to fulfill the legislature's purpose in enacting the stream adjudication provisions, namely, sustainable management of the water resource.¹³⁵ The court did caution that under constitutional standards, courts must protect the land-based right from total extinguishment, i.e., a court cannot simply declare that a water right no longer exists.¹³⁶ Courts must protect land-based water rights as property rights consistent with constitutional principles.¹³⁷ However, the court upheld the power of the SWRCB to take actions that limit or alter dormant land-based water rights by fixing the nature, scope, and extent of those rights, as long as the change does not equate to total extinguishment.¹³⁸ The court explained that in areas of scarce water resources, such as in arid California, it is not reasonable to allow undefined and unlimited rights when they can be integrated without destroying the entire property right.¹³⁹ The court explained its divergence from *Tulare* and similar cases by reasoning that there is a difference between piecemeal private adjudication and a comprehensive statutory adjudication; whereas the former cannot guarantee due process to a land-based right holder, the statutory adjudication procedures were specifically designed to provide all required due process via extensive notice, hearing, and other procedures.¹⁴⁰

As a result of *Long Valley*, California courts may approve a decree that limits the nature, scope, and extent of unexercised riparian rights to surface water without violating the takings clause.¹⁴¹ However, as described below, this rule has not yet been applied to groundwater.

2. *The Goleta Court Declines to Apply Long Valley to Groundwater*

After *Long Valley*, the question naturally arose, could dormant land-based rights to groundwater also be limited? The courts had already recognized that land-based rights to groundwater are analogous to land-based rights to surface water, and that generally the same principles should apply.¹⁴² The dormant-right question was raised before California's Second District Court of Appeal in *Wright v. Goleta Water District*.¹⁴³ This case pitted

134. *Id.*

135. *Id.* at 660–61, 665–66.

136. *Id.* at 665.

137. *Id.*

138. *Id.*

139. *Id.* at 664–66.

140. *Id.*; *cf.* *Meridian, Ltd. v. City of San Francisco*, 90 P.2d 537, 553 (Cal. 1939) (“[The case-by-case] method of resolving controversies involving the rights of the users of water on the river is necessarily piecemeal, unduly expensive and obviously unsatisfactory.”).

141. *See In re Long Valley*, 599 P.2d at 669.

142. *See Wright v. Goleta Water Dist.*, 219 Cal. Rptr. 740, 749 (Cal. Ct. App. 1985).

143. *Id.* at 743.

landowners claiming senior rights to groundwater against a special district water supplier.¹⁴⁴ The overlying landowners brought the action against the water district to determine their relative rights to water in the basin; the defendant water district cross-complained against other land-based and use-based water right holders, seeking a determination of the basin's safe yield and a decree designed to avoid overdraft.¹⁴⁵ The trial court determined that the existing, exercised rights of the water district and others were senior to dormant rights of certain land-based claimants, and allocated prospective rights based on these priority determinations.¹⁴⁶

On appeal, the court reversed this determination.¹⁴⁷ The appellate court held that, although the SWRCB may adjust priorities for dormant land-based rights, this authority does not exist when there are insufficient protections for property right holders.¹⁴⁸ The court noted that the comprehensive stream adjudication procedures were carefully designed to include certain notice and other requirements to ensure adequate due process to water right holders, and that without those standards, a lawsuit could not bind nonparticipating property owners.¹⁴⁹ However, the court left open the possibility that a comprehensive procedure could be designed for groundwater that would provide the same kind of protections that are afforded to surface water users by the Water Code.¹⁵⁰

This potential was subsequently discussed with approval by the California Supreme Court in *City of Barstow v. Mojave Water Agency*.¹⁵¹ In *Mojave*, the court considered whether water could be allocated in litigation according to equitable principles rather than priority.¹⁵² The court held that when fashioning a solution to oversubscription of a water system, a decree may adjust, but may not wholly disregard, water right priorities.¹⁵³ In so holding, the court described *Wright*, noting that *Wright* protects dormant rights, and again signaled the importance of the property right in priority.¹⁵⁴ However, in a much-perused footnote, the court mused in dicta that a trial court could conceivably apply the *Long Valley* principles to groundwater if land-based right holders were afforded the same due process protections provided by the stream adjudication provisions of the Water Code.¹⁵⁵ The court noted that to fulfill the quest to “harmonize water shortages with a fair

144. *Id.*

145. *Id.*

146. *Id.*

147. *Id.* at 750.

148. *Id.* at 749–50.

149. *Id.*

150. *Id.*

151. *City of Barstow v. Mojave Water Agency*, 5 P.3d 853, 862–63 (Cal. 2000).

152. *Id.* at 858.

153. *Id.* at 869.

154. *Id.* (citing *Wright*, 219 Cal. Rptr. at 743, 745).

155. *Id.* at 868 n.13.

allocation of future use,” courts should have some ability to limit future groundwater use by a land-based right holder.¹⁵⁶

3. *California’s Sustainable Groundwater Management Act and Dormant Groundwater Rights*

Although California’s failure to manage groundwater basins comprehensively has been harshly criticized for a long time, reform has been slow. Concern over the state’s dwindling groundwater resources heightened between 2007–2014, when the state struggled through an eight-year period of nearly continuous drought; over that period, the anxieties of long-term drought and the specter of failing groundwater basins awakened a new political will.¹⁵⁷ Previously unknown coalitions emerged ready to support a new approach to groundwater management, and in 2014 this creative energy resulted in the passage of the Sustainable Groundwater Management Act (SGMA).¹⁵⁸

SGMA is designed to achieve a sustainable allocation of groundwater in heavily pumped basins by empowering locals to create their own solutions, continuing California’s long tradition of local management of groundwater resources.¹⁵⁹ SGMA establishes that the state will not step in unless and until local agencies fail to meet certain planning requirements or fail to achieve sustainability.¹⁶⁰ The Act requires the creation of new local entities, called

156. *Id.*

If Californians expect to harmonize water shortages with a fair allocation of future use, courts should have some discretion to limit the future groundwater use of an overlying owner who has exercised the water right and to reduce to a reasonable level the amount the overlying user takes from an overdrafted basin.

Id.

157. Tina Cannon Leahy, *Desperate Times Call for Sensible Measures: The Making of the California Sustainable Groundwater Management Act*, 9 GOLDEN GATE U. ENVTL. L.J. 5, 5–6 (2015); *Groundwater Problems and Prospects, Part 2: The Story Behind the Passage of the Sustainable Groundwater Management Act*, MAVEN’S NOTEBOOK (Mar. 19, 2015), <http://mavensnotebook.com/2015/03/19/groundwater-problems-and-prospects-part-2-the-story-behind-the-passage-of-the-sustainable-groundwater-management-act/>.

158. CAL. WATER CODE § 10720 (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.).

159. *Id.* § 10720.1(b) (“In enacting this part, it is the intent of the Legislature to . . . enhance local management of groundwater consistent with rights to use or store groundwater and Section 2 of Article X of the California Constitution.”); *id.* § 10720.1(d) (“To provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater.”); *id.* § 10720.1(h) (“To manage groundwater basins through the actions of local governmental agencies to the greatest extent feasible, while minimizing state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner.”); *see also* *City of Santa Maria v. Adam*, 149 Cal. Rptr. 3d 491, 501 (Cal. Ct. App. 2012) (“There is no statewide system for allocating rights in groundwater. The Legislature has left that to local government or, as here, to adjudication by the courts.” (citing *O.W.L. Found. v. City of Rohnert Park*, 86 Cal. Rptr. 3d 1, 14–15 (Cal. Ct. App. 2008))).

160. CAL. WATER § 10735.4(c) (stating that the SWRCB) may develop interim plan if local agency has not addressed deficiency resulting in probationary status); *id.* § 10735.8 (stating that the SWRCB has

groundwater sustainability agencies, which will have the power and the obligation to identify water sustainability objectives for their own groundwater basin and to adopt a management plan designed to achieve those objectives.¹⁶¹ The objectives must avoid certain undesirable conditions such as seawater intrusion and subsidence, and SGMA terms the absence of those conditions “sustainable yield.”¹⁶² Sustainable yield is defined similarly to the common law “safe yield” standard.¹⁶³

SGMA as originally enacted did not address the problem left open by *Goleta* and *Mojave*, i.e., whether courts can limit dormant land-based rights to groundwater.¹⁶⁴ This omission was addressed the following year by Assembly Bill (AB) 1390, a bill that created comprehensive groundwater adjudication procedures by amending the state’s Code of Civil Procedure.¹⁶⁵ Signed by Governor Jerry Brown on October 9, 2015, AB 1390 stated that courts should interpret the new provision as adding “notice and due process sufficient to enable a court in a comprehensive adjudication conducted pursuant to this chapter to determine and establish the priority for unexercised water rights. The court may consider applying the principles established in *In re Waters of Long Valley Creek Stream System* (1979) 25 Cal.3d 339.”¹⁶⁶ The bill acknowledged that this provision, unlike other aspects of the bill, may be interpreted to alter groundwater law.¹⁶⁷ By providing these protective due process procedures, AB 1390 attempts to fix the problem identified by the *Goleta* court so that courts can quantify land-based rights to groundwater, including dormant rights.

AB 1390 makes this suggestion only with respect to adjudication, and does not address whether groundwater sustainability agencies can likewise limit dormant land-based rights as they attempt to limit pumping to safe yield

authority to adopt interim plans and the content of the plans); *id.* § 10735.8(g)(1) (stating that the SWRCB may determine whether sustainability plan will achieve sustainable yield).

161. *Id.* § 10721(j) (groundwater sustainability agencies (GSAs)); *id.* §§ 10725–26.9 (powers and authorities of GSAs); *id.* § 10721(k) (groundwater sustainability plans (GSPs)); *id.* §§ 1027–728.6 (GSPs).

162. *Id.* § 10721(w) (sustainable yield); *id.* § 10721(x) (undesirable results).

163. See Alfred Smith, *Water Rules: California’s Sustainable Groundwater Management Act Provides a Comprehensive Set of Tools for Local Agencies to Implement Groundwater Management Plans*, 37 L.A. LAW., Feb. 2015, at 18, 23 (referencing the connection between SGMA and common-law safe yield standards). Compare CAL. WATER § 10721(w) (sustainable yield), and *id.* § 10721(x) (undesirable results), with CAL. DEP’T OF WATER RES., GROUND WATER BASINS IN CALIFORNIA: A REPORT TO THE LEGISLATURE IN RESPONSE TO WATER CODE SECTION 12924 60 (1980), http://www.water.ca.gov/pubs/groundwater/bulletin_118/ground_water_basins_in_california_bulletin_118-80_b118_80_ground_water_ocr.pdf (describing safe yield as “the maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect”). Cf. Leahy, *supra* note 157, at 35 & n.176 (concluding that both standards were ambiguous pre-SGMA).

164. See *City of Barstow v. Mojave Water Agency*, 5 P.3d 853 (Cal. 2000); *Wright v. Goleta Water Dist.*, 219 Cal. Rptr. 740 (Cal. Ct. App. 1985).

165. 2015 Cal. Legis. Serv. Ch. 672 (AB 1390) (West) (codified at CAL. CIV. PROC. CODE § 830).

166. CAL. CIV. PROC. CODE § 830(b)(7) (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.).

167. *Id.*

under SGMA.¹⁶⁸ That issue remains to be addressed either in future legislation or on a case-by-case basis during the SGMA process.

B. Quantification of Dormant Rights Is Necessary to Protect the Common Pool Resource of Groundwater

In business circles there is a saying that “you can’t manage what you don’t measure,” an adage that has been embraced by groundwater management advocates in California.¹⁶⁹ Along these lines, the California Supreme Court in *Long Valley* recognized that in the surface water context, dormant rights create “pernicious effects” and inhibit planning that would protect the public interest.¹⁷⁰ Scientists and policy experts likewise recognize that quantification is necessary to ensure the continued viability of heavily pumped groundwater basins.¹⁷¹ In fact, accurate data and quantitative management have been identified as basic requirements for sustainable human use of a common pool resource.¹⁷² More specifically, studies demonstrate that successful groundwater management requires quantitative standards for groundwater levels and individual pumping, combined with monitoring and enforcement.¹⁷³ In one example, experts specifically attributed management success to quantification; in that case, pumping limits were assigned to all rights in a court adjudication, and post-judgment the parties were required to report annual pumping to each other in an open and public process.¹⁷⁴ This framework provided protection against excess pumping by any individual property owner, which in turn protected everyone’s property interests in the common pool of groundwater.¹⁷⁵ The key was that everyone knew how much the other was allowed to pump, and that total pumping was set at a level that would quantitatively protect the core groundwater resource from depletion.¹⁷⁶

In California, it might be argued that there is no need to quantify dormant rights because, when overlying owners are ready to exercise their

168. 2015 Cal. Legis. Serv. Ch. 672 (AB 1390) (West).

169. See Anna North, *California’s Big Groundwater Problem*, N.Y. TIMES: TAKING NOTE (July 22, 2015, 2:43 PM), http://takingnote.blogs.nytimes.com/2015/07/22/californias-big-groundwater-problem/?_r=0. The concept is often said to originate with management guru Peter Drucker, who allegedly said, “If you can’t measure it, you can’t manage it,” although the Drucker Institute maintains that he “never actually said it.” Paul Zak, *Measurement Myopia*, DRUCKER INST. (July 4, 2013), <http://www.druckerinstitute.com/2013/07/measurement-myopia/>.

170. *Rowland v. Ramelli (In re Waters of Long Valley Creek Stream Sys.)*, 599 P.2d 656, 661 (Cal. 1979).

171. See GRAY ET AL., *supra* note 4 (recommending quantification of groundwater rights as one of the top reforms needed to ensure sustainable groundwater).

172. Ostrom, *supra* note 22.

173. OSTROM, *supra* note 20.

174. *Id.*

175. *Id.*

176. *Id.*

rights, the priority system dictates that those land-based uses will simply displace lower priority appropriators.¹⁷⁷ This argument ignores important factors. First, in reality, later uses do not typically supplant existing uses; new uses are simply added to existing uses, thus increasing the total demand on the basin and paving the way toward overdraft. Second, once a groundwater basin is in overdraft, existing uses may legally supplant unexercised groundwater rights under the doctrine of prescription.¹⁷⁸ In this regard, quantification of dormant rights can help protect those rights by allowing landowners to take steps to avoid prescription by appropriative users, and by correcting the “pernicious effect” that uncertainty about future pumping has on groundwater management.¹⁷⁹

C. Beyond Reasonable Use: Inherent Limits on Private Property Rights in Common Pool, Depletable Resources

Because the *Long Valley* court cloaked its decision to quantify dormant water rights in the authority of the reasonable use doctrine, the analysis does not, of course, apply in a nonreasonable use jurisdiction such as Texas.¹⁸⁰ However, this Article proposes that the *Long Valley* reasoning is not exclusive; there is another principle leading to the same outcome, and this principle applies in all jurisdictions. This more broadly applicable principle has two components:

- (1) As a matter of physical reality, there is an inherent limit on the quantity of distributable private property rights in a common pool depletable resource.¹⁸¹
- (2) There is no property right to deplete a common pool resource beyond recovery.¹⁸²

Under the foregoing, limits on property rights are defined by the nature of the property itself as a common pool, depletable resource.¹⁸³ In an overdrafted or nearly overdrafted basin, unquantified dormant rights are inconsistent with these limits.¹⁸⁴ This Article proposes that honoring these limits requires quantification of dormant land-based rights, particularly in heavily pumped basins, based on the following principles:

177. *Rowland v. Ramelli (In re Waters of Long Valley Creek Stream Sys.)*, 599 P.2d 656, 664 (Cal. 1979).

178. *Id.* at 663 n.6.

179. *Id.* at 662 (describing the negative effects of uncertainty); GRAY ET AL., *supra* note 4 (explaining that quantification is critical to protecting groundwater).

180. *See In re Long Valley*, 599 P.2d at 665.

181. *See* GRAY ET AL., *supra* note 4; Ostrom, *supra* note 22.

182. *See* Dellapenna, *supra* note 12.

183. *See* GRAY ET AL., *supra* note 4; Ostrom, *supra* note 22.

184. *See* GRAY ET AL., *supra* note 4; Ostrom, *supra* note 22.

First, available rights are limited by the capacity of the resource.¹⁸⁵ The following example illustrates this concept. Assume that several people hold individual rights to a blueberry pie. The scope of each individual's initial rights is defined by the size of their slice, and the cumulative rights are necessarily fixed by the size of the pie. Although their individual slices may not be equal, the cumulative value of their rights cannot exceed the amount of pie available. If the pie is smaller, at least some shares must get proportionally smaller.

Second, the property right itself includes an inherent duty to use the resource so as not to damage the renewability of the resource.¹⁸⁶ Here we must part from the pie example—after all, who wouldn't want to eat an entire blueberry pie? But groundwater is property of a different kind, and that makes all the difference. Groundwater is a common pool, depletable resource that is critical to human health and safety, environmental and economic viability, and quality of life.¹⁸⁷ For this reason, if not for others, each individual property right in the common pool resource is impressed with an inherent obligation to protect the sustainability of the resource against destruction.¹⁸⁸ As explored below, this inherent obligation is arguably already reflected in existing principles within the general law of property as well as within concepts specific to water law, including the absence of a right to destroy common pool resources, the broadly recognized prohibition against the waste of water, the public trust doctrine, and the sovereign ability to regulate property by way of the police power.

I. No Right to Destroy

The right to destroy, or *jus abutendi*, is commonly listed among the sticks in the bundle of property rights.¹⁸⁹ Some scholars take the position that *jus abutendi* has not received much treatment in the law beyond its classical origins and is increasingly treated with hostility in contemporary society.¹⁹⁰ Others maintain that the right clearly exists in, and is integrated into,

185. Griggs, *supra* note 10 (“Candor thus compels us to reconsider the groundwater right itself: in obedience to the actual hydrological bases upon which the right depends, in accordance with its actual rather than perceived legal status . . .”); Fennell, *supra* note 26, at 13 (discussing how the attributes of a resource influence property rights).

186. See GRAY ET AL., *supra* note 4.

187. See Fennell, *supra* note 26, at 13.

188. *Id.*

189. See, e.g., Clifford W. Schulz & Gregory S. Weber, *Changing Judicial Attitudes Towards Property Rights in California Water Resources: From Vested Rights to Utilitarian Reallocations*, 19 PAC. L.J. 1031, 1035 n.13 (1988) (identifying the fundamental attributes of property as *jus possidendi*, *jus prohibendi*, *jus utendi*, *jus fruendi*, *jus abutendi*, and *jus disponendi* (citing Roscoe Pound, *The Changing Role of Property in American Jurisprudence*, 12 UNIV. CHI. CONF. 31, 33–34 (1953))).

190. Lior Jacob Strahilevitz, *The Right to Destroy*, 114 YALE L.J. 781, 786 (2005) (“In the twentieth century, the right to destroy fell out of favor, and the most recent literature has argued that such a right, if it exists at all, should be substantially circumscribed on public policy grounds.”).

contemporary society, albeit with limits and boundaries.¹⁹¹ Despite their differences, these scholars agree that when the right does exist, it likely attaches to those forms of property that have a certain degree of common value such as works of art, historical properties, cultural resources, and, notably, land and natural resources.¹⁹²

It appears that the concept of *jus abutendi* has not been explored in any significant way in the context of depletable, common pool resources like groundwater.¹⁹³ Yet the logic applies: if the right to destroy personal property that has substantial common value is limited, then, rationally, the right of an individual to destroy common resources should also be similarly limited. This notion should be particularly true when the resource is, like groundwater, not only economically and environmentally valuable, but also necessary for communal health and safety.

2. *Prohibition Against Waste of Water*

The idea that common pool rights are inherently limited commensurate with the capacity of that common pool is arguably already enshrined in prohibitions against waste of water found in common law, statutory, and constitutional authorities.¹⁹⁴ Historically, waste has been defined as use in excess of need and/or use divergent from social norms.¹⁹⁵ Judicial and agency findings of waste typically involve a context-specific analysis, depending on variables such as water availability, competing demands, and custom.¹⁹⁶ To date, waste is largely a forgiving concept that does not attempt to force technology or substantially alter the status quo, allowing “a wide range of acceptable conduct” and censoring only the most egregious actions.¹⁹⁷

And yet—despite the “low expectations” associated with the waste doctrine—a prohibition against waste must, if it is to mean anything, impose an expectation that a resource cannot be mined to nothingness. Surely

191. JOHN G. SPRANKLING, *THE INTERNATIONAL LAW OF PROPERTY* 293–304 (2014).

192. *Id.* at 302–04 (describing limits on the right to destroy land and natural resources); see Strahilevitz, *supra* note 190.

193. Compare Schulz & Weber, *supra* note 189 (discussing the concept of *jus abutendi*), with OSTROM, *supra* note 20 and accompanying sources (discussing groundwater as a common pool resource without reference to *jus abutendi*).

194. *E.g.*, State Dep’t of Ecology v. Grimes, 852 P.2d 1044, 1051 (Wash. 1993) (en banc) (“From an early date, courts announced the rule that no appropriation of water was valid where the water simply went to waste.”).

195. Tulare Irr. Dist. v. Lindsay-Strathmore Irr. Dist., 45 P.2d 972, 975 (Cal. 1935) (holding that flooding fields in winter to kill gophers is a waste of water); Neuman, *supra* note 47, at 933 (“[W]aste can be legally defined as the amount of flow diverted in excess of reasonable needs under customary practices.” (quoting Steven J. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 491 (1982))).

196. Neuman, *supra* note 47, at 933.

197. *Id.* at 940.

complete destruction must equate to waste, at least absent a social agreement to destroy that resource.¹⁹⁸ Likewise, because the waste doctrine protects water resources against (at least some) individual acts of excessive use, then logically the doctrine must protect the resource against the biggest hit of all, i.e., destruction of the resource. If, for example, flooding fields to kill gophers is a waste of water because it renders water unavailable for others, then the destruction represented by allowing groundwater to be pumped until the resource cannot be recovered should also be waste.¹⁹⁹

Although judicial decisions do not reflect a strong or assertive waste doctrine, this does not necessarily mean that the principles of waste are weak or that a strong doctrine does not or cannot exist.²⁰⁰ The concept of waste is evolving in the public sphere as science progresses and cultural policies integrate notions of intergenerational equity.²⁰¹ Statutes, regulations, ordinances, and other authorities establishing policies for water use regularly declare sustainability and the preservation of a resource for future generations to be a core principle; these pronouncements underscore a connection between the doctrine of waste and long-term preservation of common pool water resources.²⁰² From this perspective, it appears that courts may not be the primary forum for evolution of the doctrine, and therefore one would not necessarily expect to see the concept evolve in that forum—or, at least, the next stage of evolution may not have yet reached the courts.²⁰³

3. Public Trust

The public trust doctrine is another potential manifestation of a prohibition against destruction of a common pool resource.²⁰⁴ The public trust doctrine posits that certain natural resources are held in common by the people, and that thus there is a duty to make careful choices about the use of those resources for the benefit of present and future generations.²⁰⁵ Although there are varying theories about the origin of the public trust doctrine, it is

198. *Id.* at 933–49.

199. *See Tulare Irr. Dist.*, 45 P.2d at 1006–07.

200. *See, e.g.,* Neuman, *supra* note 47, at 940.

201. *See* Rhett B. Larson, *The New Right in Water*, 70 WASH. & LEE L. REV. 2181, 2231 (2013) (connecting waste of water resources associated with water being withdrawn faster than natural replenishment to impacts on human health and intergenerational equity). *See generally* Edith Brown Weiss, *In Fairness to Future Generations and Sustainable Development*, 8 AM. U. J. INT'L L. & POL'Y 19 (1992) (describing the concept of intergenerational equity and sustainability in the context of natural resources).

202. *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 831 (Tex. 2012) (stating that “regulation must take into account not only historical usage but future needs”).

203. *See* Larson, *supra* note 201, at 2230–32.

204. *See* MICHAEL C. BLUMM & MARY CHRISTINA WOOD, *THE PUBLIC TRUST DOCTRINE IN ENVIRONMENTAL AND NATURAL RESOURCES LAW* 4 (Carolina Acad. Press 2013).

205. *See id.* (“The [public trust doctrine] requires governmental trustees to manage the resources that are in the corpus of the trust as a long-term steward for the benefit of both present and future generations.”).

often said that the principle traces to ancient Roman law, under which the sovereign had a duty to protect common natural resources including the air, sea, and seashores.²⁰⁶ The scope of the public trust doctrine as applied to water resources is determined separately by each U.S. state according to their individual law and priorities;²⁰⁷ each state independently determines which environmental resources and values are protected by the doctrine.²⁰⁸

In California, the public trust doctrine has been interpreted to protect the beds and banks of navigable and tidally influenced waters acquired under the equal footing doctrine.²⁰⁹ The scope of the doctrine in California is based on the idea that the public trust is inherently part of the title to federal lands, that Congress conveyed title to all public lands within each state to each state that entered the Union, and that this title as conveyed was impressed with the public trust obligation.²¹⁰ As a result, the public trust doctrine may be powerful where it applies but, at least in the California water context, appears to be limited in application to activities that directly or indirectly affect navigable and tidally influenced waters.²¹¹

Ongoing litigation in California raises the question whether groundwater pumping that impacts a navigable surface water, the Scott River, is within the scope of the public trust doctrine; an early decision by a superior court has held that the doctrine applies.²¹² In so holding, the superior court invokes the causal connection between groundwater pumping and surface water impacts as the basis for its application of the doctrine to groundwater.²¹³ This reasoning is based on the seminal California Supreme Court decision applying the public trust to water resources, *National Audubon Society v. Superior Court*, which held that non-navigable waters are within the scope of the doctrine when diversion of those waters affect navigable waters impressed with the trust.²¹⁴ Notably, under the *National Audubon* analysis, the public trust doctrine does not apply absent an impact

206. *Nat'l Audubon Soc'y v. Superior Court*, 658 P.2d 709, 718 (Cal. 1983) (“By the law of nature these things are common to mankind—the air, running water, the sea and consequently the shores of the sea.” (quoting Institutes of Justinian 2.1.1)); Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 475–84 (1970).

207. *PPL Mon., LLC v. Montana*, 132 S. Ct. 1215, 1234–35 (2012).

208. *Id.*; Robin Kundis Craig, *A Comparative Guide to the Eastern Public Trust Doctrines: Classifications of States, Property Rights, and State Summaries*, 16 PENN. ST. ENVTL. L. REV. 1, 4 (2007); Robin Kundis Craig, *A Comparative Guide to the Western States' Public Trust Doctrines: Public Values, Private Rights, and the Evolution Toward an Ecological Public Trust*, 37 ECOLOGY L.Q. 53, 56 (2010).

209. *Nat'l Audubon Soc'y*, 658 P.2d at 709.

210. *Id.*

211. *Id.* But see Dave Owen, *The Mono Lake Case, the Public Trust Doctrine, and the Administrative State*, 45 U.C. DAVIS L. REV. 1099, 1122–35 (2012) (concluding that the public trust doctrine has not independently affected the outcome of environmental conflicts).

212. *Env'tl. Law Found. v. State Water Res. Control Bd.*, No. 34-2010-80000583, 2014 WL 8843074, at *7–10 (Cal. Super. Ct. July 15, 2014).

213. *Id.* at *8–9.

214. *Nat'l Audubon Soc'y*, 658 P.2d at 720–21.

on navigable waters.²¹⁵ As of this writing, the Scott River litigation raising the issue of application of the trust to groundwater is still pending in superior court.²¹⁶ If the court's determination and reasoning are upheld on appeal, which seems likely (both the appeal and the upholding), then the outcome will be that at least certain groundwater basins—basins in which pumping affects navigable surface water—would be subject to public trust protections.²¹⁷ However, basins lacking such connection would not be subject to the doctrine, at least absent legislative or judicial expansion.²¹⁸

The public trust doctrine also applies to navigable waters in Texas.²¹⁹ In this regard, although it is clear that Texas has the power to regulate groundwater that is held in private ownership,²²⁰ Texas courts have not addressed the application of the public trust to groundwater that is hydrologically connected to surface water.²²¹ In this and other contexts, the scope of the public trust doctrine's application to natural resources in Texas is still being explored.²²²

Some scholars argue for a broader conception of the public trust doctrine, one that would apply the doctrine to every exercise of the government's sovereign power over natural resources, not just navigable and tidally influenced resources.²²³ Others argue that application of the doctrine does not depend on title, and that it is instead a function of the sovereign's duty to protect the common resources of the people.²²⁴ There are a few court decisions along these lines: In California, one appellate court held that the doctrine applied to birds.²²⁵ In Texas, a district court held that the doctrine

215. *Id.*

216. *See id.*

217. *See id.*

218. *See id.*

219. *See* TEX. WATER CODE ANN. § 11.021 (West, Westlaw through 2015 Reg. Legis. Sess.) (“The water of the ordinary flow, underflow, and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, floodwater, and rainwater of every river, natural stream, canyon, ravine, depression, and watershed in the state is the property of the state.”); *id.* § 11.0235 (“The waters of the state are held in trust for the public, and the right to use state water may be appropriated only as expressly authorized by law.”); *see also* *Cummins v. Travis Cty. Water Control & Improvement Dist. No. 17*, 175 S.W.3d 34, 49 (Tex. App.—Austin 2005, pet. denied) (holding that Texas Water Code § 11.021 supports application of the public trust doctrine to navigable waters in Texas).

220. *See* TEX. WATER § 11.021.

221. *See id.*

222. *See* *Bonser-Lain v. Tex. Comm'n on Env'tl. Quality*, No. D-1-GN-11-002194, 2012 WL 3164561, at *1–2 (201st Dist. Ct., Travis County, Tex. Aug. 2, 2012), *vacated on other grounds*, 438 S.W.3d 887 (Tex. App.—Austin 2014, no pet.).

223. Joseph L. Sax, *Liberating the Public Trust Doctrine from Its Historical Shackles*, 14 U.C. DAVIS L. REV. 185, 185 (1980).

224. *E.g.*, Harrison C. Dunning, *The Public Trust: A Fundamental Doctrine of American Property Law*, 19 ENVTL. L. 515, 520 (1989) (“Indeed, California courts established that this easement exists as a consequence of state sovereignty; consequently it does not depend on a showing of prior state ownership of the resource.”).

225. *Ctr. for Biological Diversity, Inc. v. FPL Grp., Inc.*, 83 Cal. Rptr. 3d 588, 606–07 (Cal. Ct. App. 2008). *But cf.* *Env'tl. Prot. Info. Ctr. v. Cal. Dep't of Forestry & Fire Prot.*, 187 P.3d 888, 926 (2008) (“There is doubtless an overlap between the two public trust doctrines—the protection of water resources

applied to air, a decision that was later vacated on other grounds.²²⁶ The state of Hawaii has adopted a very broad conception of the public trust doctrine, under which all natural resources are protected for present and future generations.²²⁷ Under these broadest conceptions of the doctrine, the public trust would preclude “unlimited” pumping rights, the exercise of which would cause total depletion of groundwater resources.

Another consideration is that, even when the public trust doctrine does apply, interpretive principles may affect the utility of the doctrine in protecting common pool groundwater. Under the law of some states, the public trust doctrine does not automatically require decision-makers such as agencies or courts to prevent environmental harm.²²⁸ For example, in California, decision-makers determine whether environmental protection is “feasible” based on a variety of economic, environmental, scientific, technological, and other factors.²²⁹ The California Supreme Court has stated that, as a matter of practical reality, sometimes water use must be allowed even when it results in environmental harm.²³⁰ And yet, even under an interpretive standard such as feasibility, which permits some harm to trust resources in favor of other values, a water use that threatens to entirely deplete the core resource would, or at least arguably should, tip the scales in favor of protection.

4. *Sovereignty and Police Power*

The sovereign and police powers of a state encompass the ability to regulate for the common health, safety, and welfare, and include the authority to adopt laws to protect a common natural resource from depletion.²³¹ States

is intertwined with the protection of wildlife. . . . Nonetheless the duty of government agencies to protect wildlife is primarily statutory.”)

226. *Bonser-Lain*, 2012 WL 3164561, at *1–2 (holding that the public trust doctrine is not limited to navigable water, but “includes all natural resources of the State including the air and atmosphere . . . ‘the preservation and conservation of [the] natural resources of the State are each and all hereby declared public rights and duties’” (quoting TEX. CONST. art. XVI, § 59)).

227. HAW. CONST. art. 11, § 1 (amended 1978).

For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii’s natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State. All public natural resources are held in trust by the State for the benefit of the people.

Id.; see also *id.* §§ 3, 7; *In re Water Use Permit Applications*, 9 P.3d 409, 409 (Haw. 2000).

228. *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709, 711–12, 727 (Cal. 1983).

229. *Id.* at 712.

230. *Id.* at 727–28.

231. See, e.g., *Fall River Valley Irr. Dist. v. Mt. Shasta Power Corp.*, 259 P. 444, 449 (Cal. 1927) (acknowledging that state police power can be invoked to prohibit a use of property that “reasonably endangers or threatens the public health, safety, comfort, or welfare” (quoting *Stone v. Kendall*, 268 S.W. 759, 761 (Tex. Civ. App.—Waco 1925, no writ))); cf. CAL. CONST., art. XI, § 7 (discussing police power of local governments). Professor Joseph Dellapenna suggests that the police power is closely connected

routinely exercise their power to protect the common resource of groundwater, whether operating through their legislature or their courts.²³² For example, California adopted the idea of managing for “safe yield” in early groundwater adjudication decisions, a standard that requires groundwater to be managed so that pumping does not exceed the level at which the basin can replenish itself over the long term.²³³ The California legislature reasserted this power in 2014 by adopting a statewide mandate to manage for “sustainable yield.”²³⁴ Local governments in California may also invoke the police power to manage groundwater.²³⁵ Texas likewise has repeatedly acknowledged the power of the state to regulate to protect the health of a groundwater basin, a power that expressly references quantification.²³⁶ Politics aside, these sovereign authorities are, as a matter of law, sufficient to preclude recognition of claims to private rights to unlimited pumping sufficient to destroy the groundwater resource; it is inconsistent for a state to exercise its sovereign authority to regulate to protect groundwater resources and simultaneously recognize an unlimited private right to destroy those same resources.

This contradiction raises the question whether, in acknowledging the impossibility of an unlimited right to pump and/or requiring quantification of dormant rights, a state would go “too far,” thereby entitling a dormant right holder to compensation under federal or state takings principles.²³⁷ When groundwater is properly characterized as a depletable common pool resource, any argument for compensation dissolves; in requiring quantification to protect the common pool, a state would not be changing property rights to groundwater—it would simply be acknowledging the physical character of the resource in which the property right is held. No political or legal rhetoric can alter the fact that there is physically no such thing as an unlimited groundwater resource, and thus unlimited rights to groundwater never

to the right of governments to abate nuisances, an act that does not require compensation to the private property owner whose exercise of rights are limited, and also to the “emergency doctrine,” wherein if two resources are inevitably going to be destroyed, the government may choose to protect one over the other, without compensation. Dellapenna, *supra* note 12. Professor Dellapenna further suggests that these doctrines are relevant to the question of whether compensation is owed if a government were to clarify that no private property right to groundwater is unlimited. *Id.*

232. See generally Dellapenna, *supra* note 12.

233. *E.g.*, *City of Los Angeles v. City of San Fernando*, 537 P.2d 1250, 1315 (Cal. 1975); *City of Los Angeles v. City of Glendale*, 142 P.2d 289, 296–97 (Cal. 1943).

234. CAL. WATER CODE § 10721(w) (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.) (defining sustainable yield); *id.* § 10727(a) (“A groundwater sustainability plan shall be developed and implemented for each medium- or high-priority basin by a groundwater sustainability agency to meet the sustainability goal established pursuant to this part.”).

235. *Baldwin v. Cty. of Tehama*, 36 Cal. Rptr. 2d 886, 891–92 (Cal. Ct. App. 1994).

236. 31 TEX. ADMIN. CODE § 356.10(6) (West 2015) (referencing “[t]he desired, quantified condition of groundwater resources (such as water levels, spring flows, or volumes) within a management area at one or more specified future times as defined by participating groundwater conservation districts within a groundwater management area as part of the joint planning process”).

237. See, e.g., *Fall River Valley Irr. Dist. v. Mt. Shasta Power Corp.*, 259 P. 444, 448 (Cal. 1927).

existed. A government cannot take what never existed. Accordingly, a rule requiring quantification would be squarely within the acceptable bounds of the police power, and would not equate to a shift of private resources for public benefit.²³⁸ Of course, the question of compensation might arise for an individual property owner if the defined quantity was substantially disproportionate to the amount that property owner should reasonably anticipate in light of the available water supply and the long-term health of the basin.

D. Is an Inherent Limit Consistent with State Water Rights Doctrines?

1. California

The inherent limits embodied in the proposed principle are consistent with California's doctrine of reasonable use and prohibition on waste. California's constitution requires that all water resources, including groundwater, be used reasonably and to the fullest extent possible.²³⁹ Allowing the destruction of a resource that could be made renewable with proper management would not be using water to the fullest extent possible, over the long term, and would waste that resource. And in fact, the connection between inherent limits and reasonable use has already been recognized by the California Supreme Court in the context of surface water in the *Long Valley* case, discussed above.²⁴⁰

In the context of California groundwater, some might argue that quantification is unnecessary because the problem of dormant rights is already corrected by allowing prescriptive rights to groundwater, which are generally not recognized in the surface water context.²⁴¹ However, as described above, this is not a complete answer to the problem of dormant rights.²⁴²

Others might question why dormant rights are a problem given the priority system, under which the California rule is that water is taken away from juniors when seniors demand it. This argument avoids the reality that juniors are rarely, if ever, curtailed absent a comprehensive adjudication; instead, pumping continues unabated and overdraft occurs. This curtailment fails to occur in part due to a lack of central management, and in part because juniors have developed a reliance on the water that they have been using.²⁴³ In this regard, the reliability provided by quantification of pumping rights,

238. See generally Joseph L. Sax, *Takings and the Police Power*, 74 YALE L.J. 36 (1964).

239. CAL. CONST. art X, § 2.

240. See *supra* Part III.A.1.

241. *People v. Shirokow*, 605 P.2d 859, 873–74 (Cal. 1980) (holding there was no prescription against the state); cf. *Brewer v. Murphy*, 74 Cal. Rptr. 3d 436, 444–46 (Cal. 2008) (recognizing a riparian prescription against another riparian owner).

242. See *supra* Part III.B.

243. See *supra* Part II.C.

including dormant rights, can encourage junior pumpers to invest in a physical solution; conversely, the lack of quantification may, as a practical matter, preclude reliability and therefore discourage sustainability-achieving physical solutions.²⁴⁴ Studies have demonstrated that the certainty provided by quantified water rights can lead to sustainability, improved economic reliability, and use of water to the fullest extent possible, consistent with California's fundamental water policy.²⁴⁵

2. Texas

To the extent that the Texas rule of capture applicable to groundwater actually bestows unlimited pumping rights, then quantification appears to conflict with Texas law.²⁴⁶ Closer examination, however, reveals that there is no conflict, because quantification is a natural corollary of an inherent limit on the quantity of the resource available for distribution, and not a doctrinal rule about who gets how much in distribution of the resource. Moreover, characterization of pumping rights as unlimited stems from interpretation of concepts that benefit from close examination. The term *absolute* in "absolute ownership," for example, might refer to a fee simple absolute interest in real property and its associated water right, rather than an absolute right to pump until the basin is entirely drained.²⁴⁷ In other words, it could be that landowners possess full ownership interests in the water available to their property, rather than a more limited usufructuary interest, easement, or license.²⁴⁸ Thus it is possible for a property right in water to be "absolute" but still limited by physical availability and an inherent duty to protect the core of the common pool resource.

Similarly, the rule of capture, properly understood, might function primarily as a rule of no liability for pumping as against immediately neighboring property owners; a functionality arguably present in the facts of the foundational cases in which the rule has been applied.²⁴⁹ In those cases, the issues seem to revolve around the extent of obligation (or more precisely lack thereof) to a neighbor or other individual user, and not around the breadth and depth of an individual's right to pump.²⁵⁰ None of these cases explore the character of the property in which the ownership interest is located, and none include a declaration that the rule of capture embodies a

244. GRAY ET AL., *supra* note 4.

245. *Id.*

246. *See* Edwards Aquifer Auth. v. Day, 369 S.W.3d 814 (Tex. 2012); Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75 (Tex. 1999).

247. *See generally* Drummond et al., *supra* note 62.

248. *Id.*

249. *See, e.g.*, Collins, *supra* note 5, at 448–49 (noting that rule of capture cases have "focused primarily on liability for groundwater use, not ownership of the resource itself").

250. *Id.*

social agreement to destroy a common pool resource.²⁵¹ The rule of capture does not appear to have been created to allow landowners to pump with abandon until they deplete a shared groundwater resource.²⁵² Consistent with the foregoing, despite continuing rhetoric about unlimited rights to pump, Texas in fact recognizes various exceptions to unlimited pumping and prohibits pumping that equates to trespass, malicious conduct, or waste, as well as pumping that results in contamination or land subsidence.²⁵³

Rhetoric aside, Texas law already recognizes the reality of the common pool.²⁵⁴ The legislature has declared that conservation of groundwater resources is required to fulfill the will of the people of Texas as expressed in the state constitution, which in turn declares conservation for present and future generations to be a public right and duty.²⁵⁵ The reality of inherent limits and the tool of quantification reflect and further these declarations, and thus, should be integrated into judicial determinations regarding the scope of rights to groundwater.

E. Quantification Does Not Require Inflexible Management

If a sustainability limit is inherent in common pool resources, as argued here, it does not necessarily follow that management to protect the common pool must be inflexible. In those basins in which sustainable yield is sought (or groundwater mining is prohibited) today, the rules do not typically treat drawdown that would be unsustainable over the long-term as per se unlawful on an annual basis; instead, pumpers may be allowed to exceed sustainable limits in a specific period in order to protect certain economic and other

251. *Id.*

252. See Drummond et al., *supra* note 62 (explaining the various exceptions to the general rule of no liability).

253. Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75, 81 (Tex. 1999) (Hecht, J., concurring) (stating that the common law rule of capture “entitles a landowner to withdraw an unlimited amount of groundwater”); e.g., WYTHE, *supra* note 87; *Texas Water Law*, *supra* note 72.

254. TEX. WATER CODE ANN. § 36.101(a)(4) (West, Westlaw through 2015 Reg. Legis. Sess.) (stating that Texas conservation districts shall “consider the public interest in conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and in controlling subsidence caused by withdrawal of groundwater from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution”).

The conservation and development of all of the natural resources of this State . . . including the control, storing, preservation and distribution of its storm and flood waters, the waters of its rivers and streams, for irrigation, power and all other useful purposes, the reclamation and irrigation of its arid, semi-arid and other lands needing irrigation, the reclamation and drainage of its overflowed lands, and other lands needing drainage, the conservation and development of its forests, water and hydro-electric power, the navigation of its inland and coastal waters, and the preservation and conservation of all such natural resources of the State are each and all hereby declared public rights and duties

TEX. CONST. art. XVI, § 59(a).

255. TEX. CONST. art. XVI, § 59(a); TEX. WATER § 36.101(a)(4).

interests.²⁵⁶ The sustainability limit imposes a duty to not pass the “tipping point,” or to otherwise allow pumping to result in unacceptable wasting or destruction of the common pool resource.²⁵⁷ Thus, recognition of an inherent limit on pumping can coexist with sensitivity to local exigencies, allowing for flexible management while protecting the resource in the long-term.

F. Quantification Should Happen at the Local Level

To ensure appropriately flexible management and responsiveness to place-based concerns, quantification should happen at the local level. Both Texas and California have embraced the local model of groundwater management. Texas created groundwater conservation districts that develop management plans and rules for specific regions.²⁵⁸ California, for its part, recently confirmed a longstanding local management philosophy by choosing local agencies as the guardians of sustainability on a statewide basis.²⁵⁹ California’s Water Code directs that “groundwater sustainability agencies” will be made up of one or more existing local water institutions or new local entities created for that purpose.²⁶⁰ Sustainability plans will focus on the regional and local groundwater resource, and local institutions are tasked with development of solutions.²⁶¹ Under California law, the state government has little role to play unless and until the locals fail to meet a mandatory standard, and even then the state thus far seems to be committed to local solutions where possible.²⁶²

In both states, approaches to groundwater management reflect a recognition that locally developed rules and local solutions are a core feature of enduring institutions for management of a common pool resource.²⁶³ Local action tends to be more politically palatable to

256. See Kaiser & Skillern, *supra* note 13, at 297–98.

257. See DAN A. TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 6.15 (2000). Colorado, New Mexico, and Oklahoma have expressly adopted tables that allow for managed exceedance of safe yield, not to exceed a tipping point to total exhaustion. *Id.*

258. See TEX. WATER §§ 36.0011–.012 (groundwater conservation districts).

259. CAL. WATER CODE § 10720.1(b) (West, Westlaw through Ch. 3 of 2016 Reg. Sess. and Ch. 1 of 2015–16 2d Exec. Sess.) (“In enacting this part, it is the intent of the Legislature to do all of the following: . . . [t]o enhance local management of groundwater consistent with rights to use or store groundwater and Section 2 of Article X of the California Constitution.”); *id.* § 10720.1(d) (“To provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater.”); *id.* § 10720.1(h) (“To manage groundwater basins through the actions of local governmental agencies to the greatest extent feasible, while minimizing state intervention to only when necessary to ensure that local agencies manage groundwater in a sustainable manner.”); see also *City of Santa Maria v. Adam*, 149 Cal. Rptr. 3d 491, 501 (Cal. Ct. App. 2012) (“There is no statewide system for allocating rights in groundwater. The Legislature has left that to local government or, as here, to adjudication by the courts.” (citing *O.W.L. Found. v. City of Rohnert Park*, 86 Cal. Rptr. 3d 1, 14–15 (Cal. Ct. App. 2008))).

260. CAL. WATER § 10721(j).

261. *Id.* § 10721(v).

262. See *id.* § 70210.

263. OSTROM, *supra* note 20.

groundwater rights holders than state regulation. Local rules reflect the particular conditions of the particular resource,²⁶⁴ leaving the most room for flexible management that integrates the rights and needs of individual water users while still protecting the common resource. Quantification and subsequent management should happen at the local level, provided that the local process respects the rights of all groundwater users, including disadvantaged communities, and considers impacts upon dependent ecosystems.

G. Addressing Objections: Law, Economics, Technology, and Cost

In any given basin, there are several potential reasons why groundwater rights have not been quantified. First, property owners maintain that the right cannot be legally quantified.²⁶⁵ Second, property owners take a political stance against quantification because they fear that this path leads to substantial reduction in economic value.²⁶⁶ Third, quantification is conceptually and technically difficult.²⁶⁷ Each of these reasons is addressed below.

As explained in this Article, the first objection is based on an incorrect understanding of the law. There is no such thing as an unlimited property right to a common pool depletable resource.²⁶⁸ Unlimited property rights lead to depletion, and there is no property right to permanently deplete a natural resource that serves health and safety interests as well as critical economic and environmental interests.²⁶⁹ It is true that a property owner may have a right to a share of the scarce or dwindling supplies, but this right is not unlimited and cannot push the resource past its tipping point.²⁷⁰ Quantification of rights to groundwater is essential to ensure the continued viability of the common pool resource.

The second objection is also misplaced. In heavily pumped basins, quantification will actually improve the real (as opposed to imagined) value of the water right for several reasons. First, a depleted basin provides no water. Second, in a depleting basin, dormant property owners that do not hold quantified rights are at significant risk of existing users developing a

264. *Id.*; see also Bernhard Grossfeld, *Geography and Law*, 82 MICH. L. REV. 1510, 1514 (1984) (describing the relationship between geography and development of water rights doctrines in different areas of the U.S.).

265. See, e.g., Gies, *supra* note 3.

266. See *id.*

267. E.g., JULIET CHRISTIAN-SMITH & KRISTYN ABHOLD, MEASURING WHAT MATTERS: SETTING MEASURABLE OBJECTIVES TO ACHIEVE SUSTAINABLE GROUNDWATER MANAGEMENT IN CALIFORNIA 7–15 (2015), <http://www.ucsusa.org/sites/default/files/attach/2015/09/measuring-what-matters-california-sustainable-groundwater-report.pdf>.

268. Arnold, *supra* note 10.

269. See *supra* Part III.C.1.

270. See, e.g., Hutchins, *supra* note 99.

reliance on their supply that cannot practically be overcome.²⁷¹ Quantifying the rights puts everyone on notice that rights may be claimed in the future, and helps users to understand how much should be invested in alternative supplies as part of a resilient water supply portfolio. Third, quantification of an inchoate, land-based right informs the property owner about data critical to rational choices about future investments: i.e., the property owner will know how much water the property will actually be able to access in the future versus an ambiguous, rhetorical claim to water that likely will not exist in the future.²⁷² Quantification makes the right more valuable, not less.²⁷³

The third objection is easily addressed from a technical standpoint: what we could not previously do, we can do today.²⁷⁴ A more pointed criticism focuses on costs associated with employing quantification methods and technologies. Cost is an important constraint—indeed, it is arguably the key constraint—and it is critical to be sensitive to how cost affects groundwater users and groundwater managers. That said, a consideration of costs should encompass all factors, including the opportunity costs of uncertain supply and unpredictable rights; costs associated with depleted groundwater, poor water quality, subsidence, and other adverse effects of uncertain and unregulated pumping; the cost of substitute supplies, and re-integration of externalities imposed on others. In many basins, groundwater levels have declined to the point that the cost of doing nothing has become unacceptably high; in those basins, quantification of pumping rights and data-driven management is imperative.²⁷⁵

271. See *supra* Part II.C.4.

272. See OSTROM, *supra* note 20.

273. Griggs, *supra* note 10, at 1317. “[W]ithout a definite and reliable quantification of both the groundwater right and the water supply on which it depends, there can be little reliance upon it as a property right and little predictability in its regulation.” *Id.*; see also *Rowland v. Ramelli* (*In re Waters of Long Valley Creek Stream Sys.*), 599 P.2d 656, 666 (Cal. 1979).

Uncertainty concerning the rights of water users has pernicious effects. Initially, it inhibits long range planning and investment for the development and use of waters in a stream system. . . . “[Dormant] rights constitute the main threat to nonriparian and out-of-watershed development, they are the principal cause of insecurity of existing riparian uses, and their presence adds greatly to the cost of obtaining firm water rights under a riparian system. They are unrecorded, their quantity is unknown, their administration in the courts provides very little opportunity for control in the public interest. To the extent that they may deter others from using the water for fear of their ultimate exercise, they are wasteful, in the sense of costing the economy the benefits lost from the deterred uses.”

In re Long Valley, 599 P.2d at 666 (quoting Frank Trelease, *A Model State Water Code for River Basin Development*, 22 LAW & CONTEMP. PROBS. 302, 318 (1957)).

274. See generally CHRISTIAN-SMITH & ABHOLD, *supra* note 267 (reviewing the state of knowledge regarding quantitative management of groundwater basins).

275. E.g., Suzanne Goldenberg, *A Texan Tragedy: Ample Oil, No Water*, GUARDIAN (Aug. 11, 2013, 10:07 AM), <http://www.theguardian.com/environment/2013/aug/11/texas-tragedy-ample-oil-no-water>; Julia Lurie, *California’s Drought Is So Bad That Thousands Are Living Without Running Water*, MOTHER JONES (July 31, 2015, 6:00 AM), <http://www.motherjones.com/environment/2015/07/drought-5000-californians-dont-have-running-water>.

IV. CONCLUSION

Although the framework and rules for groundwater rights in California and Texas are quite different, the systems share a commonality: In each, private ownership interests are necessarily shaped and defined by the nature of groundwater as a depletable common pool resource. Given this reality, the concept of unlimited rights is both physically and legally impossible.²⁷⁶ Unlimited rights are also undesirable because unlimited rights create uncertainty and ambiguity that ultimately, and ironically, impair the value of the land-based right to groundwater.

Property owners who hold rights to groundwater should embrace quantification as a means of protecting their rights. Accepting quantification, however, does not mean accepting less than one's fair share of water associated with a property right. The question of how much future water is fairly assigned to any particular property owner in light of the capacity of the basin and other rights is a separate question, to be addressed in the quantification process.

276. Griggs, *supra* note 185, at 1317 (describing how quantification protects the property interest in water and noting that “[t]his is not a doctrinal matter”).

