A PRIMER ON GROUNDWATER LAW

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JOSEPH W. DELLAPENNA*

I. INTRODUCTION

A large percentage, about thirty percent, of fresh water on planet Earth is underground.[1] Not all water underground is "groundwater." As hydrologist Harold Thomas pointed out nearly sixty years ago,

> [g]round water is only the part of the subterranean water that occurs where all pores in the containing rock materials are saturated. The "*zone of saturation*" may extend up to the land surface in some places . . . . At all other places, above the ground water zone, "a *zone of aeration*" exists . . . . Some water is in the zone of aeration at all times . . . . Wells cannot extract any of this water; they must be drilled through the zone of aeration and obtain their supplies from ground water.[2]

Water in the zone of aeration does serve various natural purposes, and human activity can prevent it from reaching zone of saturation, but direct exploitation of that water is difficult at best. Yet Thomas himself conceded that "often it is hard to identify or classify subterranean water on the basis of the definition above" because "the wide range of conditions of occurrence of ground water . . . reflect the great variations in porosity and permeability of the solid components of the earth's crust."[3] It is around the zone of saturation that the major actors in water politics and policy have debated the issues and problems involved in the development and continued use of groundwater.[4] Yet, while not all water underground fits a hydrologist's definition of groundwater or is the focus of lawyers' attention, every drop of the water beneath the surface is potentially the subject matter of an administrative

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1. KARRIE LYNN PENNINGTON & THOMAS V. CECH, INTRODUCTION TO WATER RESOURCES AND ENVIRONMENTAL ISSUES 4–5 (2010).

2. Harold E. Thomas, *Underground Sources of Our Water*, *in* WATER, THE YEARBOOK OF AGRICULTURE 1955, 62, 64–65 (emphasis added).

3. *Id.* at 65.

4. ZACHARY A. SMITH, GROUNDWATER IN THE WEST 3–4 (1989).

regulation or a lawsuit.[5] Both scientists and lawyers have focused too often on aquifers and water tables without realizing fully the extent to which the unsaturated zone, or zone of aeration, is an integral part of a groundwater system where disturbances sometimes can have irreversible or irremediable effects.

No one knows precisely how much of the world's water is located underground, but we know that groundwater is rapidly growing in importance as a source of water for agricultural, ecological, industrial, and municipal use around the world.[6] In 2005, of the average of 410,000 million gallons per day ("mgd") (460,000 acre-feet ("ac-ft."); 564 million cubic meters ("MCM")) being withdrawn in the United States, 82,600 mgd (92,000 ac-ft.; 113.5 MCM) were drawn from groundwater.[7] Thus about twenty percent of water used in the United States comes from groundwater, a ratio that has been stable since 1950.[8] Two-thirds of groundwater pumped in the United States is used for irrigation, and more than half of that water is pumped in just four states: California, Nebraska, Arkansas, and Texas.[9] While overall water withdrawals have fallen nationally by six percent since 1980, and withdrawals of groundwater have fallen by about three percent,[10] demand remains high and increases when there is a severe drought as happened in the summer of 2012.[11] Furthermore, the qualitative effects of human activity on groundwater are often as important or more important than the quantitative effects of those activities, yet qualitative effects can be among the most difficult to verify.[12]

Before the invention of the high-speed centrifugal (turbine) pump in 1937,[13] groundwater was not such an important source of water. Wells were shallow and

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5. *See, e.g.*, Beck Dev. Co., Inc. v. S. Pac. Transp. Co., 44 Cal. App. 4th 1160, 1172–1203, 52 Cal. Rptr. 2d 518, 527–47 (1996); McPherson Landfill, Inc. v. Bd. of City. Comm'rs, 49 P.3d 522 (Kan. 2002); Atlixco Coal. v. Cnty. of Bernalillo, 984 P.2d 796 (N.M. Ct. App. 1999), *cert. denied*, 981 P.2d 1207 (N.M. 1999); Bragg v. Edwards Aquifer Auth. 71 S.W.3d 729 (Tex. 2002).

6. *See* Yoshihide Wada et al., *Global Depletion of Groundwater Resources*, 37 GEOPHYSICAL RES. LETTERS L20402 (2010).

7. Joan F. Kenny et al., *Estimated Use of Water in the United States in 2005*, at 4 (U.S. Geological Survey Circular no. 1344), 2009 at 4.

8. *Id.* at 43 (table 14).

9. *Id.* at 4.

10. *Id.* at 43 (table 14).

11. *See, e.g.*, *Drought Impact on Arkansas' Beef Cattle Industry*, DELTA FARM PRESS, Sept. 29, 2012, *available at* http://deltafarmpress.com/livestock/drought-impact-arkansas-beef-cattle-industry; John Eligon, *A Drought Leaves Cracks in a Way of Life*, N.Y. TIMES, Oct. 4, 2012, *available at* http://www.nytimes.com/2012/10/04/us/widespread-drought-threatens-way-of-life-for-farmers.html?page wanted=all&_r=0; Michael Muskal, *As drought widens, fifty percent of U.S. counties declared disaster area*, L.A. TIMES, Aug. 1. 2012, *available at* http://www.latimes.com/news/nation/nationnow/la-na-nn-drought-strikes-over-half-of-us-20120801,0,2541774.story; Neil Shah & Conor Dougherty, *Drought's Grip Is Wide, Deep*, WALL ST. J., Sept. 4, 2012, *available at* http://online.wsj.com/article/SB10000872396390444914904577623604026814924.html.

12. *See, e.g.*, J. Wayland Eheart, *Genetic Algorithms and Neural Networks: Do Pluralized Techniques Hold Any Advantages for Designing Groundwater Quality Assurance Systems?*, *in* WATER POLICY AND MANAGEMENT: SOLVING THE PROBLEMS 285 (Darrell G. Fontane & Harry N. Tuvel eds. 1994) ("WATER POLICY AND MANAGEMENT"; Miguel A. Mejia, Mohamed M. Hantush & Miguel A. Mariño, *A Physically Based Conceptual Model for Simulating Contaminant Levels in Subsurface Water*, *in* WATER POLICY MANAGEMENT.

13. Steve Schafer, *Economics and Finance*, *in* FLAT WATER: A HISTORY OF NEBRASKA AND ITS WATER 113 (Charles A. Flowerday ed. 1993) ("FLAT WATER"); Leslie Sheffield, *Technology*, in FLAT WATER 87.

were mostly for domestic uses.[14] As a result of this invention, litigation over groundwater and legislative interventions became increasingly common after World War II. Hand-in-hand with these changes was the growth of knowledge about how groundwater behaves and how it connects with surface water sources.[15] In contrast with the situation today, two hundred years ago people knew little about finding usable quantities of groundwater. The best technique for deciding where to dig a well was a divining rod.[16] When a successful well was dug, it might provide water for a brief period or for centuries. No one knew why, when, or under what circumstances a well would go dry and the idea of a body of law addressing the management of groundwater was unimaginable.

In such circumstances, the creation by courts in the United States[17] and England[18] of the common law of groundwater in the nineteenth century was steeped in ignorance. Where scientific or technological certainties were available, nineteenth-century courts were as prepared to be guided thereby as any later common law judges. But hydrogeology and hydraulics were not developed enough then to offer certainty, and the common law concerning groundwater developed with little guidance from either—as the courts and legislatures readily admitted.[19] Perhaps the clearest expression of this ignorance is found in the Ohio decision of *Frazier v. Brown*:

> [T]he existence, origin, movement and course of such waters, and the causes which govern and direct their movements, are so *secret, occult and concealed,* that an attempt to administer any set of legal rules in respect to them would be involved in hopeless uncertainty, and would be, therefore, practically impossible.[20]

To scientists, the relationship of groundwater to surface waters is now a well-known fact, but to lawyers and jurists "[t]he implications with respect to water rights in these physically interconnected sources of supply" were profound.[21] Unfortunately for the future congruity of law and science, the courts in most jurisdictions spoke of the early common law decisions as rules of property. The idea that

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14. Today, about one-third of the public water supply comes from groundwater. Kenny et al., *supra* note 7, at 16. Fifteen states get more than half of their public supplies from groundwater. *Id.* at 17 (Table 5).

15. *Compare* Oscar E. Meinzer, *Outline of Ground-Water Hydrology, with Definitions* (United States Geological Survey, Water-Supply Paper No. 494) 1923; *with* NATIONAL RESOURCES PLANNING BOARD & NATIONAL RESOURCES COMMITTEE, DEFICIENCIES IN HYDROLOGIC RESEARCH (1940); *and with* HAROLD E. THOMAS, THE CONSERVATION OF GROUND WATER: A SURVEY OF THE PRESENT GROUND-WATER SITUATION IN THE UNITED STATES (1951).

16. *See generally* GEORGE APPLEGATE, THE COMPLETE GUIDE TO DOWSING (2002); EVON ZARTMAN VOGT & RAY HYMAN, WATER WITCHING USA (2000).

17. Greenleaf v. Francis, 35 Mass. 117 (1836).

18. Acton v. Blundell, 152 Eng. Rep. 1223 (Ex. Cham. 1843).

19. *See, e.g.*, Ga. Code Ann. § 51-9-8 (2001) (providing that "[t]he course of a stream of water underground and its exact condition before its first use are so difficult of ascertainment that trespass may not be brought for any supposed interference with the rights of a proprietor"); Chatfield v. Wilson, 28 Vt. 49, 54 (1856); *Acton*, 152 Eng. Rep. at 1228. *See generally* Kevin L. Patrick & Kelly E. Archer, *A Comparison of State Groundwater Laws*, 30 TULSA L.J. 123, 125–29 (1994).

20. Frazier v. Brown, 12 Ohio St. 294, 311 (1861) (emphasis added).

21. 1 WELLS A. HUTCHINS, WATER RIGHTS LAWS IN THE NINETEEN WESTERN STATES 59 (Harold H. Ellis & J. Peter DeBraal eds., 1972); Frank C. Foley, *Water and the Laws of Nature,* 5 U. KAN. L. REV. 492 (1957).

nearly all groundwater is tributary to some stream (or that streams are tributary to groundwater),[22] if followed rigorously, would make chaos of existing legal regimes, unsettling what was conceived of as established property rights. Courts, therefore, were reluctant to change the rules to bring them into conformity with later scientific knowledge. Yet the explosive growth of groundwater extraction, made possible by the high-pressure centrifugal pump, created crises in some areas where groundwater demand outstripped groundwater supply.[23] Such problems could only result in stresses on the received groundwater law.[24] Eventually, some courts and legislatures became more willing to define the relations of parties concerning their interests in groundwater consistently with recognized scientific knowledge of hydrology and geology ("hydrogeology").

Because of the relatively recent emergence of groundwater as a field of scientific knowledge and of large-scale economic exploitation, as well as concern over the unsettling of property rights, the law relating to groundwater long remained relatively undeveloped and exhibited considerable confusion. As Mark Goodman, commenting on the state of groundwater law in Arizona in 1978, summed it up, "[t]he history of [groundwater law] is as thrilling as ignorance, inertia, and timidity could have made it."[25] Not the least of the continuing disconnects between water science and water law is the continuing application, in most states, of different bodies of law to surface waters and to groundwater even though they are all part of a single hydrologic cycle—a fact that has long been known.[26] This approach carries over to groundwater itself where the rule persists that water flowing in an underground stream is subject to the law applicable to surface waters, while "percolating" groundwater (water seeping through interstices in the soil or rock) is subject to the law applicable to groundwater.[27] This article discusses only the law applicable to groundwater as so narrowly conceived, and in particular to the law allocating groundwater so narrowly conceived to particular users and uses.

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22. *Compare* Safranek v. Town of Limon, 228 P.2d 975 (Colo. 1951) (all groundwater is presumptively tributary); *with* Stevens v. Spring Valley Water Works & Supply Co., 247 N.Y.S.2d 503 (1964) (jury to decide between experts testifying on whether pumping from a well dried up a perennial stream). *See generally* Tom I. Romero, II, *Uncertain Waters and Contested Lands: Excavating the Layers of Colorado's Legal Past*, 73 U. Colo. L. Rev. 521, 541–44 (2002); Frank J. Trelease, *Conjunctive Use of Groundwater and Surface Water*, 27 ROCKY MTN. MIN. L. INST. 1853 (1982); Charles F. Wilkinson, *Western Water Law in Transition*, 56 U. COLO. L. REV. 317, 321–22 (1985).

23. *See, e.g.*, Southwest Eng'g Co. v. Ernst, 291 P. 2d 764 (Ariz. 1955).

24. *See generally* David H. Getches, *The Metamorphosis of Western Water Policy: Have Federal Laws and Local Decisions Eclipsed the States' Role?*, 20 STAN. ENVTL. L.J. 3 (2001).

25. Mark N. Goodman, *Current Groundwater Law in Arizona*, 1978 ARIZ. ST. L.J. 205, 224 (1978).

26. *See, e.g.*, Thomas, *supra* note 2, at 254.

27. *See, e.g.*, Jones v. Oz-Ark-Val Poultry Co., 306 S.W.2d 111 (Ark. 1957) (riparian rights). *See also* Neal v. Hunt, 541 P.2d 559 (Ariz. 1975) (appropriative rights); North Gualala Water Co. v. State Water Res. Control Bd., 43 Cal. Rptr. 3d 821 (Ct. App. 2006) (appropriative rights), *rev. denied*; Collens v. New Canaan Water Co., 234 A.2d 825 (Conn. 1967) (riparian rights); Maddocks v. Giles, 728 A.2d 150 (Me. 1999) (same); Jones v. Home Bldg. & Loan Ass'n, 114 S.E.2d 638 (N.C. 1960) (same); Huelsmann v. Ohio, 381 N.E.2d 950 (Ohio 1977) (same).

II. THE ALLOCATION OF GROUNDWATER

Groundwater law has undergone a great deal of development over the last century. As a result, today there are five different theories for allocating groundwater to particular users:

1) Absolute dominion (also called "absolute ownership" or "the rule of capture");
2) Correlative rights;
3) The reasonable use rule;
4) Appropriative rights; and
5) Regulated riparianism.

In this article, I will briefly present the five theories of water law. First, however, a few words are in order regarding this nomenclature because, particularly for the first three terms, there is some disagreement or perhaps confusion about what is the proper name of the theory or the meaning of that name. In part, at least, this disagreement or confusion reflects the reality that groundwater law is such a recent development, a development that during the formative stages of the emergence of these theories was steeped in ignorance of what was going on underground.[28]

The first theory, often called the absolute dominion rule,[29] is also referred to as the absolute ownership rule[30] or the rule of capture.[31] While these terms are more or less interchangeable,[32] they carry different connotations. These connotations could affect a court's willingness to replace the rule as modern science and technology render it obsolete. Absolute dominion stops just short of saying it is a property right, although just what it does say if not that is not altogether clear.[33] Absolute ownership sets the theory firmly in the camp of property rights, which serves to limit seriously the ability of courts or legislatures to alter the rule.[34] The rule of

28. See *supra* text accompanying notes 21, 22.

29. *See, e.g.*, *Maddocks*, 728 A.2d 150; *see also* California v. Super. Ct., 93 Cal. Rptr. 2d 276, 286 (Ct. App. 2000); *In Re* Wai'ola O Moloka'i, Inc., 83 P.3d 664, 711 (Haw. 2004); Allstate Ins. Co. v. Dana Corp., 759 N.E.2d 1049, 1054 (Ind. 2001); McNamara v. City of Rittman, 838 N.E.2d 640, 643 (Ohio 2005).

30. *See, e.g.*, Sw. Sand & Gravel, Inc., v. Cent. Ariz. Water Conservation. Dist., 212 P.3d 1, 6, 10 n.8 (Ariz. Ct. App. 2008), *cert. denied*, 130 S. Ct. 1937 (2010); *North Gualala Water Co*., 43 Cal. Rptr. 3d at 834 n.12; Cochran v. Dep't of Agric., Div. of Water Res., 249 P.3d 434, 439 (Kan. 2011); Mich. Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 196–98 (Mich. Ct. App. 2005); Citizens for Ground Water Prot. v. Porter, 275 S.W.3d 329, 349 (Mo. Ct. App. 2008); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 121, 127 (Neb. 2005); *In re* Town of Nottingham, 904 A.2d 582, 592 (N.H. 2006); *McNamara* 838 N.E.2d at 643; Edwards Aquifer Auth. v. Day, 369 S.W.3d 814, 827–30 (Tex. 2012); Towns v. N. Sec. Ins. Co., 964 A.2d 1150, 1160 (Vt. 2008).

31. Martin v. City of Linden, 667 So.2d 732, 738 (Ala. 1995); Davis v. Agua Sierra Res., LLC, 203 P.3d 506, 508 (Ariz. 2009); Board of City Comm'rs v. Park City Sportsmen's Ranch, LLP, 45 P.3d 693, 701–02 (Colo. 2002); U.S. Aviex Co. v. Travelers Ins. Co., 336 N.W.2d 838, 844 (Mich. Ct. App. 1983); *Edwards Aquifer Auth.*, 369 S.W.3d at 823–30.

32. Thus some courts have used more than one of these terms in a single opinion without considering whether they might carry different meanings. *See, e.g.*, *McNamara* 838 N.E.2d at 643 (using "absolute dominion" and "absolute ownersip"); *Edwards Aquifer Auth*., 369 S.W.3d at 823–30 (using "absolute ownership" and "rule of capture").

33. See *infra* this text accompanying notes 45–58.

34. See *infra* this text accompanying notes 50–52.

capture, on the other hand, indicates by its terms that the water user has no property in the groundwater until the water is pumped from a well, which might lead one to expect that courts that use this phrase would have the easiest time moving from the rule of capture to one of the other approaches to groundwater law.[35] Curiously, this does not seem to be the case in Texas, where the courts most often use the phrase "rule of capture."[36]

The uncertainty about what to call absolute dominion is minor compared to the wide disagreement about the relationship between correlative rights and reasonable use. Many courts actually call the rule of correlative rights a rule of reasonable use.[37] Some commentators use correlative rights to indicate that a state applies rules of riparian rights (applicable to surface waters) to groundwater.[38] This confusion results from a judicial tendency to treat the terms correlative rights and reasonable use as merely variant ways of making the same point—that water users drawing from a common source have interrelated rights such that each must consider the equal claim of others on that source.[39]

Both correlative rights and the reasonable use rule then require a sharing of the groundwater resources among those who have legitimate claims upon them. A rule that allows the unlimited pumping of water so long as it is used on land overlying the aquifer from which the water is pumped is actually a variant of the absolute dominion rule—absolute dominion limited by an appurtenance rule. This is the approach I take in this article to the use of these semantically overlapping terms. With that understanding it is now possible to describe the several approaches to groundwater law and to analyze their strengths and weaknesses.

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35. Davis v. Agua Sierra Res., LLC, 203 P.3d 506, 509–10 (Ariz. 2009) (holding that the reservation of groundwater in a deed conveying land overlying an aquifer cannot include groundwater that has not yet been captured); *see also* Robert G. Schaffer, *Davis v. Agua Sierra Resources: Bringing Some Clarity to Groundwater Rights in Arizona*, 1 ARIZ. J. ENVTL. L. & POL'Y 25 (2010); *see generally* Keith H. Hirokawa, *Property as Capture and Care*, 74 ALB. L. REV. 175 (2011).

36. *See Edwards Aquifer Auth*., 369 S.W.3d at 838 (holding that landowners under the rule of capture have title to the groundwater under their land, title that is compensable if there is a taking by the government); *see also* Marvin W. Jones & Andrew Little, *The Ownership of Groundwater in Texas: A Contrived Battle for State Control of Groundwater*, 61 BAYLOR L. REV. 578 (2010); Ashlie Newman, Note, Edwards Aquifer Authority v. Day *and the Future of Groundwater Regulation in Texas*, 31 REV. OF LITIG. 403 (2012); Deborah Clarke Trejo, *Identifying and Valuing Groundwater Withdrawal Rights in the Context of Takings Claims—A Texas Case Study*, 23 TUL. ENVTL. L.J. 409 (2010).

37. *See, e.g.*, Bowles v. City of Enid, 245 P.2d 730, 732 (Okla 1952); *see also* Peter N. Davis, *Eastern Water Diversion Permit Statutes: Precedents for Missouri?*, 47 MO. L. REV. 429, 441 n.49 (1982).

38. *See also* RESTATEMENT (SECOND) OF TORTS § 858 (1979); Robert W. Adler, *Climate Change and the Hegemony of State Water Law*, 29 STAN. ENVTL. L.J. 1, 29 (2010); David L. Callies et al., *The Moon Court, Land Use, and Property: A Survey of Hawai'i Case Law 1993-2010*, 33 U. HAW. L. REV. 635, 649 (2011); Jamie Carpenter, *Pre-Statutory Water Rights Claims in Utah: Uncertainty in the Administration of Water Rights*, 14 U. DENV. WATER L. REV. 301, 304 (2011); Davis, *supra* note 37, at 441; Thomas A. Mitchell, *The Future of Oil and Gas Conservation Jurisprudence: Past as Prologue*, 49 WASHBURN L. J. 379, 386–94 (2010); John R. Nolon, *The Law of Sustainable Development: Keeping Pace*, 30 PACE L. REV. 1246, 1273–75 (2010); G. Alan Perkins, *Arkansas Water Rights: Review and Considerations for Reform*, 25 U. ARK. LITTLE ROCK L. REV. 123, 137–38 (2002).

39. *See, e.g.*, Maddocks v. Giles, 728 A.2d 150, 153 n.5 (Me. 1999); Maerz v. United States Steel Corp., 323 N.W.2d 524, 527 (Mich. 1982); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 128 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006); Woodsum v. Township of Pemberton, 412 A.2d 1064, 1071–72, 1076–77 (N.J. Super. Ct. Law Div. 1980), *aff'd on other grounds,* 427 A.2d 615 (N.J. Super. Ct. App. Div. 1981); Ravan v. Greenville Cnty., 434 S.E.2d 296, 306–07 (S.C. 1993); Provo River Water Users Ass'n v. Morgan, 857 P.2d 927, 932 (Utah 1993). *See also infra* text accompanying notes 77–89, 147–53.

A. Absolute Dominion

Throughout most of human history, landowners dug wells without asking anyone's permission.[40] Even when an increasing number of states began to require a state permit before a landowner could drill a well, the states still did not require an accounting of, or payment for, water drawn from the well. A minimal fee might have been charged for the permit application, but that was to defray the costs of the permitting process and not as payment for the water. The costs that had to be borne by the landowner, to the extent not subsidized by the state, were the costs of drilling and lining the well and the cost of operating pumps, if necessary. These investment costs were the only costs recognized. Landowners regarded the groundwater itself as a free good from nature,[41] a view that still prevails in many circles.[42] These attitudes underlie the continuing support for the absolute dominion rule. As we have seen, the rule initially drew support from the pervasive ignorance regarding what was happening underground.[43]

Justice John Anthony Plowman provided a clear statement of the absolute dominion rule in an English decision from as late as 1969, *Langbrook Properties, Ltd. v. Surrey County Council*:

> A man may abstract the water under his land which percolates in undefined channels to whatever extent he pleases, notwithstanding that this may result in the abstraction of water percolating under the land of his neighbor and, thereby, cause him injury. In such circumstances, the principle of *sic utere tuo et alienum non laedas* [from nuisance law: so use your own property so as not to injure another's property],[44] does not operate and the damage is *damnum sine injuria* [condemnation without injury].[45]

Justice Plowman went onto say:

> Moreover, since it is not actionable to cause damage by the abstraction of underground water, even where this is done maliciously, it would seem illogical that it should be actionable if it were done carelessly. Where there is no duty not to injure for the sake of inflicting injury, there cannot, in my judgment, be a duty to take care not to inflict the same injury.[46]

Statements such as this were once nearly universal in courts in the United States.[47] Given the pervasive ignorance at the time regarding whether groundwater

40. *See* LUDWIK A. TECLAFF, WATER LAW IN HISTORICAL PERSPECTIVE 146–47 (1985)

41. *See id.* at 192.

42. *See, e.g.*, ROBERT C. REPETTO, WORLD ENOUGH AND TIME: SUCCESSFUL STRATEGIES FOR RESOURCE MANAGEMENT 62, 85 (1986).

43. *See supra* text accompanying notes 19, 20.

44. U.S. LEGAL, http://definitions.uslegal.com/s/sic-utera-tuo-ut-alienam-non-laedas/ (last visited Apr. 1, 2013).

45. [1969] 3 All E.R. 1424.

46. *Id.* at 1440.

47. *See generally* Corona Coal Co. v. Thomas, 101 So. 673 (Ala. 1924); Roath v. Driscoll, 20 Conn. 533 (Conn. 1860); Saddler v. Lee, 66 Ga. 45 (Ga. 1879); Edwards v. Haeger, 54 N.E. 176 (Ill. 1899); New Albany & Salem R.R. v. Peterson, 14 Ind. 112 (Ind. 1860); Chase v. Silverstone, 62 Me. 175 (Me.

moved at all,[48] this was perhaps the only possible answer to complaints about interference with groundwater in the nineteenth century. While some courts were willing to admit that point candidly,[49] scholars of the law as well as other judges were not satisfied with that answer. They searched for a doctrinal explanation for this rather extreme proposition. They found it in the hoary maxim of the common law that ownership of land extended up to the heavens and down to the inferno (*cujus est solum, ejus est usque ad caelum et ad infernos*).[50] By the early twentieth century, the rationale had evolved to a view that "percolating waters . . . constitute part and parcel of the land in which they are found, and belong absolutely to the owner of such land, who may deal with them as he sees fit."[51] These two rationales are related and serve to set the absolute dominion rule clearly in the mode of a property right—something not required if the refusal to adjudicate is based on the inability to determine the necessary facts rather than a recognition of ownership. These rationales led to emergence of an alternative name for the "absolute dominion rule"—the "absolute ownership rule."[52]

An altogether different rationale also emerged in the nineteenth century that perhaps was more consistent with the reality that there simply was insufficient knowledge to enable a court to decide a dispute over groundwater. That rationale drew an analogy to the "property" in wild animals, as described by the Pennsylvania Supreme Court in *Westmoreland Cambria Nat. Gas Co. v. Dewitt*:[53]

> Water and oil, and still more strongly gas, may be classed by themselves, if the analogy be not too fanciful, as minerals *ferae naturae*. In common with animals, and unlike other minerals, they have the power and the tendency to escape without the volition of the owner . . . . They belong to the owner of the land, and are part of it, so long as they are on or in it, and subject to his control; but when they escape, and go into other land, or come under another's control, the title of the former owner is gone.

1873); W. Maryland R.R. Co. v. Martin, 73 A. 267 (Md. 1909); Greenleaf v. Francis, 35 Mass. 117 (Mass. 1836); Bd. of Supervisors of Clarke Cnty. v. Miss. Lumber Co., 80 Miss. 535 (Miss. 1902); Forbell v. City of N.Y., 58 N.E. 644 (N.Y. 1900); Haldeman v. Bruckhart, 45 Pa. 514 (Pa. 1863); Frazier v. Brown, 12 Ohio St. 294 (Ohio 1861); Buffum v. Harris, 5 R.I. 243 (R.I. 1858); Hous. & Tex. Cent. R.R. Co. v. East, 81 S.W. 279 (Tex. 1904); Chatfield v. Wilson, 28 Vt. 49 (Vt. 1855); Clinchfield Coal Co. v. Compton, 139 S.E.2d 308 (Va. 1927); Joseph W. Dellapenna, *The Absolute Dominion Rule*, *in* 2 WATERS AND WATER RIGHTS § 20.04 (Amy K. Kelly ed. 2011).

48. See *supra* text accompanying notes 19, 20.

49. *See, e.g.*, *Frazier*, 12 Ohio St. at 311; *Chatfield*, 28 Vt. at 54; Acton v. Blundell, 152 Eng. Rep. 1228 (Ex. Cham. 1843).

50. *See* JOSEPH K. ANGELL, LAW OF WATERCOURSES § 109 (4th ed. 1850). Angell was the leading authority in the United States on water law in the nineteenth century. The first edition appeared in 1824; the fourth edition is the last one for which Angell made significant revisions to section 109. Interestingly, Angell's English contemporary, Humphrey Woolrych, still did not mention groundwater as late as 1853—a decade after *Acton v. Blundell*, 152 Eng. Rep. 1223 (Ex. Cham. 1843), the first modern English case on groundwater. *See generally* HUMPHREY W. WOOLRYCH, A TREATISE OF THE LAW OF WATERS (2d ed. 1851).

51. CLESSON KINNEY, IRRIGATION § 49 (1894); JOSEPH LONG, THE LAW OF IRRIGATION § 45 (2d ed. 1916).

52. *See supra* text accompanying notes 29–34.

53. Westmoreland Cambria Nat. Gas Co. v. Dewitt, 18 A. 724, 725 (Pa. 1889).

From this rationale, it is a short step to conclude, as with wild animals, that there is no real property until the water is captured, as by pumping from a well[54]—hence the rule of capture as an alternative to the absolute dominion rule.[55]

Despite all the absolutist rhetoric, the absolute dominion rule was seldom applied so absolutely on this side of the Atlantic.[56] Instead of such absolutist approaches, even the earliest American case asserting the absolute dominion of the overlying landowner applied a malicious pumping exception to uphold liability.[57] A few courts have even held that mere negligence in the exercise of one's "absolute" right to pump groundwater was actionable if the negligence injured a neighbor.[58]

The absolute dominion rule received considerable revision in the courts in the United States by the early twentieth century because hydrologists and engineers, and eventually lawyers and jurists, learned more about the nature and behavior of percolating groundwater. Thus Clesson Kinney, an attorney who wrote about irrigation, in 1894 could describe groundwater as "pass[ing] through the ground beneath the surface without definite channels . . . the course of which is unknown and unascertainable."[59] Only twelve years later, he would describe groundwater in very different terms:

> [W]aters . . . slowly percolate or infiltrate their way through the sand, gravel, rock, or soil, which do not then form a part of any body of water or the flow of any watercourse, surface or subterranean, but which may eventually find their way by force of gravity to some watercourse or other body of water, with whose waters they mingle, and thereby lose their identity as percolating waters.[60]

His understanding, while still limited, was a significant advance over the view of groundwater as "occult," found in court decisions only a few decades earlier[61] and in his own writing of barely a decade earlier. Beyond malice and neglect, the first real challenge to the absolute dominion rule came from municipal withdrawal of groundwater for resale to customers located often at great distances from the well-field where the water is abstracted. In cases like *Forbell v. City of New York*,[62] the court bluntly limited withdrawals under the absolute dominion of the surface

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54. *See, e.g.*, Justesen v. Olsen, 40 P.2d 802, 805 (Utah 1935) ("There can be no more ownership of water moving through the soil than there can be of ownership of water moving across the surface. It is evasive and constantly changing. In either case any use must of necessity be in its nature usufructory [sic] only"); *see also* JAN G. LAITOS, NATURAL RESOURCES LAW: CASES AND MATERIALS 757–58 (1985); Jeremiah I. Williamson, *Stream Wars: The Constitutionality of the Utah Public Waters Access Act*, 14 U. DENV. WATER L. REV. 315, 332–33 (2011).

55. *See supra* text accompanying notes 31, 35.

56. For some of the few cases that did apply the rule in such an absolutist way, *see* Rose v. Socony-Vacuum Co., 173 A. 627 (R.I. 1934); Drinkwine v. State, 274 A.2d 485 (Vt. 1970); Menne v. City of Fond du Lac, 77 N.W.2d 703 (Wis. 1956).

57. Greenleaf v. Francis, 35 Mass. 117, 122 (Mass. 1836).

58. *See, e.g.*, Gamer v. Town of Milton, 195 N.E.2d 65 (Mass. 1964); Friendswood Dev. Co. v. Smith-Southwest Indus., 576 S.W.2d 21 (Tex. 1978).

59. KINNEY, *supra* note 51, § 49.

60. 2 CLESSON KINNEY, IRRIGATION AND WATER RIGHTS § 1183, at 2150 (2d ed. 1912).

61. Hous. & Tex. Cent. Ry. Co. v. East, 98 Tex. 146, 149 (Tex. 1904).

62. Forbell v. City of New York, 58 N.E. 644 (N.Y. 1900); *see also* Hathorn v. Natural Carbonic Gas Co., 87 N.E. 504 (N.Y. 1909); *see* Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 20.08.

owner to uses located on land overlying the aquifer. Other courts introduced another important, but rather different, limitation: a landowner withdrawing groundwater must have some "useful purpose of his own, though . . . the water may be entirely diverted from the land to which it would otherwise naturally pass."[63] From decisions such as this, one could conclude that the court had abandoned the absolute dominion rule, or perhaps one could derive the *malicious* limitation on the exercise of one's absolute dominion—although many of the cases introducing that limitation are earlier than the cases requiring a useful purpose.[64] Later in the twentieth century, courts began to recognize liability when the pumping of groundwater could unreasonably interfere with the use of surface waters.[65]

With exceptions to a landowner's "absolute dominion" for malicious or negligent acts, for pumping without a useful purpose, or for unreasonable interference with surface water rights, one might conclude that a state has virtually abandoned the absolute dominion rule.[66] This is not quite true. The exceptions give leeway for a court to prohibit unreasonable groundwater pumping, but only if the court is willing to characterize the pumping as within one of these exceptions. If there is no intent to injure a neighbor (no malice), no negligence in the abstraction, a useful purpose for the abstraction, and no unreasonable interference with surface waters, then each landowner is free to capture as much groundwater as she can before someone with a more powerful pump sucks her well dry.[67]

Today the absolute dominion rule, after nearly two centuries since its first expression in a common law decision, exists more in its absence than in any presence. It perhaps survives to any real degree only in Indiana, Maine, and Texas.[68] Even in those jurisdictions, its reach has been limited legislatively.[69] In Texas alone the courts have diligently protected their version of the rule of capture,[70] although even

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63. Tampa Waterworks Co. v. Cline, 20 So. 780, 784 (Fla. 1896); *see also* Gagnon v. French Lick Hotel Co., 72 N.E. 849 (Ind. 1904).

64. *See* Roath v. Driscoll, 20 Conn. 533, 544 (1850); Greenleaf v. Francis, 35 Mass. (18 Pick.) 117, 122 (1836).

65. *See, e.g.*, Collens v. New Canaan Water Co., 234 A.2d 825, 832 (Conn. 1967); Mich. Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 201–09 (Mich. Ct. App. 2005), *rev'd in part on other grounds*, 737 N.W.2d 447 (Mich. 2007); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 127–28 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006).

66. *Cf.* H. Floyd Sherrod, Jr., *The Groundwater Use Act of 1972: Protection for Georgia's Groundwater Resources*, 10 GA. L. REV. 709, 733 (1972) (describing "groundwater law in Georgia as 'murky'" by its embrace of the absolute dominion rule with "exceptions for malice and negligence, and in the face of legislative modifications"). Perhaps this explains a Georgia court's reliance on non-recovery in tort for purely economic losses to dismiss a groundwater case rather than exploring whether Georgia still follows the absolute dominion rule. *See* Remax the Mountain Co. v. Tabsum, Inc., 634 S.E.2d 77 (Ga. Ct. App. 2006), *cert. denied*.

67. *See, e.g.*, Wiggin v. Braz. Clay & Coal Co., 452 N.E.2d 958 (Ind. 1983).

68. *See id.*; Maddocks v. Giles, 728 A.2d 150 (Me. 1999); Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75, 83 (Tex. 1999).

69. *See* Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 20.07–20.07(b).

70. *See* Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75 (Tex. 1999); *see generally* Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 20.07(a)–20.07(a)(2)(B); Susana Elena Canseco, *Landowners' Rights in Texas Groundwater: How and Why Texas Courts Should Determine Landowners Do Not Own Groundwater in Place*, 60 BAYLOR L. REV. 491 (2008); Dylan O. Drummond, Lynn Ray Sherman & Edmond R. McCarthy, Jr., *The Rule of Capture in Texas—Still So Misunderstood after All These Years*, 37 TEX. TECH. L. REV. 1 (2004); Ronald Kaiser, *Water Concerns in Texas: A Problem in Search of a Solution*, 67 TEX. B.J. 188 (2004).

there the courts accept a malice or negligence exception.[71] The Texas legislature has attempted to curtail the absolute rights of landowners, but its efforts have been limited by strong resistance in the state's courts.[72] Elsewhere, in jurisdictions where the most recent precedent (which often is very old) proclaims the absolute dominion of the overlying landowner over groundwater (even in England),[73] the doctrine is far weaker if it survives at all. And a large number of courts in a significant number of states have explicitly abandoned the absolute dominion rule.[74] Several courts have so abandoned on the basis that the early decisions were not based on property rights but on the lack of information necessary to decide whether one groundwater user had injured the rights of another groundwater user.[75] In the alternative, courts have displaced the absolute dominion rule as a rather straightforward

71. Friendswood Dev. Co. v. Smith-Sw. Indus., 576 S.W.2d 21, 23 (Tex. 1978) (negligence); Houston & Tex. Cent. RR v. East, 81 S.W. 279, 281 (Tex. 1904) (malice).

72. *See* Rolling Plains Groundwater Conserv. Dist. v. City of Aspermont, 353 S.W.3d 756 (Tex. 2011); Edwards Aquifer Auth. v. Chem. Lime, Ltd., 291 S.W.3d 392 (Tex. 2009); Guitar Holding Co. v. Hudspeth Cnty. Underground Water Conserv. Dist., FM Props. 2010 U.S. Dist. LEXIS 85817 (Aug. 18, 2010); Operating Co. v. City of Austin, 22 S.W.3d 868 (Tex. 2000); Quick v. City of Austin, 7 S.W.3d 109 (Tex. 1998); City of Del Rio v. Clayton Sam Holt Hamilton Trust, 269 S.W.3d 613 (Tex. Ct. App. 2008), *rev. denied*; City of San Marcos v. Texas Comm'n of Envtl. Qual., 128 S.W.3d 264 (Tex. Ct. App. 2004), *rev. denied*; S. Plains Lamesa R.R. v. High Plains Underground Water Conserv. Dist., 52 S.W.3d 770 (Tex. Ct. App. 2001); Sw. Travis Cnty Water Dist. v. City of Austin, 64 S.W.3d 25 (Tex. Ct. App. 2000), *petition withdrawn*; Barshop v. Medina Cnty. Underground Water Conserv. Dist., 925 S.W.2d 618 (Tex. 1996); *but see* Bragg v. Edwards Aquifer Auth., 342 Fed. Appx. 43 (5th Cir. 2009) (denying takings claims based on the effects of the Authority's regulations); *see generally* Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 20.07(a)(1)–20.07(a)(2)(B); Jones & Little, *supra* note 36; Trejo, *supra* note 36.

73. *Compare* Stephens v. Anglia Water Auth., [1987] 3 All E.R. 379, 384 (C.A.) (proclaiming the absolute dominion rule); *with* England and Wales (United Kingdom) Water Act, 1945, 8 & 9 Geo. VI, ch. 42 (creating conservation areas within which the Minister of Housing and Local Government could license groundwater withdrawals to protect municipal, industrial, or other water supplies); England and Wales (Water Resources) Act, 1963, 10 Eliz. II, ch. 38, (requiring a license for using water from any source, including "any underground strata," meaning water subjacent to the land surface for anything other than "underground works"). *See generally* Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 20.03.

74. Williams v. Gibson, 4 So. 350, 353-54 (Ala. 1887); Bristor v. Cheatham, 255 P.2d 173, 178-79 (Ariz. 1953); Jones v. Oz-Ark-Val Poultry Co., 306 S.W.2d 111, 115 (Ark. 1957); Cason v. Florida Power Co., 76 So. 535, 536 (Fla. 1917); *In re* Water Use Permit Applications, 9 P.3d 409, 489–90 (Haw. 2000); Bower v. Moorman, 27 Idaho 162, 174, 147 P. 496, 500 (1915); Willis v. City of Perry, 60 N.W. 727, 730 (Iowa 1894); Finley v. Teeter Stone, Inc., 248 A.2d 106, 112 n.3 (Md. 1968); Schenk v. City of Ann Arbor, 163 N.W. 109, 111–12 (Mich. 1917); Stillwater Water Co. v. Farmer, 93 N.W. 907, 909 (Minn. 1903), *further appeal*, 108 N.W. 824 (Minn. 1906); Higday v. Nickolaus, 469 S.W.2d 859, 865–70 (Mo. Ct. App. 1971); Woodsum v. Township of Pemberton, 412 A.2d 1064, 1071–72, 1076–77 (N.J. 1980), *aff'd on other grounds*, 427 A.2d 615 (N.J. 1981); Forbell v. City of New York, 58 N.E. 644 (N.Y. 1900); Rouse v. City of Kinston, 123 S.E. 482, 489 (N.C. 1924); Cline v. Am. Aggregates Corp., 474 N.E.2d 324, 326–27 (Ohio 1984); Routhrauff v. Sinking Spring Water Co., 14 A.2d 87, 90 (Pa. 1940); Wood v. Picillo, 443 A.2d 1244, 1249 (R.I. 1982); Glover v. Utah Oil Ref. Co., 218 P. 955, 956 (Utah 1923); Patrick v. Smith, 134 P. 1076, 1079 (Wash. 1913); Pence v. Carney, 52 S.E. 702, 705 (W. Va. 1905); State v. Michels Pipeline Const., Inc., 217 N.W.2d 339 (Wis. 1974); *see also* Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 21.03–04.

75. *See* Aikins v. Ariz. Dep't of Water Res., 743 P.2d 946, 950–51 (Ariz. Ct. App. 1987); Town of Chino Valley v. City of Prescott, 638 P.2d 1324, 1328 (Ariz. 1981), *appeal dismissed*, 547 U.S. 1101 (1982); Village of Tequesta v. Jupiter Inlet Corp., 371 So. 2d 663, 666–67 (Fla. 1979), *cert. denied*, 444 U.S. 965 (1979); *Michels Pipeline*, 217 N.W.2d at 343–48; *see also* Canseco, *supra* note 70, at 495–505, 511–14.

application of the age-old concepts of nuisance law, including *sic utere tuo ut alienum non laedas*.[76]

B. Correlative Rights

American courts first introduced the phrase "correlative rights" in Minnesota and New Jersey early in the twentieth century.[77] In New Jersey, the phrase was applied to limit the right to make massive abstractions of groundwater for merchandising outside the area of recharge. In these early cases, the court seemed to have meant nothing more than that users drawing upon a common aquifer would have to share the waters on some basis of fairness—in other words, a version of what, in this paper, I term the reasonable use rule.[78] The use of the phrase took a different turn when California, in the case of *Katz v. Walkinshaw*,[79] announced that it was rejecting the reasonable use rule in favor of what it termed the *correlative rights rule*.[80] The California court used the phrase "correlative rights" to mean that competing groundwater users must share the safe yield of the aquifer in proportion to their land holdings, at least when both are seeking water for irrigation.[81]

In any ultimate sense, it matters little what the phrase "correlative rights" means, but the existence of such highly varied understandings of what it means creates confusion, to say the least. What underlies the difference between correlative rights and the reasonable use rule as announced in *Katz* is choice between a strict proportional sharing among water users and a careful, albeit highly unpredictable, weighing of competing claims to use groundwater. Proportional sharing provides a kind of certainty to investors (even if an aquifer is overdeveloped or there is a sharp drop in the level of water, they will not be cut off entirely).[82] Some, however, see proportional sharing as too mechanical to address the complexities of resolving disputes between competing groundwater users, creating a risk of undersupplying water to socially more important uses.[83] Those who favor one or the other approach perhaps seek to enhance its legitimacy by enlarging the number of states

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76. *See* Neuse River Found., Inc. v. Smithfield Foods, Inc., 574 S.E.2d 48 (N.C. Ct. App. 2002), *rev. denied*, 577 S.E.2d 628 (2003); *Michels Pipeline*, 217 N.W.2d at 347; *see also* James Burling, *The Latest Take on Background Principles and the States' Law of Property after Lucas and Palazzolo*, 24 U. HAW. L. REV. 497 (2002); Canseco, *supra* note 70, at 496. The Latin maxim means "so use your property so as not to injure your neighbor's." U.S. LEGAL, http://definitions.uslegal.com/s/sic-utera-tuo-ut-alienam-non-laedas/ (last visited Apr. 1, 2013).

77. Erickson v. Crookston Waterworks, Power & Light Co., 111 N.W. 391 (Minn. 1907), *further appeal*, 117 N.W. 435 (1908); Meeker v. City of E. Orange, 74 A. 379 (N.J. 1909).

78. *See* this text, *supra* accompanying notes 37–39.

79. Katz v. Walkinshaw, 74 P. 766 (Cal. 1903).

80. The court had embraced the reasonable use rule in its first decision on the case. Katz v. Walkinshaw, 74 P. 766 (Cal. 1902).

81. *Id.* at 772; *see generally* Joseph W. Dellapenna, *Correlative Rights Today*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 21.03. Keith Hirokawa has concluded that proportional sharing is determined according to a longer list of factors than just the extent of land ownership. Keith H. Hirokawa, *Property as Capture and Care*, 74 ALB. L. REV. 175, 216–18 (2010).

82. *See, e.g.*, J. David Aiken, *The Western Common Law of Tributary Groundwater: Implications for Nebraska*, 83 NEB. L. REV. 541, 567 (2004).

83. *See, e.g.*, Willis v. City of Perry, 60 N.W. 727, 730 (Iowa 1894); Mich. Citizens for Water Conserv. v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 199–207 (Mich. Ct. App. 2005), *rev'd on other grounds*, 737 N.W.2d 447 (Mich. 2007); Moore v. Berlin Mills Co., 67 A. 578, 580 (N.H. 1907).

that support that approach.[84] With each side claiming that the same states support their view of correlative rights, they succeed only in feeding confusion about the terminology. When even well-informed and thoughtful water law experts disagree, the resulting confusion can make it difficult to know which common law rule applies in a particular jurisdiction.

As already indicated,[85] in this article I use "correlative rights" in the California sense, while referring to the balancing evaluation approach as the *reasonable use rule*. The reasonable use rule is a readily available name for the balancing approach,[86] a name that has been widely used in other water contexts for similar balancing approaches.[87] There is no readily available alternative to correlative rights for the California (proportional sharing) approach, so I use that term in this paper only in this narrower sense. Conceived of as a rule of proportional sharing, correlative rights are also found in Nebraska and Oklahoma, and possibly in New York and Tennessee.[88] The caselaw in Tennessee is simply too limited to allow certain conclusions in this regard, while the regulated riparian statute in New York[89] is too vague to allow one to know for certain whether correlative rights—if that is the common law in New York—continue to predominate in that state. Even in California, Nebraska, and Oklahoma, several other legal regimes are applied to groundwater that serve to complicate, if not confuse, the issue of sharing in those states.[90] This section, however, will focus strictly on the correlative rights rules in the three states that most unequivocally embrace that doctrine as defined for this article.

What the California Supreme Court had done in *Katz v. Walkinshaw* was initially unclear. Some California courts did not see the decision as abandoning the absolute dominion rule for an utterly new kind of rights for groundwater *in situ*.[91] Justice Lucien Shaw, the author of *Katz,* was able to reaffirm the emerging correlative rights rule and to develop some of its implications in several opinions in 1908

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84. Thus Peter Davis casts a very wide net for counting correlative rights (in the reasonable use sense) jurisdictions. Davis, *supra* note 37, at 441 nn.49, 50. Clifford Davis, on the other hand, can find only reasonable use jurisdictions. Clifford Davis, *The Right to Use Water in Eastern States, in* 7 WATER & WATER RIGHTS § 619, at 160–66 (Robert Emmet Clark ed., 1976). Both positions are plausible if you only look at the phrasing in the decisions. Peter Davis, however, counts several states where the highest court has expressly denied that they were following correlative rights. *See* MacArtor v. Graylyn Crest III Swim Club, Inc., 187 A.2d 417, 419 (Del. Ch. 1963); Higday v. Nickolaus, 469 S.W.2d 859, 866-67 (Mo. Ct. App. 1971); State v. Michels Pipeline Const. Inc., 217 N.W.2d 339, 350 (Wis. 1974).

85. *See* the text accompanying *supra* notes 37–39.

86. *See, e.g.*, Henderson v. Wade Sand & Gravel Co., 388 So. 2d 900, 902 (Ala. 1980) (mentioning the correlative rights doctrine, but expressly adopting the reasonable use rule).

87. *See, e.g.*, Joseph W. Dellapenna, *The Right to Consume Water under "Pure" Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, at ch.7 (considering the application of the reasonable use rule to the allocation of surface waters); Joseph W. Dellapenna, *Related Systems of Water Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 10.03(b)(4) (considering the application of the reasonable use rule to the drainage of diffused surface waters).

88. *See* Katz v. Walkinshaw, 74 P. 766 (Cal. 1903); Beatrice Gas Co. v. Thomas, 59 N.W. 925, 928–29 (Neb. 1894); Forbell v. City of N. Y., 58 N.E. 644 (N.Y. 1900); Canada v. City of Shawnee, 64 P.2d 694 (Okla. 1936); Nashville, Chattanooga, & St. L. Ry. v. Rickert, 89 S.W.2d 889 (Tenn. Ct. App. 1935), *state cert. denied*. One might add Puerto Rico, although that is not entirely clear. *See* Dellapenna, *Correlative Rights Today*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 21.02.

89. N.Y. ENVTL. CONSERV. LAW §§ 15-1501(1)(a) (2012) (applying to water from "any permitted source"); 15-1527 (applying to groundwater in Long Island).

90. *See* Dellapenna, *Correlative Rights Today*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 21.03(b) to 21.04.

91. *See* De Wolfskill v. Smith, 89 P. 1001 (Cal Ct. App.1907).

and 1909.[92] These decisions included allowing an overlying landowner who had not used groundwater before *Katz* to obtain a declaratory judgment against an appropriator who had put the groundwater to use before the declaratory suit, thus protecting the surface landowner's paramount right to the groundwater on his land.[93] Another decision fully reaffirmed that landowners abstracting water from a common underground source had rights that were "coequal . . . and correlative."[94] Under these decisions, no priorities existed as between overlying landowners, and the only difference was determined by the relative extent of their respective surface estates.

Some commentators and at least one California lower court at first seemed to think that *Katz* was simply a variant phrasing of the reasonable use rule.[95] To some extent that confusion continues today.[96] Yet the California cases rather clearly establish a different rule: owners of land overlying a single groundwater source have rights in the water in proportion to their ownership of the surface estates, at least when using the water to irrigate, and the first one to use the water does not acquire a right to more than that proportion. This approach subsequently was applied in an unbroken line of California decisions.[97]

The result is very different from the true reasonable use rule in that there is no room for judicial adjustment of shares to reflect a judge's appraisal of what is the most reasonable use of the groundwater. If a groundwater user exceeded a proportionate share, other landowners could obtain a declaratory judgment to protect their unused but invaded interests.[98] Absent such a declaratory action, the landowner risks a finding of a prescriptive right acquired by another landowner's pumping from the aquifer.[99] Without an actual injury to the complaining overlying owner, however, a court will not grant an injunction against the illegal use.[100]

It is not so clear how this approach should be applied when those seeking to use groundwater are not seeking the water for irrigation—which is perhaps why these cases tended to be decided on other grounds, such as appropriation, prescription, or pueblo rights.[101] In *Los Osos Valley Associates v. City of San Luis*

92. Hudson v. Dailey, 105 P. 748 (Cal. 1909); Barton v. Riverside Water Co., 101 P. 790 (Cal. 1909); Burr v. Maclay Rancho Water Co., 98 P. 260 (Cal. 1908); Verdugo Cañon Water Co. v. Verdugo, 93 P. 1021 (Cal. 1908).

93. *See Burr*, 105 P. 748.

94. *See Hudson*, 105 P. at 753.

95. *Ex parte* Elam, 91 P. 811, 813 (Cal. Ct. App. 1907); *see also* 40 CYCLOPEDIA OF LAW AND PROCEDURE 627–29 (1912).

96. *See, e.g.*, CLYDE MARTZ, CASES ON THE LAW OF NATURAL RESOURCES 393 (1951); Davis, *supra* note 37, at 441 nn.49, 50.

97. Tehachapi-Cummings Cnty. Water Dist. v. Armstrong, 122 Cal. Rptr. 918, 924–25 (Cal. Ct. App. 1975); Alpaugh Irrig. Dist. v. Cty. of Kern, 248 P.2d 117, 120 (Cal. Ct. App. 1952); Orchard v. Cecil F. White Ranches, 217 P.2d 143, 149 (Cal. Ct. App. 1950). *See also* Eric L. Garner & Jill N. Willis, *Right Back Where We Started from: The Last Twenty-Five Years of Groundwater Law in California*, 36 MCGEORGE L. REV. 413, 414–24 (2005).

98. Cohen v. La Canada Land and Water Co., 91 P. 584, 589 (Cal. 1907).

99. Hi-Desert Cty. Water Dist. v. Blue Skies Country Club, Inc., 28 Cal. Rptr. 2d 909, 915–18 (Cal. Ct. App. 1994); Alpaugh Irrig. Dist. v. Cty. of Kern, 248 P.2d 117, 120 (Cal. Ct. App. 1952). *See* Dellapenna, *Correlative Rights Today*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 21.03(b)(3).

100. City of San Bernardino v. City of Riverside, 198 P. 784, 787–88 (Cal. 1921).

101. *See id.*, 198 P. 784 (denying a city the right to abstract water from an underground source for sale to customers; holding that the city must qualify for such uses only through appropriation or some other legal basis other than as a landowner correlatively abstracting water from the ground). For these other legal

Obispo,[102] the court held that the city was liable for inverse condemnation when its pumping of water for municipal uses caused subsidence damage to a shopping center. This was the case regardless of whether the subsidence was foreseeable, because inverse condemnation takes place whenever a public action results in physical damage to private property unless the state acts in the proper exercise of emergency police powers or if the state has an absolute right to inflict the damage.[103] No user of groundwater with correlative rights has an absolute right to pump water, while the reasonableness of the pumping is irrelevant.[104] Therefore, the city is liable without fault for the damage its activities inflicted.[105]

Los Osos appears to clarify the nature of correlative rights, but that theory really should not be relevant to surface subsidence cases. Correlative rights provide a way to divide pumping rights among competing water users when there is not enough water to satisfy all demands. Subsidence cases do not involve the dividing up of limited supplies of water. Between neighboring private users of groundwater, courts presumably would fall back on either ordinary tort theories (strict liability for failure to provide support, negligence, or nuisance), or would apply something like the reasonable use or absolute dominion rules to resolve the controversy. Unless California courts hold public entities to stricter standards than a private groundwater user, they should have taken the same approach in *Los Osos*.[106]

When applicable, correlative rights seem to provide a measure of certainty on which landowners can rely.[107] In actual practice, they provide incentives for problematic behavior and create uncertainty. Owners of land overlying an aquifer can be expected to police rampant overpumping by other landowners only if they are vigilant about protecting rights in groundwater that they are not using. In a state like California, groundwater users have strong incentives to pump as much as possible in order to establish an appropriative right or a prescriptive right to the groundwater.[108] Waste becomes a means for capturing future rents for the water pumped now.[109] As a result, correlative rights can generate a "tragedy of the commons," physically limited only by the cost of abstracting groundwater.[110] Still, one

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bases, see Dellapenna, *Correlative Rights Today*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 21.03(b) to 21.03(c).

102. Los Osos Valley Assocs. v. City of San Luis Obispo, 36 Cal. Rptr. 2d 758, 761–64 (Cal. Ct. App. 1994).

103. *Id.*

104. *Id.*

105. *Id.*

106. *Cf.* Alvis v. Cnty. of Ventura, 100 Cal. Rptr. 3d 494 (Cal. Ct. App. 2009) (rejecting a claim for causing a landslide through improper groundwater management for failure to prove negligence).

107. *See* Aiken, *supra* note 82, at 567.

108. *See* Dellapenna, *Correlative Rights Today*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 21.03(b)(2), (b)(3).

109. *See generally* Amy Beatie & James Fosnaught, *The City of Golden's Application for Surface Water Rights: A Kayak Course, Instream Flow, Dilution, or What?*, 2 U. DENV. WATER L. REV. 273 (1999). The notion of capturing rents has been developed in the body of political and economic theory that goes by the name of "public choice theory." *See generally* DANIEL A. FARBER & PHILIP P. FRICKEY, LAW AND PUBLIC CHOICE: A CRITICAL INTRODUCTION (1991); Chulho Jung et al., *The Coase Theorem in a Rent-Seeking Society*, 15 INT'L REV. L. & ECON. 259 (1995); Andrew H. Sawyer, *Improving Efficiency Incrementally: The Governor's Commission Attacks Waste and Unreasonable Use*, 36 MCGEORGE L. REV. 209 (2005).

110. Michael P. Mallery, Comment, *Groundwater: A Call for a Comprehensive Management Program*, 14 PAC. L.J. 1279, 1285–86 (1983).

should not overstress these problems. As one California court recently noted, "[a]fter all is said and done in the legal area, it is apparent that money is the real issue here: who must pay for the cost of importing water to replenish amounts taken in excess of the safe yield."[111] This is a significant question, but it hardly poses an existential threat to a state—so long as water can be found in other watersheds available for importation.

Perhaps only California has applied full-blown correlative rights in the sense of proportionate sharing, although even in California, correlative rights are mixed with other sorts of legal rights to use groundwater. Courts in at least fourteen other states have described themselves, at one time or another, as following a rule of correlative rights: Arkansas, Florida, Hawaii, Maryland, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Oklahoma, Tennessee, Utah, and Washington.[112] Most of these states never actually applied correlative rights in the strict sense of a proportional sharing of groundwater among overlying landowners.[113] These courts usually were not very clear about the difference between their notion of correlative rights and the reasonable use rule.[114] Several courts claimed to follow a "combination" of the two rules.[115] Despite the widespread use of the phrase "correlative rights," in fact we find outside of California, at most, only limited recognition of correlative rights in the sense of proportional sharing.

Of all of the states purportedly applying correlative rights, only Nebraska and Oklahoma appear to have embraced strict proportional sharing if there is not sufficient groundwater to go around,[116] though the Colorado Supreme Court has em-

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111. Hi-Desert Cnty. Water Dist. v. Blue Skies Country Club, Inc., 28 Cal. Rptr. 2d 909, 918 (Ct. App. 1994).

112. Faires v. Dupree, 197 S.W.2d 735 (Ark. 1946); Magnolia Petrol. Co. v. Smith, 238 S.W. 56, 59 (Ark. 1922); Koch v. Wick, 87 So. 2d 47, 48 (Fla. 1956); Labruzzo v. Atl. Dredging & Const. Co., 54 So. 2d 673, 675–77 (Fla. 1951); Wong Leong v. Irwin, 10 Haw. 265, 270 (1896); Davis v. Afong, 5 Haw. 216, 222–23 (1884); Finley v. Teeter Stone, Inc., 248 A.2d 106, 112 n.3 (Md. 1968); Stillwater Water Co. v. Farmer, 93 N.W. 907 (Minn. 1903); Springfield Waterworks Co. v. Jenkins, 62 Mo. App. 74, 80 (1895); Lowe v. Prospect Hill Cemetary Ass'n, 78 N.W. 488, 492 (Neb. 1899); Moore v. Berlin Mills Co., 67 A. 578, 580 (N.H. 1907); Beatrice Gas Co. v. Thomas, 59 N.W. 925, 927 (Neb. 1894); Ocean Grove Camp-Meeting Ass'n v. Comm'rs of Asbury Park, 3 A. 168, 170 (Ch. 1885); Bloodgood v. Ayers, 15 N.E. 433 (N.Y. 1888); Village of Delhi v. Youmans, 45 N.Y. 362 (1871); Pixley v. Clark, 35 N.Y. 520 (1866); Clark v. Lawrence, 59 N.C. 83, 85–86 (1860); Canada v. Shawnee, 64 P.2d 694 (Okla. 1936); Nashville, C. & St. L. Ry. v. Rickert, 89 S.W.2d 889, 896–97 (Tenn. Ct. App. 1935); Garns v. Rollins, 125 P. 867, 870–72 (Utah 1912); Patrick v. Smith, 134 P. 1076, 1079 (Wash. 1913).

113. *See* John Ruple, *Clear Law and Murky Facts: Utah's Approach to Conjunctive Surface and Groundwater Management*, 47 IDAHO L. REV. 217, 223–24 (2011).

114. In addition to the cases cited *supra* in note 112, *see* Tequesta v. Jupiter Inlet Corp., 371 So. 2d 663, 666–70 (Fla. 1979), *cert. denied*, 444 U.S. 965 (1979); *In re* Water Use Permit Applications, 9 P.3d 409, 489–90 (Haw. 2000); *In re* Application U-2, 413 N.W.2d 290, 298 (Neb. 1987); Sorensen v. Lower Niobrara Natural Res. Dist., 376 N.W.2d 539, 546 (Neb. 1985); Woodsum v. Pemberton, 412 A.2d 1064, 1071–72, 1076–77 (N.J. Super. Ct. Div. 1980), *aff'd on other grounds*, 427 A.2d 615 (N.J. Super. Ct. App. Div. 1981); Bayer v. Nello L. Teer Co., 124 S.E.2d 552, 557 (N.C. 1962); Jones v. Home Bldg. & Loan Ass'n of Thomasville, 114 S.E.2d 638, 647–48 (N.C. 1960); Bowles v. City of Enid, 245 P.2d 730, 732 (Okla. 1952); Branch v. W. Petroleum, Inc., 657 P.2d 267, 272–73 (Utah 1982).

115. Stillwater Water Co. v. Farmer, 93 N.W. 907, 909 (Minn. 1903); *In re* Application U-2, 413 N.W.2d 290, 298 (Neb. 1987); Woodsum v. Pemberton, 412 A.2d 1064, 1071–72, 1076–77 (N.J. Super. Ct. Law Div. 1980), *aff'd on other grounds*, 427 A.2d 615 (N.J. Super. Ct. App. Div. 1981); Stevens v. Spring Valley Water Works Co., 247 N.Y.S. 2d 503, 509 (N.Y. App. Div. 1964); Hanson v. Salt Lake City, 205 P.2d 255, 258 (Utah 1949).

116. Prather v. Eisenmann, 261 N.W.2d 766, 771 (Neb. 1978); *In re* Application T-851, 686 N.W.2d 360, 364–67 (Neb. 2004); Canada v. Shawnee, 64 P.2d 694 (Okla. 1936).

braced correlative rights in the sense of strict proportional sharing for "nontributary, non-designated" groundwater.[117] Because the Colorado decision did not discuss whether uses are restricted to overlying land or other characteristic features of correlative rights, one could conclude that only Nebraska and Oklahoma, other than California, have actually adopted correlative rights in the strict sense.

Nebraska's Supreme Court unequivocally indicated in *Prather v. Eisenmann*[118] that it would apply the rule of proportional sharing. Even in Nebraska, however, the application of correlative rights took a rather different turn than in California. Unlike California, Nebraska has never recognized pueblo rights, and the state's appropriative rights statute does not apply to groundwater. Instead, the Nebraska Legislature enacted a preference statute for groundwater under which domestic use takes priority over all other uses, defining domestic uses broadly as "all uses of ground water required for human needs as it relates to health, fire control and sanitation and shall include the use of ground water for domestic livestock as related to normal farm and ranch operations."[119] The court in *Prather* interpreted this statute as requiring, when there was insufficient groundwater available to satisfy all such domestic uses, that

> [e]very overlying owner [have] an equal right to a fair share of the underground water for domestic purposes . . . . If the water became insufficient for the use of all domestic users, each domestic user would be entitled to a proportionate share of the water . . . regardless of priority in time . . . .[120]

The court went on to hold that when an overlying owner using groundwater for domestic purposes is compelled to deepen a well to another level because of heavy pumping from the aquifer by another overlying owner, the owner making the deepening of the well necessary would have to compensate the owner whose well needed deepening.[121] Some of the courts considering this question purported to be applying correlative rights, but their approach turned on reasonableness, not on proportionality. While protection of the head, pressure, or lift of a well might be true under the reasonable use rule,[122] it would not be automatic.[123] Under the reasonable use rule, in contrast with correlative rights, a well owner is obliged to deepen the owner's well or increase the power of the pump as long as the burden was only a "reasonable inconvenience."[124]

Thus, while the decision in *Prather* may well be what its author describes it as being "a very equitable solution [that] reimburses . . . only for the expense they were forced to incur because of the action [of the overpumping overlying own-

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117. E. Cherry Creek Valley Water & Sanitation Dist. v. Rangeview Metro. Dist., 109 P.3d 154 (Colo. 2005).

118. *Prather*, 261 N.W.2d 766.

119. NEB. REV. STAT. § 46-613(1) (2012).

120. *Prather*, 261 N.W.2d at 771.

121. *Id.* at 771–72.

122. *See* Lingo v. City of Jacksonville, 522 S.W.2d 403, 404 (Ark. 1975) (dictum); Birchwood Lakes Colony Club, Inc. v. Medford Lakes, 449 A.2d 472, 477 (N.J. 1982); Woodsum v. Pemberton, 412 A.2d 1064, 1071–72, 1076 (N.J. Super. Law Div. 1980), *aff'd on other grounds*, 427 A.2d 615 (N.J. Super. Ct. App. Div. 1981); Hanson v. Salt Lake City, 205 P.2d 255 (Utah 1949).

123. Erickson v. Crookston Waterworks Power & Light Co., 117 N.W. 435, 439–40 (Minn. 1908) (denying a claim for compensation for the cost of deepening a well).

124. *Id.* at 441.

er],"[125] the one found to be pumping excessively in a sense still wins because an injunction is denied, and the overpumper is only required to pay the cost of deepening the other overlying owners' wells. In fact, this version of correlative rights seems to be limited to an injured owner's right to compensation in a quasi-eminent domain proceeding for the loss of groundwater use. While there is a certain appeal to limiting recovery to the cost of deepening a well, determining who is causing the lowering of a water table is not an easy question. Everyone who pumps water (or draws it by artesian pressure) is causing the water table to drop. Indeed, given the low speed of water movement through the ground, the drop in the water table usually lags months or years behind the pumping that causes the drop, making it even more difficult to determine whose pumping is the most significant cause of the drop. Even if that were not so, in a case like this each use necessarily interferes with the other, and whichever use prevails necessarily destroys or impairs the other.[126] In any event, without an award of punitive damages when the one held responsible knew the likely effect of his or her action, there is little to discourage excessive, even wasteful, pumping of groundwater under such a rule. *Prather* does not discourage a landowner from overpumping if that owner is more interested in getting the water than in the possibility of having to pay other overlying owners for the costs of deepening their wells.

The full import of the *Prather* decision is not altogether clear. The same Nebraska statute also provides for a preference for agricultural uses of groundwater against manufacturing and industrial uses.[127] The statute does not define "agricultural uses," apart from indicating that the term agricultural uses includes aquaculture.[128] Whether a large-scale animal feedlot is included within the class of domestic uses, or within the class of agricultural uses, or within the class of industrial uses is not indicated, and could make a substantial difference in particular cases. Presumably, if there is not enough groundwater to satisfy all uses within a class, the water available would also be allocated proportionally among the several overlying owners. The court in *Prather* did not actually reach the question of allocation among competing users within a class—other than domestic uses—if there is not enough groundwater for all, and it is not clear on what the proportional allocation is to be based. At least for domestic uses, one might think that water should be allocated in proportion to the number of people to be served, yet if livestock is included in the equation, then even for domestic uses, allocation in proportion to the amount of land owned would seem to be necessary. Otherwise an owner could increase the owner's share by adding more animals—for example, by moving from a grazing operation to a feedlot operation. Among strictly agricultural users, any other possible basis for proportional allocation—e.g. acres planted (or capable of being planted) in particular crops, or historic usage—would seem far more complicated than simple allocation in proportion to the amount of land owned,[129] and could also lead

125. *Prather*, 261 N.W.2d at 771.

126. *See* Ronald Coase, *The Problem of Social Cost*, 3 J. LAW & ECON. 1, 3–15 (1960) (particularly at 12–13).

127. NEB. REV. STAT. § 46-613 (2012).

128. *Id.* § 46-613(2).

129. *Cf.* Tehachapi-Cummings Cnty. Water Dist. v. Armstrong, 122 Cal. Rptr. 918, 924–25 (Ct. App. 1975).

to pressures to increase demand by wasteful pumping to create an enhanced history of use.

Despite the importance of *Prather* in indicating that Nebraska follows correlative rights, its preference statute actually breaks from correlative rights. A preferred use (domestic uses versus all other uses; agricultural uses versus all uses except domestic use) can fully displace a less preferred use without proportional allocation and presumably without compensation. In *Spear T Ranch, Inc. v. Knaub*,[130] the Nebraska Supreme Court further compromised the application of correlative rights. While reaffirming the general rule of proportional sharing, the court also declared that landowners were only entitled to "a reasonable proportion" of the available groundwater.[131] This statement could be considered an inelegant expression of the proportional sharing rule endorsed elsewhere in the opinion, except that the court, in resolving the dispute between a surface water user and a groundwater user, indicated that a surface water user had a claim against the groundwater user if the surface water user demonstrated that the groundwater use was causing "unreasonable injury" to the surface water user.[132] The court explicitly stated that in this context reasonableness was to be measured by weighing the equities rather than according to a rule of proportionality.[133] Given the differences in use—watering a ranch versus irrigation of a farm—finding a common measure for proportionality might have been impossible, but the court did not discuss this problem.[134] Whether correlative rights between competing groundwater uses can survive the application in Nebraska of the reasonable use rule to disputes between users of surface waters and groundwater users remains to be seen.

Courts in Oklahoma ambiguously embraced correlative rights early on in the leading case of *Canada v. City of Shawnee*.[135] In that case, the city created a large well field to supply municipal needs, causing wells and springs for adjoining farms to dry up. Oklahoma had already recognized, by statute, the ownership of a landowner of the water "flowing over or under [the land's] surface but not forming a definite stream."[136] The court held that this statute did not allow a landowner to "exhaust the entire water supply of the community . . . for the purpose of transporting and selling [the] water at a distance and off the premises"[137] Whether this holding actually embraced the reasonable use rule or correlative rights was not clear because the court generally referred to both concepts in each sentence. The Okla-

130. Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 122–29 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006).

131. *Id.* at 131.

132. *Id.* at 131–33; *see also* Aiken, *supra* note 82, at 579–81; J. David Aiken, *Hydrologically-Connected Ground Water, Section 858, and the Spear T Ranch Decision*, 84 NEB. L. REV. 962, 979–94 (2006) [hereinafter Aiken, *Hydrologically-Connected Ground Water*]; Donald Blankenau, Thomas Wilmoth & Jaron Bromm, Spear T Ranch v. Knaub: *The Reincarnation of Riparianism in Nebraska Water Law*, 38 CREIGHTON L. REV. 1203 (2005).

133. *Spear T Ranch*, 691 N.W.2d at 131–33; *see also* Aiken, *Hydrologically-Connected Ground Water*, *supra* note 132, at 984–94; Blankenau, Wilmoth & Bromm, *supra* note 132, at 1210–11.

134. *Spear T. Ranch*, 691 N.W.2d at 131.

135. Canada v. City of Shawnee, 64 P.2d 694, 695 (Okla. 1936).

136. OKLA. STAT. ANN. tit. 60, § 60(A) (West 2013).

137. *Canada*, 64 P.2d at 695.

homa Groundwater Act of 1973 apparently resolved this uncertainty.[138] The Act authorized the Oklahoma Water Resources Board to set a maximum annual yield for groundwater basins or subbasins and to allocate withdrawals from each basin whenever total withdrawals exceed the maximum annual yield.[139] The statute provides that groundwater is to be allocated proportionate to the share of land held by each landholder[140]—a clear application of correlative rights. The allocated water can be used outside the groundwater basin of origin unless a moratorium is imposed by the Oklahoma Legislature to protect "sensitive groundwater basins"—basins in which the aquifer has been designated as a "sole source aquifer" under the Safe Drinking Water Act.[141]

What the cases applying correlative rights in California, Nebraska, and Oklahoma have in common is that while the right to use groundwater is dependent on ownership of the land surface overlying a source of groundwater, the right is limited by an obligation to respect the similar rights of others owning overlying land.[142] Nebraska, like California, has concluded that correlative rights thus are "inseparable from the land to which [the right] applies."[143] Clearly, groundwater use is not an unlimited private property right in states that apply correlative rights.[144] As the Nebraska Supreme Court summarized the point, "[g]round water is owned by the public, and the only right held by an overlying landowner is in the use of the ground water."[145] The right of the overlying owner to use groundwater is a usufructuary right and not an absolute right.[146] The property right in groundwater, therefore, is a right protected under the constitution as a proportional interest held as an appurtenance of the estate of the overlying owner, but the right cannot be asserted beyond that limited purpose.

138. OKLA. STAT. ANN. tit. 82, §§ 1020.1–1020.22 (West 2013); *see generally* Robert H. Anderson, *Oklahoma's 1973 Groundwater Law: A Short History*, 43 OKLA. L. REV. 1 (1990); L. Paul Goeringer, *A Practitioner's Guide to the Oklahoma Groundwater Act: How to Dip Your Bread into the Gravy While It Is Still Hot*, 2 KY. J. EQUINE AGRIC. & NAT. RESOURCES L. 157 (2009).

139. OKLA. STAT. ANN. tit. 82, §§ 1020.4–1020.9 (West 2013); *see also* Tex. Cnty. Irrigation & Water Res. Ass'n v. Okla. Water Res. Bd., 803 P.2d 1119 (Okla. 1990); Kline v. State *ex rel.* Okla. Water Res. Bd., 759 P.2d 210 (Okla. 1988). Wells for domestic uses are exempted from the permit requirement. OKLA. STAT. ANN. tit. 82, § 1020.3 (West 2013); *see generally* Nathan Bracken, *Exempt Well Issues in the West*, 40 ENVTL. L. 141 (2010); Laura A. Schroder, Therese A. Ure & Sarah Lijefelt, *Domestic Groundwater Exemptions: Competing Uses Put Pressure on Western Water Right Requirements, But Constitutional Right to Life May Trump Prior Appropriation Doctrine*, 47 WILLAMETTE L. REV. 405 (2011).

140. OKLA. STAT. ANN. tit. 82, § 1020.9(B) (West 2013).

141. *Id.* §§ 1020.9(A)–1020.9(B); *see also* Jacobs Ranch, L.L.C. v. Smith, 148 P.3d 842 (Okla. 2006).

142. *See, e.g.*, Sorensen v. Lower Niobrara Nat. Res. Dist., 376 N.W.2d 539, 547–48 (Neb. 1985).

143. *Id.* at 547–48; *see also* Montecito Valley Water Co. v. City of Santa Barbara, 77 P. 1113, 1114–15 (Cal. 1904).

144. Application U-2 v. Abrahamson, 413 N.W.2d 290, 298 (Neb. 1987); State *ex rel.* Douglas v. Sporhase, 305 N.W.2d 614, 617 (Neb. 1981), *rev'd on other grounds sub nom.*, 458 U.S. 941 (1982).

145. *Application U-2*, 413 N.W.2d at 298.

146. *Id.*; State v. Super. Ct., 93 Cal. Rptr. 2d 276, 282–84 (Ct. App. 2000).

C. The Reasonable Use Rule

Both correlative rights and the reasonable use rule require a sharing of the groundwater among those who have a legitimate claim upon the resource.[147] I have already written in this article about the confusion of the reasonable use rule with correlative rights and why I use "correlative rights" to refer to the proportionate sharing of groundwater.[148] I will note here one further theory whereby courts have sought to distinguish the reasonable use theory from correlative rights apart from proportional sharing.

Several courts have sought to distinguish correlative rights from the reasonable use rule by conceiving of correlative rights as requiring a reasonable sharing among competing users of groundwater, not necessarily a rule of proportional sharing, regardless of where the water is used, while conceiving of the reasonable use rule as allowing unlimited pumping by competing users so long as the water is used on the overlying land.[149] This distinction does not work because courts adhering to correlative rights in the proportional sharing sense have also limited uses to the overlying land.[150] Furthermore, even courts that do not limit the term correlative rights to proportional sharing often limit use under correlative rights to the overlying land.[151] A contrasting view is that the reasonable use rule, properly understood, requires balancing the social utility of competing uses against each other rather than the proportional sharing of correlative rights.[152] A rule that allows the unlimited pumping of water so long as it is used on land overlying the aquifer from which the water is pumped should be seen as a variant form of the absolute dominion rule—

147. *See* Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 128–29 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006); *see also* Anna di Robilant, *Abuse of Rights: The Continental Drug and the Common Law*, 61 HASTINGS L. J. 687, 696–701 (2010).

148. *See supra* text accompanying notes 37–39, 77–90, and *infra* 147–53.

149. Brady v. Abbott Labs., 433 F.3d 679 (9th Cir. 2005), *cert. denied*, 549 U.S. 886 (2006); *In re* Water Use Permit Applications, 9 P.3d 409, 489–90 (Haw. 2000); Mich. Citizens for Water Conserv. v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 198 (Mich. Ct. App. 2005), *rev'd on other grounds*, 737 N.W.2d 447 (Mich. 2007); *Spear T Ranch*, 691 N.W.2d at 128; *see also* Davis, *supra* note 37, at 441; Heather Elliott, *Alabama's Water Crisis*, 63 ALA. L. REV. 383, 392–93 (2012); Ellen Kohler, *Ripples in the Water: Judicial, Executive, and Legislative Developments Impacting Water Management in Michigan*, 53 WAYNE L. REV. 1, 8, 13 (2007); Daniel F. McLawhorn, *Where Will You Go When the Well Runs Dry? Local Government Ownership and Water Allocation in North Carolina*, 32 CAMPBELL L. REV. 51, 58–59 (2009); R. Timothy Weston, *Harmonizing Management of Groundwater and Surface Water Use Under Eastern Water Law Regimes*, 11 U. DENV. WATER L. REV. 239, 250–51 (2008); Sandra Zellmer, *Floods, Famines, or Feasts: Too Much, Too Little, or Just Right*, 24 NAT. RES. & ENVT. 20, 22 (Winter 2010).

150. Hudson v. Dailey, 105 P. 748, 753 (Cal. 1909); Montecito Valley Water Co. v. City of Santa Barbara, 77 P. 1113, 1114–15 (Cal. 1904); Sorensen v. Lower Niobrara Nat. Res. Dist., 376 N.W.2d 539, 547–48 (Neb. 1985).

151. *In re* Water Use Permit Applications, 9 P.3d 409, 490 (Haw. 2000); Erickson v. Crookston Waterworks, Power & Light Co., 117 N.W. 435, 441 (Minn. 1908); Meeker v. City of East Orange, 74 A. 379, 385 (N.J. 1909); Forbell v. City of New York, 58 N.E. 644, 645–46 (N.Y. 1900); *see also* Lingo v. City of Jacksonville , 522 S.W.2d 403, 405 (Ark. 1975) (*dictum*) (criticizing the correlative rights doctrine for limiting uses to the overlying land, but then declaring that such a restriction did not apply for the Arkansas version of the correlative rights doctrine); Glover v. Utah Oil Ref. Co., 218 P. 955, 957 (Utah 1923).

152. *See, e.g.*, Spear T Ranch, Inc. v. Knaub 691 N.W.2d 116, 129–31 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006) (describing this approach as the "Restatement" approach).

absolute ownership limited by an appurtenance rule.[153] In this article, I use the term "reasonable use rule" to indicate that a court will allocate groundwater on the basis of the reasonableness of the competing uses, relegating rules allowing unlimited pumping, even if limited by appurtenance requirements, to the "absolute dominion" rule and rules of proportionate sharing to "correlative rights."

New Hampshire was the first jurisdiction to reject the absolute dominion rule for groundwater, all the way back in 1854 in *Bassett v. Salisbury Manufacturing Co.*[154] This was not long after courts had adopted absolute dominion as the common law in England and in several American states.[155] The New Hampshire Supreme Court case arose when a dam on the Powow River drove up the water table under Bassett's land, causing it to become waterlogged.[156] As a result, Bassett could no longer dig peat or grow crops on his land.[157] The New Hampshire Supreme Court concluded:

> It is settled that a party may recover some damages whenever another, under a claim of right, assumes to interfere in any way with his property, in a case where the continued exercise of such assumed right, may by time ripen into an easement and incumbrance (*sic*) on the property . . . because the party has no other remedy to protect himself against such encroachments but by a suit for damages.[158]

Within ten years, the case was back before the state supreme court, after its *fifth* trial.[159] Only then did the court firmly reject the absolute dominion rule[160] and unanimously adopted a reasonable use rule for groundwater:

> We need not argue that some rights exist; that the owner of the land may make some use of the water in it; that he may do some acts that will affect to some extent the drainage; that a well may be dug, under some circumstances, although it will draw water by percolation from a water-course, from adjoining land, or even from the well of a neighbor . . . . [T]he sole ground of the qualification of the land-owner's right in such cases, and that is, as in certain cases of water-courses, the similar rights of others; and this will of course determine the extent of the qualification, which . . . is the rule of reasonable use—of a reasonable exercise of one's own right. The rights of each land-owner being similar, and his enjoyment dependent upon the action of the other land-owners, these rights must be valueless unless exercised with reference to each other, and are correlative. The maxim, "*Sic utere*," &c., therefore applies, and . . . restricts each to a rea-

153. *See* Hathorn v. Natural Carbonic Gas Co., 87 N.E. 504 (N.Y. 1909); Forbell v. City of N.Y., 58 N.E. 644, 646 (N.Y. 1900); Dellapenna, *The Absolute Dominion Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 20.08.

154. Bassett v. Salisbury Mfg. Co., 28 N.H. 438, 444–45 (1854).

155. *See supra* text accompanying notes 40–55.

156. *Bassett*, 28 N.H. at 439–40.

157. *Id.* at 440.

158. *Id.* at 455–56.

159. The number of trials in *Bassett* is indicated in *Swett v. Cutts.* Swett v. Cutts, 50 N.H. 439, 444 n.1 (1870) (reporter's note).

160. Bassett v. Salisbury Mfg. Co., 43 N.H. 569, 579 (1862).

> sonable exercise of his own right, a reasonable use of his own property, in view of the similar rights of others.[161]

In short, as Justice William Bartlett stated in opening this opinion, "No landowner has an absolute and unqualified right to the unaltered drainage or percolation to or from his neighbor's land."[162] The court expressly chose to apply the same rule to groundwater that it had already applied to surface waters, rejecting the putative natural flow doctrine.[163] Within a decade, the New Hampshire Supreme Court would extend the same rule to diffused surface run-off, drawing upon both the reasonable use rules for stream waters and groundwater.[164] Therefore, across the board—including stream water, groundwater, and surface run-off—New Hampshire by the 1880s had the reasonable use rule as part of the jurisdiction's common law regarding disputes over all significant forms of ambulatory water.[165]

New Hampshire's Supreme Court knew it had done something unique, even acknowledging that its action was regarded by the text writers as "peculiar to the jurisprudence of this state."[166] Proudly, the court announced that "[t]he doctrines of reasonable necessity, reasonable care, and reasonable use prevail in this state in a liberal form, on a broad basis of general principle."[167] Not everyone fully grasped what this development meant, or at least how to describe it. Some commentators simply denied that New Hampshire, whatever its judges might claim for the jurisdiction, had different rules, insisting that for groundwater New Hampshire really followed the absolute dominion rule and the then-usual common enemy rule for surface run-off.[168] Writers of legal encyclopedias treated the New Hampshire cases as subjecting the general groundwater rule of absolute dominion merely "to some qualifications on the ground that such right relates to the beneficial use of the waters or of the land for some purpose connected with ordinary operations of agriculture, mining, domestic use, or improvements either public or private."[169] Even after it became generally accepted that New Hampshire rejected the absolute dominion rule, confusion continued over whether the New Hampshire rule should properly be consider a form of correlative rights or something else. Thus, as late as 1982, Peter Davis listed New Hampshire as a correlative rights state.[170] New Hampshire's Supreme Court had used the phrase "correlative rights" in a few groundwater deci-

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161. *Id.* at 577.

162. *Id.* at 573.

163. Runnels v. Bullen, 2 N.H. 532, 537 (1823). For a modern statement that these rules are the same, *see* Anglers of the Au Sable, Inc. v. Dep't. Envtl. Quality, 770 N.W.2d 359, 376–77 (Mich. Ct. App. 2009), *rev'd on other grounds,* 793 N.W.2d 596 (Mich. 2010), *reversal vacated as moot*, 796 N.W.2d 240 (Mich. 2011).

164. Swett v. Cutts, 50 N.H. 439, 446 (1870).

165. Town of Rindge v. Sargent, 9 A. 723, 723–24 (N.H. 1886).

166. City of Franklin v. Durgee, 51 A. 911, 913 (N.H. 1901).

167. Haley v. Colcord, 59 N.H. 7, 8 (1879).

168. As noted by John M. Shirley, New Hampshire's official reporter: "By reference to the note of Judge Redfield (Am. L. Reg., January, 1872, pp. 19, 24), it will be seen that that eminent jurist endorses the English doctrine, and assumes and seems to think that the cases of Dr. Bassett [involving the adoption of the reasonable use rule for groundwater in lieu of the absolute dominion rule] and Dr. Swett [involving the adoption of the reasonable use rule for surface run-off in lieu of the common enemy rule], reversing the English rule, are in harmony with it." Swett v. Cutts, 50 N.H. 439, 444 n.1 (1870) (reporter's note).

169. Briscoe Baldwin Clark, *Waters and Watercourses* § I(2), *in* 30 AM. & ENG. ENCYCLOPEDIA OF LAW. 314 (2d ed. 1905).

170. Davis, *supra* note 37, at 441 n.50.

sions.[171] Generally, however, the court referred to "reasonable use" and decided the cases, even the ones in which it referred to correlative rights, on the basis of the reasonableness of the uses rather than a rule of proportional sharing (correlative rights, strictly speaking), eschewing hard and fast rules regarding the use of groundwater.[172]

For the New Hampshire Supreme Court, property was not an "unrestricted dominion" as in the civil law tradition, but merely "an aggregation of qualified privileges, the limits of which are prescribed by the equality of rights, and the correlation of rights and obligations necessary for the highest enjoyment of land by the entire community of proprietors."[173] Proprietary rights, in this view, are always limited, never absolute, and always to be exercised in relation to the rights of others.[174] Such a view enabled the court to sweep away at an early date so much of the law then enjoying wide acceptance in the rest of the common-law world: the natural flow doctrine for streams, the absolute dominion doctrine for groundwater, and the common enemy rule for surface run-off.[175]

For a long time, New Hampshire stood alone. New Hampshire (reasonable use) and California (correlative rights) might worship at strange shrines, but the rest of the country remained soundly committed to the absolute dominion rule. And by the 1920s, the reasonable use rule had accrued particular definitions, limitations, and constraints that later critics were to claim allowed decisions with results close to what the absolute dominion rule itself would have provided.[176] The states that first showed interest in the New Hampshire rule, when it was a new rule, were appropriative rights jurisdictions or jurisdictions that were developing correlative rights.[177] Courts that proclaimed their acceptance of the emerging theory of correlative rights were also favorably impressed by the reasonable use rule; their approving citations to the New Hampshire decisions suggests in fact that these states were embracing the reasonable use rule rather than correlative rights, properly speak-

171. *See, e.g.,* Moore v. Berlin Mills Co., 67 A. 578, 580 (N.H. 1907); Dolbeer v. Suncook Waterworks Co., 58 A. 504, 506 (N.H. 1904).

172. Ladd v. Granite State Brick Co., 37 A. 1041, 1042 (N.H. 1889) ("Whatever may be the law in other jurisdictions, it must be regarded as settled in [New Hampshire] that the test is the reasonableness or unreasonableness of the business in question under all the circumstances . . . . The question of reasonableness is a question of fact.").

173. Thompson v. Androscoggin River Improvement Co., 54 N.H. 545, 551 (1874); *see also Moore*, 67 A. at 580.

174. *Thompson*, 54 N.H. at 552.

175. While not quite as groundbreaking in the twentieth century, New Hampshire did eventually enact a statute for the protection of groundwater quality that requires permits for groundwater withdrawals of more than 57,600 gallons per day. *See* N.H. REV. STAT. ANN. § 485-C:21 (2013), *construed in* New Hampshire Dep't of Envtl. Servs. v. Mottolo, 917 A.2d 1277 (N.H. 2007); *In re* Nottingham, 904 A.2d 582 (N.H. 2006). New Hampshire also requires that all water users who withdraw more than 20,000 gpd averaged over a seven-day or a thirty-day period register their uses with the state. N.H. REV. STAT. ANN. §§ 488:1 to 488:11 (2013).

176. *See infra* Part II.A.

177. *See* Bruening v. Dorr, 47 P. 290 (Colo. 1896); IDAHO CONST. Art. XV; Idaho Rev. Code § 3242 (1908), *now found at* IDAHO CODE ANN. § 42-226 (2000). Colorado today still recognizes a right to a "reasonable pump lift" for groundwater appropriators. *See* Upper Black Squirrel Creek Ground Water Mgmt. Dist. v. Goss, 993 P.2d 1177, 1189 (Colo. 2000); Meridian Ranch Metropolitan Dist. v. Colorado Ground Water Comm'n, 240 P.3d 382, 388-89 (Colo. App. 2009), *cert. denied*.

ing.[178] California, which ultimately developed the most complete form of correlative rights, initially adopted the reasonable use rule in the first opinion in *Katz v. Walkinshaw*,[179] only to turn away on a rehearing to adopt its version of correlative rights.[180] Other jurisdictions, the so-called eastern correlative rights states, were favorably impressed, as well, citing the reasonable use rule as authority for their decisions.[181] If one counts the decisions that some classify as applying correlative rights but in which the rule of allocation was the reasonableness of the use rather than proportionate sharing, at least seven states other than New Hampshire had adopted the reasonable use rule by 1920.[182]

During the 1920s, at least two more states adopted some variation of the reasonable use rule.[183] By 1934, a new legal encyclopedia indicated that the reasonable use rule was the normal law for groundwater—a rather remarkable transformation of the understanding of the law in less than twenty years.[184] By then, many judges had adopted the phrase "American rule" as a common shorthand expression for the reasonable use rule, a practice that continues to this day even as the number of states following the reasonable use rule is in decline.[185] Over the next several decades, additional courts adopted the reasonable use rule,[186] coming close to making it truly the "American rule."

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178. Stillwater Water Co. v. Farmer, 93 N.W. 907, 909 (Minn. 1904); Meeker v. City of East Orange, 74 A. 379, 380 (N.J. 1909); Smith v. City of Brooklyn, 46 N.Y.S. 141, 143 (N.Y., App. Div. 1897), *aff'd on other grounds*, 54 N.E. 787 (N.Y. 1899).

179. Katz v. Walkinshaw, 70 P. 663 (Cal. 1902), *rev'd on rehearing,* 74 P. 766 (Cal. 1903) (opinion of Temple, J., printed in the official reports as a dissent to the majority opinion substituted on rehearing), 70 P. 663 (1902), *rev'd on rehearing,* 74 P. 766 (Cal. 1903).

180. *Katz*, 74 P. 766 (Cal. 1903). *See supra* the text at notes 75–84.

181. *See, e.g.*, Cason v. Florida Power Co., 76 So. 535, 536 (Fla. 1917).

182. *See* Williams v. Gibson, 4 So. 350, 353-54 (Ala. 1887); Cason v. Florida Power Co., 76 So. 535, 536 (Fla. 1917); Bower v. Moorman, 27 Idaho 162, 174, 147 P. 496, 500 (1915); Willis v. City of Perry, 60 N.W. 727, 730 (Iowa 1894); Schenk v. City of Ann Arbor, 163 N.W. 109, 111–12 (Mich. 1915); Patrick v. Smith, 134 P. 1076, 1079 (Wash. 1913); Pence v. Carney, 52 S.E. 702, 705 (W. Va. 1905). *See also* Long v. Louisville & Nashville R.R., 107 S.W. 203, 205 (Ky. 1908) (a pollution case, rather than an allocation case); Clark v. Lawrence, 59 N.C. 83, 83 (1860) (same).

183. Rouse v. City of Kinston, 123 S.E. 482, 489 (N.C. 1924); Glover v. Utah Oil Refining Co., 218 P. 955, 956 (Utah 1923).

184. 67 CORPUS JURIS, *Waters* § 255, at 838 (1934).

185. *See* Adams v. Lang, 553 So. 2d 89, 91 (Ala. 1989); Jarvis v. State Land Dep't, 479 P.2d 169, 172 (Ariz. 1970); Jones v. Oz-Ark-Val Poultry Co., 306 S.W.2d 111, 114–15 (Ark. 1957); FMC Corp. v. Plaisted & Cos., 72 Cal. Rptr. 2d 467, 513 (Cal. Ct. App. 1998), *rev. denied*; City of Valparaiso v. Defler, 694 N.E.2d 1177, 1179–80 (Ind. Ct. App. 1998); McDowell v. Rural Water Dist. No. 2, 282 N.W.2d 594, 596 (Neb. 1979); Woodsum v. Township of Pemberton, 412 A.2d 1064, 1070–71 (N.J. Super. Ct. Law Div. 1980), *aff'd on other grounds*, 427 A.2d 615 (N.J. Super. Ct. App. Div. 1981); Bowles v. City of Enid, 245 P.2d 730, 732 (Okla. 1950); *see also* Peter N. Davis, *Federal and State Water Quality Regulation and Law in Missouri*, 55 MO. L. REV. 411, 492–95 (1990); Eric L. Garner, Michelle Ouellette, & Richard L. Sharff, Jr., *Institutional Reform in California Groundwater Law*, 25 PAC. L.J. 1021, 1040–41 (1994); Robert Jerome Glennon & Thomas Maddock, III, *In Search of Subflow: Arizona's Futile Effort to Separate Groundwater from Surface Water*, 36 ARIZ. L. REV. 567, 604 (1994); Corwin W. Johnson, *The Continuing Void in Texas Groundwater Law: Are Concepts and Terminology to Blame*, 17 ST. MARY'S L.J. 1281, 1288–89 (1986); Linda A. Malone, *The Necessary Interrelationship between Land Use and the Preservation of Groundwater Resources*, 9 UCLA J. ENVT'L L. & POL'Y 1, 5 (1990).

186. Bristor v. Cheatham, 255 P.2d 173, 178–79 (Ariz. 1953); Jones v. Oz-Ark-Val Poultry Co., 306 S.W.2d 111, 115 (Ark. 1957); Higday v. Nickolaus, 469 S.W.2d 859, 865–70 (Mo. Ct. App. 1971), *transfer denied*; Cline v. Am. Aggregates Corp., 474 N.E.2d 324, 326–27 (Ohio 1984); Rothrauff v. Sinking Spring Water Co., 14 A.2d 87, 90 (Pa. 1940); Wood v. Picillo, 443 A.2d 1244, 1249 (R.I. 1982); State v. Michels Pipeline Const., Inc., 217 N.W.2d 339 (Wis. 1974); *see also* Spear T Ranch, Inc. v. Knaub, 691

Adopting the reasonable use rule in place of the absolute dominion rule reflected a growing confidence that more knowledge was available regarding groundwater than when the absolute dominion rule developed, a confidence that was greater than was the actual situation in the late nineteenth and early twentieth centuries. As David Getches wrote even in 1990, "practical difficulties in knowing about [groundwater], let alone controlling it" are real barriers to action: "even with the benefit of modern science, there are complexities that press the limits of available technology."[187] True, in the twentieth-first century, far more is possible than anyone in the late nineteenth century or, indeed, through most of the twentieth century would have thought scientifically possible. Modern hydrogeology can now provide the necessary knowledge for assessing hydrogeological characteristics, including all the major geologic and hydrologic factors affecting groundwater location and movement within the mapped unit.[188] The problem today is not so much lack of the tools to recover the desired information, but rather the expense, both in money and in time, to obtain it. Consider the case of *City of Los Angeles v. City of San Fernando*,[189] in which the trial was delayed ten years to allow research to determine the facts regarding the groundwater basins subject to the dispute, yet by the time the case reached the California Supreme Court, after a lengthy trial and intermediate appeal, the data was already ten years old.[190] Today, then, we have the means for obtaining sufficient information about groundwater to allocate groundwater among competing uses—if we are willing to bear the expense. If the enormously greater knowledge about water generally, and groundwater in particular, still causes doubts and delays today, one may wonder at the confident optimism with which those late nineteenth-century judges adopted the reasonable use rule.

Whether initially justified or not, however, the reasonable use rule was to be the vehicle that eventually ousted the absolute dominion rule in most of the United States and to modify that rule profoundly where the reasonable use rule did not oust the absolute dominion rule completely. Today, the reasonable use rule is embedded in the *Restatement (Second) of Torts*.[191] From a high of about twenty-six states (counting those that stated they followed correlative rights but determining them according to a reasonableness balancing process), today the reasonable use rule continues to be applied in about ten states—although the answer is not entirely certain in some of these states.[192] In several states, the legislature or the courts have

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N.W.2d 116, 131–33 (Neb. 2005) (adopting the reasonable use rule for disputes between users of surface waters and users of groundwater), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006).

187. David H. Getches, *Groundwater Quality Protection: Setting a National Goal for State and Federal Programs*, 65 CHI.-KENT L. REV. 387, 390 (1990).

188. *See, e.g.*, Rosato v. 2550 Corp., 894 N.Y.S.2d 513, 515 (N.Y. App. Div. 2010) (describing the information before the court as arguably providing "a reasonable degree of hydrogeological certitude," but ordering a trial to determine whether that information was accurate); *see generally* Joseph W. Dellapenna, *The Physical and Social Bases on Quantitative Groundwater Law*, *in* 2 WATERS AND WATER RIGHTS, *supra*, note 47, §§ 18.01 to 18.05; Luke W. Harris & Christopher J. Sanchez, *Considerations for Analyzing Colorado Ground Water: A Technical Perspective*, 15 U. DENV. WATER L. REV. 105 (2011).

189. 537 P.2d 1250 (Cal. Ct. App. 1975).

190. *Id.* at 1310.

191. RESTATEMENT (SECOND) OF TORTS, *supra* note 38, § 858.

192. Alabama, Michigan, Missouri, New York, Ohio, Pennsylvania, Rhode Island, Tennessee, West Virginia, and Wisconsin. Some contend that New York and Tennessee follow correlative rights rather than reasonable use. *See* the text of *supra* at notes 88–90. Alabama and New York have regulated riparian statutes with limited application to groundwater.

replaced the reasonable use rule with appropriative rights,[193] and at least one state even went to correlative rights from the reasonable use rule.[194] In nine formerly reasonable use states, the legislature enacted a regulated riparian statute in large measure that draws upon the reasonable use rule.[195] In the regulated riparian states, furthermore, the reasonable use rule remains the residual rule for disputes that, for one reason or another, cannot be resolved by the application of the regulated riparian system.

The intent—expressed explicitly in the New Hampshire cases,[196] only implicitly in many cases in other states, but ultimately explicitly in the *Restatement (Second) of Torts*[197]—created considerable confusion regarding just what the reasonable use rule for groundwater really means and how it operates. These problems largely derived from the difficulty in obtaining the knowledge necessary to decide whether one use of groundwater was interfering with another, let alone which use might be most socially valuable. Yet drawing from the premise that the reasonable use rule for groundwater is to operate largely according to the same principles as the reasonable use rule for surface waters, one can deduce how to apply the reasonable use rule correctly to groundwater.[198] Thus, analogously to the rule for surface waters,[199] the only lawful uses of groundwater under the reasonable use rule are on land overlying the aquifer from which the water is taken.[200] The limitation of use to the overlying land did not altogether prohibit the use of groundwater off the overlying land, but it did mean that in any dispute involving one using groundwater on overlying land and another using the groundwater off the overlying land, the one using the water on the overlying land would always win, virtually without regard to

193. *See infra* Part II.D.

194. Katz v. Walkinshaw, 74 P. 766 (Cal. 1903); *see also* Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 131–33 (Neb. 2005) (adopting the reasonable use rule for disputes between users of surface waters and users of groundwater), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006); *In re* Application U-2, 413 N.W.2d 290, 298 (1987) (describing Nebraska's groundwater law as a combination of correlative rights and the reasonable use rule); Sorensen v. Lower Niobrara Nat. Res. Dist., 376 N.W.2d 539, 546 (Neb. 1985) (same).

195. *See* the text of *infra* at notes 341–48.

196. Bassett v. Salisbury Mfg. Co., 43 N.H. 569, 577 (1862); *see also* Heston v. Ousler, 398 A.2d 536, 539 (N.H. 1979); Seacoast Water Comm'n v. City of Portsmouth, 203 A.2d 649, 656 (N.H. 1964); Moore v. Berlin Mills Co., 67 A. 578, 580 (N.H. 1907); City of Franklin v. Durgee, 51 A. 911, 913 (N.H. 1901); Ladd v. Granite State Brick Co., 37 A. 1041, 1042 (N.H. 1895); Swett v. Cutts, 50 N.H. 439, 446 (1870); Boardman v. Woodman, Ex'r, 47 N.H. 120, 150 (1866).

197. RESTATEMENT (SECOND) OF TORTS § 858 (1979).

198. *See generally* Dellapenna,*The Reasonable Use Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 22.

199. Dellapenna, *The Right to Consume Water under "Pure" Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 7.02(a)(1).

200. *See* Brady v. Abbott Labs., 433 F.3d 679 (9th Cir. 2005), *cert.denied*, 549 U.S. 886 (2006); Farmers Inv. Co. v. Bettwy, 558 P.2d 14 (Ariz. 1976); *In re* Water Use Permit Applications, 9 P.3d 409, 490 (Haw. 2000); Barclay v. Abraham, 631, 96 N.W. 1080, 1084 (Iowa 1903); United Fuel Gas Co. v. Sawyers, 259 S.W.2d 466, 468 (Ky. 1953); Bernard v. City of St. Louis, 189 N.W. 891, 892 (Mich. 1922); Michigan Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 197–99 (Mich. Ct. App. 2005), *rev'd on other grounds,* 737 N.W.2d 447 (Mich. 2007); Erickson v. Crookston Waterworks, 117 N.W. 435, 441 (Minn. 1908); City of Blue Springs v. Central Dev. Ass'n, 831 S.W.2d 655, 659 (Mo. Ct. App. 1992), *transfer denied*; Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 128 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006); Borough of Wallington v. Tube Reducing Corp., 42 A.2d 757, 758 (N.J. Ch. 1945); Forbell v. City of New York, 58 N.E. 644 (N.Y. 1900); Rouse v. City of Kinston, 123 S.E. 482, 493 (N.C. 1924); Crook v. Hewitt, 31 P. 28 (Wash. 1892); Pence v. Carney, 52 S.E. 702 (W. Va. 1905).

the equities as between the uses or the users.[201] When there is not enough water to satisfy all the uses on overlying land, the test for reasonableness is a relational one rather than an abstract test of reasonableness.[202] A few words are in order regarding the concept of reasonableness.

Some courts and commentators describe the reasonable use rule as serving only to limit the use of groundwater to land overlying the aquifer or other underground source.[203] By this view, so long as a use is not wasteful, each overlying landowner can make virtually unlimited use of the groundwater on the overlying land regardless of the impact on other lawful groundwater users.[204] This view could be seen as evaluating the reasonableness of a use of groundwater in the abstract. Another possible understanding of abstract reasonableness would be to determine whether a particular use is reasonable at any time, regardless of the particular circumstances of the instant case.[205] Such abstract approaches to reasonableness have rarely been applied to surface waters.[206] Given the professed intention to apply the same rule to groundwater as to surface waters, there is no reason to consider that reasonableness for groundwater should be applied abstractly either.

In particular, there is little legal authority for reading the reasonable use rule as allowing unlimited pumping if the groundwater is used on the overlying land and without regard to the impact on other groundwater users. Many of the judicial statements expressing this view are dicta in disputes involving uses of the overlying land or the malicious waste of water.[207] In other cases,[208] the statements follow or precede statements indicating that the use must be "reasonable" without explanation; in context, many of these purported precedents actually support a more nuanced reading of the rule. The New Hampshire decisions, the origin of the rule, clearly required determination of what was reasonable by a relational rather than an abstract test.[209] Other courts—even in these early years—referred to "reasonable" as a relative term, requiring the comparison of the competing interests.[210] Many

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201. *See, e.g.*, Higday v. Nickolaus, 469 S.W.2d 859, 866 (Mo. 1971), *transfer denied*.

202. *See also* Dellapenna, *The Right to Consume Water under "Pure" Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 7.03(d)(2)–7.03(e).

203. *See, e.g.*, Barclay v. Abraham, 96 N.W. 1080, 1084 (Iowa 1903); Michigan Citizens for Water Conserv. v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 198 (Mich. Ct. App. 2005), *rev'd on other grounds*, 737 N.W.2d 447 (Mich. 2007); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 128, 131 (Neb. 2005), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006); DAVID H. GETCHES, WATER LAW IN A NUTSHELL 254 (2d ed. 1990); Weston, *supra* note 149, at 327.

204. Weston, *supra* note 149, at 327.

205. *See, e.g.*, Joslin v. Marin Municipal Water Dist., 429 P.2d 889 (Cal. 1967) (holding that the use of a small river to transport gravel to one's land is not a reasonable use without balancing costs against benefits).

206. *See* Dellapenna, *The Right to Consume Water under "Pure" Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 7.02(d)(1).

207. *See, e.g.*, Tracy v. City of Mt. Pleasant, 146 N.W. 78, 82 (Iowa 1914) (use of the overlying land); Barclay v. Abraham, 96 N.W. 1080, 1082-84 (Iowa 1903) (malicious waste).

208. *See, e.g.*, Eley v. Twin State Gas and Elec. Co., 117 A. 817, 819 (N.H. 1922) (stating that the use of water must be "reasonable" without explaining the term).

209. Moore v. Berlin Mills Co., 67 A. 578, 580 (N.H. 1907); Dolbeer v. Suncook Waterworks Co., 58 A. 504, 506 (N.H. 1904); Gillis v. Chase, 31 A. 18 (N.H. 1892); Ladd v. Granite State Brick Co., 37 A. 1041, 1042 (N.H. 1889).

210. Minnesota Loan & Trust Co. v. St. Anthony Falls Water-Power Co., 85 N.W. 520, 523 (Minn. 1901); Gulf Pipe Line Co. v. Thomason, 299 S.W. 532, 533 (Tex. Ct. Civ. App. 1927); *see also* Ohio Oil Co. v. Westfall, 88 N.E. 354, 355 (Ind. Ct. App. 1909) (a question of fact for the jury).

courts in other states cited the initial New Hampshire cases as the source of their new rule without ever indicating that they intended anything other than what the rule meant in New Hampshire.[211] If courts were attempting to create two different rules, why wouldn't the jurists use two different labels for the rules, or at least indicate that they meant something different from what New Hampshire meant when it used the phrase "reasonable use"? Not only is there no such indication in any of the decisions, but no one has ever suggested why courts would want to develop two different versions of the reasonable use rule for groundwater.

The law in some states regarding the reasonable use rule and its meaning was far less clear than in New Hampshire.[212] For example, several decisions by the Iowa Supreme Court seemed to establish an absolutist or abstract reading of the reasonable use rule as applied to groundwater, indicating that a landowner in making a reasonable use of the groundwater could exhaust the aquifer without liability to neighboring landowners.[213] But in each, the court indicated that such exhaustion must be "reasonable," without defining precisely what that term means or how the court would go about determining whether a use was reasonable.[214] In one case involving an apparently malicious dewatering of an aquifer, the Iowa Supreme Court did enjoin the pumping of the water, but the defendant was making no use of the water at all in that case.[215] The Iowa court did not resolve these uncertainties in any of its later decisions.[216] Indeed, when the court decided that it would find "malice in law" from simple negligent injury of one groundwater user by another, it seems to have reverted back to the idea of a relational test for reasonableness.[217] The court in the same case declared that all that was called for was "neighborliness."[218] Uncertainties about the meaning of the reasonable use rule in Iowa only disappeared when the Iowa Legislature enacted a regulated riparian statute that encompassed groundwater as well as surface waters, rendering disputes over the meaning of the reasonable use rule for groundwater largely irrelevant.[219]

The caselaw in other states adhering to the reasonable use rule is similarly indeterminate. In most of the decisions, the courts have merely indicated that the use of groundwater must be "reasonable," "rightful," "ordinary," or "legitimate," with-

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211. *See, e.g.*, Cason v. Florida Power Co., 76 So. 535, 537–38 (Fla. 1917); Gagnon v. French Lick Springs Hotel Co., 72 N.E. 849, 852 (Ind. 1904); Barclay v. Abraham, 96 N.W. 1080, 1083 (Iowa 1903); Chase v. Silverstone, 62 Me. 175 (1873); Peck v. Clark, 8 N.E. 335, 337 (Mass. 1886); Schenk v. City of Ann Arbor, 163 N.W. 109, 114 (Mich. 1917); Erickson v. Crookston Waterworks, 111 N.W. 391, 393 (Minn. 1907), *further appeal on other grounds*, 117 N.W. 435 (Mich. 1907); Springfield Water Works Co. v. Jenkins, 62 Mo. App. 74, 74 (1895); Meeker v. City of East Orange, 74 A. 379, 380 (N.J. Ct. App. 1909); Houston & Tex. Cent. R.R. v. East, 81 S.W. 279, 280 (Tex. 1904).

212. *See, e.g.*, Willis v. City of Perry, 60 N.W. 727, 730 (Iowa 1894); Hougan v. Milwaukee & St. Paul Ry., 35 Iowa 558, 559–60 (1872).

213. *See Willis*, 60 N.W. at 730; *Hougan*, 35 Iowa at 559–60.

214. *Id.*

215. Barclay v. Abraham, 96 N.W. 1080 1083–84 (Iowa 1903).

216. *See* DeBok v. Doak, 176 N.W. 631, 634 (Iowa 1920) (finding "malice in law" found from simple negligence); Tracy v. City of Mt. Pleasant, 146 N.W. 78, 82 (Iowa 1914) (barring use off the overlying land).

217. *See DeBok*, 176 N.W. at 634.

218. *Id.* at 634–35.

219. IOWA CODE §§ 455B.264(1), 455B.268(1)(a) (2012).

out defining how one determines whether this test is met.[220] Only in a few decisions involving use off of the overlying land or use that is clearly malicious or wasteful did courts speak in absolutist terms.[221] Generally nothing in the caselaw suggests that the dicta in the latter cases are to displace the holdings in the other decisions—assuming that the "absolutist" cases were decided later, which is not always the case. Yet before 1971 (when the tentative draft of the relevant section of the *Restatement (Second)* came out), only a few courts were explicit that the reasonable use rule for groundwater requires a reasonable balance between the competing interests.[222]

The embrace of a relational (balancing) test for reasonableness for groundwater in the *Restatement (Second)* led some commentators to conclude that it represented a new rule (the so-called "Restatement rule") instead of having restated the reasonable use rule (or, as some would have it, correlative rights).[223] If one reads the earlier reported cases with a mindset that "reasonableness" or similar terms must be read in abstract or absolutist terms, one can interpret this language as setting forth an abstract or absolutist version of the reasonable use theory. Many commentators have done so.[224] But why would anyone assume that courts, in speaking of "reasonable use" for groundwater, meant something radically different from what they meant in using the same phrase regarding riparian rights or would

220. *See, e.g.*, Sloss-Sheffield Steel Co. v. Wilkes, 165 So. 764, 769 (Ala. 1936) ("reasonable and beneficial use"; "natural and legitimate use"), *aff'd on other grounds on subsequent appeal*, 181 So. 276 (Ala. 1938); Bristor v. Cheatham, 255 P.2d 173, 178–79 (Ariz. 1953) ("reasonable use"); United Fuel Gas Co. v. Sawyers, 259 S.W.2d 466, 468 (Ky. 1953) ("a legitimate and not unreasonable use"); Cincinnati, N.O. & T. P. Ry. v. Gillispie, 113 S.W. 89, 90 (Ky. 1908) (denying recovery of damages to groundwater if the damage could be "by the exercise of ordinary care"); Bernard v. City of St. Louis, 189 N.W. 891, 892–93 (Mich. 1922) ("reasonable use"); Schenk v. City of Ann Arbor, 163 N.W. 109, 111–12 (Mich. 1917) ("a qualified right"); Bayer v. Nello L. Teer Co., 124 S.E.2d 552, 556 (N.C. 1962) ("reasonable and beneficial use"); Township of Hatfield v. Lansdale Mun. Auth., 168 A.2d 333, 334 (Pa. 1961) ("reasonable user"); Rothrauff v. Sinking Spring Water Co., 14 A.2d 87, 90 (Pa. 1940) ("reasonable use"); Wheatley v. Baugh, 25 Pa. 528, 535 (1855) ("fair enjoyment"); Evans v. City of Seattle, 47 P.2d 984, 987–88 (Wash. 1935) ("reasonable use"); Patrick v. Smith, 134 P. 1076, 1079 (Wash. 1913) ("use . . . in a reasonable manner and to a reasonable extent"); Crook v. Hewitt, 31 P. 28, 29–30 (Wash. 1892) ("the reasonableness of the use is a question of fact to be passed upon by the court or jury"); Drummond v. White Oak Fuel Co., 140 S.E. 57, 60 (W. Va. 1927) ("for domestic and ordinary purposes"); Pence v. Carney, 52 S.E. 702, 706 (W. Va. 1905) ("Such reasonable and beneficial use . . . for any purpose for which the owner . . . might legitimately use and enjoy his land.").

221. *See, e.g.*, Rogers v. Bond Bros., 130 S.W.2d 22, 24 (Ky. 1939); *Schenk*, 163 N.W. at 114–15; *Nello L. Teer Co.*, 124 S.E.2d at 559; *Township of Hatfield*, 168 A.2d at 334; Rothrauff, 14 A.2d at90; Lybe's Appeal, 106 Pa. 626, 630–31 (1884).

222. *See* Bristor v. Cheatham, 255 P.2d 173, 179–80 (Ariz. 1953); Jones v. Oz-Ark-Val Poultry Co., 306 S.W.2d 111, 115 (Ark. 1957); Higday v. Nickolaus, 469 S.W.2d 859, 866 (Mo. 1971), *transfer denied*; Ladd v. Granite State Brick Co., 37 A. 1041, 1041 (N.H. 1889); Town of Rindge v. Sargent, 9 A. 723, 723–24 (N.H. 1887); Associated Contractors Stone Co. v. Pewee Valley Sanitarium & Hosp., 376 S.W.2d 316, 318–19 (Ky. 1964); Louisville Ref. Co. v. Mudd, 339 S.W.2d 181, 185–87 (Ky. 1960); Wheatley v. Baugh, 25 Pa. 528, 535 (1855).

223. *See, e.g.*, DAVID H. GETCHES, WATER LAW IN A NUTSHELL 256 (3d ed. 1997); A. Dan Tarlock & Stuart L. Deutsch, *Foreword to a Symposium on Prevention of Groundwater Contamination in the Great Lakes Region*, 65 CHI-KENT L. REV. 345, 354 (1990).

224. *See, e.g.*, Jean A. Bowman & Gary R. Clark, *Transitions in Midwestern Ground Water Law*, 25 WATER RESOURCES BULL. 413, 416–18 (1989); Tarlock & Deutsch, *supra* note 223, at 354.

come to mean regarding diffused surface waters, not to mention nuisance cases from which all of the reasonable use decisions ultimately derive?[225]

The most likely reason for the apparent confusion about the meaning of the reasonable use rule for groundwater is that the early courts focused their discussion, limited as it was, solely on the actions of the defendant without much, if any, attention to the impact on the plaintiff. They did this because they were unable to determine what was happening beneath the ground, in stark contrast to the ease of determining what was happening to waters on the surface. Today that problem can be overcome if one is willing to expend the necessary time and money. Why then does the abstract or absolutist theory of the reasonable use rule persist? Perhaps the answer lies in the few commentators who clearly and explicitly espoused the abstract view of reasonableness for groundwater because of their distaste for the uncertainties inherent in the relativist version of reasonable use—an attitude that is even clearer in attempts to render the test of reasonableness as an abstract test for riparian rights despite the clear and explicit language in such cases to the contrary.[226]

Courts applying reasonable use to riparian rights usually have said little that is clear about how to balance the relevant interests in order to decide the case.[227] Often the courts do little other than list the factors to be considered without indicating how these factors are to be weighed to allow a conclusion on the relative reasonableness of the activities in question.[228] Given the inability of the plaintiff in many of the groundwater cases to present evidence that another's use is actually interfering with the plaintiff's use, it's hardly surprising that courts have not said much at all about any balancing process they might envision in referring to the reasonable use theory for groundwater. At most, they have said that the question of reasonableness is "for the jury" without any attempt to spell out what the jury is to consider or how it is supposed to decide the question.[229] Such silence allows the possibility that courts are not engaged in, nor interested in, any sort of balancing process. A better reading is that the difficulty of obtaining the necessary information for groundwater left courts not uninterested in balancing, but rather reluctant to enjoin an activity when a complaining neighbor could not prove the unreasonableness of

225. Anna di Robilant, *Abuse of Rights: The Continental Drug and the Common Law*, 61 HASTINGS L.J. 687, 696–710 (2010).

226. *See, e.g.*, Bowman & Clark, *supra* note 224, at 416–18; Frank J. Trelease, *The Model Water Code, the Wise Administrator and the Goddam Bureaucrat*, 14 NAT. RESOURCES J. 207 (1974). *See generally* Dellapenna, *The Right to Consume Water under "Pure" Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 7.02(d)(1).

227. *See, e.g.*, Harris v. Brooks, 283 S.W.2d 129, 135–36 (Ark. 1955).

228. The classic list is found in Red River Rolling Mills v. Wright, 15 N.W. 167, 169 (Minn. 1883). For other examples, *see* Locklin v. City of Lafayette, 867 P.2d 724, 749-50 (Cal. 1994); Lake Williams Beach Ass'n v. Gilman Bros. Co., 496 A.2d 182, 185 (Conn. 1985); Westland Skating Ctr., Inc. v. Gus Machado Buick, Inc., 542 So. 2d 959, 963 (Fla. 1989); Pyle v. Gilbert, 265 S.E.2d 584, 589 (Ga. 1980); Lummis v. Lilly, 429 N.E.2d 1146, 1150 (Mass. 1982); Heins Implement Co. v. Miss. Highway & Transp. Comm'n, 859 S.W.2d 681, 689 (Mo. 1993).

229. Carlson v. State, 598 P.2d 969, 974 (Alaska 1979); Moore v. Berlin Mills Co., 67 A. 578, 580 (N.H. 1907); Vill. of Brady Lake v. City of Kent, 773 N.E.2d 1073, 1079 (Ohio Ct. App. 2002); Collins v. Chartiers Valley Gas Co., 21 A. 147, 148 (Pa. 1891); Wheatley v. Baugh, 25 Pa. 528, 535 (1878); Crook v. Hewitt, 31 P. 28, 29 (Wash. 1892).

the offending activity,[230] or that courts were relying on intuition in their balancing even more than they certainly did in balancing for surface water disputes.[231]

One of the few cases in which a court expressed the abstract or absolutist version of the reasonable use rule directly and clearly as the correct interpretation of that rule was *State v. Michels Pipeline Const., Inc.*,[232] decided by the Wisconsin Supreme Court in 1974. Yet even in *Michels* the court chose not to follow the rule it had articulated and instead embraced the tentative draft of the American Law Institute's *Restatement (Second) of Torts*.[233] After *Michels*, the *Restatement (Second)* (which was completed in 1977) began to have a significant impact in moving courts in the direction both of adopting the reasonable use rule and into making clear that this required a balancing of interests rather than an abstract decision.[234] More recently, Ohio and Vermont have enacted the reasonable use rule for groundwater, clearly indicating that the application of the rule requires a balancing or relational test.[235]

Both statutes include a fairly standard list of relevant factors to be considered.[236] The Ohio statute, following the *Restatement (Second)*, provides that temporal priority is to be considered in determining reasonableness, but does not indicate how this factor is to weigh against the other variables that help to determine reasonableness.[237] Vermont, in contrast, explicitly incorporates consideration of environmental concerns in deciding whether a particular use is reasonable.[238] And while Vermont also mandates consideration of existing values in "land, investments, enterprises, and productive uses," it pointedly omitted reference to existing

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230. *See, e.g.*, Stocks v. CFW Constr. Co., 472 So. 2d 1044, 1045 (Ala. 1985) (not a water dispute, but characterizing a leading Alabama groundwater case [Henderson v. Wade Sand & Gravel Case, 388 So. 2d 900 (Ala. 1980)] as involving only a question of the burden of proof); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 128–131 (Neb. 2005) (rejecting as insufficient to state a cause of action allegations of injury without allegations of unreasonable behavior), *further appeal on other grounds*, 713 N.W.2d 489, 490 (Neb. 2006).

231. *See e.g.*, Harris v. Brooks, 283 S.W.2d 129, 135 (Ark. 1955) (protesting that the decision on whether a use of water is reasonable cannot merely result from intuition, but providing scant basis for its determination of reasonableness).

232. State v. Michels Pipeline Const., Inc., 217 N.W.2d 339, 349 (Wis. 1974).

233. *Id.* at 350.

234. Henderson v. Wade Sand & Gravel Co., 388 So. 2d 900 (Ala. 1980) (curiously referring to § 857, rather than § 858); Maerz v. U.S. Steel Corp., 323 N.W.2d 524, 530 (Mich. Ct. App. 1982) (describing the Restatement (Second) as expressive of correlative rights rather than the reasonable use rule); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116, 131–33 (Neb. 2005) (applying a balancing test for a dispute between users of groundwater and surface waters), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006); Woodsum v. Twp. of Pemberton, 412 A.2d 1064, 1072 (N.J. Super. Ct. 1980) (describing the 'Restatement rule' as close to the state's version of correlative rights), *aff'd on other grounds,* 427 A.2d 615 (N.J. App. Div. 1981); Cline v. Am. Aggregates Corp., 474 N.E.2d 324, 327 (Ohio 1984); Hughes v. Emerald Mines Corp., 450 A.2d 1, 7 (Pa. Super. Ct. 1983) (reaching the same result through application of RESTATEMENT (SECOND) of Torts § 829 on nuisance). *See generally* Aiken, *supra* note 82, at 579–85, 591–95.

235. OHIO REV. CODE ANN. § 1521.17 (LexisNexis 2012) (applying to surface waters as well as to groundwater); VT. STAT. ANN. tit. 10, § 1410 (2010) (same); *see also* VT. STAT. ANN. tit. 24, § 4347(5) (2010) (requiring regional plans to promote the reasonable use of water and other resources). *See generally* Evan Mulholland, *Groundwater Quantity Regulation in Vermont: A Path Forward*, 8 VT. J. ENVTL. L. 1 (2006).

236. OHIO REV. CODE ANN. § 1521.17(B) (LexisNexis 2012); VT. STAT. ANN. tit. 10, § 1410(e) (2010).

237. OHIO REV. CODE ANN. § 1521.17(C) (LexisNexis 2012).

238. VT. STAT. ANN. tit. 10, § 1410(e)(2) (2010).

values in the use of the water itself.[239] Finally in 2008, the voters of Ohio amended the state constitution declaring that "[a] property owner has a property interest in the reasonable use of the ground water underlying the property owner's land."[240] This provision does not indicate what uses are reasonable, and it would not appear to preclude state regulation of uses to ensure they are reasonable.[241] Vermont explicitly abolishes the "common-law doctrine of absolute ownership of groundwater."[242]

The reasonable use rule allows courts to resolve disputes flexibly in response to the equities of the particular situation. This is not an easy process to administer, and the proper outcome is seldom clearly right or wrong.[243] Ambiguities in the early cases prevent a definitive conclusion that all courts understood the reasonableness test for groundwater as relational rather than abstract, but the better reasoning is found in the *Restatement (Second)*: the reasonable use rule as applied to groundwater generally requires a relational test involving the balancing of utility against harm.[244] There are only a few situations where an abstract analysis is appropriate. One such situation is when the use of groundwater is not on the land overlying the aquifer.[245] A court might find negligence per se from some dramatic action that caused a well to go dry overnight,[246] the withdrawal of lateral support,[247] or water logging from the artificial recharge of groundwater.[248] In a few cases, courts have held that when the state dewaters an aquifer to allow construction of a highway, the state constitution mandates compensation to injured landowners.[249]

D. Appropriative Rights

Appropriative rights were invented in the mining camps of California.[250] Gold was discovered at Sutter's Mill (now Sacramento), California, only months before the Treaty of Guadalupe-Hidalgo (1848) transferred the southwestern lands (including California) from Mexico to the United States.[251] The result was a massive gold

239. *Id.* § 1410(e)(7).

240. OHIO CONST., art. I, § 19b.

241. *See* State *ex rel.* Cordray v. Helms, 949 N.E.2d 522, 529 (Ohio Ct. App. 2011) (holding that the discharge of improperly treated sewage into an aquifer is not a reasonable use).

242. VT. STAT. ANN. tit. 10, § 1410(a)(5) (2010).

243. *See generally* Dellapenna, *The Reasonable Use Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47, §§ 22.04(d)–(e).

244. RESTATEMENT (SECOND) OF TORTS § 858A (1977).

245. *See, e.g.*, Higday v. Nikolaus, 469 S.W.2d 859, 870–71 (Mo. Ct. App. 1971), *transfer denied.*

246. *See, e.g.*, Wolf Creek Collieries Co. v. Davis, 441 S.W.2d 401, 403 (Ky. 1969).

247. *See, e.g.*, Bjorvatn v. Pac. Mech. Const., Inc., 464 P.2d 432, 435 (Wash. 1970).

248. *See, e.g.*, Whitlatch v. City of Iowa Falls, 201 N.W. 83 (Iowa 1924); Payne v. Taylor, 10 Ky. Rep. 328 (1821); *but see* E-L Enters., Inc. v. Milwaukee Metro. Sewage Dist., 785 N.W.2d 409 (Wis. 2010) (holding that dewatering an aquifer to allow construction of a new sewer was not a compensable taking when the dewatering caused settling of the ground and thereby damaged a neighboring building); Wilkening v. State, 344 P.2d 204 (Wash. 1959) (holding that protecting oneself from the "flow" of unwanted groundwater does not give rise to liability to someone whose land becomes waterlogged as a result).

249. McNamara v. City of Rittman, 838 N.E.2d 640, 644 (Ohio 2005); State v. Ponten, 463 P.2d 150, 154 (Wash. 1969); Bay v. Hein, 515 P.2d 536, 537 (Wash. Ct. App. 1973) (dictum).

250. *See* Dellapenna, *Dual Systems*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 8.02(a).

251. *The Gold Rush of 1849*, HISTORY., http://www.history.com/topics/gold-rush-of-1849 (last visited Feb. 20, 2013).

rush.[252] California's non-aboriginal population swelled from a few thousand to over 100,000 in less than a year, and to 300,000 within five years.[253] The newcomers mostly settled in the mountains prospecting for gold and ignoring the agricultural lands. All of this happened without any organized government in place.[254] The law found in the Spanish-founded missions, presidios, and pueblos was virtually swept away, ignored by the miners.[255] The Yankee intruders, however, were not without law. They brought along the only law with which they were familiar—the common law of the eastern United States.[256] That law, however, was not helpful to the forty-niners regarding the two most central material factors in their lives—land and water. Under the common law, the land belonged to the government and the waters went with the land.[257] The forty-niners were unable to acquire title to the land without a regular government and comprehensive surveys, but they were unwilling to wait for that to happen. The newcomers simply searched for the gold as trespassers and took the water they needed.[258]

The results helped to give Americans a national mythology based on violent disputes, blood feuds, and sudden death.[259] The miners sought to bring order to their lives through vigilance committees that created vigilante law. The committees adopted the most elementary notion of justice: the first to grab it owns it, or, more eloquently, first in time is first in right.[260] The resulting customs were well established on the ground before effective formal governments could be created. The first governments could do little more than ratify the customs of miners.[261] Justice Stephen Field, at one time Chief Justice of California, later would sum the matter

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252. *Id.*

253. *See* Jennison v. Kirk, 98 U.S. 453, 456–58 (1878); *see also* NORRIS HUNDLEY, JR., THE GREAT THIRST: CALIFORNIANS AND THEIR WATER 64 (1992).

254. DONALD J. PISANI, TO RECLAIM A DIVIDED WEST: WATER, LAW, AND PUBLIC POLICY, 1848–1902, 12–14 (1992); CHARLES HOWARD SHINN, MINING CAMPS—A STUDY IN AMERICAN FRONTIER GOVERNMENT (Harper and Row, 1965).

255. Statutes in several states, including California, preserved Spanish-Mexican irrigation law, but such rights were subordinated to the needs of the miners. PISANI, *supra* note 254, at 38–44; Gregory J. Hobbs, Jr., *The Role of Climate in Shaping Western Water Institutions*, 7 U. DENV. WATER L. REV. 1, 6–14 (2003).

256. *See, e.g.*, JOHN PHILLIP REID, LAW FOR THE ELEPHANT: PROPERTY AND SOCIAL BEHAVIOR ON THE OVERLAND TRAIL (Publisher's Press 1980); *see also* SHINN, *supra* note 254, at 11–35.

257. United States v. Gear, 44 U.S. (3 How.) 120 (1845); United States v. Gratiot, 39 U.S. (14 Pet.) 526 (1840).

258. Moore v. Smaw, 17 Cal. 199 (1861). On the cowboy culture of simply grabbing what they need, *see* Debra L. Donahue, *Western Grazing: The Capture of Grass, Ground, and Government*, 35 ENVTL. L. 721 (2005); James R. Rasband, *Questioning the Rule of Capture Metaphor for Nineteenth Century Public Land Law: A Look at R.S. 2477*, 35 ENVTL. L. 1005 (2005).

259. *See, e.g.*, Andrea McDowell, *Criminal Law Beyond the State: Popular Trials on the Frontier*, 2007 B.Y.U. L. Rev. 327 (2007).

260. Fort Vannoy Irrig. Dist. v. Water Res. Comm'n, 188 P.3d 277, 283-284 (Or. 2008). See *generally* HUNDLEY, *supra* note 253, at 67–73; Mark T. Kanazawa, *Efficiency in Western Water Law: The Development of the California Doctrine, 1850-1911*, 27 J. LEGAL STUD. 159, 165–67 (1998); John Umbeck, *The California Gold Rush: A Study of Emerging Property Rights*, 14 EXPLORATIONS IN ECON. HIST. 197 (1977); Donald Pisani, *Enterprise and Equity: A Critique of Western Water Law in the Nineteenth Century*, 18 WESTERN HIST. Q. 15, 19 (1987). Small miners actually supported riparian rights to the increasing concentration of water in the hands of large, capital intensive mining companies. PISANI, *supra* note 254, at 23–26, 35–38; Sandra Zellmer, *The Anti-Speculation Doctrine and Its Implications for Collaborative Water Management*, 8 NEV. L.J. 994 (2008).

261. *See* the California Practice Act, 1851 Cal. Stat., ch. 5, § 621; *see also* HUNDLEY, *supra* note 253, at 73–74.

up for the United States Supreme Court: "the miners . . . were emphatically the law-makers, as respects mining, upon the public lands in the State."[262] As a result, with more than a touch of irony, "a legal system that arose from the relatively lawless mining camps of the Wild West . . . c[a]me to be viewed as though it had been handed down directly from God."[263]

All the feuding and fussing about water that gave rise to appropriative rights was focused on surface waters.[264] With no efficient way to pump groundwater from any significant depth, the miners (and later the ranchers and farmers) did not bother much about groundwater. All that changed, first with the increasing demand for new sources of water, and later, with the advent of high-speed centrifugal (turbine) pump that became increasingly common after World War II.[265] As a result, appropriation rules for groundwater came almost eight decades after they had been developed for streams.

In 1899, Idaho became the first state to include groundwater in the statutory list of waters subject to appropriation.[266] Idaho did little with this provision until the 1950s when a statute was enacted to authorize the Director of the Department of Water Resources to set and enforce a reasonable pump lift for appropriators.[267] With broad authority to regulate groundwater use, the court would later hold that the Director had discretion on whether to set pump lift levels.[268] Eventually, the Idaho Supreme Court concluded that this provision prohibited ground water mining—in other words, it prohibited groundwater abstraction in excess of the "reasonably anticipated average rate of future recharge."[269] The court only upheld the constitutionality of later appropriation enactments in the state in 2007.[270]

Other states included groundwater in their respective water appropriation statutes in the following years.[271] Utah achieved the same result by judicial construction of a statute that did not address the question of its application to groundwater.[272] Because appropriations began under these statutes later than appropria-

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262. Jennison v. Kirk, 98 U.S. 453, 457 (1878). For Justice Field's role in developing the law of natural resources in California, see HUNDLEY, *supra* note 253, at 71–72; PISANI, *supra* note 234, at 22–23, 30.

263. Reed D. Benson, *A Few Ironies of Western Water Law*, 6 WYO. L. REV. 331, 333 (2006).

264. *See* HUTCHINS, *supra* note 21, at 159–97.

265. Schafer, *supra* note 13; Sheffield, *supra* note 13.

266. 1899 Idaho Laws 380, § 2.

267. 1951 Idaho Laws, 200, § 1; 1953 Idaho Laws, 287, § 1. *see* Robert Haskell Abrams, *Legal Convergence of East and West in Contemporary American Water Law*, 42 ENVTL. L. 65, 73–74 (2012).

268. A&B Irrig. Dist. v. Idaho Dep't Water Resources, 153 Idaho 500, 284 P.3d 225 (2012). For other cases interpreting the Director's authority over groundwater, *see* City of Pocatello v. Idaho, 152 Idaho 830, 275 P.3d 845 (2011); Clear Springs Foods, Inc. v. Spackman, 150, Idaho 790, 252 P.3d 71 (2011).

269. Baker v. Ore-Ida Foods, Inc., 95 Idaho 575, 585, 513 P.2d 627, 637 (1973); *but cf.* Gallegos v. Colorado Ground Water Comm'n, 147 P.3d 20, 27 (Colo. 2006) (the prior right of groundwater users relative to surface water users does not guarantee the maintenance of historic water tables); *see generally* Douglas L. Grant, *Reasonable Groundwater Pumping Levels Under the Appropriation Doctrine: The Law and Underlying Economic Goals*, 21 NAT. RESOURCES J. 1 (1981).

270. Am. Falls Reservoir Dist. No. 2 v. Idaho Dep't Water Resources, 143 Idaho 862, 154 P.3d 433 (2007); *see generally* Reed D. Benson, *Alive but Irrelevant: The Prior Appropriation Doctrine in Today's Western Water Law,* 83 U. COLO. L. REV. 675, 691–95 (2012).

271. *See* 1919 Ariz. Laws 298, § 1; 1913 Cal. Stat. 1013, § 42; 1945 Kan. Laws 665, § 1; 1913 Nev. Stat. 191 §§ 1, 2; 1915 Nev. Stat. 210 § 1; 1903 Utah Laws 100, § 45.

272. Wrathall v. Johnson, 40 P.2d 755 (Utah 1935). The state's legislature confirmed the application of appropriative rights to groundwater later that year. 1935 Utah Laws 105, *codified at* UTAH CODE ANN. § 73-1-1 (2010).

tions from surface waters, groundwater rights generally were junior to a good many significant surface appropriations.[273]

At their best, these enactments reflected an emerging awareness of groundwater problems. At their worst, they were unclear and ineffective gestures to a public opinion not yet fully aware of groundwater, even in the western states, and they had little effect on groundwater law development in those states. Not until 1927 did effective groundwater statutes in the western states begin.[274] New Mexico's pioneer 1931 statute—the first appropriative rights statute specifically for groundwater—served as a model for other states that adopted this approach.[275] The problem with having two separate appropriation statutes—one for surface waters and one for groundwater—was how to coordinate the resulting two sets of priorities.[276] Once again, appropriations from groundwater were subordinated to a good many significant appropriations from surface waters, often through characterizing the groundwater as "tributary" to the surface waters.

In the first decade of the twentieth century, many appropriative rights states began to apply a further presumption—that all groundwater was tributary to surface streams.[277] Anyone seeking to appropriate water by way of a well, tunnel, or drain had the burden of proof that it was *not* tributary to a surface stream.[278] Samuel

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273. *See, e.g.*, A&B Irrig. Dist. v.Aberdeen-Am. Falls Ground Water Dist., 141 Idaho 746, 118 P.3d 78 (2005); *see generally* Jeffrey C. Fereday & Michael C. Craemer, *The Maximum Use Doctrine and Its Relevance to Water Rights Administration in Idaho's Boise River Basin*, 47 IDAHO L. REV. 67 (2010).

274. *See* Robert E. Clark, *Ground Water Legislation in the Light of Experience in the Western States*, 22 MONT. L. REV. 42 (1960); Robert E. Clark, *Groundwater Management: Law and Local Response*, 6 ARIZ. L. REV. 178 (1965). *See generally* HUTCHINS, supra note 21, at 634–53.

275. 1931 N.M. Laws Ch. 131, *codified at* N.M. STAT. ANN. §§ 72-12-1 to 72-12-10. An attempt was made, with less success, four years earlier. 1927 N.M. Laws ch. 182. The constitutionality of the 1931 New Mexico statute was upheld in *State v. Dority*, 225 P.2d 1007 (N.M. 1950). The New Mexico statute, like many appropriative rights statutes, exempts domestic wells from the priority scheme. *See, e.g.*, Bounds v. State, 252 P.3d 708 (N.M. Ct. App. 2010), *cert. granted*, 263 P.3d 902 (N.M. 2011). *See generally* Abrams, *supra* note 267, at 73–77.

276. *See, e.g.*, COLO. REV. STAT. § 37-92-101 (1969); OKLA. STAT. tit. 82, § 1020.7 (1993); WASH. REV. CODE § 90.44.050 (2003); Tarrant Reg'l Water Dist. v. Herrmann, 656 F.3d 1222, 1249 (10th Cir. 2011), *cert. filed*, 80 USLW 3453 (Jan. 19, 2012); V Bar Ranch LLC v. Cotten, 233 P.3d 1200 (Colo. 2010); Five Corners Family Farmers v. State, 268 P.3d 892 (Wash. 2011); *see also* John B. Carter, *Montana Groundwater Law in the Twenty-First Century*, 70 MONT. L. REV. 221 (2009); Charles W. Howe, *Water Law and Economics: An Assessment of River Calls and the South Platte Well Shut-Down*, 12 U. DENV. WATER L. REV. 181, 181–82 (2008); Lawrence J. MacDonnell, *Integrating Use of Ground and Surface Water in Wyoming*, 47 IDAHO L. REV. 51 (2010); Judith V. Royster, *Conjunctive Management of Reservation Water Resources: Legal Issues Facing Indian Tribes*, 47 IDAHO L. REV. 255 (2011); *see generally* Abrams, *supra* note 267, at 69–81.

277. *See, e.g.*, Harmony Ditch Co. v. Ground Water Mgmt. Subdist., 136 P.3d 899 (Colo. 2006); Am. Falls Reservoir Dist. No. 2 v. Idaho Dep't of Water Res., 143 Idaho 862, 154 P.3d 433 (2007); Mont. Trout Unlimited. v. Mont. Dep't of Natural Res. & Conservation, 133 P.3d 224 (Mont. 2006); Montgomery v. Lomos Altos, Inc., 150 P.3d 971 (N.M. 2006); Herrington v. State, 133 P.3d 258 (N.M. 2006); Salt Lake City v. Silver Fork Pipeline Corp., 5 P.3d 1206 (Utah 2000); Postema v. Pollution Control Hearing Bd., 11 P.3d 726, 741 (Wash. 2000). *See also* Colorado Ground Water Comm'n v. North Kiowa-Bijou Groundwater Mgmt. Dist., 77 P.3d 62, 70 (Colo. 2003) (indicating that the presumption applies to all groundwater in Colorado except in the Denver Basin). A few courts in western states have rejected this presumption. *See In re* General Adjudication of all Rights to Use Water in the Gila River System, 9 P.3d 1069, 1074, 1082 (Ariz. 2000), *cert. denied sub nom.* Phelps Dodge Corp. v. United States, 530 U.S. 1250 (2000).

278. *See generally* SAMUEL C. WIEL, WATER RIGHTS IN THE WESTERN STATES §§ 337, 1082 (3d ed. 1911) (in the 1979 reprint edition; this material is in volume 1); Carter, *supra* note 276, at 227–32, 236–38; Eric L. Garner & Steven M. Anderson, *The California Supreme Court Reviews the Mojave River Adjudication*, 2 U. DENV. WATER L. REV. 26, 27–32 (1998); Gregory J. Hobbs, Jr., *Protecting Prior Appropria-*

Wiel, a leading authority on water law through the first half of the twentieth century, found that until the beginning of the twentieth century the rule had been the *opposite*—an appropriator of water in a surface stream "could follow the water to the very mouth of the spring, but not further."[279] California led the way to the modern presumption in 1903.[280] By 1911, Wiel already was stating the modern presumption.[281] Wiel denied that this was a new law, insisting that "it is a question of fact, not of law" stemming from greater hydrogeological knowledge of the relationship between surface streams and groundwater.[282] Today, the presumption is in harmony with the modern scientific view that no basis exists in hydrogeology for distinctions between surface waters and groundwater. Different rules are applied in the increasingly rare cases in which a court finds that the water in question is not tributary.[283] Wells can continue to pump tributary groundwater only if they can take steps, such as providing substitute or augmented sources of water, to protect senior appropriators from surface waters.[284]

The subordination of groundwater uses to senior surface water uses—uses that might date from the mid-nineteenth century and be devoted to what in this century are low-valued uses—is not always the best result either economically or socially.[285] Yet this is precisely what appropriative rights requires; the entirety of a junior use must cease before any part of a senior use must cut back, a practice that completely disregards the economic principle of marginal utility.[286] Despite the best efforts of many people, markets have not proven up to the task of resolving these problems.[287] Utah has dealt with the problem of the general subordination of groundwater uses to surface water uses by holding that when groundwater supports vegetation on the surface of the land that amounts to an appropriation with a priority date predating early state settlement.[288] Some states have responded by moves to

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tion Water Rights Through Integrating Tributary Groundwater: Colorado's Experience, 47 IDAHO L. REV. 5 (2010); Veronica A. Sperling & David M. Brown, *Outline of Colorado Groundwater Law*, 1 U. DENV. WATER L. REV. 275, 286–94 (1998).

279. WIEL, *supra* note 278 § 78, at 130 (1st ed. 1905). *See, e.g.*, Ely v. Ferguson, 27 P. 587 (Cal. 1891); Hanson v. McCue, 42 Cal. 303 (1871).

280. McLintock v. Hudson, 74 P. 849 (Cal. 1903).

281. WIEL, *supra* note 278 § 337, at 1082.

282. *Id.* § 1082, at 1023.

283. Gallegos v. Colo. Ground Water Comm'n, 147 P.3d 20, 28 (Colo. 2006) (groundwater which has only a de minimis effect on surface water is to be administered as designated groundwater); E. Cherry Creek Valley Water Dist. v. Rangeview Metro. Dist., 109 P.3d 154 (Colo. 2005) (non-tributary groundwater is allocated according to the amount of overlying land owned by the user—correlative rights); Herrington v. State, 133 P.3d 258 (N.M. 2006) (an appropriator cannot change the point of diversion from a stream to a well if the aquifer in question does not connect to the stream).

284. *See, e.g.*, COLO. REV. STAT. §§ 37-92-103, 37-92-302 (2009).

285. *See* Howe, *supra* note 276, at 183–87.

286. *See* M. Mason Gaffney, *Economic Aspects of Water Resources Policy*, 28 Am. J. Econ. & Sociology 131, 140 (1969); *see generally* ROBIN PAUL MALLOY, LAW AND ECONOMICS: A COMPARATIVE APPROACH TO THEORY AND PRACTICE 20–33 (1990); RICHARD POSNER, ECONOMIC ANALYSIS OF LAW § 1.1 (7th ed. 2007); Herbert Hovenkamp, *Marginal Utility and the Coase Theorem*, 75 Cornell L. Rev. 783, 783 (1990). For an extreme example, drawn from surface waters, *see* State *ex rel.* Cary v. Cochran, 292 N.W. 239 (Neb. 1940).

287. Howe, *supra* note 276, at 187–88; *see generally infra* Part III.

288. Riordan v. Westwood, 203 P.2d 922, 929 (Utah 1949). Otherwise, Utah requires, like other states, that the appropriation result from human agency in putting the water to use. Melville v. Salt Lake Cty., 570 P.2d 687, 689 (Utah 1977). Because of the patterns of human settlement in the arid and semi-arid

vest authority to manage groundwater in administrative agencies with sometimes ill-defined deference to the temporal priority system.[289] The Nebraska Supreme Court has gone to the other extreme, simply resisting the treatment of groundwater as subject to the legal regime applicable to surface waters.[290] The Nebraska Legislature reversed one of the cases in which the court sought to keep the two regimes strictly separate.[291] The Nebraska Supreme Court still interprets other relevant statutes narrowly.[292]

Groundwater appropriations, like the historically longer established surface water appropriations, can be lost through nonuse (by abandonment or forfeiture) or (in some states) taken by prescriptive user (based upon adverse use).[293] These general principles comprise the basic means of extinguishing water rights. Some states apply a general forfeiture statute to all water uses within the state,[294] while others have separate forfeiture statutes for surface water uses and groundwater uses.[295] Some states have abolished the possibility of prescriptive title.[296] When one of these principles does apply, the problem becomes to decide when a court will apply one of the principles to a groundwater use.

E. Regulated Riparianism

In the second half of the twentieth century, many states adhering to traditional riparian rights began to manage their surface water resources as public property through what are coming to be called regulated riparian systems, although even today one could debate whether certain states have in fact crossed the boundary from relying largely on unregulated common law riparian rights to a regulated riparian system.[297] These statutes formed the basis for the *Regulated Riparian Model*

West, that rule continues to subordinate groundwater to a great many surface water uses. *See supra* text accompanying notes 277–78.

289. *See, e.g.*, John C. Peck, *Groundwater Management in Kansas: A Brief History and Assessment*, 15 KAN. J.L. & PUB. POL'Y 441, 451–52 (2006).

290. Central Platte Natural Res. Dist. v. State of Wyo., 513 N.W.2d 847, 855 (Neb. 1994).

291. NEB. REV. STAT. § 46–674.20 (LexisNexis2012).

292. *See In re* Cent. Neb. Power & Irrigation Dist., 699 N.W.2d 372 (Neb. 2005); Spear T Ranch, Inc. v. Knaub, 691 N.W.2d 116 (Neb. 2005) (holding that groundwater is not subject to surface water priorities, at least absent proof of unreasonable harm to the surface water user), *appealed on other grounds*, 713 N.W.2d 489 (Neb. 2006); *In re* Application T-851, 686 N.W.2d 360 (Neb. 2004) (holding that the Department of Natural Resources' authority to grant a permit for "direct irrigation service" does not include authority to grant a permit for incidental underground storage); *In re* Referral of Lower Platte S. Natural Res. Dist., 621 N.W.2d 299 (Neb. 2001) (rejecting the Department of Natural Resources' authority to consider the impact of a groundwater transfer if the transfer is other than for agricultural or environmental remediation purposes).

293. *See, e.g.*, Orange County Water Dist. v. City of Riverside, 10 Cal. Rptr. 899 (Cal. Ct. App. 1961) (upholding a claim of prescriptive title); State *ex rel.* Erickson v. McLean, 308 P.2d 983 (N.M. 1957) (finding forfeiture for failure to make a beneficial use).

294. *See, e.g.*, UTAH CODE ANN. § 73-3-4 (LexisNexis 2008).

295. *See, e.g.*, NEV. REV. STAT. ANN. § 534.090 (LexisNexis 2006); N.M. STAT. ANN. §72-12-8 (LexisNexis 2012).

296. *See* ALASKA STAT. § 46.15.040(a) (2008); MONT. CODE ANN. § 85-2-301(3) (1998); N.D. CENT. CODE § 61-04-22 (2003); NEV. REV. STAT. §§ 533.060(3), 534.050 (2006); UTAH CODE ANN. § 73-3-1 (LexisNexis 2008); WASH. REV. CODE §90.14.220 (2009).

297. ALA. CODE §§ 9-10B-1 to 9-10B-30, 41-23-1 (2008); ARK. CODE ANN. §§ 15-22-201 to 15-22-622 (2005); CONN. GEN. STAT. §§ 22a-365 to 22a-380 (2001); DEL. CODE ANN. tit. 7, §§ 6001-6031 (2001); FLA. STAT. ANN. §§ 373.012 to 373.619 (LexisNexis 2003); GA. CODE ANN. §§ 12-5-20 to 12-5-31, 12-5-43 to 12-5-53 (2003); HAW. REV. STAT. §§ 174C-1 to 174C-101 (LexisNexis 2004); IOWA CODE

Water Code drafted by the American Society of Civil Engineers and finally adopted as an official standard of the Society in 2003.[298] After long neglect, lawyers and scholars today are coming to recognize that these new laws represent a fundamentally different approach to water law.[299] Similarly, many states that had applied absolute dominion, correlative rights, or the reasonable use rule to groundwater now apply the regulated riparian approach to groundwater.[300] A regulated riparian approach differs in significant ways from the other four approaches to groundwater law.

Strictly speaking, riparian rights do not apply to groundwater, at least not to percolating groundwater.[301] "Riparian" refers to the Latin word *ripa*, meaning the bank of a stream.[302] Percolating groundwater simply does not have banks. Still, it makes sense to speak of the application of the regulated riparian approach or of regulated riparianism to groundwater, in part because often this approach was extended to groundwater simply by including groundwater within the scope of the statute establishing the regulated riparian system for surface waters. Extending the term this way is no more problematic than the earlier displacement of the term "littoral rights" (pertaining to the shore of a lake or the sea) with "riparian rights," which today has been accepted by nearly all courts.[303]

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§§ 455B.261 to 455B.281 (2004); KY. REV. STAT. ANN. §§ 151.010 to 151.600, 151.990 (LexisNexis 2004); MD. CODE ANN., ENVT. §§ 5-501 to 5-514 (LexisNexis 2006); MASS. ANN. LAWS ch. 21G, §§ 1-19 (LexisNexis 2002); MICH. COMP. LAWS SERV. § 324.32701 to 324.32803 (LexisNexis 2001); MINN. STAT. §§ 103G.001 to 103G.315 (1997); MISS. CODE ANN. §§ 51-3-1 to 51-3-55 (2012); N.J. STAT. §§ 58:1A-1 to 58:1A-17 (2001); N.Y. ENVTL. CONSERV. LAW §§ 15-1501 to 15-1529 (Gould 2012); N.C. GEN. STAT. §§ 143-215.11 to 143-215.22K (2012); S.C. CODE ANN. §§ 49-4-10 to 49-4-180 (2008); VA. CODE ANN. §§ 62.1-242 to 62.1-253 (2006); WIS. STAT. §§ 30.18, 30.28, 30.292 to 30.298, 281.35 (2004). *See generally* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9; Joseph W. Dellapenna, *Adapting Riparian Rights to the Twenty-First Century*, 106 W. VA. L. REV. 539, 583–90 (2004). In 2002, a court used the phrase "regulated riparianism" to name its system of water rights. City of Waterbury v. Town of Washington, 800 A.2d 1102, 1157–7, 1149–50, nn. 44, 45, (Conn. 2002).

298. *See* REGULATED RIPARIAN MODEL WATER CODE (Joseph W. Dellapenna ed., Am. Soc'y of Civil Eng'rs 2004).

299. *See* George William Sherk, *The Regulated Riparian Model State Water Code: Perspectives on the Relationship Between Water Quantity and Water Quality*, 7 RIVERS 1 (1999).

300. *See, e.g.*, NEB. REV. STAT. §§ 46-656.01 to 46-656.67, 46–675 to 46–692 (LexisNexis 2012) (replacing or limiting correlative rights).

301. Riparian rights are applied to "underground streams." *See* Dellapenna, *Introduction to Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 6.04.

302. Kester v. Tewksbury, 701 So. 2d 443, 443 n.2 (Fla. Dist. Ct. App. 1997), *appeal on other grounds after remand sub nom.* Tewksbury v. City of Deerfield Beach, 763 So. 2d 1071 (Fla. Ct. App. 1999), *rev. dismissed sub nom.* Cove Rest. & Marina v. City of Deerfield Beach, 766 So. 2d 220 (Fla. 2000).

303. *See, e.g.*, Stefanoni v. Duncan, 923 A.2d 737, 744–47 (Conn. 2007); Brannon v. Boldt, 958 So. 2d 367, 368 (Fla. Dist. Ct. App. 2007), *rev. dismissed*, 969 So. 2d 315 (Fla. 2007); Brett v. Eleventh St. Dockowners Ass'n, 141 Idaho 517, 522, 112 P.3d 805, 810 (2005); Alderson v. Fatlan, 867 N.E.2d 1081, 1082 (Ill. App. Ct.), *aff'd on other grounds*, 898 N.E.2d 595 (Ill. 2007); Rauseo v. Commonwealth, 838 N.E.2d 585, 588–89 (Mass. App. Ct. 2005), *rev. denied*, 844 N.E.2d 1097 (Mass. 2006); Glass v. Goeckel, 703 N.W.2d 58 (Mich. 2005), *cert. denied*, 546 U.S. 1174 (2006); Columbia Land Dev., LLC v. Sec'y of State, 868 So. 2d 1006, 1012 (Miss. 2004); City of N.Y. v. Mazzella, 858 N.Y.S.2d 114, 117 (App. Div. 2007); Prewitt v. Town of Wrightsville Beach, 595 S.E.2d 442, 445 (N.C. Ct. App. 2003); Slavin v. Town of Oak Island, 584 S.E.2d 100 (N.C. Ct. App.), *appeal dismissed*, 590 S.E.2d 271 (N.C. 2003); Webster v. Regan, 609 N.W.2d 733, 735 (N.D. 2000); Hack v. Sand Beach Conserv. Dist., 891 N.E.2d 1228, 1232-33 (Ohio Ct. App. 2008); Newport Realty, Inc. v. Lynch, 878 A.2d 1021, 1025 (R.I. 2005); Hilton Head Plantation Prop. Owners' Ass'n v. Donald, 651 S.E.2d 614, 617 (S.C. Ct. App. 2007), *state cert. denied*; TH

Analysts of riparian rights often conclude that the application of riparian rights produces such uncertainty and even confusion as to impede the settlement of problems arising during severe water shortages, to leave significant public interests unprotected, and to discourage public or private investment in water development.[304] Much the same could be said regarding the reasonable use rule as applied to groundwater.[305] Arguably the application of appropriative rights and correlative rights at the least avoids these problems of uncertainty, although those systems continue to provide little or no protection for the public interest in groundwater, or even to allow for the consideration of the marginal utility of various uses of groundwater in determining which uses are to prevail in the event of shortage.[306] Continued adherence to the absolute dominion rule is even worse, virtually guaranteeing a "tragedy of the commons" for groundwater.[307] The decision by the American Society of Civil Engineers to prepare two model codes recognizes that regulated riparianism differs from appropriative rights because regulated riparianism treats water as a form of public property, rather than as either common property or as private property.[308] The *Model Code* contains exhaustive references to similar provisions in actual state regulated riparian statutes.

Every state—even those most strongly committed to the absolute dominion rule—has some regulations on the extraction and use of groundwater. For example, all states require the licensing of persons who drill wells for other than their own use.[309] Most states also require the registration of new wells[310] and the capping or plugging of abandoned wells.[311] These statutes, however, are directed at ensuring properly drilled and closed wells rather than at regulating the use of water extracted

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Inv., Inc. v. Kirby Inland Marine, LP, 218 S.W.3d 173, 184–86, 196, 199 (Tex. App. 2007), *cert. denied*, 555 U.S. 1098 (2009).

304. *See* Dellapenna, *Adapting Riparian Rights to the Twenty-First Century*, *supra* note 297, at 591–593. For an excellent brief discussion of the shortcomings of riparian (and appropriative) rights, *see* Gaffney, *supra* note 286.

305. *See* Katz v. Walkinshaw, 74 P. 766 (Cal. 1903).

306. *See generally* MALLOY, *supra* note 286; POSNER, *supra* note 286, § 1.1; Hovenkamp, *supra* note 286.

307. *See* explanation in text, *supra* at notes 108–11. For an attempt to refute the theory of the tragedy of the commons relative to the absolute dominion rule, *see* Jason Scott Johnston, *The Rule of Capture and the Econ. Dynamics of Natural Res. Use and Survival under Open Access Mgmt.*, 35 ENVTL. L. 855 (2005).

308. REGULATED RIPARIAN MODEL WATER CODE (Am. Soc'y of Civil Eng'rs 2004); *see generally* Ray Jay Davis, *Water, Water Everywhere: Two New Model Water Codes*, 9 PROB. & PROP. 8 (1995); *see generally* J.W. Harris, *Private and Public Property: What Is the Difference?*, 111 L.Q. REV. 421 (1995).

309. *See, e.g.*, GA. CODE ANN. §§ 12-5-120 to 12-5-153 (2012); MICH. COMP. LAWS SERV. §§ 333.12714, 333.12715 (LexisNexis 2012); MO. REV. STAT. §§ 256.600 to 256.640 (2012); N.H. REV. STAT. ANN. §§ 482-B:1 to 482-B:18 (2013); OHIO REV. CODE ANN. § 1521.05 (LexisNexis 2012); 32 PA. CONS. STAT. §§ 645.1 to 645.13 (2012); R.I. GEN. LAWS §§ 46-13.2-1 to 46-13.12 (2012); TENN. CODE ANN. §§ 69-11-101 to 69-11-112 (2012).

310. *See, e.g.*, IND. CODE ANN. § 14-25-7-15(b) to (e) (LexisNexis 2012) (for wells with a capacity of more than 100,000 gallons per day); LA. REV. STAT. ANN. § 38:3094(A)(2), (5) (2012) (for wells with a capacity of more than 50,000 gallons per day); OHIO REV. CODE ANN. § 1521.16 (LexisNexis 2012) (for wells with a capacity of more than 100,000 gallons per day); 27 PA. CONS. STAT. § 3118 (2012) (for wells with a capacity of more than an average rate of 10,000 gallons/day over a thirty-day period); TENN. CODE ANN. §§ 69-8-301 to 69-8-304 (2012) (for wells with a capacity of more than 10,000 gallons/day); TEX. WATER CODE ANN. § 36.117 (West 2011) (requiring the registration of wells not required to obtain a permit).

311. *See, e.g.*, GA. CODE ANN. § 12-5-134(K) (West 2012); TEX. WATER CODE ANN. §§ 36.113(c)(6), (d)(6), 36.1131(b)(7) (West 2011).

from the wells. Many other statutes address the preservation of groundwater quality.[312] Yet other states regulate public water systems in the interest of public health and financial endurance, but not as a means of regulating groundwater usage.[313] Only with enactment of a comprehensive regulatory system for allocating groundwater to particular uses do we progress into a regulated riparian approach to groundwater.[314] This approach allows the possibility of balancing the public interests and the private interests in a comprehensive regulatory framework—although the complexities of this process will make its successful application neither easy nor inexpensive.[315]

While the details of these new systems vary more than the administrative systems under appropriative rights, there is a common core to the new systems.[316] The core of the regulated riparian approach to water management is the requirement that water users obtain a time-limited permit from the state based upon an evaluation of the reasonableness of the proposed use of water.[317] The rights of water users are determined by the permits, not by the place of the use. In fact, a common motive for enactment of a regulated riparian statute is to authorize the use of water on non-riparian or non-overlying land.[318] What links regulated riparianism to traditional

312. *See, e.g.*, MICH. COMP. LAWS SERV. §§ 324.3101 to 324.3133 (LexisNexis 2012); N.H. REV. STAT. ANN. § 482-B:15 (LexisNexis 2012); W. VA. CODE ANN. §§ 22-12-1 to 22-12-14 (LexisNexis 2011).

313. *See, e.g.*, *In re* Osage Water Co., 51 S.W.3d 58, 60 (Mo. Ct. App. 2001), *transfer denied.*

314. States and local governments (whether they have comprehensive regulations of groundwater usage or not) often take effects on groundwater into account when zoning land. *See, e.g.*, S. Anchorage Concerned Coal., Inc. v. Municipality of Anchorage Bd. of Adjustment, 172 P.3d 774, 781 (Alaska 2007); Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova, 150 P.3d 709, 737 (Cal. 2007); Meridian Ranch Metro. Dist. v. Colo. Groundwater Comm'n, 240 P.3d 382, 388 (Colo. App. 2009); Jackson Cnty. v. Earthsource Res., Inc., 627 S.E.2d 569, 571 (Ga. 2006); Ralph Naylor Farms, LLC v. Latah Cnty., 144 Idaho 806, 813, 172 P.3d 1081, 1088 (2007); Town & Country Utils., Inc. v. Ill. Pollution Control Bd., 866 N.E.2d 227 (Ill. 2007); Griswold v. Town of Denmark, 927 A.2d 410, 413 (Me. 2007); Sweenie v. A.L. Prime Energy Consultants, 887 N.E.2d 238, 239 n.2 (Mass. 2008); Redrock Valley Ranch, LLC v. Washoe Cnty., 254 P.3d 641, 646 n.4 (Nev. 2011); Johnson v. Town of Wolfeboro Planning Bd., 945 A.2d 13, 14–15 (N.H. 2008); Cadena v. Bernalillo Cnty. Bd. of Cnty. Comm'rs, 131 P.3d 687, 690–91 (N.M. Ct. App. 2006); State *ex rel.* R.T.G., Inc. v. State, 780 N.E.2d 998, 1002 (Ohio 2002); Save Our Rural Or. v. Energy Facility Siting Council, 121 P.3d 1141, 1159–60 (Or. 2005); Lischio v. Zoning Bd. of Rev. of N. Kingstown, 818 A.2d 685, 687–88 (R.I. 2003); Hallco Tex., Inc. v. McMullen Cnty., 221 S.W.3d 50, 65–66 (Tex. 2006); Gardner v. Board of Cnty. Comm'rs, 178 P.3d 893, 898–99, 902 (Utah 2008); Kittitas Cnty. v. E. Wash. Growth Mgmt. Hearings Bd., 256 P.3d 1193, 1209 (Wash. 2011); *but see* Town of Avon v. W. Cent. Conservancy Dist., 937 N.E.2d 366, 378 (Ind. Ct. App. 2010) (holding that zoning to protect groundwater quantities exceeded the town's authority); Lake Beulah Water Mgmt. Dist. v. Vill. of E. Troy, 799 N.W.2d 787, 792 (Wis. 2011) (holding that local zoning to protect groundwater was preempted by the state's regulated riparian statute); *see generally* James G. Moose, *The Relationship between Water Supply and Land Use Planning: Leading Cases under the California Environmental Quality Act*, 4 GOLDEN GATE U. ENVTL. L.J. 27 (2010).

315. *See* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(5)(D).

316. *See id.* ch. 9.

317. *See, e.g.*, Nw. Fla. Water Mgmt. Dist. v. Dep't of Cmty. Affairs, 7 So.3d 1129 (Fla. Dist. Ct. App. 1st Dist. 2009); Marion Cnty. v. Greene, 5 So.3d 775 (Fla. Dist. Ct. App. 5th Dist. 2009); *see also* REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308; Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03–9.03(a)(2); Dellapenna, *The Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(1), (b)(2).

318. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, § 2R-1-02; Dellapenna, *Right to Consme Water under "Pure" Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 7.02–7.02(a)(2); Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(2); *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(2), nn.196–203.

riparian rights is that the criterion for permits is whether the use would be "reasonable" (or some similar term).[319] The criterion of "reasonable use," however, is applied very differently than at common law, most importantly because an administering agency decides before a use begins whether it is reasonable, both in terms of general social policy and in terms of the effects of the proposed use on other permitted uses as opposed to an after-the-fact decision by a court.[320]

The administering agency is required to make permits subject to conditions designed to protect other lawful uses and public values.[321] The statutes often provide preferences for certain classes of uses.[322] Temporal priority has a strictly limited role in the permit process.[323] Perhaps its most important difference from appropriative rights is that permits usually are issued only for a period of time (from three to twenty years, depending on the state).[324] When a permit expires, the question of the use's continued reasonableness is reexamined.

While users are sometimes required to pay fees to the agency for the permits based on the amount of water they will use, these fees cannot be considered payment for the water itself.[325] While failing to implement economic incentives for the wise use of groundwater, regulated riparian statutes create mechanisms for long-term planning and provide in other ways for the public interest in the waters of the state.[326] One major purpose of regulated riparian permits is to gather the necessary

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319. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, §§ 2R-1-01, 2R-2-20, 6R-3-01, 6R-3-02; *see also Regulated Riparianism*, *supra* note 297, § 9.03(b)(1)–9.03(b)(3); *Regulated Riparian Approach*, *supra* note 317, § 23.03(a)–23.03(b)(5).

320. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 298, §§ 6R-2-01–6R-2-08, 6R-3-02, 6R-3-05; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(5)(A), 9.03(b)(1)–9.03(b)(3); Dellapenna, *The Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(4).

321. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, § 7R-1-01; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(5)(A), 9.05–9.05(c); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(5).

322. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, §§ 6R-1-02, 6R-3-04; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(3), 9.05(c); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(2).

323. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, §§ 6R-1-03, 6R-3-02; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(b)(3); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(2), nn.209-236, & 243.

324. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 298, § 7R-1-02; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(4); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(5), nn.341–349, 362, 365–67, & 390–98.

325. *See* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(5)(C). The Regulated Riparian Model Water Code breaks new ground in this respect, requiring water use fees that, to some extent at least, reflect the use value of the water. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, § 4R-1-08.

326. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, §§ 4R-2-01–4R-2-04; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.05(a)–(d); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.05–23.05(d). The agency can incorporate permit conditions based on its plans. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, § 7R-1-01; *see also* Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.05(a), nn.585–92. *See, e.g.*, Ariz. Water Co. v. Ariz. Dep't of Water Res., 73 P.3d 1267, 1271, 1273–74 (Ariz. Ct. App. 2003), *rev'd on other grounds*, 91 P.3d 990 (Ariz. 2004).

information to enable planning to occur on an on-going basis; several create statewide data systems for this purpose.[327] The regulated riparian approach addresses pollution problems by vesting both the management of water allocation and water quality issues in a single agency—an agency charged to integrate the consideration and granting of permits to use in light of both sets of policies.[328] Regulated riparian codes also usually require the agency to define and protect some minimum flows for surface waters and minimum levels for groundwater.[329] The administering agency also is usually given broad discretion to plan for and to deal with crises brought on by droughts or other water emergencies.[330] There is some evidence, however, that administering agencies prefer (at least for surface waters) to use temporal priority or pro rata sharing in order to avoid litigation or other difficulties for the agency.[331] This sabotages the whole scheme of regulated riparianism, based as it is on expert appraisal of the uses that will best serve the needs of society, eschewing allocation without evaluation of social utility.

Most regulated riparian states apply the same legal regime to groundwater as they apply to surface waters.[332] Arkansas, Georgia, South Carolina, Virginia, and Wisconsin, however, have separate regulated riparian statutes for surface waters and groundwater.[333] An additional three states have a regulated riparian system for

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327. *See, e.g.*, Wash. Cty. v. Nw. Fla. Water Mgmt. Dist., 85 So.3d 1127 (Fla. Dist. Ct. App. 1st Dist. 2012); *see also* REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, § 4R-2-03; Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.03(a)(5)(B), at notes 583–98; Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.03(b)(6), nn.421–29.

328. *See* REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, §§ 4R-3-04, 6R-4-04.

329. Id. § 3R-2-01 through 3R-2-05; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.05(b); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.05(b).

330. REGULATED RIPARIAN MODEL WATER CODE, *supra* note 298, §§ 7R-3-01–7R-3-07; *see also* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.05(d); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.05(d).

331. *See* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.05(d), nn. 954.

332. ALA. CODE §§ 9-10B-3(3), (19) (LexisNexis 2008); CONN. GEN. STAT. §§ 22a-367(9), 22a-368 (2009); DEL. CODE ANN. tit. 7, §§ 6003(a)(3), (b)(4) (2008); FLA. STAT. ANN. §§ 373.019(17), 373.023(1), 373.069 to 373.0695, 373.103(1) (LexisNexis 2009); HAW. REV. STAT. §§ 174C-3, 174C-4(a) (2008); IOWA CODE §§ 455B.264(1), 455B.268(1)(a) (2009); KY. REV. STAT. ANN. §§ 151.120(1), 151.150(2) (LexisNexis 2008); MD. CODE ANN., ENVIR. §§ 5-101(j)(1), 5-501(a), 5-502(a) (LexisNexis 2008); MASS. GEN. LAWS ch. 21G, §§ 2, 7 (LexisNexis 2009); MICH. COMP. LAWS SERV. §§ 324.32701(v), 324.32702(2), 324.32706(2)(b), 324.32707(1)(e), (f), (7), 324.32708(1)(e), (g), (3), 324.32714(4)(b), (c), 324.32722(1), 324.32802 (LexisNexis 2009); MINN. STAT. §§ 103G.005(17), 103G.271(1) (2009); MISS. CODE ANN. §§ 51-3-1, 51-3-5 (2008); N.J. STAT. § 58:1A-3(g) (2009); N.C. GEN. STAT. §§ 143-215.21(3), (5) (2007); *see generally* Ellen Kohler, *Ripples in the Water: Judicial, Executive, and Legislative Developments Impacting Water Management in Michigan*, 53 WAYNE L. REV. 1, 50–55, 64–69 (2007); Weston, *supra* note 149, at 239, 258–61, 263–71. Where New York comes out on this question is not clear. *See* N.Y. ENVTL. CONSERV. LAW §§ 115–605 (applying to any water withdrawals within the Great Lakes basin), 15-1501(1)(a) (applying to "any approved source"), 15-1527 (applying to wells in Long Island) (McKinney 2012).

333. ARK. CODE ANN. §§ 15-22-901–15-22-914 (2007); GA. CODE ANN. §§ 12-5-90–12-5-107 (2008); S.C. CODE ANN. §§ 49-5-10–49-5-150 (2008); VA. CODE ANN. §§ 62.1-254–62.1-270 (2008); WIS. STAT. §§ 281.34, 281.35 (2008).

groundwater without having one for surface waters.[334] New Hampshire has also enacted a very limited regulated riparian statute that applies only to groundwater.[335] Vermont is moving in this direction.[336] In Pennsylvania, the state legislature has not enacted a regulated riparian system for either surface waters or groundwater, but parts of the state nonetheless are subject to such a system for both sources of water under two interstate water commissions rather than under state law.[337]

As the large number of states that simply included groundwater and surface waters in the same regulated riparian statute indicates, and unlike the common law doctrines applied to groundwater (absolute dominion, correlative rights, the reasonable use rule, and some versions of appropriative rights), the regulated riparian approach generally attempts to achieve the conjunctive management that long has been the dream of scientists and legal scholars.[338] For each of fourteen states, the often elaborate regulatory provisions applicable to surface waters apply in full force to groundwater, with few or no special provisions for groundwater.[339] These statutes also contain no provision regarding the coordination of underground and surface sources. To be done properly, the balancing process to determine what is reasonable must be undertaken by considering both underground and surface sources in a single calculus. This will not end, however, the risk of groundwater users being slighted compared to surface water users because of the difficulty and expense of obtaining the information necessary to perform that calculus.[340]

Of the nine states that have stand-alone regulated riparian systems applicable to groundwater, only five—Arkansas, Georgia, South Carolina, Virginia, and Wisconsin—apply a different regulated riparian statute to surface waters.[341] Two of the states that have regulated riparian systems for groundwater only (Arizona and Nebraska) apply appropriative rights to surface waters.[342] The other two states apply

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334. ARIZ. REV. STAT. §§ 45-401–45-898.01 (LexisNexis 2008); 525 ILL. COMP. STAT. ANN. 45/1–45/7 (LexisNexis 2009); NEB. REV. STAT. ANN. §§ 46-656.01–46-656.67, 46-675–46-692 (LexisNexis 2008).

335. N.H. REV. STAT. ANN. §§ 485-C:1–485-C:21 (LexisNexis 2008). *See In re Garrison Place Real Est. Inv. Trust*, 986 A.2d 670 (N.H. 2009); *In re* Town of *Nottingham*, 904 A.2d 582 (N.H. 2006).

336. VT. STAT. ANN. tit. 10, §§ 1390–1419 (2007).

337. *Delaware River Basin Compact*, art. 10, Pub. L. No. 87-328, 75 Stat. 688 (1961) *available at* http://www.state.nj.us/drbc/library/documents/compact.pdf; *Susquehanna River Basin Compact*, art. 11, Pub. L. No. 91-575, 84 Stat. 1509 (1970) *available at* http://www.srbc.net/about/srbc_compact.pdf.

338. *See, e.g.*, Slusher v. Martin Cty., 859 So. 2d 545 (Fla. Dist. Ct. App. 2003); *In re* Water Use Permit Applications, 9 P.3d 409, 488–95 (Haw. 2000); *see also* REGULATED RIPARIAN MODEL WATER CODE, *supra* note 308, §§ 2R-2-32, 3R-1-01.

339. *See* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47.

340. *Id.*

341. *See* Dellapenna, *Regulated Riparianism*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 9.05–9.05(d); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23.05–23.05(d).

342. For a rare explicit acknowledgement that Arizona and Nebraska have enacted a regulated riparian system for groundwater rather than a scheme of appropriate rights, see Danielle Spiegel, Book Note, *Can the Public Trust Doctrine Save Western Groundwater?*, 18 NYU ENVTL. L.J. 412, 422 (2010); *see also* Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23; J. David Aiken, *The Western Common Law of Tributary Groundwater: Implications for Nebraska*, 83 NEB. L. REV. 541 (2004); *but see Spear T Ranch, Inc. v. Knaub*, 691 N.W.2d 116, 133–38 (Neb. 2005) (stating that the Ground Water Management and Protection Act does not displace the common law of groundwater), *further appeal on other grounds*, 713 N.W.2d 489 (Neb. 2006).

On the Arizona act generally, see William Blomquist, Tanya Heikkila, & Edelia Schlager, *Institutions and Conjunctive Water Management among Three Western States*, 41 NAT. RES. J. 653, 661–66

more or less pure riparian rights to surface waters. The states that have separate regulated riparian statutes for surface waters and groundwater are all states that formerly followed riparian rights for surface waters and (apparently) the absolute dominion rule for groundwater.

In each state in which a regulated riparian statute was enacted for either surface waters or groundwater, the immediate cause of the enactment was a perceived crisis in the state's water law caused by an extraordinary shortage of water relative to demand, a shortage that was perceived as likely to be recurring or even permanent.[343] This pattern explains the few states that have separate regulated riparian statutes for surface waters and groundwater. Arkansas, Georgia, South Carolina, and Virginia enacted their regulated riparian statutes at different times for surface waters and groundwater, largely because of local political circumstances rather than because of any particular decision that separate regulatory regimes are appropriate for the different sources of water.[344] The reasons why the pressures for law reform were felt at different times and perhaps in different degrees in these states for different sources of water varied and have not been subjected to thorough analysis, but each state found it easier to enact a separate statute rather than to enact amendments to the earlier enacted statute to extend its reach to additional water sources. This appears to have been true even when, as was true in three states, the newer statute closely parallels the earlier statute. These statutes share one feature that sets them apart from general regulated riparian statutes that apply to most or all waters in the state—virtually by definition, having a stand-alone regulated riparian statute that focuses exclusively on groundwater impedes or precludes the possibility of conjunctive management. This problem can be dealt with satisfactorily in Arkansas, Georgia, South Carolina, Virginia, and Wisconsin—states that have a separate regulated riparian statute for surface waters administered by the same agency as administers the state's regulated riparian for groundwater.

In states where the law of surface waters is not regulated riparianism, applying regulated riparianism to groundwater (Arizona, Illinois, Nebraska, New Hampshire) can make conjunctive management difficult or impossible. The Arizona Supreme Court made this clear in its decision in *In re General Adjudication of the Gila River*.[345] As the case proceeded, the court held that even if pumping groundwater would deplete related surface streams by fifty percent or more of the amount

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(2001); Desmond D. Connall, Jr., *A History of the Arizona Groundwater Management Act*, 1982 Ariz. St. L.J. 313; Glennon & Maddock, *supra* note 185. A federal court recently assumed that Arizona still followed the reasonable use rule for groundwater. Brady v. Abbott Labs., 433 F.3d 679 (9th Cir. 2005), *cert. denied*, 549 U.S. 886 (2006). *See also* L. William Staudenmaier, *Between a Rock and a Dry Place: The Rural Water Supply Challenge for Arizona*, 49 ARIZ. L. REV. 321 (2007) (analyzing water issues on the basis of the continued applicability of the reasonable use doctrine).

343. *See generally* Robert H. Abrams, *Water Allocation by Comprehensive Permit Systems in the East: Considering a Move Away from Orthodoxy*, 9 VA. ENVTL. L.J. 255 (1990); Ray Jay Davis, Don Phelps & George William Sherk, *Influencing Water Legislative Development: What to Do and What to Avoid*, 31 WATER RESOURCES BULL. 583 (1995).

344. *See, e.g.*, John L. Fortuna, Note, *Water Rights, Public Resources, and Private Commodities: Examining the Current and Future Law Governing the Allocation of Georgia Water*, 38 GA. L. REV. 1009, 1033–41 (2004); G. Alan Perkins, *Arkansas Water Rights: Review and Considerations for Reform*, 25 U. ARK. LITTLE ROCK L. REV. 123 (2002).

345. *In re* Gen. Adjudication of All Rights to Use Water in Gila River System and Source, 857 P.2d 1236 (Ariz. 1993) (en banc).

of groundwater pumped within ninety days of the pumping, the groundwater was not subject to appropriation and therefore could not be included in a general adjudication of surface water rights.[346] Conjunctive management is not altogether precluded by this decision. Legislation expressly authorizes the underground storage and recovery of surface waters[347] and the retirement of groundwater by withdrawing land from irrigation or by substituting surface waters for uses of groundwater.[348] These arrangements still leave conjunctive management seriously incomplete. This is a major problem even if the regulated riparian scheme works as designed, yet there is no reason to believe that the regulated riparian approach is any worse than the other approaches to groundwater law when it comes to conjunctive management. One could conclude, on the other hand, that the regulated riparian approach is superior to the other approaches in other respects.

III. IS THERE A ROLE FOR MARKETS?

In this "neoliberal" era, markets are presented as the best or only tool for managing or resolving social, political, and economic problems.[349] Such thinking

346. *In re* Gen Adjudication of All Rights to Use Water in Gila River Sys. & Source, 9 P.3d 1069, 1081 (2000). For critiques of this decision, *see* Allison Evans, *The Groundwater/Surface Water Dilemma in Arizona: A Look Back and a Look Ahead Toward Conjunctive Management Reform*, 3 PHOENIX L. REV. 269, 283 (2010); Glennon & Maddock, *supra* note 185.

347. ARIZ. REV. STAT. §§ 37.106.01(F), 45-402(2), (11)(b), 23(b), (30)(b), (33), 45-451(C)(1), 45-465(B)(5), 45-466(B), 45-467(A)(2), (E)(1), (F)(1), (J), (N), 45-556(B), 45-563(B), 45-566(A)(2), (5), 45-567(A)(4), 45-597, 45-601, 45-611(A), 45-612(B), 45-614(A)(3), 45-632(B)(5), (L), 45-635(A)(3), 45-801.01 to 45-898.01, 45-1043(A)(2), 45-1051(A)(4), 48-3713(C), 48-4502(1).

348. ARIZ. REV. STAT. §§ 45-402(38), (39), 45-437.01 to 45-437.03, 45-452(B) to (F), (J), 45-454.01(A)(3), 45-461 to 45-465, 45-469, 45-470 to 45-473, 45-476(B), (D), 45-479(A), 45-480(A) to (C), 45-481(4), 45-514(A), 45-515(A), 45-542(C), 45-543, 45-545(B)(1), 45-555(B)(2), 45-566(A)(9), 45-567(A)(8), 45-611(A)(3), (B)(3), (C)(4), 45-613 to 45-615, 45-617, 45-812.01(B), 45-831.01(B)(1), 45-832.01, 45-834.01, 45-851.01, 45-874.01(A), 45-1002(A)(6), 48-4502(2), 49-290.01(A).

349. *See, e.g.*, TOM BETHELL, THE NOBLEST TRIUMPH: PROPERTY AND PROSPERITY THROUGH THE AGES (1998); Alfred C. Aman, Jr., *Law, Markets and Democracy: A Role for Law in the Neo-Liberal State*, 51 N.Y.L. SCH. L. REV. 801 (2007); Shea Coulson, *Liberty, Property and the Environment: Rethinking Environmental Law in Canada*, 26 WINDSOR REV. LEGAL & SOC. ISSUES 49 (2009); Colin Crawford, *The Social Function of Property and the Human Capacity to Flourish*, 80 FORDHAM L. REV. 1089 (2011); Tsilli Dagan & Talia Fisher, *Rights for Sale*, 96 MINN. L. REV. 90 (2011); Jody Freeman, *The Private Role in Public Governance*, 75 N.Y.U. L. REV. 543 (2000); Timothy K. Kuhner, Citizens United *as Neoliberal Jurisprudence; The Resurgence of Economic Theory*, 18 VA. J. SOC. POL'Y & L. 395 (2011); O. Lee Reed & E. Clayton Happ, *A "Commonest" Manifesto: Property and the General Welfare*, 46 AM. BUS. L.J. 103 (2009); C. Gregory Ruffennach, *Free Markets, Individual Liberties and Safe Coal Mines: A Post-Sago Perspective*, 111 W. VA. L. REV. 75 (2008); Sidney A. Shapiro, *Outsourcing Government Regulation*, 53 DUKE L.J. 389 (2003); Daniel J. Sharfstein, *Atrocity, Entitlement, and Personhood in Property*, 98 VA. L. REV. 635 (2012); Jack M. Beermann, *Administrative-Law-Like Obligations of Private[ized] Entities*, 49 UCLA L. REV. 1717 (2002); John Williamson, *A Short History of the Washington Consensus*, 15 LAW & BUS. REV. AM. 7 (2009). For critiques of the idea that markets always work and are always better than alternative forms of social ordering, *see* ROBERT H. NELSON, ECONOMICS AS RELIGION: FROM SAMUELSON TO CHICAGO AND BEYOND (2001); DAVID BOLLIER, SILENT THEFT: THE PRIVATE PLUNDER OF OUR COMMON WEALTH (2003); DANIEL H. COLE, POLLUTION AND PROPERTY: COMPARING OWNERSHIP INSTITUTIONS FOR ENVIRONMENTAL PROTECTION (2002); MICHAEL J. SANDEL, WHAT MONEY CAN'T BUY: THE MORAL LIMITS OF MARKETS: AN INTRODUCTORY SURVEY (2012); LARS WERIN, ECONOMIC BEHAVIOR AND LEGAL INSTITUTIONS (2003); Joseph W. Dellapenna, *Climate Disruption, the Washington Consensus, and Water Law Reform*, 81 TEMP. L. REV. 383 (2008); Dellapenna, *Adapting Riparian Rights to the Twenty-First Century*, *supra* note 297; Keith Sealing, *Dear Landlord: Please Don't Put a Price on My Soul: Teaching Property Law Students that "Property Rights Serve Human Values,"* 5 N.Y. CITY L. REV. 35 (2002); Theodore A. Feitshans & Kelly Zering, *Federal Regulations of Animal and Poultry Production*

leads economists, engineers, lawyers, and others to propose markets as the best tool for environmental management generally,[350] and for water resources in particular.[351] Critics have raised serious questions about the utility of such schemes for water, a common pool resource, even when the water is underground in confined or unconfined aquifers.[352] Despite the widespread advocacy of markets, state controls

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Under the Clean Water Act: Opportunities for Employing Economic Analysis to Improve Societal Results, 10 PENN ST. ENVTL. L. REV. 193 (2002).

350. *See, e.g.*, TERRY ANDERSON & DONALD R. LEAL, FREE MARKET ENVIRONMENTALISM (2d ed. 2001); JOHN BRAITHWAITE, REGULATORY CAPITALISM: HOW IT WORKS, IDEAS FOR MAKING IT WORK BETTER (2008); WILLIAM K. JAEGER, ENVIRONMENTAL ECONOMICS FOR TREE HUGGERS OR OTHER SKEPTICS (2005); SHEILA M. OLMSTEAD & NATHANIAL KEOHANE, MARKETS AND THE ENVIRONMENT (2007); GERNOT WAGNER, BUT WILL THE PLANET NOTICE? HOW SMART ECONOMICS CAN SAVE THE WORLD (2011); Robert W. Adler, *Priceline for Pollution: Auctions to Allocate Public Pollution Control Dollars*, 34 WM. & MARY ENVTL. L. & POL'Y REV. 745 (2010); Marc Allen Eisner, *Private Environmental Governance in Hard Times: Markets for Virtue and the Dynamics of Regulatory Change*, 12 THEORETICAL INQ. L. 489 (2011); Thomas M. Gremillon, *Reducing Carbon Emissions through Compensated Moritoria: Ecuador's Yasuní Initiative and Beyond*, 41 ENVTL. L. RPTR. NEWS & ANALYSIS 10641 (2011); Shi-Ling Hsu, *A Prediction Market for Climate Outcomes*, 83 U. COLO. L. REV. 179 (2011); Heather Hughes, *Enabling Investment in Environmental Sustainability*, 41 ENVTL. L. RPTR. NEWS AND ANALYSIS 10745 (2011); Timothy F. Malloy, *The Social Construction of Regulation: Lessons from the War against Command and Control*, 58 BUFF. L. REV. 267 (2010); Jeremy Remy Nash, *Trading Species: A New Direction for Habitat Trading Programs*, 32 COLUM. J. ENTVL. L. 1 (2007); Robert N. Stavins, *A Meaningful U.S. Cap-And-Trade System to Address Climate Change*, 32 HARV. ENVTL. L. REV. 293 (2008); Barton H. Thompson, Jr., *Ecosystem Services and Natural Capital: Reconceiving Environmental Management*, 17 N.Y.U. ENVTL. L.J. 460 (2008); Laura A. Wayburn & Anton A. Chiono, *The Role of Federal Policy in Establishing Ecosystem Service Markets*, 20 DUKE ENVTL. L. & POL'Y F. 385 (2010).

351. *See, e.g.*, ALINE BAILLAT, INTERNATIONAL TRADE IN WATER RIGHTS: THE NEXT STEP (2010); KAREN BAKKER, PRIVATIZING WATER: GOVERNANCE FAILURE AND THE WORLD'S WATER CRISIS (2011); OECD, PRIVATE SECTOR PARTICIPATION IN WATER INFRASTRUCTURE (2009); Jonathan H. Adler, *Water Rights, Markets, and Changing Ecological Conditions*, 42 ENVTL. L. 93 (2012); Jeremy Allouche, Matthias Finger & Patrícia Luís Manso, *Water Sector Evolution Scenarios: The Case of Europe*, 10 WATER POL'Y 221 (2008); Oliver M. Brandes & Linda Nowlan, *Wading into Uncertain Waters: Using Markets to Transfer Water Rights in Canada—Possibilities and Pitfalls*, 19 J. ENVTL. L. & PRACTICE 267 (2009); Craig D. Broadbent et al., *Creating Real Time Water Leasing Market Institutions: An Integrated Economic and Hydrological Methodology*, 144 J. CONTEMP. WATER RESEARCH & EDUC. 50 (2010); Steven E. Clyde, *Marketplace Reallocation in the Colorado River Basin: Better Utilization of Scarce Water Resources*, 28 J. LAND RESOURCES & ENVTL. L. 49 (2008); David J. Guy, *A Model Water Transfer Act for California: An Agricultural Perspective*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 709 (2008); Johanna Hamburger, *Improving Efficiency and Overcoming Obstacles to Water Transfers in Utah*, 15 U. DENV. WATER L. REV. 69 (2011); James L. Huffman, *Against the Current: Four Decades in Water Law and Policy*, 42 ENVTL. L. 19 (2012); Lawrence J. MacDonnell & Teresa A. Rice, *Moving Agricultural Water to Cities: The Search for Smarter Approaches*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 105 (2008); Robert David Pilz, *Lessons in Water Policy Innovation from the World's Driest Inhabited Continent: Using Water Allocation Plans and Water Markets to Manage Water Scarcity*, 14 U. DENV. WATER L. REV. 97 (2010); Kevin M. Sibbernsen, *Looking for Water Down Under: Revitalizing Wyoming's Water Law in Light of New South Wales's Water Management Act 2000*, 21 GEO. INT'L ENVTL. L. REV. 761 (2009); Richard A. Slaughter, *A Transactions Cost Approach to the Theoretical Foundations of Water Markets*, 45 J. AM. WATER RESOURCES ASS'N 331 (2009); Marcia Silva Stanton, *Payments for Fresh Water Services: A Framework for Analysis*, 18 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 189 (2012); Barton H. Thompson, Jr., *Water as a Public Commodity*, 95 MARQ. L. REV. 17, 23–31 (2011); Vicki Waye & Christina Son, *Regulating the Australian Water Market*, 22 J. ENVTL. L. 431 (2010).

352. *See* Amitrajeet A. Batabyal, *Contemporary Research in Ecological Economics: Five Outstanding Issues*, 25 INT'L J. ECOL. & ENVT'L SCIENCE 143 (1999); Dellapenna, *Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 23; Joseph W. Dellapenna, *The Importance of Getting Names Right: The Myth of Markets for Water*, 25 WM. & MARY ENVT'L L. & POL'Y REV. 317 (2000); Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163 (1999); Stephanie E. Hayes Lusk, *Texas Groundwater: Reconciling the Rule of Capture with Environmental and Community Demands*, 30 ST. MARY'S L.J. 305 (1998).

in fact generally are being extended rather than reduced—as the spread of administrative controls under appropriative rights and the regulated riparian approach attest.

In contrast to a system that determines allocation of property claims through the discretionary acts of judges and administrators, market advocates prefer independent, fixed property rights in groundwater. They see the defects in markets, including market failures, as trifling alongside the harm perpetrated by a discretionary legal regime that depends on a determination of "reasonableness," whether determined only after a particular water situation has erupted into controversy (as under the reasonable use rule) or when a permit is issued (as under the regulated riparian approach).[353] For market advocates, the state should formally recognize the impact of market forces on property allocations, rather than mask them under potential discretionary reassignments based on reasonableness. The state should allow private property in a natural resource like groundwater or allow the state's instrumentalities to hold property interests as delegates of state power.

Market proponents argue that the propertization or commoditization of groundwater, while still confined in its aquifer, offers opportunities for benefits to be derived from the exclusivity, fixity, enforceability, and transferability of the traditional property rights with such right holders having individualized benefits that will reduce their desire for wealth transfers from the taxpayer or from the environment and with conservation of the resource following almost inevitably.[354] By allowing the universal development of this additional form of property, what was once merely a freely exploitable natural phenomenon becomes a conservable natural resource.[355] For market proponents, requirements of "reasonableness," "fairness," and "public interest" simply prevent a proper definition of the property right, specification of the resource, and maximization of profit and conservation alike. Such court-imposed rules are seen as interventions that impose non-market controls that convert something into a public resource that would far better be managed as a private property right.[356]

Once a property right has been defined and the terms for the enforcement and transferability are set forth in its definition, market proponents claim that the right should be allowed to operate in the market only under predictable constraints previously laid down by law to guide decisions of potential investors in the newly defined property right.[357] Assuming that the property right in groundwater has been defined so as to compel its property holders to "face the full opportunity costs of their actions, [so that] they will take only those actions that produce positive net

353. *See, e.g.*, Jack Hirshleifer, *Foreword*, *in* WATER RIGHTS: SCARCE RESOURCE ALLOCATION, BUREAUCRACY AND THE ENVIRONMENT 20, 34 (Terry L. Anderson ed., 1983); Andrew P. Morriss, Bruce Yandle & Terry L. Anderson, *Principles for Water*, 15 TUL. ENVTL. L.J. 335 (2002).

354. *See, e.g.*, Morriss, Yandle & Anderson, *supra* note 353. For an early example of such an argument, *see* WILLIAM RAMSEY & CLAUDE ANDERSON, MANAGING THE ENVIRONMENT: AN ECONOMIC PRIMER 253–81 (1982).

355. This argument is developed at some length in ROGER W. FINDLEY & DANIEL A. FARBER, CASES AND MATERIALS ON ENVIRONMENTAL LAW 387–404 (5th ed. 1999).

356. Alfred G. Cuzan, *Appropriators vs. Expropriators: The Political Economy of Water in the West*, *in* WATER RIGHTS: SCARCE RESOURCE ALLOCATION, BUREAUCRACY AND THE ENVIRONMENT, *supra* note 353, at 28–32.

357. David T. Fractor, *Privatizing the Ground Water Resource: Individual Use and Alternative Specifications*, 24 WATER RESOURCES BULL. 405, 410 (1988).

benefits for themselves and for society," market proponents such as Terry Anderson conclude that the law has done enough.[358] Greater specificity, enforceability, and transferability of groundwater under such a property system arguably justify rejection of a state's discretionary right to intervene on behalf of "reasonableness," "fairness," and the "public interest."[359] As economist Jack Hirshleifer commented,

> [I]n a populist era the idea of anyone having exclusive rights seems like an offense against the public. And in an activist age, the solution to be feared is subjecting all uses to the whim of a supervisory agency rather than to the even-handed enforcement of carefully defined property rights. When commissions or courts license . . . with tenure contingent upon . . . some ill-defined notion such as serving the public good, the result is a grossly inefficient allocation of water resources.[360]

Market proponents point to the supposed success of markets for managing surface waters in Chile as "proof" that market systems can and do work.[361] Proponents also point to other examples, such as the California Water Bank[362] and the water transfer from the Imperial Irrigation District and San Diego.[363] These examples do not in fact prove that markets for raw water actually work. As geographer Carl Bauer has shown through extensive on-the-ground research, reports of the successful implementation of the Chilean water marketing laws are greatly exaggerated.[364] Elsewhere I have written extensively about both the California Water

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358. TERRY L. ANDERSON, WATER CRISIS: ENDING THE POLICY DROUGHT 5, 17 (1983).

359. For an early espousal of this view, *see* Terry R. Armstrong, *Introduction to* WHY DO WE STILL HAVE AN ECOLOGICAL CRISIS? 1 (Terry R. Armstrong ed. 1972).

360. Hirshleifer, *supra* note 353, at 34. *See also* Jeffrey S. Ashley, *Administrative versus Legislative Management: The Impact of Discretion on Water Resource Management in the West*, 20 J. LAND RESOURCES & ENVT'L L. 223 (2000).

361. *See, e.g.*, David Guy, *A Model Water Transfer Act for California: An Agricultural Perspective*, 4 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 75, 77 n.24 (1996).

362. *See, e.g.*, RICHARD HOWITT ET AL., A RETROSPECTIVE ON CALIFORNIA'S 1991 EMERGENCY DROUGHT WATER BANK (1992); RAY CAPPOCK ET AL., CALIFORNIA WATER TRANSFERS: THE SYSTEM AND THE 1991 DROUGHT, IN SHARING SCARCITY: GAINERS AND LOSERS IN WATER MARKETING 21 (Harold O. Carter, Henry J. Vaux & Ann F. Scuering eds. 1994); Brian E. Gray, *The Market and the Community: Lessons from California's Drought Water Bank*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 41, 43–48 (2008); Richard E. Howitt, *Empirical Analysis of Water Market Institutions: The 1991 California Water Market*, 16 RESOURCE & ENERGY ECON. 357 (1993); Morris Israel & Jay R. Lund, *Recent California Water Transfers: Implications for Water Management*, 35 NAT. RESOURCES J. 1 (1995); Scott A. Jercich, *California's 1995 Water Bank Program: Purchasing Water Supply Options*, 123 J. WATER RESOURCES PLAN. & MGMT. 59 (1997); Martha H. Lennihan, *The California Drought Emergency Water Bank: A Successful Institutional Response to Severe Drought*, *in* WATER LAW: TRENDS, POLICIES, AND PRACTICES 127 (Kathleen Marion Carr & James D. Crammond eds. 1995); Kevin M. O'Brien & Robert R. Gunning, *Water Marketing in California Revisited: The Legacy of the 1987-92 Drought*, 25 PAC. L.J. 1053 (1994); Richard W. Wahl, *Market Transfers of Water in California*, 1 HASTINGS W-NW. J. ENVTL. L. & POL'Y 49, 51 52 (1994).

363. *See, e.g.*, Stephen N. Bretsen & Peter J. Hill, *Water Markets as a Tragedy of the Anticommons*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 723, 756–60 (2009); Jedidiah Brewer *et al.*, *Transferring Water in the American West: 1987-2005*, 40 U. MICH. J.L. REFORM 1021, 1021–25 (2007); C. Carter Ruml, *The Coase Theorem and Western U.S. Appropriative Rights*, 45 NAT. RES. J. 169 (2005).

364. CARL J. BAUER, AGAINST THE CURRENT: PRIVATIZATION, WATER MARKETS, AND THE STATE IN CHILE (1998); CARL J. BAUER, SIREN SONG: CHILEAN WATER LAW AS A MODEL FOR INTERNATIONAL REFORM (2004) (documenting the widespread exaggerations regarding the success of water markets in Chile); Carl Bauer, *Market Approaches to Water Allocation : Lessons from Latin America*, 144 J. CONTEMP. WATER RESEARCH & EDUC. 44 (2010); Carl J. Bauer, *Dams and Markets: Rivers and*

Bank and the "sale" from the Imperial Irrigation District to San Diego, showing that they were not true market transactions but regulatory interventions masquerading as market transactions—interventions that had the effect of transferring wealth from poorer members of the communities involved to the wealthier members of those communities.[365]

The problem that prevents markets from functioning without heavy-handed state intervention is the very same problem that the market is supposed to promote—the treating of a water right as a discrete item of property. Water in large quantities is, by its nature, a shared resource so that what you do with or to your water affects my water. As a result, courts will not allow a change in a water right (whether by sale or otherwise) if it would adversely affect other water rights—even junior water rights.[366] Except for the absolute dominion rule, this "third-party rule" applies to groundwater every bit as much as it applies to surface water.[367] To do otherwise would be to allow the seller of a water right to convey the property rights of affected third parties without their consent or their compensation.[368] The result, however, is that any significant sale of water rights that would involve a significant change in the pattern of water usage can be blocked by numerous, perhaps innumerable, third parties—resulting in what some would call a "tragedy of the anticommons."[369]

In contrast with the advocates of markets, many persons argue that the law should limit uses of groundwater to those that are "reasonable"—whether in the guise of the reasonable use rule[370] or in the guise of the regulated riparian approach.[371] The power to decide whether a particular use or pattern of use is reason-

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Electric Power in Chile, 49 NAT. RES. J. 583 (2009); *see also* Chris Sagers, *The Myth of "Privatization,"* 59 ADMIN. L. REV. 37 (2007).

365. Dellapenna, *Climate Disruption, the Washington Consensus, and Water Law Reform*, *supra* note 349, at 422–28; Dellapenna, *Introduction to Riparian Rights*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 6.02(b)(2), (3); Joseph W. Dellapenna, *Special Challenges to Water Markets in Riparian States*, 21 GA. ST. U.L. REV. 305 (2004); *see also* Brian E. Gray, *The Modern Era in California Water Law*, 45 HASTINGS L.J. 249, 252–71 (1994); Gray, *supra* note 362, at 262; O'Brien & Gunning, *supra* note 362, at 1078–83; Joseph L. Sax, *Understanding Transfers: Community Rights and the Privatization of Water*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 33 (2008); Kenneth R. Weber, *Effects of Water Transfers on Rural Areas*, 30 NAT. RES. J. 13 (1990).

366. *See, e.g.*, Barron v. Idaho Dep't of Water Res., 135 Idaho 414, 18 P.3d 219 (2001); *see generally* Jean-Marc Bourgeon, K. William Easter, & Rodney B.W. Smith, *Water Markets and Third-Party Effects*, 90 AM. J. AGRIC. ECON. 902 (2008); Dellapenna, *The Importance of Getting Names Right*, *supra* note 352, at 356–58; Teri Etchells, Hector M. Malano & Thomas A. McMahon, *Overcoming Third Party Effects from Water Trading in the Murray-Darling Basin*, 8 WATER POL'Y 69 (2006).

367. *See* Laura Ziemer, Stan Bradshaw, & Meg Casey, *Changing Changes: A Roadmap for Montana's Water Management,* 14 U. DENV. WATER L. REV. 47 (2010).

368. The point is explained in POSNER, *supra* note 286, at 77–78.

369. Stephen N. Bretson & Peter J. Hill, *Water Markets as a Tragedy of the Anticommons*, 33 WM. & MARY ENVTL. L. & POL'Y L. REV. 723 (2009); *see generally* Mark A. Heller, *The Tragedy of the Anticommons: Property Rights in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998).

370. *See, e.g.*, RESTATEMENT (SECOND) OF TORTS, *supra* note 38, § 858; WILLIAM GOLDFARB, WATER LAW 44 (2d ed. 1988); Jean A. Bowman & Gary R. Clark, *Transitions in Midwestern Ground Water Law*, 25 WATER RESOURCES BULL. 413 (1989); *see generally* Dellapenna, *The Reasonable Use Rule*, *in* WATERS AND WATER RIGHTS, *supra* note 47.

371. *See, e.g.*, THE MULTI-GOVERNANCE OF WATER: FOUR CASE STUDIES (Matthias Finger, Ludivine Tamiotti, & Jeremy Allouche eds. 2005); Robert Beck, *The Regulated Riparian Model Water Code: Blueprint for Twenty First Century Water Management*, 25 WM. & MARY ENVT'L L. & POL'Y REV. 113 (2000); J.W. Looney, *Modification of Arkansas Water Law: Issues and Alternatives*, 38 ARK. L. REV.

able allows courts or administrators to exercise discretion over a protracted period of time through a process of reversing or reinstating specific decisions regarding "reasonableness" in a particular fact situation. The result is that groundwater "rights" held on the predicate that the use in question is "reasonable" can be lost at any time without compensation.[372] Discretion in courts and administrators, so much lamented by market proponents,[373] is preferred by others who are unimpressed by the markets.

Proponents of a market regime for environmental management similarly criticize the increasing employment of "traditional planning and land-use control tools" by either state or federal governments "embark[ing] on a massive planning . . . strategy."[374] Rural land for the most part remains substantially unregulated, yet concern over well-head protection and other water issues has increased the amount of regulation applicable to land use, both above and below the surface of the ground.[375] However necessary this may be, such legal intervention into previously little-regulated land uses, especially in rural areas, represents heavy reliance on regulation rather than markets. Even staunch critics of rural land use controls doubt that they can prevent the broad implementation of centrally directed state/federal controls over rural land when the public interest requires it.[376] If the surface use of farmland is seeing more public control, it is unlikely that there will be much movement towards fixed, enforceable, and transferable property interests in groundwater that has not yet been pumped from the ground.

One need not adopt a pure market system, if such could ever exist or has ever existed historically, in order to accept the value of legal regimes accommodating market forces through independent, fixed property rights—for example, estates in groundwater.[377] Most likely, neither a system of command regulations nor an autonomous system of fixed units of independent private property alone will be employed. Even should the state claim to be public trustee of groundwater, equitable estates having the dignity of independent, fixed rights could still be carved out of this trust corpus.[378] The state needs identifiable units of property to regulate, just as

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221 (1984); *see generally* Dellapenna, *The Regulated Riparian Approach to Groundwater*, *in* WATERS AND WATER RIGHTS, *supra* note 47.

372. ANDERSON, *supra* note 358, at 99. Actual examples of this happening are easier to identify for surface water uses than for groundwater uses. *See, e.g.*, Harris v. Brooks, 245 A.2d 129 (Ark. 1955) (displacing a rice farm that had been in business for about twenty years in favor of a boat livery in its first year of operation).

373. Terry Anderson quotes Steven Williams to the effect: "At every stage of the [regulation] procedure, we see government agencies exercising enormous discretion . . . . This vast discretion has three dangerous facets: it is an occasion for influence-peddling, it breeds unfairness, and it erodes the rule of law." *Id.* at 90–91.

374. Orlando E. Delogu, *A Comprehensive State and Local Government Land Use Control Strategy to Preserve the Nation's Farmland Is Unnecessary and Unwise*, 34 U. KAN. L. REV. 519, 535 (1986).

375. *See, e.g.*, The Safe Drinking Water Act, 42 U.S.C. §§ 300f to 300j-26.

376. Delogu, *supra* note 374, at 537–38.

377. *See, e.g.*, Craig Anthony (Tony) Arnold, *Water Privatization Trends in the United States: Human Rights, National Security, and Public Stewardship*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 785 (2009).

378. *Compare In re* Water Use Permit Applications, 9 P.3d 409, 440–56 (Haw. 2000) (accepting the public trust claim) *with* State *ex rel.* State Eng'r v. Commissioner of Pub. Lands, 200 P.3d 86, 93–95 (N.M. 2008) (rejecting the public trust claim); *see also* Lake Beulah Water Mgmt. Dist. v. Village of East Troy, 799 N.W.2d 73, 75 (Wis. 2011) (applying the public trust to groundwater when a high-capacity well would affect surface—public trust—waters); *see generally* Kenton M. Bednarz, *Should the Public Trust*

the holders of these units need the state legal regime to provide full security for their interests. In any resulting mixed system, government's role would remain strong. Not only would governmental intervention be necessary to provide information and monitor groundwater, it would also be necessary to create a legal and institutional framework for sales of water or aquifer access rights.[379]

IV. CONCLUSION

In managing an ambulatory resource such as groundwater, the legal system—whether one of independent fixed property rights, or one of command regulations, or a mix of both—must limit use of the resource as necessary to ensure its sustainability.[380] In considering the physical removal of groundwater, like the physical removal of stream water, one must focus on how consumptive the use will be and how much of the water extracted eventually will find its way back to *some* aquifer, even if not the aquifer of the extracted water's origin.[381] In some way, people using groundwater must be induced to vary the rate of pumping, maintain sustainable water tables, and return or substitute at least a portion of the extracted water.[382] The traditional failure to establish resource specifications and to identify protectable interests has led to waste and abuse of groundwater.[383] Whether correction comes through a market or by a stringent system of standards rigorously enforced, the quantity and quality of groundwater must be maintained to produce a sustainable yield of potable water, as well as providing surface support and resistance to saltwater incursion. Anything less will produce dramatically negative results.

Command (regulations), while intended to ensure the sustainability of scarce ambulatory resources, has not been entirely successful.[384] Markets have their own

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Doctrine Interplay with the Bottling of Michigan Groundwater? Now Is the Appropriate Time for the Michigan Supreme Court to Decide, 53 WAYNE L. REV. 733 (2007); Jordan Browning, *Unearthing Subterranean Water Rights: The Environmental Law Foundation's Efforts to Extend California's Public Trust Doctrine*, 34 ENVIRONS ENVTL. L. & POL'Y J. 231 (2011); Spiegel, *supra* note 342; Jack Tuholske, *Trusting the Public Trust: Application of the Public Trust Doctrine to Groundwater Resources*, 9 VT. J. ENVTL. L. 189, 214–37 (2008).

379. Delogu, *supra* note 374, at 536.

380. *See generally* Robert Haskell Abrams, *Water, Climate Change, and the Law: Integrated Eastern States Water Management Founded on a New Cooperative Federalism*, 42 ENVTL. L. RPTR. 10433 (2012); JAYANATH ANANDA, REFORMING INSTITUTIONS IN WATER RESOURCE MANAGEMENT: POLICY AND PERFORMANCE FOR SUSTAINABLE POLICY DEVELOPMENT 100 (Lin Crase & Vasant P. Gandhi eds., 2009); Denise D. Fort & Summer McKean, *Groundwater Policy in the Western United States*, 47 IDAHO L. REV. 325 (2011); John Hedges, *Currents in California Water Law: The Push to Integrate Groundwater and Surface Water Management through the Courts*, 14 U. DENV. WATER L. REV. 375 (2011); Arlene Kwasniak, *Water Scarcity and Aquatic Sustainability: Moving beyond Policy Limitations*, 13 U. DENV. WATER L. REV. 321 (2010); Adam Schemp, *Western Water in the 21st Century: Policies and Programs That Stretch Supplies in a Prior Appropriation World*, 40 ENVTL. L. RPTR. 10394 (2010); Barton H. Thompson, Jr., *Beyond Connections: Pursuing Multidimensional Conjunctive Management*, 47 IDAHO L. REV. 273 (2011).

381. *See* Richard C. Ausness, *Water Rights, the Public Trust Doctrine, and the Protection of Instream Uses*, 1986 U. ILL. L. REV. 407, 407–10 (1987).

382. *Id.* at 431–33, 435–37. Ausness makes clear at the beginning of the article that the measures he describes for protection surface streams could also be employed for aquifers. *Id.* at 409.

383. Robert H. Nelson, *Private Rights to Government Actions: How Modern Property Rights Evolve*, 1986 U. ILL. L. REV. 361, 377 (1986). This conclusion is not limited to the United States. *See, e.g.*, WATER CRISIS IN INDIA (K. R. Gupta ed., 2008).

384. Howard Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and Fine-Tuning Regulatory Reforms*, 37 STAN. L. REV. 1267 (1985).

problems when used to manage water resources.[385] Yet for too long, groundwater has been treated as outside either regulation or a specific property system. As a scarce resource, groundwater increasingly has lost even the vaguest appearance of rightfully carrying a zero price, yet it continues to be priced as if it were a free good.[386] The resulting policies of either creating publicly financed projects that make the water available greatly below cost or of authorizing self-suppliers to pump from allegedly free aquifers are in trouble.[387] These failures persist because public awareness about aquifers has been slow to develop and is comparatively recent. People in modern urban-industrial societies, moreover, mostly saw themselves as detached from nature, until recently giving little thought to most resources provided by nature.[388] Thus even today, public awareness often is confined to those who perceive the possibility that the groundwater resource is more limited than the demands that are or may be made on it. These perceptual problems combine to ensure that too often the world's legal systems have been willing to leave resources like groundwater in a common-property condition that creates "a destructive negative sum [game]"[389]—in other words, a "tragedy of the commons."[390]

The tragedy of the commons works itself out in all too familiar patterns. When groundwater is plentiful, indifference is prevalent. When groundwater is scarce, rather than shifting to conservation, users insist on getting more of the scarce resource. Conservation, if it appears, has been a late bloomer. Judging from the increasing unpopularity of environmental regulations,[391] most Americans are only generally concerned about water availability, pollution, or use and not about any dynamic role that water plays in nature. Yet in recent years, sustainability has become a mantra in the public consciousness as well as on government agendas.[392] This changing public opinion puts pressure on the legal system to change in many

385. *See supra* text accompanying notes 366–72.

386. *See* Dellapenna, *The Physical and Social Bases of Quantitative Groundwater Law*, *in* WATERS AND WATER RIGHTS, *supra* note 47, § 18.06, 18.07.

387. *See, e.g.*, JAN G. LAITOS, NATURAL RESOURCES LAW 2–20 (2002) (exploring market failures, the costs of government intervention, and the general dissatisfaction with the current operations of American water usage).

388. *See generally* RONALD INGLEHART, MODERNIZATION AND POSTMODERNIZATION: CULTURAL, ECONOMIC AND POLITICAL CHANGE IN 43 COUNTRIES 180–88 (1997); Robert Bejesky, *An Analytical Appraisal of Public Choice Value Shifts for Environmental Protection in the United States and Mexico*, 11 IND. INT'L & COMP. L. REV. 251 (2001); Ellen Hanak et al., *Myths of California Water Law—Implications and Reality*, 16 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 3, 57–61 (2010).

389. ROBERT C. REPETTO, WORLD ENOUGH AND TIME: SUCCESSFUL STRATEGIES FOR RESOURCE MANAGEMENT 9 (1986).

390. *See* Garret Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1243 (1968).

391. *See, e.g.*, John M. Broder, *Bashing EPA Is New Theme in GOP Race*, N.Y. TIMES, Aug. 18, 2011, at A1; Arthur Pugsley, *The Myth of EPA Overregulation*, 39 ECOLOGY L.Q. 475, 475 (2012).

392. *See generally* AGENDA FOR A SUSTAINABLE AMERICA (John C. Dernbach ed. 2009); WILLIAM R. BLACKBURNE, THE SUSTAINABILITY HANDBOOK: THE COMPLETE MANAGEMENT GUIDE TO ACHIEVING SOCIAL, ECONOMIC AND ENVIRONMENTAL RESPONSIBILITY (2007); INNOVATIONS IN SCIENCE, ENGINEERING AND MANAGEMENT FOR SUSTAINABLE WATER RESOURCES 2007-2009 (Paul Jeffrey, Bruce Jeffries, & Bruce Beck eds. 2010); PERSPECTIVES ON SUSTAINABLE RESOURCES IN AMERICA (Roger A. Sejo ed. 2008); SUSTAINING LIFE ON EARTH: ENVIRONMENTAL AND HUMAN HEALTH THROUGH GLOBAL GOVERNANCE (Colin L. Soskolne et al. 2008); MARILYN WAITE, SUSTAINABLE WATER RESOURCES IN THE BUILT ENVIRONMENT (2010).

ways, including imposing meaningful regulations on groundwater in order to protect aquifers.[393]

Under such pressure, conservation has already become a legal mandate in various guises. Appraisal of public concerns about groundwater often takes the form of claims that the public trust applies to groundwater.[394] Administrative agencies purport to assess and apply the "public interest," albeit often with little or no actual opportunity for public input.[395] Governments now create formal institutions for ensuring public involvement in decisions affecting groundwater. These can include advisory committees or elected decision-making bodies[396]—a global phenomenon.[397] Some commentators have suggested that all that is needed to ensure adequate public involvement is a mandatory duty to negotiate among the interested parties.[398] Yet even when groundwater users directly elect the decision-making authorities, the decision-makers all too often do not seem responsive to their constituents. One study of local groundwater districts across eastern Colorado and Kansas found as many as forty percent of irrigators doubted whether the districts served the interests of those eligible to vote.[399] That votes in irrigation or groundwater districts can be, and often are, weighted according to the size of the voter's landholdings (rather than on the "one person, one vote" basis) contributes to the

393. *See generally* Joseph W. Dellapenna, *Global Climate Disruption and Water Law Reform*, 15 WIDENER L. REV. 409 (2010); Janet C. Neuman, *Adaptive Management: How Water Law Needs to Change*, 31 ENVT'L L. RPTR. 11432 (2001).

394. *See* authorities collected *supra* at note 378.

395. *See, e.g.*, North Carolina v. Hudson, 731 F. Supp. 1261, 1267 (E.D.N.C. 1990), *aff'd on other grounds*, 940 F.2d 58 (4th Cir. 1991), *cert. denied*, 502 U.S. 1092 (1992); *In re* Town of Nottingham, 904 A.2d 582 (N.H. 2006); *see also* Martha L. Black & Ellen J. Kohler, *Diminishing Democracy: A Review of Public Participation in Michigan's Environmental Decisionmaking*, 50 WAYNE L. REV. 219 (2004); James D. Fine & Dave Owen, *Technocracy and Democracy: Conflicts Between Models and Participation in Environmental Law and Planning*, 56 HASTINGS L.J. 901, 901–70 (2005); Douglas L. Grant, *Two Models of Public Interest Review of Water Allocation in the West*, 9 U. DENV. WATER L. REV. 485 (2006); Stephanie Tai, *Three Asymmetries of Informed Environmental Decisionmaking*, 78 TEMPLE L. REV. 659 (2005).

396. *See, e.g.*, Times of Trenton Publishing Corp. v. Lafayette Yard Cmty. Dev. Corp., 874 A.2d 1064 (N.J. App. Div. 2004), *aff'd on other grounds*, 874 A.2d 1064 (N.J. 2005); TEX. WATER CODE ANN. § 9.016 (repealed 2007); *see also* Maxine E. Dakins, Jeffery D. Long, & Michael Hart, *Collaborative Environmental Decision Making in Oregon Watershed Groups: Perceptions of Effectiveness*, 41 J. AM. WATER RES. ASS'N 171 (2005); Peter Lavigne, *Watershed Councils East and West: Advocacy, Consensus and Environmental Progress*, 22 UCLA J. ENVTL. L. & POL'Y 301 (2004).

397. PUBLIC PARTICIPATION IN THE GOVERNANCE OF INTERNATIONAL FRESHWATER RESOURCES (Carl Bruch et al. eds. 2005); Anna Blomqvist, *How Can Stakeholder Participation Improve European Watershed Management: The Water Framework Directive, Watercourse Groups and Swedish Contributions to Baltic Sea Eutrophication*, 6 WATER POL'Y 39 (2004); Jerome Delli Priscoli, *What Is Public Participation in Water Resources Management and Why Is It Important?*, 29 WATER INT'L 221 (2004); Vishal Narain, *Brackets and Black Boxes: Research on Water Users' Associations*, 6 WATER POL'Y 185 (2004); Gül Özerol & Jens Newig, *Evaluating the Success of Public Participation in Water Resources Management: Five Key Constituents*, 10 WATER POL'Y 639 (2008); Anna V'ari, *Hungarian Experiences with Public Participation in Water Management*, 29 WATER INT'L 329 (2004).

398. Priscoli, *supra* note 397, at 226–27; Robin McCall, *Dogs vs. Birds: Negotiated Rulemaking at Fort Funston*, 13 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 187 (2007); Barak D. Richman, *Mandating Negotiations to Solve the NIMBY Problem: A Creative Regulatory Response*, 20 UCLA J. ENVT'L L. & POL'Y 223 (2001).

399. David E. White & Stephen E. Kromm, *Local Groundwater Management Effectiveness in the Colorado and Kansas Ogallala Region*, 35 NAT. RES. J. 275 (1995); *see also* Maxine E. Dakins, Jeffery D. Long, & Michael Hart, *Collaborative Environmental Decision Making in Oregon Watershed Groups: Perceptions of Effectiveness*, 41 J. AM. WATER RES. ASS'N 171 (2005).

tendency of the directors not to act in the interests of the community as a whole.[400] Whether ensuring the actual representativeness of such institutions would solve such problems is far from clear. This in turn raises questions about the extent to which representative or even direct public decision-making actually works given the insights available from public choice theory[401] and cognitive psychology.[402]

Despite the growing importance of public involvement in decision-making regarding groundwater, courts have in fact shown little interest in protecting public involvement in the administrative procedures increasingly imposed on groundwater users.[403] The Justice Department, in enforcing Section 5 of the Voting Rights Act,[404] has proven more interested, and perhaps will be more effective, in compelling states to allow citizens a voice in groundwater management.[405] Too frequently,

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400. *See* Ball v. James, 451 U.S. 355 (1981); *see also* Deutsch v. Kalcevic, 140 P.3d 340 (Colo. Ct. App. 2006) (disallowing electors from challenging an election in a groundwater management district if the elector does not own property in the subdistrict in which the alleged violation occurred). *See generally* Tom I. Romero, II, *Uncertain Waters and Contested Lands: Excavating the Layers of Colorado's Legal Past*, 73 U. COLO. L. REV. 521, 532–56 (2002); Elizabeth Burleson, *Public Water Districts*, *in* 2 WATERS AND WATER RIGHTS, *supra* note 47, § 27.01(c).

401. *See generally* ENCYCLOPEDIA OF PUBLIC CHOICE (Charles K. Rowley & Friedrich Schneider eds. 2004); DANIEL A. FARBER & PHILIP F. FRICKEY, LAW AND PUBLIC CHOICE (1991); Donald P. Green & Ian Shapiro, PATHOLOGIES OF RATIONAL CHOICE THEORY: A CRITIQUE OF APPLICATIONS IN POLITICAL SCIENCE (1994); JERRY L. MASHAW, GREED, CHAOS, AND GOVERNANCE: USING PUBLIC CHOICE TO IMPROVE PUBLIC LAW (1997); Jeffrey S. Ashley, *Administrative Versus Legislative Management: The Impact of Discretion on Water Resource Management in the West*, 20 J. LAND RES. & ENVTL L. 223 (2000); John W. Lee & W. Eugene Seago, *Policy Entrepreneurship, Public Choice, and Symbolic Reform: Analysis of Section 198, The Brownfields Tax Incentive: Carrot or Stick or Just Never Mind?*, 26 WM. & MARY ENVTL L. & Pol'y Rev. 613 (2002); John O. McGinnis, *The Condorcet Case for Supermajority Rules*, 16 SUP. CT. ECON. REV. 67 (2008).

402. *See, e.g.*, MICHAEL SHERMER, THE MIND OF THE MARKET: COMPASSIONATE APES, COMPETITIVE HUMANS, AND OTHER TALES FROM EVOLUTIONARY ECONOMICS (2008); William K. Black, *The Imperium Strikes Back: The Need to Teach Socioeconomics to Law Students*, 41 SAN DIEGO L. REV. 231 (2004); Gary Blasi, *Advocacy against the Stereotype: Lessons from Cognitive Psychology*, 49 UCLA L. REV. 1241 (2002); Jeremy A. Blumenthal, *Law and the Emotions: The Problems of Affective Forecasting*, 80 IND. L.J. 155 (2005); David A. Dana, *A Behavioral Economic Defense of the Precautionary Principle*, 97 NW. U.L. REV. 1315 (2003); Lauren B. Edelman, *Rivers of Law and Contested Terrain: A Law and Society Approach to Economic Rationality*, 39 LAW & SOC'Y REV. 181 (2004); Ronald J. Gilson, *The Mechanisms of Market Efficiency Twenty Years Later: The Hindsight Bias*, 28 J. CORP. L. 715 (2003); Owen D. Jones & Sarah F. Brosnan, *Law, Biology, and Property: A New Theory of the Endowment Effect*, 49 WM. & MARY L. REV. 1935 (2008); Leo Katz, *What We Do When We Do What We Do and Why We Do It*, 37 SAN DIEGO L. REV. 753 (2000); Russel Korobkin, *The Endowment Effect and Legal Analysis*, 97 NW. U. L. REV. 1227 (2003); Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. 1051 (2000); Jeffrey J. Rachlinski & Cynthia R. Farina, *Cognitive Psychology and Optimal Government Design*, 87 CORNELL L. REV. 549 (2002); Lee Ross & Donna Shestowsky, *Contemporary Psychology's Challenge to Legal Theory and Practice*, 97 NW. U.L. REV. 1081 (2003); Cass R. Sunstein, *What's Available: Social Influences and Behavioral Economics*, 97 NW. U.L. REV. 1295 (2003).

403. *See, e.g.*, Watahomigie v. Ariz. Bd. of Water Quality Appeals, 887 P.2d 550 (Ariz. Ct. App. 1994), *rev. denied*; Ko'olau Agric. Co. v. Comm'n on Water Res. Mgmt., 868 P.2d 455 (Haw. 1994); State *ex rel.* Upper Republican Natural Res. Dist. v. Dist. Judges, 728 N.W.2d 275 (Neb. 2007); *In re* Town of Nottingham, 904 A.2d 582 (N.H. 2006); DuLaney v. Okla. State Dep't of Health, 868 P.2d 676 (Okla. 1993).

404. 42 U.S.C. § 1973c (2013).

405. *See* Texas v. United States, 866 F. Supp. 20 (D.D.C. 1994) (upholding application of the Voting Rights Act to the creation of the Edwards Aquifer Authority and ordering a trial to determine whether preclearance by the Justice Department is necessary for establishment of the Authority); *see* R. Tim Hay, Comment, *Blind Salamanders, Minority Representation, and the Edwards Aquifer: Reconciling Use-Based Management of Natural Resources with the Voting Rights Act*, 25 ST. MARY'S L.J. 1449 (1994). *Cf.*

a lack of effective public participation results in a denial of environmental justice or opens the door to environmental racism or both; overcoming such problems is no easier for groundwater management systems than for other aspects of social interaction.[406]

One means for ensuring that groundwater management institutions are more responsive to the public is litigation challenging the institutions if they step outside the bounds of their mandate. Persons, natural or artificial, who could lose directly from decisions by groundwater management institutions, often litigate whether the institution was authorized to take the decision it made.[407] Traditional notions of standing often preclude suits by persons with a more generalized interest in the

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City of Combes v. East Rio Hondo Water Supply Corp., 244 F. Supp. 2d 778 (S.D. Tex.) (denying application of the Voting Rights Act to a water supply corporation because it was not a political subdivision under Texas law), *aff'd mem.,* 539 U.S. 955 (2003).

406. *See, e.g.*, Chester Residents Concerned for Quality Living v. SEIF, 132 F.3d 925 (3d Cir. 1997), *vacating as moot,* 524 U.S. 924 (1998); N.Y.C. Envtl. Justice Alliance v. Giuliani, 50 F. Supp. 2d 250 (S.D.N.Y.), *aff'd mem.,* 184 F.3d 206 (2d Cir. 1999); *see generally* ACCESS TO ENVIRONMENTAL JUSTICE: A COMPARATIVE STUDY (Andrew Harding ed., Martinus Nijhoff Publishers, 2007); THE LAW OF ENVIRONMENTAL JUSTICE: THEORIES AND PROCEDURES TO ADDRESS DISPROPORTIONATE RISKS (Michael B. Gerrard & Sheila R. Foster eds., 2d ed. 2008); Gregory Baker, *Rediscovering Therapeutic Jurisprudence in Overlooked Areas of Law—How Exposing Its Presence in the Environmental Justice Movement Can Legitimize the Paradigm and Make the Case for Its Inclusion into All Aspects of Legal Education and the Practice of Law*, 9 FLA. COASTAL L. REV. 215 (2008); Maxine Burkett, *Just Solutions to Climate Change: A Climate Justice Proposal for a Domestic Clean Development Mechanism*, 56 BUFF. L. REV. 169 (2008); Luke W. Cole, *Environmental Justice and the Three Great Myths of White Americana*, 14 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 573 (2008); Eileen Gauna, *LNG Facility Siting and Environmental (In)justice: Is It Time for a National Siting Scheme?*, 2 ENVTL. & ENERGY L. & POL'Y 85 (2007); Alice Kaswan, *Environmental Justice and Domestic Climate Change Policy*, 38 ENVTL. L. RPTR. 10287 (2008); Judith E. Koons, *Locational Justice: Race, Class, and the Grass Roots Protests of Property Takings*, 46 SANTA CLARA L. REV. 811 (2006); Harold A. McDougal, *Hurricane Katrina: A Story of Race, Poverty, and Environmental Injustice*, 51 HOW. L.J. 533 (2008); Melissa O'Connor, *A Failure to Protect: After 13 Years Environmental Justice Fails to Materialize*, 35 S.U.L. REV. 119 (2007); Catherine A. O'Neill, *Environmental Justice in the Tribal Context: A Madness to EPA's Method*, 38 ENVTL. L. 495 (2008); Benjamin Rajotte, *Environmental Justice in New Orleans, A New Lease on Life for Title VIII?*, 21 ENVTL. L.J. 51 (2007); Clifford Rechstchaffen, *Strategies for Implementing the Environmental Justice Vision*, 1 GOLDEN GATE ENVTL. L.J. 321 (2007); Janell Smith & Rachel Spector, *Environmental Justice, Community Employment and the Role of Lawyers in Post-Katrina New Orleans*, 10 N.Y. CITY L. REV. 277 (2007); Mark Stallworthy, *Sustainability, Coastal Erosion and Climate Change: An Environmental Justice Analysis*, 18 J. ENVTL. L. 357 (2006); Tara Ulezalka, *Race and Waste: The Quest for Environmental Justice*, 26 TEMP. J. SCI., TECH. & ENVTL. L. 51 (2007); Robert R.M. Verchick, *Katrina, Feminism, and Environmental Justice*, 13 CARDOZO J.L. & GENDER 791 (2008): L. Darnell Wheeden, *Hurricane Katrina and the Toxic Tort Implications of Environmental Injustice in New Orleans*, 40 J. MARSHALL L. REV. 1 (2006).

407. *See, e.g.*, Ariz. Water Co. v. Ariz. Dep't Water Res., 91 P.3d 990 (Ariz. 2004) (challenging mandatory conservation measures that did not also apply to end users); Allegretti v. Imperial Cty., 42 Cal. Rptr. 3d 122 (Cal. Ct. App. 2006) (challenging conditions on a well permit), *state rev. denied, cert. denied*, 549 U.S. 1113 (2007); *In re* Water Use by Wai'ola O Moloka'i, Inc., 83 P.3d 664, 677–78 (Haw. 2004) (challenging a permit authorizing the use of water off the land from which it was withdrawn); Am. Falls Reservoir Dist. No. 2 v. Idaho Dep't of Water Res., 143 Idaho 863, 154 P.3d 433 (2007) (challenging conjunctive management rules); Fryeburg Water Co. v. Town of Fryeburg, 893 A.2d 618 (Me. 2006) (challenging a permit for increased groundwater pumping); Perdue Farms Inc. v. Hadder, 675 A.2d 577 (Md. Ct. Spec. App. 1996) (challenging restrictions on the amount of dissolved nitrogen allowed in water used in spray irrigation); Saunders Cty. v. City of Lincoln, 638 N.W.2d 824 (Neb. 2002) (challenging a city's decision to drill new wells); King v. State, 481 S.E.2d 330 (N.C. Ct. App.) (challenging restrictions on property development in the coastal zone), *rev. denied*, 487 S.E.2d 548 (N.C. 1997); Jacobs Ranch, LLC v. Smith, 148 P.3d 842 (Okla. 2006) (challenging a moratorium on out-of-basin uses); Larry Koch, Inc. v. Tex. Natural Res. Conserv. Comm'n, 52 S.W.3d 833 (Tex. Ct. App. 2001) (challenging a failure to notify the plaintiff of possible sources of pollution to his land), *rev. denied*; State Water Control Bd. v. Crutchfield, 578 S.E.2d 762, 767–69 (Va. 2003) (challenging a pollution discharge permit).

decision.[408] In some states, and under federal law, the authorization of "citizen suits" or other expansive notions of standing appeared to enable such diffused interests to gain a hearing in court.[409] Federal courts, however, have been cutting back on standing in environmental cases, including under the citizen suit provisions.[410] On the other hand, more recent cases on standing have given a more generous reading than many expected.[411]

Some state courts have also taken narrow views of standing in the litigation of environmental cases.[412] Other states have taken steps to protect public access to

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408. *See, e.g.*, Spear T Ranch, Inc. v. Knaub, 713 N.W.2d 489 (Neb. 2006) (denying standing to a public power and irrigation district with surface appropriations that did not have a direct interest in a dispute over groundwater); Mich. Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 737 N.W.2d 447, 458–59 (Mich. 2007) (denying standing to a water conservation organization regarding lakes and wetlands along which it did not own land), *rev'd*, 487 Mich. 349 (Mich. 2010); Neuse River Found. v. Smithfield Foods, Inc., 574 S.E.2d 48, 53–54 (N.C. Ct. App. 2002) (denying standing to public interest groups, riparian landowners, commercial fishermen, and a marina owner seeking to challenge a public nuisance without a showing of special injuries to themselves), *rev. denied*, 577 S.E.2d 628 (N.C. 2003); Wash. Cnty. Water Conservation Dist. v. Morgan, 82 P.3d 1125 (Utah 2003) (denying standing to the district to challenge decisions by the state engineer that did not directly affect the district's water rights).

409. *See, e.g.*, Mich. Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174 (Mich. Ct. App. 2005), *rev'd on other grounds,* 737 N.W.2d 447 (Mich. 2007), *rev'd*, 487 Mich. 349 (Mich. 2010); Citizens Advocating Responsible Dev. v. Kandiyohi Cnty. Bd. of Comm'rs, 713 N.W.2d 817 (Minn. Ct. App. 2005); Citizens against Landfill Location v. Texas Comm'n on Envtl. Quality, 169 S.W.3d 258 (Tex. 2005); *see generally* Noah D. Hall, *The Evolving Role of Citizens in United States-Canadian International Environmental Law*, 24 PACE ENVTL. L. REV. 131 (2007); Mark Seidenfeld & Janna Satz Nugent, "*The Friendship of the People": Citizen Participation in Environmental Enforcement*, 73 GEO. WASH. L. REV. 269 (2005); Kristi M. Smith, *Who's Suing Whom?: A Comparison of Government and Citizen Suit Environmental Enforcement Actions Brought under EPA-Administered Statutes, 1995–2000*, 29 COLUM. J. ENVTL L. 359 (2004).

410. *See* Steel Co. v. Citizens for a Better Env't., 523 U.S. 83 (1998); Bennett v. Spear, 520 U.S. 154 (1997); Lujan v. Defenders of Wildlife, 504 U.S. 555 (1992); Hayes v. Whitman, 264 F.3d 1017 (10th Cir. 2001); *see also* Matthew D. Zinn, *Policing Environmental Regulatory Enforcement: Cooperation, Capture, and Citizen Suits*, 21 STAN. ENVTL L.J. 81 (2002).

411. Friends of the Earth, Inc. v. Laidlaw Envtl. Services (TOC), Inc., 528 U.S. 167 (2000); Cent. for Biological Diversity v. Leuckel, 417 F.3d 532 (6th Cir. 2005); Natural Res. Def. Council v. Sw. Marine, Inc., 236 F.3d 985 (9th Cir. 2000), *cert. denied sub nom.* Sw. Marine, Inc. v. San Diego Bay Keeper, 533 U.S. 902 (2001); *see generally* Susan D. Daggett, *NGOs as Lawmakers, Watchdogs, Whistle-Blowers, and Private Attorneys General*, 13 COLO. J. INT'L ENVT'L L. & POL'Y 99 (2002); Steven G. Davison, *Standing to Sue in Citizen Suits against Air and Water Polluters under* Friends of the Earth, Inc. v. Laidlaw Environmental Services (TOC), Inc., 17 TUL. ENVTL. L.J. 63 (2003); John D. Echeverria, *Standing and Mootness in the Wake of* Laidlaw, 10 WIDENER L. REV. 183 (2003); Hudson D. Henry, *A Shift in Citizen Suit Standing Doctrine*: Friends of the Earth, Inc. v. Laidlaw Environmental Services, 28 ECOLOGY L.Q. 233 (2001); Stanley A. Millan, *The Odd Couple: The High Court's Expansion of Environmental Standing in Waters but Contraction of Regulatory Jurisdiction Over Them*, 47 LOY. L. REV. 729 (2001); James M. Noble, Friends of the Earth v. Laidlaw *and the Increasingly Broad Standard for Citizen Standing to Sue in Environmental Litigation*, 42 NAT. RES. J. 416 (2002); Michael L. Rustad, *Smoke Signals from Private Attorneys General in Mega Social Policy Cases*, 51 DEPAUL L. REV. 511 (2001); Philip Weinberg, *Unbarring the Bar of Justice: Standing in Environmental Suits and the Constitution*, 21 PACE ENVTL. L. REV. 27 (2003).

412. *See, e.g.*, Friends of Tilden Park, Inc. v. D.C.., 806 A.2d 1201 (D.C. Ct. App. 2002); Friends of Nassau Cty., Inc. v. Nassau Cty., 752 So. 2d 42 (Fla. Ct. App. 2000); Denton v. Browns Mill Dev. Co., 561 S.E.2d 431 (Ga. 2002); Bremner v. City of Honolulu, 28 P.3d 350 (Haw. Ct. App. 2001), *cert. denied*, 31 P.3d 203 (Haw. 2001); Neighborhood Action Comm. v. State, 652 So. 2d 693, 696–97 (La. Ct. App. 1995), *writ denied*, 654 So. 2d 352 (La. 1995); Mich. Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 737 N.W.2d 447, 458–59 (Mich. 2007); City of Lincoln v. Cent. Platte Nat. Res. Dist., 638 N.W.2d 839, 845 (Neb. 2002); Becker v. Pieper, 32 P.3d 912 (Or. Ct. App. 2001); Cmty. Nat'l Bank v. State, 782 A.2d 1195 (Vt. 2001); *see generally* Oliver A. Houck, *Standing on the Wrong Foot: A Case for Equal Protection*, 58 SYRACUSE L. REV. 1 (2007).

litigation over resource management.[413] Standing requirements for intervention in administrative proceedings sometimes differ from standing requirements for initiating or intervening in judicial proceedings.[414] In federal courts, at least, some plaintiffs have been able to skirt the restrictions on citizen suit provisions by bringing *qui tam* actions under the False Claims Act.[415] In either sort of case, however, a court can invoke notions of governmental immunity and judicial deference to administrative decisions, particularly if governmental discretion is involved, to prevent litigants from successfully challenging the institution's decisions.[416] Some courts have been unwilling to shelter local governments behind claims of governmental immunity in groundwater disputes with neighbors.[417] The Supreme Court found standing in *Massachusetts v. Environmental Protection Agency*[418] in a state to represent the rights of its citizens in challenging action (or inaction) by the federal government in its decisions.

To a certain extent, public participation can be achieved through the multiplication of administrative agencies that must approve a project. For example, the one-time monopoly of the Federal Power Commission (now the Federal Energy Regula-

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413. *See* Equilon Enterprises, LLC v. Consumer Cause, Inc., 52 P.3d 685 (Cal. 2002); Fort Trumbull Conservancy, LLC v. Alves, 815 A.2d 1188, 1194–1200 (Conn. 2003); Friends of Nassau Cty., Inc. v. Nassau Cty., 752 So. 2d 42 (Fla. Ct. App. 2000); *In re* Water Use Permit Applications, 93 P.3d 643, 655-56 (Haw. 2004), *further appeal on other grounds*, 147 P.3d 836 (Haw. 2006); Guillory v. Union Pac. Corp., 817 So. 2d 1234 (La. Ct. App. 2002); Miss. Sierra Club, Inc. v. Miss. Dep't of Envtl. Quality, 819 So. 2d 515 (Miss. 2002); Saratoga Lake Prot. Dist. v. Dep't of Pub. Works of Saratoga Springs, 846 N.Y.S.2d 786 (N.Y. App. Div. 2007), *appeal denied*, 886 N.E.2d 803 (N.Y. 2008); Neuse River Found. v. Smithfield Foods, Inc., 574 S.E.2d 48, 53–54 (N.C. Ct. App. 2002), *rev. denied*, 577 S.E.2d 628 (N.C. 2003); Mattaponi Indian Tribe v. Commonwealth, 541 S.E.2d 920 (Va. 2001); Kohlbeck v. Reliance Const. Co., 647 N.W.2d 277 (Wis. Ct. App. 2002); *see also* John H. Beisner & Jessica Davidson Miller, *They're Making a Federal Case out of It . . . in State Court*, 25 HARV. J.L. & PUB. POL'Y 143 (2001); Karl S. Coplan, *Direct Environmental Standing for Chartered Conservation Corporations*, 12 DUKE ENVTL. L. & POL'Y F. 183 (2001); John Edward Davidson, *Tomorrow's Standing Today: How the Equitable Jurisdiction Clause of Article III, Section 2 Confers Standing Upon Future Generations*, 28 COLUM. J. ENVTL. L. 185 (2003); F. Andrew Hessick, *Standing, Injury in Fact, and Private Rights*, 93 CORNELL L. REV. 275 (2008); Michael L. Rustad, *Smoke Signals from Private Attorneys General in Mega Social Policy Cases*, 51 DEPAUL L. REV. 511 (2001).

414. *See, e.g.*, San Juan Cnty. v. United States, 503 F.3d 1163 (10th Cir. 2007); *In re* SRBA Case No. 39576, 136 Idaho 747, 40 P.3d 105 (2002); *In re* Application of Osage Water Co., 51 S.W.3d 58 (Mo. Ct. App. 2001); *In re* Town of Nottingham, 904 A.2d 582 (N.H. 2006); Howard v. Cahill, 736 N.Y.S.2d 470 (N.Y. App. Div. 2002); State *ex rel.* Forman v. Clackamas Cty., 45 P.3d 491 (Or. Ct. App. 2002); Birdsboro v. Dept. of Envtl. Prot., 795 A.2d 444 (Pa. Commw. Ct. 2002); *see also* Zinn, *supra* note 410.

415. *See, e.g*, Allison Engine Co. v. United States *ex rel.* Sanders, 553 U.S. 662 (2008); Cook Cty. v. United States *ex rel*. Chandler, 538 U.S. 119 (2003); Vt. Agency of Nat. Res. v. United States *ex rel.* Stevens, 529 U.S. 765 (2000); *see also* Rockwell Int'l Corp. v. United States, 549 U.S. 457 (2007) (a violation of regulations at a nuclear power plant justify a *qui tam* action, but the relator is barred because he was not acting on the basis of non-public knowledge); *see generally* Antonio J. Senagore, "*Based Upon*" *and the False Claims Act's* Qui Tam *Provision: Reevaluating the Seventh Circuit's Method of Statutory Interpretation*, 3 SEVENTH CIR. REV. 244 (2007.

416. *See, e.g.*, Walsh v. Corps of Engineers, 757 F. Supp. 781 (W.D. Tex. 1990); McPherson Landfill, Inc. v. Bd. of Cnty. Comm'rs, 49 P.3d 522 (Kan. 2002); Pyramid Lake Paiute Tribe v. Washoe Cnty., 918 P.2d 697 (Nev. 1996); N.J. Transit Corp. v. Cat in the Hat, LLC, 803 A.2d 114 (N.J. App. Div. 2002), *aff'd on other grounds*, 826 A.2d 690 (N.J. 2003); League of Wis. Municipalities v. Wis. Dep't of Comm., 647 N.W.2d 301 (Wis. Ct. App. 2002); *see also* Douglas T. Kendall, *Conservative Judicial Activism and the Environment: An Assessment of the Threat*, 32 ENVT'L L. RPTR. 10835 (2002); Marla Mansfield, "*By the Dawn's Early Light": The Administrative State Still Stands after the 2000 Supreme Court Term (Commerce Clause, Delegation, and Takings)*, 37 TULSA L. REV. 205, 248–71 (2001).

417. *See, e.g.*, Vill. of Brady Lake v. City of Kent, 773 N.E.2d 1073 (Ohio Ct. App. 2002).

418. Massachusetts v. EPA 549 U.S. 497 (2007). *See generally* Houck, *supra* note 412.

tory Commission) over the licensing of hydroelectric dams has been broken by court decisions requiring the Commission to accept licensing conditions imposed by other agencies.[419] Even when other agencies do not have a veto over the primary agency's decisions, they can delay the decision, sometimes for decades, through litigation as well as through consultations.[420] Whether the social costs of such delays are appropriate often depends on one's opinion of the decision being delayed.

419. *See, e.g.*, Escondido Mut. Water Co. v. La Jolla Band of Mission Indians, 466 U.S. 765 (1984); Sierra Club v. Glickman, 156 F.3d 606 (5th Cir. 1998); *see generally* Michael C. Blumm & Vicki A. Nadol, *The Decline of the Hydropower Czar and the Rise of Agency Pluralism in Hydroelectric Licensing*, 26 COLUM. J. ENVT'L L. 81 (2001); Denise Ferkich Hoffman & Barbara Coler, *Brownfields and the California Department of Toxic Substance Control: Key Programs and Challenges*, 31 GOLDEN GATE U.L. REV. 433 (2001).

420. *See, e.g.*, North Carolina v. Hudson, 665 F. Supp. 428 (E.D. N.C. 1987), *judgment entered*, 731 F. Supp. 1261 (E.D. N.C. 1990), *aff'd on other grounds,* 940 F.2d 58 (4th Cir. 1991), *cert. denied*, 502 U.S. 1092 (1992), *further rev. denied sub nom.* North Carolina v. Fed. Energy Reg. Comm'n, 112 F.3d 1175 (D.D.C. 1997), *cert. denied*, 522 U.S. 1108 (1998). *See also* Richman, *supra* note 398.