REIMAGINING WESTERN WATER LAW: TIME-LIMITED WATER RIGHT PERMITS BASED ON A COMPREHENSIVE BENEFICIAL USE DOCTRINE

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The dwindling supply of western water resources and the increasing water demands of a growing population necessitate a fundamental reexamination of the prior appropriation system. As a nineteenth century system of water allocation, prior appropriation, traditionally applied, is ill-equipped to effectively and efficiently cope with these twenty-first-century realities. The system must be reformed. The reimagining of western water law has two components. First, the determination of whether water is being put to a "beneficial use" should be based upon a holistic, comparative assessment of the relative value of the use of that water—an exercise in values and priorities that is conducted on a basin-wide scale. The beneficial use analysis should take into account issues integrally related to water use, such as energy intensity and water pollution. Second, western states should adopt a renewable water right permit system subject to periodic review where, upon the expiration of the permit, the water right holder is subject to a reexamination of the beneficial use of the appropriated water according to the newly refashioned doctrine. This two-part modernization of the prior appropriation system will allow for a more sustainable allocation of scarce western water resources.

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INTRODUCTION

The settlement of the American West was promoted in part by the erroneous claim that "rain follows the plow."[1] In fact, the interior of the American West has always lacked sufficient water resources to reclaim more than a fraction of the land for farming and other uses.[2] The early settlers responded to this

1. The phrase was coined by politician Charles Dana Wilber:

> Suppose now that a new army of frontier farmers . . . could, acting in concert, turn over the prairie sod, and after deep plowing . . . present a new surface of green . . . . No one can question or doubt the inevitable effect of this cool condensing surface upon the moisture in the atmosphere as it moves over by the Western winds. A reduction of temperature must at once occur, accompanied by the usual phenomena of showers. . . . To be more concise. *Rain follows the plow*.

CHARLES DANA WILBER, THE GREAT VALLEYS AND PRAIRIES OF NEBRASKA AND THE NORTHWEST 68 (3d ed. 1881).

2. "Compared with the whole extent of [the lands of the United States], but a very small fraction is immediately available for agriculture . . . ." J. W. POWELL, REPORT ON THE LANDS OF THE ARID REGION OF THE UNITED STATES vii (Washington, Gov't Printing Office, 2d ed. 1879).

environmental circumstance by following a system of water allocation known as "prior appropriation," which protected water users in order of priority while limiting water rights to the amount of water that could be put to a "beneficial use."[3] This beneficial use requirement is the linchpin of the prior appropriation system of water allocation because it establishes "the basis, the measure[,] and the limit of all rights to the use of water"[4]—the allowable type of use to which western water is put and the amount of water that may be allocated to that type of use.

So long as the population of the West remained small, the prior appropriation system worked reasonably well because there was sufficient water to meet settlers' modest demands.[5] The rapidly growing population of the West and the attendant swelling demand for water resources, however, has increasingly stressed this delicate system.[6] Moreover, greenhouse gas-induced climate change threatens to exacerbate these existing strains, as rising temperatures, altered precipitation patterns, a depleted western snowpack, and magnified risk of flooding and drought will further reduce the region's limited water supplies.[7]

Many commentators have identified problems with the prior appropriation system, such as its protection of comparatively low-value uses of water and its almost exclusive focus on the individual user of water instead of a basin-wide approach.[8] These problems are at least partially due to the stagnant, simplistic way that states administer the prior appropriation system generally and the beneficial use doctrine particularly. This Comment argues for the reform of western water law through the modernization of the beneficial use doctrine in or-

3. *See* CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN 234–35 (1992) [hereinafter CROSSING].

4. UTAH CODE ANN. § 73-1-3 (West 1953). *See also, e.g.*, WYO. STAT. ANN. § 41-3-101 (1977).

5. *See* Steven J. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 483 (1982) [hereinafter *Waste in Western Water Law*].

6. *See* RICHARD A. SLAUGHTER, INSTITUTIONAL HISTORY OF THE SNAKE RIVER 1850-2004 2 (2004), *available at* http://www.cses.washington.edu/db/pdf/Slaughter_InstitutionalHistorySnake241.pdf.

7. *See* Benjamin K. Sovacool & Kelly E. Sovacool, *Preventing National Electricity-Water Crisis Areas in the United States*, 34 COLUM. J. ENVTL. L. 333, 357–58 (2009).

8. *See* Charles F. Wilkinson, *Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine*, 24 LAND & WATER L. REV. 1, 12–14 (1989).

der to ensure more productive use of scarce water resources. A re-envisioning of beneficial use should incorporate two essential elements. First, the determination of whether water is being put to a beneficial use should be based upon a holistic, comparative assessment of the relative value of the use of that water—an exercise in values and priorities that is conducted on a basin-wide scale. The analysis should take into account issues integrally related to water use, such as energy consumption and water pollution, where the embedded energy intensity of the water and severe pollution resulting from the use to which the water is put would become factors to consider in determining if water is being put to a beneficial use. These important and interconnected issues are not presently considered in the beneficial use analysis.[9] Second, western states should adopt a renewable water right permit system subject to periodic review, where upon the expiration of the permit, the water right holder is subject to a re-examination of the beneficial use of the appropriated water, according to the newly refashioned doctrine.

Part I of this Comment discusses the history and evolution of prior appropriation in western water law. Next, Part II discusses the major problems associated with the traditional prior appropriation system and the beneficial use doctrine in the modern, resource-constrained environment. Finally, Part III proposes a two-part makeover of the beneficial use doctrine. First, a comprehensive, basin-wide approach to beneficial use is established, where energy intensity and water pollution are factors considered in the beneficial use determination. Second, this more robust beneficial use doctrine will form the basis of a reviewable, renewable water right permit system. Additionally, Part III discusses a potential hurdle to the establishment of this reimagined beneficial use doctrine, namely, a constitutional takings challenge by a water right holder. By fashioning a new foundation and administration of the beneficial use doctrine, a more sustainable system of water allocation will allow the western United States to continue to bloom despite an increasingly arid environment.[10]

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9. *See* Eric T. Freyfogle, *Ethics, Community, and Private Land*, 23 ECOLOGY L.Q. 631, 656 (1996) (noting that "[w]estern water law requires that water uses be 'beneficial,' but it retains an antiquated nineteenth-century definition of the term").

10. *Lab Researchers Find that Humans Are Cause of Diminishing Water Flow in the West*, LAWRENCE LIVERMORE NAT'L LABORATORY (Jan. 31, 2008), https://publicaffairs.llnl.gov/news/news_releases/2008/NR-08-01-07.html ("Scien-

I. HISTORY AND EVOLUTION OF BENEFICIAL USE IN WESTERN WATER LAW

Understanding the historical development of prior appropriation is essential to understanding the problems with the beneficial use doctrine and this Comment's proposed solutions. This part explains the historical underpinnings of the prior appropriation system of water rights and defines the integral component of the beneficial use doctrine as a part of this system. Section A traces the origin of prior appropriation in the western United States and details several of the important constitutional and statutory foundations of what is now established law. Section B considers the treatment of the beneficial use doctrine in the courts.

A. The Origin of Prior Appropriation

On January 24, 1848, James Marshall first discovered gold at Sutter's Mill in California.[11] This event heralded the beginning of western water law. Because water is essential in mining for gold,[12] "[e]arly western water law was symbiotic with hardrock mining law."[13] Additionally, western water law grew out of agricultural necessity. West of the hundredth merid-

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tists have noted that water flow in the West has decreased for the last 20 to 30 years . . . .").

11. CROSSING, *supra* note 3, at 34.

12. Water was a critical resource for the mining of gold reserves. There were three principle techniques that required water as the integral component. CHARLES B. TURRILL, CALIFORNIA NOTES 154–58 (San Francisco, Edward Bosqui & Co., 1876), *available at* http://books.google.com/books/download/California_notes.pdf?id=kDwVAAAAYAAJ&output=pdf&sig=ACfU3U2MlMzNYK8MPhRcEUAlwy-Cl53HBg. First, miners frequently panned for gold by filling a pan with dirt and water from a streambed. *Id.* at 154–55. The water forms mud from the dirt, which washes away the lighter materials and hopefully leaves gold in the bottom of the pan. Second, the board-sluice, a "trough of rough boards . . . not less than fifty feet long" into which dirt is shoveled and a stream of water flows, was popular for a time. *Id.* at 156. "[A]s the soil dissolves and is carried away, the gold sinks to the bottom." *Id.* Lastly, and requiring the most prodigious amounts of water, is hydraulic mining, whereby "[m]iniature rivers brought in artificial channels . . . were led to every mining camp." *Id.* at 158. Put under intense pressure, the water would blast away entire mountain sides, which were then methodically sluiced to search for gold. *Id. See also* S.T. HARDING, WATER IN CALIFORNIA 61–70 (1960) [hereinafter WATER IN CALIFORNIA].

13. CROSSING, *supra* note 3, at 231.

ian,[14] fewer than twenty inches of rainfall generally fall every year, which is the minimum amount of rainfall required for non-irrigated agriculture.[15] Therefore, farming west of this longitude required large quantities of water to be removed from rivers and streams for irrigation.[16] However, the only established water law in use within the United States during the nineteenth century that was available to govern the appropriation of water was the common-law doctrine of riparian rights, which holds that landowners adjacent to watercourses are entitled to the "reasonable use" of the water in the natural watercourses so long as downstream users were not impaired by the upstream uses.[17] The riparian rights doctrine was well-suited for the fertile eastern United States because bountiful rainfall often meant that large water withdrawals were not required.[18] This doctrine, however, quickly proved untenable in the arid West because agriculture was impossible without large water withdrawals for irrigation,[19] a process which, by its very nature, would impair downstream users.

The West's answer to the East's riparian doctrine came in the form of prior appropriation. Before it was applied to the allocation of water resources, prior appropriation was the law of mining camps in California, wherein the first person to find a valuable mineral in a particular location gained the rights to that land and its minerals to the exclusion of all others[20]—in other words, "first in time, first in right."[21] As it became clear that mining was not possible without the use of the scarce water resources of the West, it was inevitable that "first in time, first in right" would be transposed from mining law to water law.[22] Thus, out of the mining camps came the doctrine of

14. The hundredth meridian is the longitudinal demarcation that runs north-south through the states of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.

15. *See* ROBERT G. DUNBAR, FORGING NEW RIGHTS IN WESTERN WATERS 1 (1983); *Waste in Western Water Law*, *supra* note 5, at 485.

16. *Waste in Western Water Law*, *supra* note 5, at 485.

17. *See* RESTATEMENT (SECOND) OF TORTS § 850 (1979) ("A riparian proprietor is subject to liability for making an unreasonable use of the water of a watercourse or lake that causes harm to another riparian proprietor's reasonable use of water or his land."); Joseph W. Dellapenna, *The Right to Consume Water Under "Pure" Riparian Rights*, *in* 1 WATERS AND WATER RIGHTS § 7.02(d) (2009).

18. *Waste in Western Water Law*, *supra* note 5, at 485.

19. *Id.*

20. *See* CROSSING, *supra* note 3, at 44–45; WATER IN CALIFORNIA, *supra* note 12, at 33–34.

21. CROSSING, *supra* note 3, at 39.

22. *See id.*; WATER IN CALIFORNIA, *supra* note 12, at 33–34.

prior appropriation, a primitive rule of priority in the capture of water that held that "the first to make use of water should have a preference over later users."[23]

Prior appropriation grew out of actual conditions on the ground, and the courts of the early West were the means by which this rule became enforceable. Following the miners' lead, the California Supreme Court memorialized the prior appropriation doctrine in the landmark case of *Irwin v. Phillips*,[24] which established the "first in time, first in right" rule as the dominant principle governing water law in the West.[25] The *Irwin* court's influential ruling was primarily motivated by the "inexorable social, economic, equitable, and pragmatic forces"[26] that swelled from the mining camps and materialized into a "universal sense of necessity and propriety."[27] With the first and economically most important western state having officially sanctioned the first-in-time doctrine, prior appropriation rapidly "swept across the West," following wherever mining led.[28]

B. The Evolution of Prior Appropriation: the Beneficial Use Doctrine as Defined by Constitutions, Statutes, and the Courts

As the territories of the West gradually became incorporated into the Union, every new state, either by constitution or statute, adopted some form of the prior appropriation doctrine,[29] whereby beneficial use "define[d] the purposes for which water appropriations may be used."[30] Colorado is one such example. The Colorado Constitution offered full sovereign protection of miners' exploitation of the state's water resources:

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23. WATER IN CALIFORNIA, *supra* note 12, at 34.

24. Irwin v. Phillips, 5 Cal. 140, 147 (1855).

25. *Id.* (stating that when there exists a conflict between two water users diverting water from a stream, the conflict "must be decided by the fact of priority upon the maxim of equity, *qui prior est in tempore potior est in jure*").

26. CROSSING, *supra* note 3, at 233–34.

27. *Irwin*, 5 Cal. at 146.

28. CROSSING, *supra* note 3, at 234.

29. *Id.* at 235; *see also* Norman K. Johnson & Charles T. DuMars, *A Survey of the Evolution of Western Water Law in Response to Changing Economic and Public Interest Demands*, 29 NAT. RESOURCES J. 347, 348–49 (1989) (noting that the prior appropriation doctrine is used to administer water rights in every western state because of the scarcity of water). California, however, employs a hybrid approach to water law, where a prior appropriation system coexists with many common law riparian rules from the eastern United States. DAVID H. GETCHES, WATER LAW IN A NUTSHELL 72 (3d ed. 1997).

30. *Waste in Western Water Law*, *supra* note 5, at 488.

"[t]he right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose."[31] With this enumeration of the basic elements of the doctrine, prior appropriation became enforceable law in Colorado. To obtain a water right, one had to divert the water from its natural course and had to put that water to a beneficial use.[32]

Different western states went about defining beneficial use in different ways, either by constitution or statute. Many states adopted what is now an "accepted catechism in western water law;"[33] namely, that "beneficial use, without waste, is the basis, measure, and limit of a water right."[34] Other states provided a more detailed explanation. Colorado, for example, determined that "[b]eneficial use is the use of that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made."[35] Such definitions, however, remained vague, and some western states sought to further clarify the requirement of beneficial use by specifically listing types of uses that were per se beneficial. Initially, these lists of beneficial uses merely sanctioned the uses to which water was being put at that time—namely mining, agriculture, industrial, municipal, domestic, stock-raising, and hydropower.[36] As time went on, some states statutorily supplemented

31. COLO. CONST. art. XVI, § 6.

32. CROSSING, *supra* note 3, at 234.

33. Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 920 (1998) [hereinafter *Inefficient Search for Efficiency*].

34. *Id.* at 923–24; *see also, e.g.*, ARIZ. REV. STAT. ANN. § 45-141(B) (1998); NEV. REV. STAT. § 533.035 (1997); N.M. STAT. ANN. § 72-1-2 (1997); N.D. CENT. CODE ANN. § 61-04-01.2 (1995); OKLA. STAT. tit. 82, § 105.2(A) (1990); OR. REV. STAT. § 540.610(1) (1997); S.D. CODIFIED LAWS § 46-1-8 (1987); UTAH CODE ANN. § 73-1-3 (West 1991); WYO. STAT. ANN. § 41-3-101 (1997).

35. COLO. REV. STAT. § 37-92-103(4) (2006) (internal quotation marks omitted). *See also* CAL. CONST. art. X, § 2 (suggesting that beneficial use encompasses a prohibition on "the waste or unreasonable use" of water).

36. These lists of prescribed beneficial uses were enumerated either in the constitution or in statute. In Colorado, for example, the constitution specifically lists domestic, agricultural, and manufacturing uses as beneficial uses. COLO. CONST. art. XVI, § 6. Idaho also lists beneficial uses in its constitution, where agriculture, mining, milling, power, and domestic uses of water are beneficial. IDAHO CONST. art. XV, § 3. Montana, by contrast, statutorily lists uses that are beneficial, including agricultural, stock water, domestic, fish and wildlife, industrial, irrigation, mining, municipal, power, and recreational uses. MONT. CODE ANN. § 85-2-102(4)(a) (2010).

their lists of traditional beneficial uses to "reflect changes in values and changes in scientific understanding[,]"[37] adding uses such as gardening, recreation, pleasure, and oil, gas, and sulfur production.[38] Later, "instream" uses such as recreation and fish and wildlife habitat preservation became widely accepted as beneficial uses.[39]

Reflecting this statutory flexibility, several states have specifically declared that certain uses of water are not beneficial. For example, "Oklahoma declares that use of water in coal slurry pipelines does not qualify as beneficial,"[40] and "Kansas statutes provide that evaporation of water from sand and gravel pits is not a beneficial use."[41] These states' legislatures constructed their prior appropriation statutes to express the policy choice that the use of water in the aforementioned industrial applications is not a beneficial use and, accordingly, is not entitled to a water right under prior appropriation.[42] However, the majority of western states do not offer such specific statutory guidance on the application of the beneficial use

37. *Inefficient Search for Efficiency*, *supra* note 33, at 924.

38. *See, e.g.*, TEX. WATER CODE ANN. § 11.002 (West 2009); TEX. WATER CODE ANN. § 64.003(19) (West 2006) (defining beneficial use broadly) (repealed 2007).

39. *Inefficient Search for Efficiency*, *supra* note 33, at 924. Instream uses depend on the maintenance of an instream flow, which is a "nondiversionary, in-place use of water with little or no resulting consumptive use." James D. Crammond, *Leasing Water Rights for Instream Flow Uses: A Survey of Water Transfer Policy, Practices, and Problems in the Pacific Northwest*, 26 ENVTL. L. 225, 226 (1996). Although instream uses now qualify as beneficial uses in many states, this initially was inherently contrary to the prior appropriation system, which required an actual physical diversion to satisfy the beneficial use requirement. Mary Ann King, *Getting Our Feet Wet: An Introduction to Water Trusts*, 28 HARV. ENVTL. L. REV. 495, 502 (2004). The protection of a minimum instream flow began in Oregon with the 1955 Minimum Perennial Streamflow Act, followed by Washington with the 1967 Minimum Water Flows and Levels Act. *Id.* at 504. This instream protection was then incorporated into those states' prior appropriation systems by allowing for instream water rights, which recognized instream flow protection as a beneficial use. *Id.* Washington was first to recognize instream water rights, with the passage of the 1971 Water Resources Act, WASH. REV. CODE § 90.54 (1992), followed by Oregon, with the 1987 Instream Water Rights Act, OR. REV. STAT. §§ 537.332, 537.348 (2003).

40. *Inefficient Search for Efficiency*, *supra* note 33, at 924 (citing OKLA. STAT. tit. 27, § 7.6 (1997)).

41. *Id.* (citing KAN. STAT. ANN. § 82a-734 (1997)).

42. These policy choices were greatly influenced by the notion that a use of water not only must be a beneficial use, but also must be a reasonable use of water considering the limited supply and the high level of demand. Thus, these states made the policy decision that use of water in a coal slurry pipeline, for example, was not a beneficial use because it is not a reasonable use when compared with other competing uses of the water resource. *See* Robert E. Beck, *Use Preferences for Water*, 76 N.D. L. REV. 753, 755–56 (2000).

mandate, nor do they define the prohibition against waste, leaving the judiciary with the task of defining the contours of the beneficial use doctrine.[43]

The courts serve a unique role under the prior appropriation system. "In addition to the usual function of hearing individual cases as they come up,"[44] every western state has a process whereby the courts perform general stream adjudications—proceedings to determine the nature, scope, and priority of every water right on a particular water body.[45] Through these dual functions, courts have helped to clarify the contours of the beneficial use doctrine by parsing out the aforementioned universally accepted explanation of beneficial use—"the basis, the measure and the limit of all rights to the use of water"[46] without waste—into two elements: the type of use and the quantitative amount of use.[47]

As applied by the courts, the type of use must merely be "something socially acceptable."[48] The judicial treatment of this element has been less problematic in those states that specifically list per se beneficial types of uses. Accordingly, farming,[49] mining,[50] milling,[51] power production,[52] and domes-

43. *Inefficient Search for Efficiency*, *supra* note 33, at 925.

44. *Id.*

45. *See id*; *see generally* A. Lynne Krogh, *Water Right Adjudications in the Western States: Procedures, Constitutionality, Problems & Solutions*, 30 LAND & WATER L. REV. 9 (1995).

46. UTAH CODE ANN. § 73-1-3 (West 1953). *See also, e.g.*, WYO. STAT. ANN. § 41-3-101 (1997).

47. *Inefficient Search for Efficiency*, *supra* note 33, at 926 (citing Robert E. Beck, *Elements of Prior Appropriation*, *in* 2 WATERS AND WATER RIGHTS § 12.02(c)(2) (2009)).

48. *Inefficient Search for Efficiency*, *supra* note 33, at 926; *see also* Robert E. Beck, *Elements of Prior Appropriation*, *in* 2 WATERS AND WATER RIGHTS § 12.02(c)(2) (2009).

49. *See, e.g.*, State Dep't of Ecology v. Grimes, 852 P.2d 1044, 1049 (Wash. 1993) (relying on a Washington state statute to determine that the "[u]se of water for the purposes of irrigated agriculture is a beneficial use"). *See* WASH. REV. CODE ANN. § 90.54.020 (West 2010) ("Uses of water for domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, and thermal power production purposes, and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state, are declared to be beneficial.").

50. *See, e.g.*, Walker v. United States, 162 P.3d 882, 890 (N.M. 2007) (citing Kaiser Steel Corp. v. W. S. Ranch Co., 467 P.2d 986, 991 (N.M. 1970), to emphasize that mining is a beneficial use).

51. Denver Power & Irrigation Co. v. Denver & R. G. R. Co., 69 P. 568 (Colo. 1902) (quoting the Colorado Constitution in noting that milling and power production are beneficial uses).

52. *Id.*

tic uses[53] all have been upheld as socially acceptable beneficial uses. Occasionally, however, courts must determine whether a particular type of use not referenced in a state statute is a beneficial use. For example, Colorado courts have declared that dust control[54] and coal-bed methane extraction[55] are beneficial uses. In this manner, courts have helped to clarify the beneficial use doctrine by determining the types of uses—in addition to any constitutionally or statutorily listed types of per se beneficial uses—that are legally beneficial.

The judicial determination of the second element of beneficial use, the amount of use, has been interpreted to require "actual use in an amount that is not wasteful."[56] This requirement has two parts. First, the water must actually be used: "[n]onuse of all or part of a water right" is not a beneficial use of that water.[57] The right to the unused quantity would be subject to judicial termination, which would cause the water to revert back to the public pursuant to state forfeiture statutes.[58] In other words, "use it or lose it."[59]

The second part of the amount of use element of beneficial use is a prohibition against waste. The California Supreme Court has defined waste as the amount of water diverted that "exceeds the amount reasonably necessary for beneficial purposes" according to diversion techniques consistent with the "general custom of the locality" rather than diversions "according to the most scientific method known."[60] This vague language makes clear that the judicial application of the prohibition against waste is not a standardized formula. Instead,

53. State Dep't of Ecology v. Campbell & Gwinn, L.L.C., 43 P.3d 4, 14 n.2 (Wash. 2002) (stating that water for domestic purposes is a beneficial use).

54. State v. Sw. Colo. Water Conservation Dist., 671 P.2d 1294, 1322 (Colo. 1983) (reasoning that the Colorado Constitution has a flexible and expansive definition of beneficial use and that the General Assembly has recognized dust control as beneficial).

55. Vance v. Wolfe, 205 P.3d 1165, 1167 (Colo. 2009).

56. *Inefficient Search for Efficiency*, *supra* note 33, at 926; *see also* Beck, *supra* note 48, at § 12.02(c)(2).

57. *Inefficient Search for Efficiency*, *supra* note 33, at 928.

58. *See, e.g.*, UTAH CODE ANN. § 73-1-4 (West 2010); N.M. STAT. ANN. § 72-5-28 (2010); WYO. STAT. ANN. § 41-3-401 (2010).

59. Janet C. Neuman & Keith Hirokawa, *How Good is an Old Water Right? The Application of Statutory Forfeiture Provisions to Pre-Code Water Rights*, 4 U. DENV. WATER L. REV. 1, 2 (2000) ("A central tenet of the prior appropriation system is 'use it or lose it.' "); *see also* C. Peter Goplerud III, *Termination of Water Rights*, *in* 1 WATERS AND WATER RIGHTS § 17.03 (3d ed. 2009).

60. Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist., 45 P.2d 972, 997 (Cal. 1935). This definition of waste is now the standard definition among western states. *Inefficient Search for Efficiency*, *supra* note 33, at 933.

the judicial determination of waste is a quantitative assessment that turns on a specific, case-by-case analysis of the water use habits of the appropriator.[61] If the challenger of a water right can satisfy the difficult burden of demonstrating both the technological feasibility of a less wasteful method of water use and non-customary practice, the court could terminate the wasted portion of the water right. As with nonuse, the terminated portion of the water right would revert back to the public pursuant to state forfeiture statutes.[62] However, "very few court cases actually find a particular use to be legally wasteful[;]"[63] all but the most egregiously wasteful practices have generally been protected.[64] As a result, very little evolution toward the efficient use of water has taken place within the beneficial use doctrine.

II. PROBLEMS WITH PRIOR APPROPRIATION AND THE TRADITIONAL BENEFICIAL USE DOCTRINE

Water resources west of the hundredth meridian have always been limited, at least in comparison to the eastern United States. Several factors, however, make the West's always-tenuous situation now unsustainable. First, the West is facing a potentially dramatic decrease in the supply of water resources, in part due to anthropogenic, greenhouse gas-induced climate change.[65] Second, this decrease is occurring at the

61. *See Inefficient Search for Efficiency*, *supra* note 33, at 933.

62. *See, e.g.*, UTAH CODE ANN. § 73-1-4 (West 2010); N.M. STAT. ANN. § 72-5-28 (2010); WYO. STAT. ANN. § 41-3-401 (2010).

63. *Inefficient Search for Efficiency*, *supra* note 33, at 928.

64. *Compare* Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist., 45 P.2d 972, 1009–10 (Cal. 1935) (holding that a loss of 40 percent of appropriated water through poor conveyance techniques was well within the realm of local custom and, thus, not wasteful), *with* Erickson v. Queen Valley Ranch Co., 99 Cal. Rptr. 446, 450–51 (Cal. Ct. App. 1971) (holding that conveyance losses of over 80 percent of a water right constituted waste). For an explanation of the judicial impotence in the enforcement of the prohibition against waste and this Comment's proposed solution, see *infra* Part III.

65. Rising temperatures, altered precipitation patterns, a depleted western snowpack, and magnified risk of flooding and drought are all potential effects of climate change that could reduce the region's limited water supplies. Specifically, the total available fresh water supply in the western United States directly depends on the size of the snowpack in the mountains because western water is almost exclusively snowmelt. Therefore, a projected decline in snowfall totals accompanied by increasing temperatures will directly impact the available water supply. As a result, "warmer precipitation falling as rain instead of snow will likely reduce snowpack between 26 and 40 percent by 2049 and between 29 and 89 percent by 2099, resulting in less water available . . . ." Sovacool & Sovacool,

same time as an unprecedented population explosion. The West is the fastest growing region in the United States.[66] As of the 2000 Census, the total population of the West was approximately 63.2 million, increasing between 1990 and 2000 by 19.7 percent.[67] Between 1950 and 2000, the population of the West increased from 13 percent to 22 percent of the total population of the United States.[68] Third, "Native American tribes are seeking their share of the water, promised long ago but never delivered, and often in areas where local supplies are already overappropriated."[69] Lastly, "[i]mproved scientific understanding and environmental laws not envisioned a century ago also create demands for water to be used in different ways or simply left in the streams."[70] Taken together, these four factors are accelerating the stresses on western water resources and thus necessitate a reexamination of the legal framework for allocating the dwindling supplies of water.

The prior appropriation system was well suited to the nineteenth and early twentieth centuries. At a time when the West was sparsely populated, prior appropriation proved to be a useful, utility-maximizing principle that promoted the productive development of vast amounts of land.[71] Even today, prior appropriation has several positive aspects that have created a productive scheme of water allocation. Importantly, prior appropriation provides a high degree of certainty to water users. One of the primary functions of any legal system is to provide certainty to the people governed by that system.[72] Prior appropriation also allows, and indeed encourages, the in-

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supra note 7, at 357–58; *see also* Robert W. Adler, *Climate Change and the Hegemony of State Water Law*, 29 STAN. ENVTL. L.J. 1, 10–17 (2010).

66. D.R. Wilson, *Major Trends as Reported by the 2000 Census: Population Growth*, WADSWORTH'S CENSUS 2000: A STUDENT GUIDE FOR SOCIOLOGY 2ND EDITION, http://www.wadsworth.com/sociology_d/special_features/ext/census/popgrowth.html (last visited Nov. 7, 2010). The western United States, for the purpose of population growth trends and statistics, includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. *Id.*

67. *Id.*

68. *Id.*

69. *Inefficient Search for Efficiency*, *supra* note 33, at 921.

70. *Id.* at 921–22.

71. *Waste in Western Water Law*, *supra* note 5, at 486.

72. *See* Antonin Scalia, *The Rule of Law as a Law of Rules*, 56 U. CHI. L. REV. 1175, 1179 (1989) (discussing the importance of certainty in the legal system).

tensive use of scarce western water resources,[73] without which rapid economic development might not occur.[74]

These advantages, however, do not mask the difficulties created by applying a nineteenth-century water right system in an environment with twenty-first-century constraints. In order to improve prior appropriation, the first step is to identify problems with the doctrine. These problems are broadly broken down into three areas: (1) prior appropriation can give priority to low-value uses despite competing high-value demands; (2) the beneficial use determination under the prior appropriation system focuses on the individual user of water and does not view water use in a regional, basin-wide manner; and (3) the beneficial use calculus does not consider issues closely related to water use—such as energy use or water pollution—because such issues have always been regarded as tangential to water use. This part discusses these three problems, which prevent the scarce western water resources from being more efficiently utilized such that the greatest benefit flows to the greatest number of people.

A. Priority Given to Low-Value Uses

Because prior appropriation allocates water rights solely based on priority in time, the system gives priority to uses of water that may not be the highest-value uses in the modern world. Partly due to the long and difficult process of transferring water rights between different users and different uses, water frequently stays in low-priority, but first-in-time, uses.[75]

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73. *See* CROSSING, *supra* note 3, at 223 ("[T]he 'use it or lose it' mentality [of prior appropriation] . . . has always driven western water developers to extract as much water as possible as quickly as possible lest it be appropriated by someone else.").

74. David E. Pinsky, *State Constitutional Limitations on Public Industrial Financing: An Historical and Economic Approach*, 111 U. PA. L. REV. 265, 310 (stating that water is one of the integral components of economic development).

75. *See* David H. Getches, *Competing Demands for the Colorado River*, 56 U. COLO. L. REV. 413, 429–30 (1985); Adam P. Schempp, *Prior Appropriation Could be Modified to Meet the Challenge Ahead*, ARIZ. WATER RESOURCE., Aug 1, 2009, *available at* http://cals.arizona.edu/azwater/awr/be021a33-7f00-0101-0190-4e0dbfc7214d.html. The transfer of water rights is inhibited by a number of state laws, which require the applicant for a water transfer "to show that no other water user, junior or senior, will be injured by the change." Getches, *supra*, at 429–30. Satisfying this burden of proof "can require costly experts, imposing a considerable transaction cost." *Id.* As a result, "[c]umbersome and expensive procedures and substantive requirements deter transfers of rights to valuable, more efficient uses." *Id.*

For example, nearly 90 percent of western water goes toward agriculture,[76] and much of that to low-value crops, such as alfalfa, which is used for animal feed. In California, nearly 20 percent of agricultural water is used to grow alfalfa, more water than is used to grow any other single crop.[77] Despite its low economic value, alfalfa requires vast quantities of water.[78] This story of using high-value water to grow extremely low-value crops is similar in other western states:

> In Colorado, some 25 percent of all water consumed goes to alfalfa crops. In Montana, agriculture takes 97 percent of all water used in the state, and just about the only irrigated crop there is hay and pasture forage; more than 5 million acres in the state are irrigated hay meadows. In Nevada—the most arid state in the country— . . . . agriculture used 2.8 *billion* gallons of water per day [in 1993]. Altogether, agriculture uses 83 percent of Nevada's water—and the major crop is hay for cattle fodder.[79]

Yet, because the traditional prior appropriation doctrine does not distinguish between more and less valuable uses within a particular category of a beneficial use, such as agriculture, the use of scarce water resources to grow extremely low-value crops is legally protected.

B. An Individualistic Approach to Beneficial Use

Another closely related problem is that under the traditional prior appropriation doctrine the beneficial use of water resources is determined on an individualistic, non-comparative basis. In other words, prior appropriation asks only whether the individual is beneficially using water. It does not ask this question relative to other users of water and does not take into account all of the considerations of a particular watershed. While a particular use of water may be beneficial when viewed

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76. *Irrigation and Water Use*, USDA ECON. RESEARCH SERV., http://www.ers.usda.gov/Briefing/WaterUse (last updated Nov. 22, 2004).

77. Harry Cline, *To Address Environmental Quality Issues, Speaker Says: Alfalfa Water Stewardship Needed*, W. FARM PRESS, Jan. 24, 2004, at 13.

78. John A. Lory, *Managing Manure on Alfalfa Hay*, UNIV. OF MO. EXTENSION (Oct. 2002), http://extension.missouri.edu/publications/DisplayPub.aspx?P=G4555 (last visited Feb. 4, 2011).

79. George Wuerthner, *Guzzling the West's Water: Squandering a Public Resource at Public Expense*, *in* WELFARE RANCHING: THE SUBSIDIZED DESTRUCTION OF THE AMERICAN WEST 195, 195 (2002), *available at* http://www.publiclandsranching.org/htmlres/wr_guzzling_water.htm.

in isolation according to antiquated constitutional, statutory, or common law, that particular use may in fact be quite detrimental to the watershed as a whole when considering competing uses of that water. The resulting allocation of scarce water resources is rarely the most efficient.

The interrelatedness of these two problems is illustrated by a scenario where a farmer uses flood irrigation to grow alfalfa. Flood irrigation is a commonly used method of watering agricultural fields.[80] In many cases, it is preferred over other methods because of its low cost—rather than building pipes and sprinkler systems, a farmer can simply release water onto a field to be soaked up by crops.[81] However, flood irrigation "creates significant losses through percolation as water soaks down past the root zone and through evaporation from the entire surface of the field."[82] Moreover, tremendous inefficiency results from flood irrigation, where "nonuniform application" of water to a field causes "certain portions of the field invariably [to] absorb more water than other parts" during flooding.[83] Despite the existence of more efficient alternatives, such irrigation practices traditionally have been protected as customary uses under the prior appropriation systems of the West.[84] This is because, under prior appropriation, "an appropriator cannot be compelled to divert [water] according to the most scientific method known."[85] Instead, the irrigator is "entitled to make a reasonable use of the water according to the general custom of the locality, so long as the custom does not involve unnecessary waste."[86]

In a plentiful watershed with relatively few competing uses, the use of such a water-intensive irrigation technique as flood irrigation likely would not cause many problems, even though vast quantities of water are being used to grow a very

80. *See generally* Blaine Hanson & Dan Putnam, *Flood Irrigation of Alfalfa: How Does it Behave?*, 2004 NAT'L ALFALFA SYMP. 159, *available at* http://alfalfa.ucdavis.edu/+symposium/proceedings/2004/04-159.pdf (stating that flood irrigation is the primary method for growing alfalfa in California).

81. *Id.*

82. *Waste in Western Water Law*, *supra* note 5, at 502.

83. *Id.*

84. *See generally* Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist., 45 P.2d 972 (Cal. 1935); *In re* Water Rights of Deschutes River, 36 P.2d 585 (Or. 1934); *In re* Water Rights in Silvies River, 237 P. 322 (Or. 1925); Basinger v. Taylor, 211 P. 1085 (Idaho 1922).

85. *Tulare Irrigation Dist.*, 45 P.2d at 997; *see also* Joerger v. Pac. Gas & Electric Co., 276 P. 1017, 1024 (Cal. 1929).

86. *Tulare Irrigation Dist.*, 45 P.2d at 997.

low-value crop. Where climate change, population growth, and other competing demands,[87] however, have combined to put tremendous stress on the only reliably available water source in a particular western location, the use of flood irrigation and alfalfa cultivation must be more closely scrutinized. These uses begin to look wasteful in comparison to other more valuable alternatives. For example, the Sacramento-San Joaquin River Delta ("Delta"), which is fed by the Sacramento-San Joaquin River system in northern California, is a vital source of water for the whole state of California, providing drinking water to twenty-two million people and irrigating 4.5 million acres of farmland.[88] As the demand for this precious water continues to grow due to California's increasing population, the supply of Delta water could diminish by as much as 25 to 40 percent as a result of climate change.[89] Nonetheless, almost 50 percent of California's agricultural growers use flood irrigation,[90] and alfalfa cultivation soaks up nearly 20 percent of the entire state's irrigated water.[91] Because over half of all water for irrigated agriculture in California comes from the Delta,[92] nearly 25 percent of the Delta's irrigation water is used for flood irrigation and nearly 13 percent is used to grow alfalfa.[93]

However, there are high-value competing uses for the waters of the Sacramento-San Joaquin river system, most notably instream flows for the preservation and rehabilitation of salmon. One concrete example of such a competing use is the San Francisco Bay Delta project, which was designed to enhance water flows from the river system into the bay in order to pro-

87. *See supra* notes 65–70 and accompanying text.

88. *Fast Facts*, S.F. ESTUARY P'SHIP, http://www.sfestuary.org/pages/index.php?ID=4 (last visited Nov. 7, 2010).

89. Henry J. Vaux, Jr., *Global Climate Change and California's Water Resources*, *in* GLOBAL CLIMATE CHANGE AND CALIFORNIA: POTENTIAL IMPACTS AND RESPONSES 69, 72 (1991), *available at* http://publishing.cdlib.org/ucpressebooks/view?docId=ft8r29p2m6;brand=ucpress; *see also* JAY LUND ET AL., PUB. POLICY INST. OF CAL., ENVISIONING FUTURES FOR THE SACRAMENTO-SAN JOAQUIN DELTA 52–54 (2007), *available at* http://www.ppic.org/content/pubs/report/R_207JLR.pdf.

90. HEATHER COOLEY ET AL., PAC. INST., MORE WITH LESS: AGRICULTURAL WATER CONSERVATION AND EFFICIENCY IN CALIFORNIA 37 (2008), *available at* http://www.pacinst.org/reports/more_with_less_delta/more_with_less.pdf.

91. Daniel H. Putnam et al., *Alfalfa Production Systems in California*, *in* IRRIGATED ALFALFA MANAGEMENT FOR MEDITERRANEAN AND DESERT ZONES 12 (2008).

92. *See* COOLEY, *supra* note 90, at 17.

93. *See generally* Hanson & Putnam, *supra* note 80 (describing major alfalfa cultivation in California, primarily through flood irrigation).

tect its salmon runs.[94] But in a system where beneficial use is determined on an individualistic basis with no consideration of competing values of alternative uses, a comparative assessment between the use of limited water supplies for flood irrigating an alfalfa crop and the use of that water for more valuable uses, such as salmon protection, are not relevant, even though the limited water supply is being used in an inefficient manner to grow a relatively low-value crop.[95] This situation is not sustainable in a world of increasing demand[96] for diminishing water resources.[97]

C. Beneficial Use Does Not Consider Issues Closely Linked to Water Use

The beneficial use doctrine fails to adequately address certain issues that are inextricably linked to water use, such as (1) the embedded energy intensity of the water and (2) water pollution. Each area will be addressed in turn.

1. The Energy-Water Nexus

The recognition of the interrelatedness, or nexus, between energy use and water use is not considered during the beneficial use calculus under the traditional prior appropriation system. Vast quantities of water are required to generate electricity. In 2006, thermoelectric power plants withdrew 195 billion gallons of water per day—47.8 percent of the total water *withdrawn*,[98] and approximately 3 percent of the total water *consumed*, in the United States.[99] In Arizona, Colorado, Idaho,

94. Robert B. Keiter, *Breaking Faith with Nature: The Bush Administration and Public Land Policy*, 27 J. LAND RESOURCES & ENVTL. L. 195, 241 (2007).

95. *See, e.g.*, Basin Electric Power Coop. v. State Bd. of Control, 578 P.2d 557, 573 (Wyo. 1978) (commenting on the inefficiency of flood irrigation by stating that it is "wasteful in the sense that much more water is put upon and passes over the land than can be consumed by the crops thereon," yet still finding that such wasteful inefficiency does not mean that the water is not being put to a beneficial use).

96. *See supra* notes 67–70 and accompanying text.

97. *See supra* note 65 and accompanying text.

98. Sovacool & Sovacool, *supra* note 7, at 340.

99. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-10-23, ENERGY-WATER NEXUS: IMPROVEMENTS TO FEDERAL WATER USE DATA WOULD INCREASE UNDERSTANDING OF TRENDS IN POWER PLANT WATER USE 2 (2009). Consumptive use is contrasted with mere withdrawal. "The term 'consumption' means water is removed entirely from the water table, whereas the term 'withdraw' means that it is returned to the water table, albeit usually in a slightly different form (i.e., at a

Montana, Nevada, New Mexico, Utah, and Wyoming, coal and gas thermoelectric power plants withdrew 650 million gallons of water per day.[100] Generating a single kilowatt-hour of electricity—the amount needed to burn an average incandescent light bulb for ten hours—requires the withdrawal of approximately three-fifths of a gallon of water.[101]

Just as water is critical to the generation of energy, vast quantities of energy are required for the collection, treatment, distribution, and end use of water.[102] Indeed, energy is embedded in nearly every aspect of water use.[103] The amount of energy embedded in a particular use of water is called its "energy intensity."[104] Energy intensity, in turn, "varies substantially, depending on the source of the raw water, the end use, and water quality requirements for discharge."[105] Specifically, some of the processes involving water that require energy include groundwater pumping, the movement of surface water supplies, the treatment of raw water to potable standards, and the distribution to end users.[106] The movement of surface water supplies, however, is by far the most energy intensive.[107] In California, for example, the State Water Project, which controls the movement of water from the water-rich northern highlands of California to the water-poor regions of southern California, is the single largest energy consumer in the state.[108] The energy demand for water use varies dramatically with the geography of the particular region, as different amounts of energy are required to overcome gravity when water is transported uphill and across numerous watersheds.[109] However, neither energy

higher temperature or with chemicals or contaminants that were used in the cooling process)." Sovacool & Sovacool, *supra* note 7, at 337.

100. CLEAN AIR TASK FORCE & THE LAND AND WATER FUND OF THE ROCKIES, THE LAST STRAW: WATER USE BY POWER PLANTS IN THE ARID WEST 2 (2003), *available at* http://www.catf.us/resources/publications/files/The_Last_Straw.pdf.

101. Joey Bunch, *Water-Guzzling Power Plants Targeted Bills Would Shift Part of Energy Load*, DENVER POST, Feb. 2, 2004, at B.05.

102. Bandana Kaur Malik, *Like Water for Energy, and Energy for Water*, ENVTL. AND ENERGY STUDY INST. (2009), http://www.eesi.org/080109_water_energy.

103. STACY TELLINGHUISEN, W. RES. ADVOCATES, WATER CONSERVATION = ENERGY CONSERVATION 5 (2009), http://www.westernresourceadvocates.org/water/CWCBe-wstudy.pdf.

104. *Id.*

105. *Id.*

106. *Id.*

107. *See id.*

108. Malik, *supra* note 102.

109. This is illustrated by the fact that water conveyances for southern California require fifty times more energy than for northern California. This is be-

consumption nor the water that is required to generate the energy to transport more water are considered in the beneficial use determination of the water use of end users.

2. Water Pollution

The Clean Water Act of 1972[110] prohibits the discharge of certain classes of pollutants by point sources, such as industrial facilities, into the surface waters of the United States without a permit issued by the Environmental Protection Agency ("EPA") or an approved state or tribal program.[111] By bringing all point sources of effluent pollution under the regulatory watch of the EPA,[112] the Clean Water Act is widely considered an effective mechanism to monitor and reduce the pollution of the nation's waterways.[113] However, non-point source polluters, such as most agricultural operations, are exempt from the Clean Water Act's permit requirements.[114] Regulation of the discharge of pollutants from agricultural operations is left almost entirely to the states.[115] In many instances, state regulation of agricultural pollutants, such as pesticide, herbicide, and fertilizer runoff, is either weak or ineffective.[116] This is critically important because massive quantities of synthetic chemicals are used in agricultural production.[117] After the often indiscriminate ap-

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cause southern California largely depends upon water that must travel hundreds of miles, often uphill over mountain ranges, before reaching its final destination. *See* CAL. ENERGY COMM'N, CALIFORNIA'S WATER-ENERGY RELATIONSHIP 11–12 (2005), *available at* http://www.energy.ca.gov/2005publications/CEC-700-2005-011/CEC-700-2005-011-SF.PDF.

110. 33 U.S.C. §§ 1251–1387 (2006).

111. *See id.* § 1342.

112. *Id.*

113. *See, e.g.*, Victor B. Flatt, *Gasping for Breath: The Administrative Flaws of Federal Hazardous Air Pollution Regulation and What We Can Learn from the States*, 34 ECOLOGY L.Q. 107, 172 (2007) (noting the Clean Water Act's "highly effective" point-source water pollution regulations); Mark Latham, *The 2008–2009 Term and the Clean Water Act: Justice Kennedy Where Art Thou?*, 44 NEW ENG. L. REV. 293, 296–97 & n.17 (2010) ("The CWA has been effective but is not a perfect statute in the fight against water pollution."); Jeffrey G. Miller, *The Supreme Court's Water Pollution Jurisprudence: Is the Court All Wet?*, 24 VA. ENVTL. L.J. 125, 132 (2005) ("The CWA erects a sophisticated and effective regulatory system to control and reduce pollution from point sources.").

114. *See* 33 U.S.C. § 1329.

115. *See id.*

116. *See* Michael Byrne, Note, *Greening Runoff: The Unsolved Nonpoint Source Pollution Problem, and Green Buildings as a Solution*, 11 N.Y.U. J. LEGIS. & PUB. POL'Y 145, 148–49 (2007).

117. *See* Jodi Soyars Windham, *Putting Your Money Where Your Mouth Is: Perverse Food Subsidies, Social Responsibility & America's 2007 Farm Bill*, 31

plication of these pollutants during the growing season, agricultural discharge through ditches, dikes, and dams returns these chemicals to the water supply.[118] This severely degrades the quality of the water into which the pollutants flow.[119] Specifically, "[p]olluted runoff causes damage to fish, wildlife and their habitat; damages drinking water supplies, promotes excessive weed growth and degrades . . . scenic beauty and recreational opportunities."[120]

Moreover, water pollution is not limited to the excessive application of synthetic chemicals. Certain irrigation techniques used in areas with high mineral content soils can degrade water quality for downstream users dependent on irrigation return flows. For example, the Mancos shale soils found in western Colorado contain high levels of salts and selenium, minerals which present a major water quality problem in the West.[121] Flood irrigation used throughout the valley surrounding Grand Junction causes salt and selenium to leach into the surrounding surface waters through return flows, thus limiting the productivity of the downstream users because of the poor

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ENVIRONS ENVTL. L. & POL'Y J. 1, 4, 19–21 (2007). As an illustration of the use of massive quantities of synthetic chemicals used in agricultural production, consider the following example:

> [G]rowing high-yield cotton uses large amounts of fertilizers and pesticides. Since cotton isn't intended for human consumption, there are few regulations regarding the amount of chemicals applied to this crop. Although cotton only uses around 3 percent of global agricultural land, it utilizes a quarter of the world's insecticides. To keep up with the plummeting market prices for cotton, farmers use more and more chemicals in hopes of increasing production and thereby making more money.

JULIE CLAWSON, EVERYDAY JUSTICE: THE GLOBAL IMPACT OF OUR DAILY CHOICES 132–33 (2008).

118. *See* Andrew C. Hanson & David C. Bender, *Irrigation Return Flow or Discrete Discharge? Why Water Pollution from Cranberry Bogs Should Fall Within the Clean Water Act's NPDES Program*, 37 ENVTL. L. 339, 341 (2007).

119. Windham, *supra* note 117, at 19; *Water Quality: Nonpoint Source Pollution*, OR. DEP'T OF ENVTL. QUALITY, http://www.deq.state.or.us/WQ/nonpoint/nonpoint.htm (last visited Nov. 7, 2010).

The extent of the water pollution that is caused by agricultural production is reflected in the fact that nonpoint pollution, primarily including agricultural runoff, is considered responsible for 65 to 75 percent of the pollution in the United States' most polluted water bodies. Daniel R. Mandelker, *Controlling Nonpoint Source Water Pollution: Can It Be Done?*, 65 CHI.-KENT L. REV. 479, 481 (1989) ("Nonpoint sources are responsible for 65% to 75% of the pollution in the 25% of the waters that remain degraded under state water quality standards.").

120. *Water Quality: Nonpoint Source Pollution*, *supra* note 119.

121. COLORADO RIVER REPORT, SIERRA CLUB (Feb. 2001), http://www.sierraclub.org/rcc/southwest/coreport/index.asp (last visited Nov. 7, 2010).

water quality.[122] In much the same way that a farmer using inefficient irrigation techniques may reduce the supply of water for those with more junior water rights, so too does the farmer using geographically inappropriate irrigation techniques reduce the overall supply of fresh water for those downstream.[123] Nonetheless, the degradation of the quality of western water supplies, either through excessive chemical application or choice of irrigation techniques, is not considered as a factor in any state's beneficial use determination.[124]

III. WESTERN WATER LAW REIMAGINED

As the foregoing demonstrates, the traditional prior appropriation doctrine does not align with the complex, interconnected nature of water use. This failure of western water law is inherent to the system, as prior appropriation was never intended to do anything more than maximize water use and create certainty of rights among water users.[125] While a complete abandonment of prior appropriation in order to achieve a maximally sustainable water allocation system may be a theoretical possibility, such an approach would create tremendous upheaval and would run counter to many powerful, vested interests such as the agriculture and ranching industries.[126] Indeed, prior appropriation "is so firmly entrenched in western laws and customs that its abolition is

122. *See id.*

123. *See* Pamela S. Clarke & Stacey M. Cronk, *The Pennsylvania Nutrient Management Act: Pennsylvania Helps to "Save the Bay" Through Nonpoint Source Pollution Management*, 6 VILL. ENVTL. L.J. 319, 324 (1995).

124. *See* Anne W. Squier, *Water Quality, Water Quantity: The Reluctant Marriage*, 21 ENVTL. L. 1081, 1085 (1991) ("[Prior appropriation] is not a doctrine of waste, it is not a doctrine of degradation, it is not a doctrine of pollution, it is a doctrine of beneficial use.") (quoting Gregory J. Hobbs, Address at the Northwestern School of Law of Lewis and Clark (Feb. 22–23, 1991)); *see also* Eric T. Freyfogle, *Ethics, Community, and Private Land*, 23 ECOLOGY L.Q. 631, 656 (1996) ("Western water law requires that water uses be 'beneficial,' but it retains an antiquated nineteenth-century definition of the term."); *Waste in Western Water Law*, *supra* note 5, at 486–87 (noting that as a consequence of the traditional application of the prior appropriation system, "the inefficient irrigation methods of a previous era have persisted despite the growing strain on limited water supplies throughout the West.").

125. *See Waste in Western Water Law*, *supra* note 5, at 486.

126. *See* Hope M. Babcock, *Reserved Indian Water Rights in Riparian Jurisdictions: Water, Water Everywhere, Perhaps Some Drops for Us*, 91 CORNELL L. REV. 1203, 1215 (2006).

almost unthinkable."[127] Therefore, to move toward a more logical, sustainable system of water allocation—one that aligns with modern priorities and takes into account the various interrelated issues associated with water use—western state legislatures should refashion the traditional prior appropriation system while keeping its essential structure intact. Change must come in the form of a reimagined western water law system.

There are two elements to a refashioned prior appropriation system. First, the beneficial use doctrine should be statutorily modified to reflect current values and needs, taking into consideration issues closely linked to water use. Second, in order to ensure more regularized water management and the effective application of the more comprehensive, modern beneficial use doctrine, a periodically reviewable and renewable water right permit system should be established. This part addresses these two prongs in turn, as well as a potential hurdle to this new system in the form of takings claims by the owner of a water right.

A. Rethinking Beneficial Use

Beneficial use is the linchpin of the prior appropriation system because it is the determinative criterion upon which a western water right is based. If a right holder puts his or her allotted quantity of water to a beneficial use, the right holder is entitled to the continued use of that amount of water. If the water is not being put to either a statutorily prescribed or judicially sanctioned beneficial use, the amount of water being put to that non-beneficial use is subject to forfeiture.[128]

There have been many proposals to reform the prior appropriation system as a means to better conserve and more efficiently preserve the ever-dwindling western water supply.[129] Most appealing is the proposal to incorporate efficient water

127. MARC REISNER & SARAH BATES, OVERTAPPED OASIS: REFORM OR REVOLUTION FOR WESTERN WATER 65 (1990).

128. *See supra* note 59 and accompanying text.

129. *See, e.g.*, Charles F. Wilkinson, *Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine*, 24 LAND & WATER L. REV. 1 (1989); David H. Getches, *Changing the River's Course: Western Water Policy Reform*, 26 ENVTL. L. 157 (1996); Reed D. Benson, *Rivers to Live By: Can Western Water Law Help Communities Embrace Their Streams?*, 27 J. LAND RESOURCES & ENVTL. L. 1 (2007).

utilization into the rubric of beneficial use.[130] Under this proposal, the quantity of water diverted but lost due to reliance on antiquated, inefficient irrigation techniques would constitute waste. The wasted water would then revert back to the public pursuant to state forfeiture statutes based on a finding of no beneficial use.[131] However, this rational idea has been applied only very sporadically in state water agencies and courts, predominately in situations of extremely inefficient irrigation practices and profligate waste.[132] More frequently, water agencies and courts holding that a water right is not being put to a beneficial use do so in the context of nonuse of the water, not because of the manner or type of use.[133]

One reason that inefficiently utilized water is rarely deemed non-beneficial and, therefore, subject to forfeiture, is the difficulty of making a "value judgment about whether the amount of the particular use is appropriate given . . . [a] generalized notion of reasonably efficient practices."[134] However, it is the state water agencies or state water courts that hear such cases in the first instance, and it is the province of these institutions, together with the legislature, to make such value judgments. If the limited constitutional and statutory lists of beneficial types of uses[135] furnish the only guide for what types of uses are beneficial, then the subsequent recognition of a multitude of other "beneficial" uses necessarily involves value judgments.[136] Moreover, because of the finite and dwindling supply of western water,[137] these value judgments will become even more important and more difficult.

If the difficulty of making value judgments is the reason that grossly inefficient irrigation practices have been upheld as beneficial uses, then a potential solution ought to make such

130. *See Waste in Western Water Law*, *supra* note 5, at 492–507.

131. *See id.*

132. *See id.* at 500 (citing State *ex rel.* Erickson v. McLean, 308 P.2d 983 (N.M 1957); Crandall v. Water Res. Dep't, 626 P.2d 877 (Or. 1981)).

133. *Inefficient Search for Efficiency*, *supra* note 33, at 928–29.

134. *Id.* at 929.

135. *See supra* notes 36–43 and accompanying text.

136. For example, the following are specific uses that Colorado has recognized as beneficial uses, and which do not appear in the constitution or statute: "Aesthetics and Preservation of Natural Environments, Augmentation, Commercial, Domestic, Fire Protection, Fishery, Geothermal, Groundwater Recharge, Industrial, Irrigation, Livestock, Minimum Flow, Municipal, Power, Recreation, Silvicultural, Snowmaking, Wildlife Watering, Wildlife Habitat." BUREAU OF LAND MGMT., COLORADO WATER RIGHTS FACT SHEET (2001), *available at* http://www.blm.gov/nstc/WaterLaws/pdf/Colorado.pdf.

137. *See supra* note 65 and accompanying text.

value judgments less difficult. Value judgments can be made more confidently if state legislators provide a stronger analytical framework, expanding the realm of considerations that can be taken into account in value-laden beneficial use determinations. This process has two elements. First, the scope of the analysis undertaken to determine beneficial use must be expanded beyond the individual water user to include a basin-wide, comparative value of use. Next, other considerations, such as energy use and water pollution, as well as inefficiency, should be incorporated into the beneficial use analysis.

1. A Basin-Wide, Comparative Value-of-Use Analysis

The first step in broadening the framework of allowable beneficial use considerations is to move away from the current individualistic approach and toward a more holistic comparative assessment of the relative value of uses to which water is put. Under the current approach, the determination of whether a right holder is putting water to a beneficial use focuses on whether that particular individual's use is beneficial, as sanctioned by the state legislature, courts, or water agency. If a right holder uses his or her allocated amount of water for agricultural cultivation, a traditionally sanctioned beneficial use, then the beneficial use standard is satisfied. But if the right holder uses that same quantity of water to flush coal slurry through a pipeline, for example, then that user is not beneficially using the water.[138] While attempting to draw a line based on the utility of the type of use, this approach is ineffective because utility in the context of effective allocation of a finite resource should be an exercise in comparative value, not individual value. This approach is blind to the other uses competing for that same limited quantity of water.

Under a broader basin-wide approach to beneficial use, however, there would be almost no categorical beneficial uses of water. Instead, the beneficial use determination would weigh relative values and priorities—a comparative examination based on competing uses in the region. This policy shift would reflect an "evolution of water rights from a concept of absolute right of use to one of comparative advantage of use."[139]

138. In Oklahoma, using water to run coal slurry through a pipeline is not a beneficial use. OKLA. STAT. tit. 27, § 7.6 (1997).

139. Imperial Irrigation Dist. v. State Water Res. Control Bd., 275 Cal. Rptr. 250, 266 (Cal. Ct. App. 1990).

Accordingly, "[t]he fact that a diversion of water may be for a purpose 'beneficial' in some respect . . . does not make such use 'reasonable' when compared with demands, or even future demands, for more important uses."[140] In other words, "[w]hat may be a reasonable beneficial use, where water is present in excess of all needs, would not be a reasonable beneficial use in an area of great scarcity and great need."[141] By forcing the beneficial use analysis to the macro level, comprehensive basin-wide water planning would become a reality, even a necessity.

At present, "western watercourses are still governed by the accumulated weight of more than a century of past private decisions, all made in isolation."[142] Perhaps part of the reason comprehensive watershed planning has not taken root in the West is because the beneficial use standard is inherently individualistic and non-comparative. However, if the most fundamental aspect of prior appropriation—the beneficial use doctrine—were based on the comparative value of alternative uses, comprehensive watershed planning might become more plausible.[143] Elements of this broadened scope and the assessment of

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140. *Id.*

141. Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist., 45 P.2d 972, 1007 (Cal. 1935). This language, which comes from the California courts, is exciting because of the rarity of any court thinking of beneficial use imaginatively. However, aside from *Tulare* and *Imperial Irrigation District*, few, if any, courts have followed this precedent. The "comparative advantage of use" language, however, does provide a useful guide to what a refashioned, robust notion of beneficial use would look like.

142. Charles F. Wilkinson, *Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine*, 24 LAND & WATER L. REV. 1, 19 (1989).

143. A general outline of comprehensive watershed planning is described by Charles Wilkinson as follows:

> First, regardless of which government actually issues a particular water right permit, all jurisdictions within a watershed should cooperate and act in a reasonably coordinated way. Second, the jurisdictions should develop an inventory of water supplies, existing uses, and potential uses. Third, future water uses should be prioritized after open public hearings. Thus choices should be made, for example, as to the amount of water to be allocated to domestic, commercial, and instream uses and as to the degree of water pollution that will be tolerated. Last, the plan must be implemented, monitored, and, if appropriate, amended. The plan must remain sufficiently flexible to accommodate socio-economic changes in the region and to incorporate new inventory and ecological data as it becomes available. Planning thus puts brakes on consumptive water development by bringing all proposals under one roof, analyzing them together, and assessing the proposed uses against available supplies. If water is not available under the plan, "new" water must be created by

comparative value of use can be seen in Colorado's rules governing changes to the type of use to which a water right is put.[144] Before granting a change in use, a state water court must determine that the new use will not injure prior appropriations.[145] The court, therefore, must determine if the new use diminishes the value of other uses on the same stream, and, in so doing, the court must compare the proposed new use with other uses in the area. While clearly not intended to subject a current water right holder to forfeiture based on comparative value of use, the Colorado system does demonstrate that basin-wide comparative analysis is not unreasonable.

Incorporating a basin-wide assessment weighing the comparative value of uses into the beneficial use doctrine, however, is necessary, but not sufficient, to ensure the sustainable use of western water resources. The beneficial use rubric must also take into account issues that are integral to water use, yet considered unrelated to the prior appropriation system, such as energy intensity and water pollution.

2. Incorporating Energy Intensity and Water Pollution into Beneficial Use

Just as inefficiency should be a factor considered in the holistic calculus of determining beneficial use,[146] energy intensity should be another criterion. The close link between water and energy was detailed in Part II.C.1, describing the vast amount of energy consumed in the collection, treatment, distribution, and end use of western water.[147] On a large scale, the energy generation from nonrenewable resources behind energy-intensive water is a major contributor to global climate change,[148] which will likely greatly reduce the available water

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conservation or transfer from existing uses; the plan must be amended; or development must be foregone.

Id. at 22.

144. The water court must answer two questions when contemplating a change of water use: "(1) What historic beneficial use has occurred pursuant to the appropriation that is proposed for change? and (2) What conditions must be imposed on the change to prevent injury to other water rights?" Santa Fe Trail Ranches Prop. Owners Ass'n v. Simpson, 990 P.2d 46, 53 (Colo. 1999).

145. *Id.*

146. *See supra* notes 130–31 and accompanying text.

147. *See supra* notes 102–09 and accompanying text.

148. U.S. GOV'T ACCOUNTABILITY OFFICE, CLIMATE CHANGE: FEDERAL ACTIONS WILL GREATLY AFFECT THE VIABILITY OF CARBON CAPTURE AND STORAGE AS A KEY MITIGATION OPTION 8 (2008), *available at* http://www.

supply.[149] Moreover, a large quantity of water is required to generate energy.

Between 2009 and 2010, 68.5 percent of the power generated in the United States was from coal-fired or gas-fired power plants,[150] which withdrew 650 million gallons of water per day in Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming alone.[151] Therefore, a water right for a particular quantity of highly energy-intensive water often entails both the quantity of water provided by the water right and the use of another quantity of water to generate the energy that allowed for the collection, treatment, distribution, and end use of the water right. The quantity of water that is used by the power plant to generate the energy required to provide the initial water right is likely part of the power plant's water right. However, that quantity of water used by the power plant could be available for other, higher-value uses by other water users but for the first right holder's use of extremely energy-intensive water and the concomitant need to provide that energy. For example, if the delivery of a water right entails an energy-intensive trans-basin diversion, the amount of water being consumed by the right holder is merely the amount of water in the water right. However, that water consumption also locks up the amount of water required by the power plant to generate the energy to deliver the quantity of the water right. That locked-up water may then be unavailable for use as an instream flow to rehabilitate a salmon run because of the power plant's negative impact on water quality.

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gao.gov/new.items/d081080.pdf (noting that coal-fired power plants account for 32.3 percent of United States carbon dioxide emissions); *Federal Actions and the Viability of CO_2 Capture and Storage*, 19 AIR POLLUTION CONSULTANT, no. 1, 2009 at 1.1 ("[C]oal-fired power plants are one of the largest sources of carbon dioxide (CO_2) emissions, a greenhouse gas that contributes to global warming. In the United States, approximately 30% of total CO_2 emissions come from coal-fired power plants, and 50% of all electricity generation comes from coal."); Ann E. Carlson, *Heat Waves, Global Warming, and Mitigation*, 26 UCLA J. ENVTL. L. & POL'Y 169, 207 (2008).

149. RONNIE COHEN, BARRY NELSON & GARY WOLFF, NATURAL RES. DEF. COUNCIL, ENERGY DOWN THE DRAIN: THE HIDDEN COSTS OF CALIFORNIA'S WATER SUPPLY 1 (2004), *available at* www.nrdc.org/water/conservation/edrain/edrain.pdf; *see also supra* note 65 and accompanying text.

150. *See* U.S. ENERGY INFO. ADMIN., ELECTRIC POWER MONTHLY: OCTOBER 2010 WITH DATA FOR JULY 2010 1 (2010), *available at* http://www.eia.gov/ftproot/electricity/epm/02261010.pdf.

151. THE CLEAN AIR TASK FORCE & THE LAND AND WATER FUND OF THE ROCKIES, THE LAST STRAW: WATER USE BY POWER PLANTS IN THE ARID WEST 2 (2003), *available at* http://www.catf.us/resources/publications/files/The_Last_Straw.pdf.

Energy generation pollutes the water that it uses, reducing the available supply of quality water for downstream users, as well as having potentially drastic effects on ecosystem health.[152] Discharged water from power plants often contains high levels of chlorine, copper, iron, and nickel.[153] Also, the intake and discharge of water can severely alter the natural flow of watercourses to which plants and animals have adapted and that are critical for ecosystem health.[154] Perhaps most critically, temperature differences between intake and discharge waters of power plants "can contribute to destruction of vegetation, increased algae growth, oxygen depletion and strain the temperature range tolerance of organisms."[155] Taken together, these negative impacts can be "multiple and widespread, affecting numerous species, at numerous life cycle stages."[156]

Each of these negative externalities, which result from the use of energy-intensive water and reduce the overall supply of western water resources, are not currently accounted for under the prior appropriation system. Moreover, it is not difficult to ascertain the energy intensity of the water allocated in a water right. Such data is widely available, especially where the water in question is the result of a costly and energy-intensive delivery mechanism.[157] Because the ultimate goal is the sustainable allocation and use of western water, considering energy intensity as a factor in the beneficial use determination will allow these negative externalities to be internalized into western water law.

These revised beneficial use determinations cannot be based entirely on a standard energy intensity—where the consumption of water for a particular use would necessarily be non-beneficial if there is a specified energy intensity—because there is no established amount of embedded energy that would automatically constitute water with "too much" energy. Even the use of extremely energy-intensive water should not be considered non-beneficial if only a very small quantity is used. Instead, the determination would have to be ad hoc: considering alternative water supplies, relative energy intensities, total

152. ELLEN BAUM, THE CLEAN AIR TASK FORCE, WOUNDED WATERS: THE HIDDEN SIDE OF POWER PLANT POLLUTION 6–12 (2004), *available at* http://www.catf.us/resources/publications/files/Wounded_Waters.pdf.

153. *Id.* at 8.

154. *Id.* at 9.

155. *Id.* at 6.

156. *Id.*

157. *See, e.g.*, Malik, *supra* note 102.

quantity of water use, and the economic value of the use to which the water is being put.

Although the above-mentioned elements of water pollution would be taken into consideration by incorporating energy intensity into the beneficial use determination, more traditional chemical water pollution should be another criterion considered in determining whether water is being put to a beneficial use. Indeed, the largest user of water in the West—the agricultural sector—is also one of the most egregious polluters. As discussed in Part II.C.2, farmers in the United States enhance their crop yields with tremendous quantities of synthetic herbicides, pesticides, and fertilizers,[158] which then flow into the water supply and severely degrade downstream water quality.[159] The result is that, while "American agriculture . . . [is] the most productive agricultural system in history, [it] is also the most polluting and environmentally destructive form of farming ever practiced."[160] In addition to the excessive use of chemicals throughout the agricultural process, the use of irrigation techniques that are inappropriate for specific geographic areas are also a major source of water pollution in the West.[161] As mentioned earlier, the widespread use of flood irrigation throughout the western slope of Colorado causes the high levels of salt and selenium in the soil to pollute the surface waters through irrigation return flows, sharply limiting the productivity of the downstream water users.[162]

Incorporating certain types of water pollution into the rubric of a holistic beneficial use doctrine would increase the total amount of unpolluted water available for downstream competing uses. The determination of what is an excessive amount of fertilizer would necessarily have to be determined on a case-by-case, crop-by-crop basis. Similarly, a determination that the use of flood irrigation constitutes impermissible water pollution would have to be based on an understanding of the soil content of the area. However, this ad hoc water pollution analysis would be grounded on the basic premise that if a farmer applies an amount of chemical herbicide to his crops that will only

158. *See supra* note 117 and accompanying text.

159. *See supra* notes 118–20 and accompanying text.

160. Windham, *supra* note 117, at 4; *see also* JEREMY RIFKIN & CAROL GRUNEWALD RIFKIN, VOTING GREEN 149 (1992).

161. *See, e.g.*, *supra* notes 120–23 and accompanying text.

162. *See supra* notes 120–23 and accompanying text.

marginally increase his crop yield,[163] or if a farmer uses flood irrigation in an area with a salt and selenium content above a certain threshold, the State Engineer[164] may determine that the farmer is not putting his water to a beneficial use.

Each of the foregoing suggested criteria, which would be considered in the beneficial use determination, are important in their own right. However, no single criterion should be determinative in this new beneficial use analysis. Instead, they are intended to complement each other, to give the State Engineer more tools to accurately and effectively ensure that limited water supplies are used in a sustainable manner and are put to the use with the highest utility. An individual's total quantity of water use would be analyzed based on the type of use to which the water was being put, the value of that use, the efficiency of the use, the energy intensity of the use, and the water pollution that resulted from the use. All of these considerations would then be compared to other competing water uses in the basin to garner accurate information on the comparative uses in that particular area. If, for example, a right holder is using extremely energy-intensive water to grow very low-value crops with excessive amounts of fertilizer compared to other water users in the basin, then the State Engineer could make a finding of no beneficial use. Upon such a deter-

163. The determination of what constitutes a merely marginal increase in crop yield and an unacceptable level of water pollution necessarily involves policy considerations. Therefore, establishing a standard—whereby the consistent application of agricultural chemicals above the level at which any more chemicals produce only marginal returns would be an important factor in the beneficial use determination—should be the province of the state legislature. Importantly, however, the overuse of agricultural chemicals only becomes relevant to a determination of beneficial use if the chemicals migrate into the water supply. Therefore, a farmer who drastically overused agricultural chemicals, yet installed some sort of system to prevent harmful migration, would not be subject to a finding of no beneficial use.

164. The State Engineer is the title given to the water resources agency in particular states, including Colorado, Nevada, New Mexico, North Dakota, and Utah. Other names for a state's water resources agency include the Water Management Board (South Dakota), Board of Control (Wyoming), Department of Natural Resources and Conservation (Montana), Department of Water Resources (Arizona and Idaho), Department of Ecology (Washington), Water Resources Department (Oregon), and State Water Resources Control Board (California). Krogh, *supra* note 45, at 19–30. Each of these differently named water resources agencies serves the same essential function of administering the state's water rights system, even though some may have many additional functions. Because State Engineer is the name given to this water resources agency in the majority of western states, that is the name this Comment uses to refer to any state's water resources agency.

mination, the amount of water deemed non-beneficially used would be forfeited and would revert to the state pursuant to state forfeiture statutes.[165] Generally, after reverting to the public, the quantity of water forfeited is available to be reallocated to satisfy other junior water rights in the hydrological basin in order of priority date.[166] In order for this refashioned, comprehensive beneficial use doctrine[167] to be applied successfully and effectively, however, a right holder's water use needs to come under periodic review.

B. A Periodically Renewable and Reviewable System of Water Right Permits

The critical foundation for implementing this new beneficial use doctrine—where the beneficial use determination is

165. *See*, *e.g.*, UTAH CODE ANN. § 73-1-4 (1989 & Supp. 2010); WYO. STAT. ANN. § 41-3-401 (2009).

166. While this is the standard process for forfeited water rights, another potential option for water rights deemed non-beneficially used pursuant to this revised beneficial use doctrine is to allow the water right holder an opportunity to conform to the new standard. For example, if a State Engineer finds that a water right holder is using agricultural chemicals far above a threshold of only marginally increased crop yield, the right holder could be given an opportunity to reduce the use of such polluting chemicals, rather than the water right being immediately forfeited. Allowing the right holder an opportunity to conform to the standard could alleviate the increased burden on the courts from takings litigation, discussed below in Section C.

167. It is worth noting that while the refashioned, comprehensive beneficial use doctrine that this Comment proposes—which considers relative efficiency, energy intensity, and water pollution in a basin-wide comparative value of use analysis—is novel in regard to western water law, most eastern states operate under a system of water allocation called riparianism that largely tracks this proposal. Under riparian doctrine, an owner of riparian land (land adjacent to water) may not make an "unreasonable" use of the water in a watercourse. *See* RESTATEMENT (SECOND) OF TORTS § 850A (1979). The determination of "reasonableness," similar to the determination of beneficial use under the proposed refashioned doctrine, depends upon

> a consideration of the interests of the riparian proprietor making the use, of any riparian proprietor harmed by it and of society as a whole. Factors that affect the determination include the following: (a) The purpose of the use, (b) the suitability of the use to the watercourse or lake, (c) the economic value of the use, (d) the social value of the use, (e) the extent and amount of the harm it causes, (f) the practicality of avoiding the harm by adjusting the use or method of use of one proprietor or the other, (g) the practicality of adjusting the quantity of water used by each proprietor, (h) the protection of existing values of water uses, land, investments and enterprises, and (i) the justice of requiring the user causing harm to bear the loss.

Id. § 850A.

based on a basin-wide, comparative value-of-use analysis that takes into consideration inefficiency, energy intensity, and water pollution—is more regularized water management through a renewable and reviewable system of water right permits. At a basic level, water right holders would be required to hold a permit for their right, something already required in almost all western states.[168] However, the permit would be for a prescribed time period, subject to renewal upon expiration, at which point the State Engineer would undertake a review of the water use embodied in the permit to determine if the water is being put to a beneficial use according to the refashioned doctrine outlined above. Although this seems intuitively rational, no state with a prior appropriation system of water allocation is currently conducting periodic reviews of water use to determine continued beneficial use.[169] It is only when someone brings a challenge to a water use, when a water right is transferred, or when a change of use is contemplated that a review is undertaken.[170] There is no effort to look at existing water rights to analyze the utility of those rights.[171] Indeed, the lack of a forced periodic reexamination in prior appropriation states is largely responsible for the stagnant application of the beneficial use doctrine, which has resulted in a "rigid, inflexible sys-

168. The following states all have some form of water permit system in place for different types of water users: Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, and Wyoming. *Western States Water Laws: Abstract*, NAT'L SCI. & TECH. CTR., BUREAU OF LAND MGMT., http://www.blm.gov/nstc/WaterLaws/abstract1.html (last visited Nov. 7, 2011).

In New Mexico, for example, water appropriation, a change in the point of diversion, diverting or storing water, or changing the place or purpose of water use all require a permit from the State Engineer. The State Engineer, upon a site inspection to ensure that the quantity of water at issue is being put to a beneficial use, has discretion to issue a permit, which embodies the user's water right. *See Western States Water Laws, New Mexico Water Rights Fact Sheet*, NAT'L SCI. & TECH. CTR., BUREAU OF LAND MGMT. (Aug. 15, 2001), http://www.blm.gov/nstc/WaterLaws/pdf/NewMexico.pdf.

169. SASHA CHARNEY, COLO. WATER CONSERVATION BD., DECADES DOWN THE ROAD: AN ANALYSIS OF INSTREAM FLOW PROGRAMS IN COLORADO AND THE WESTERN UNITED STATES 22–23 (2005) (noting that although a handful of western states undertake periodic review of in-stream water rights, and several undertake period review when a water right is transferred to another user or to another use, no western states currently undertake such period review for other water rights more generally), *available at* www.cde.state.co.us/artemis/nr3/nr32d352005internet.pdf.

170. *Id.*

171. *See id.*

tem imposing in large measure today's needs and knowledge far into the future—in itself a form of waste."[172]

Implementing the transition to a periodically reviewable and renewable water right permit system would surely create tremendous upheaval. Such a change would be the biggest development in western water law since the inception of the prior appropriation doctrine itself. Accordingly, while such a transition potentially could be accomplished within the current framework by water agencies or by water courts simply requiring a periodic review, the establishment of this time-limited permit system likely would be more successful if statutorily established by state legislatures.

The idea of a renewable permit system in the realm of water is not a new idea. Many eastern riparian states have long been using an administrative water permitting system[173]—termed "regulated riparianism"[174]—and these states shed light on what such a system could look like in a western prior appropriation state. Although every regulated-riparian state implements its system differently, there is a fundamental core that can be distilled from different states' statutes. This forms the basis of the Regulated Riparian Model Water Code of the American Society of Civil Engineers.[175] The foundation of this administrative water permitting system is the requirement to obtain a state-issued, time-limited permit before withdrawing any water from a water source within that state.[176] "Reasonable use" is the criterion that serves as the basis for the time-limited water permits—the state water agency must decide whether the proposed water use is reasonable, "both in terms of general social policy and in terms of the effects of the proposed use on other permitted uses."[177] The permits generally are issued for a period of time "representing the economic life of any

172. Jeffrey O'Connell, *Iowa's New Water Statute—The Constitutionality of Regulating Existing Uses of Water,* 47 IOWA L. REV. 549, 578 (1962).

173. Joseph W. Dellapenna, *Global Climate Disruption and Water Law Reform*, 15 WIDENER L. REV. 409, 439–40 (2010) (identifying eighteen states that employ an administrative water permitting system).

174. *Id.* at 440–45.

175. *See* REGULATED RIPARIAN MODEL WATER CODE (1997) [hereinafter MODEL CODE].

176. *See id.* § 6R-1-01; 1 WATERS AND WATER RIGHTS § 9.03(a)–9.03(a)(2) (1991 ed. 2007).

177. Dellapenna, *supra* note 173, at 441 (summarizing MODEL CODE, *supra* note 175, §§ 6R-2-01 to -08, 6R-3-02, 6R-3-05 and WATERS AND WATER RIGHTS, *supra* note 176, §§ 9.03(a)(5)(A), 9.03(b)(1)–9.03(b)(3)).

necessary investments not to exceed 20 years."[178] Within six months of the expiration of the permit, a water right holder may apply for renewal of the permit, subject again to the reasonableness review.[179] The goal of subjecting water users to a periodic review for reasonableness is to allow the state water agency to "use the expiration of permits to facilitate the application of water to more socially valuable uses."[180] Finally, "[r]egulated riparian statutes include elaborate judicial enforcement provisions, provide for hearings within the agency, and judicial review of agency decisions."[181]

This logical and coherent system of water allocation offers several instructive points of reference upon which to model a permit-based prior appropriation system. First, all water right owners in the state above a certain threshold of quantitative water use should be required to obtain a permit that details the quantitative amount of use and type of beneficial use to which that water is put. A threshold is required because of the incredibly large number of water rights in each state.[182] Requiring every water right holder to obtain a permit, no matter how trivial the amount of water, would cause an enormous administrative burden, hampering the effectiveness of the system. The implementing statute could determine this threshold by establishing "categorical exclusions,"[183] a concept borrowed from the National Environmental Policy Act,[184] wherein certain classes of users and a certain quantitative amount of use would be exempt from the permit requirements.[185] For example, individual homeowners and users of less than five acre-feet of water per year would be exempt.

Next, a certain window of time would be established to apply for a permit or to apply for an exemption from maintaining a permit. Considering the large number of likely applicants,

178. MODEL CODE, *supra* note 175, § 7R-1-02; *see also* WATERS AND WATER RIGHTS, *supra* note 176, § 9.03(a)(4).

179. MODEL CODE, *supra* note 175, § 7R-1-02.

180. *Id.* § 7R-1-02 cmt.

181. Dellapenna, *supra* note 173, at 442 (summarizing §§ 5R-4-01 to -5-03, 5R-1-01 to -03, and 5R-3-01 to -03).

182. A western state can have "hundreds of thousands of water rights." John E. Thorso, *Dividing the Waters*, WORLD WATER COUNCIL, http://www.worldwatercouncil.org/index.php?id=1265 (last visited Nov. 27, 2010).

183. *Cf.* 40 C.F.R. § 1508.4 (2009) (providing an example of how categorical exclusions have been used to exclude certain activities from environmental assessment on account of their insignificant effect).

184. 42 U.S.C. §§ 4321–47 (2006).

185. *See* 40 C.F.R. § 1508.4.

five years is probably a sufficient period of time, at which point, if a water right holder has not applied for a permit, the water right will be considered abandoned.

The concern of administrative burden should also be considered in determining the all-important question of permit duration, which establishes the length of time between each review. Because of insufficient resources and the tremendous number of water rights, the permit's duration cannot be so short as to render a thorough evaluation of the water right impossible. Moreover, the length of time must balance the need for certainty and stability in one's water right with the equally important need for flexibility in the water rights system. A certain minimum length of time should be required to "enable investors to accomplish their goals, or at least to amortize their investment, while preventing the monopolization of water by the earliest users."[186] Eastern states that have adopted regulated riparianism have established permit durations generally ranging from one to twenty years.[187] Most regulated-riparian states, however, set permit durations at ten years.[188] The State of Georgia is an exception to this rule, where agricultural water right permits are issued for a period of twenty-five years[189] and non-agricultural permits are issued for a duration of ten to fifty years.[190]

It is also instructive to look at other time-limited permit systems in the context of natural resources. Grazing permits, for example, whether on National Forest System or Bureau of Land Management lands, are issued for a period of ten years.[191] In comparison, licenses to operate hydroelectric generating facilities by the Federal Energy Regulatory Commission ("FERC") generally are issued for periods of thirty to fifty years.[192] The FERC hydroelectric licenses offer a more desira-

186. WATERS AND WATER RIGHTS, *supra* note 176, § 9.03(a)(4).
187. MODEL CODE, *supra* note 175, § 7R-1-02 cmt.
188. *Id.*
189. GA. CODE ANN. § 12-5-31(a)(3) (2006 & Supp. 2010).
190. *Id.* § 12-5-31(h).
191. 43 U.S.C. § 1752(a) (2006).
192. For a complete list of FERC-issued licenses, including their date of issue and date of expiration, see *Complete List of Issued Licenses*, FERC, http://www.ferc.gov/industries/hydropower/gen-info/licensing/licenses.xls (last visited Nov. 23, 2010). *See also* 16 U.S.C. § 799 (2006) ("Licenses under this subchapter shall be issued for a period not exceeding fifty years."); Madeline Fleisher, Note, S. D. Warren Co. v. Maine Board of Environmental Protection, 30 HARV. ENVTL. L. REV. 551, 558 (2006) (noting that thirty to fifty years is the typical time-span for FERC licenses). Although this analogy is not exactly apt, as hy-

ble time horizon, as all of the benefits of a secure and certain system are provided while still maintaining the desirable level of flexibility. Considering the many different models, this Comment suggests that the period between reviews should be no less than twenty-five years and no more than fifty years. The ten-year permits in most eastern regulated-riparian states and for grazing on public lands likely provide far too short of a time period in which to enable investors in water projects or water right holders to amortize their investments and do not offer the degree of certainty that is provided by permits of longer duration. Moreover, as is customary in regulated-riparian states, it is critical that the western state legislatures provide a means for staggering the expiration dates of the numerous permits so that the State Engineer has a steady, predictable, and manageable workload.[193]

Finally, just as "reasonable use" is the criterion upon which permit applications are considered under regulated riparianism, "beneficial use" will be the criterion upon which a water right permit is evaluated in prior appropriation states. This evaluation is where the refashioned beneficial use doctrine fits into the new time-limited permit system. Specifically, when the duration of the permit expires, the water right holder would have to reapply for the permit, at which point the State Engineer would determine whether the water was being put to a beneficial use according to the redefined standard that considers energy intensity, water pollution, and comparative value of use on a basin-wide scale.[194] Just as in regulated-riparian states, State Engineer decisions would be subject to judicial review, with deference given to the administrative decision.

C. Takings Claims as a Hurdle to a Reimagined Western Water Law

Although this Comment's proposed change works within the prior appropriation system, the entrenchment of prior appropriation in the West makes certain that any change will face challenges. The most likely hurdle to a re-envisioned sys-

droelectric generating facilities need to obtain water rights in addition to FERC operating licenses, the permit still offers guidance in terms of an appropriate duration.

193. *See* MODEL CODE, *supra* note 175, § 7R-1-02 cmt.

194. *See supra* Part III.B.

tem is a potential takings claim by water users whose water rights are forfeited because their use is deemed not beneficial.

It is a well-established principle that a water right is a property right.[195] The Fifth Amendment to the United States Constitution prohibits the taking of property without just compensation.[196] Should a water right holder lose his or her water right under the refashioned beneficial use standard because, for example, the right holder is using extremely energy-intense water for a low-value use in a basin with severe water shortages and high-value competing uses, the right holder is likely to bring suit against the state claiming that property was taken without just compensation. Such a takings claim is likely to fail for several reasons.

The power of the state to regulate in a manner that constrains property rights is rather broad,[197] and regulation intended to "conserve scarce natural resources by requiring more efficient use" is firmly within the state's valid exercise of the police power.[198] Under a traditional regulatory takings analysis, the question then becomes under what circumstances does a regulation that constrains property effect a taking requiring just compensation.[199] More to the point, the question is whether the application of a refashioned beneficial use doctrine, which results in either a partial or complete forfeiture of a water right,[200] requires the state to provide just compensation to

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195. This is true in every prior appropriation state. *See, e.g.*, Colorado *ex rel.* Danielson v. City of Thornton, 775 P.2d 11, 20 (Colo. 1989) ("[A] water right is a property right that can be bought and sold."); DeWitt v. Balben, 718 P.2d 854, 860 (Wyo. 1986) (same); *In re* Snake River Basin Water Sys., 764 P.2d 78, 87 (Idaho 1988) (Bistline, J., dissenting) (same).

196. U.S. CONST. amend. V.

197. Joseph L. Sax, *The Constitution, Property Rights and the Future of Water Law*, 61 U. COLO. L. REV. 257, 261 (1990).

198. *Id.* at 262 (citing State v. Dexter, 202 P.2d 906 (Wash. 1949)).

199. *Id.*

200. Partial forfeiture, as compared to complete forfeiture, "means that a portion of an allocated water right can be lost when the user fails to beneficially apply that portion of the appropriated water right." Lane Jacobson, *Snake River Adjudication Issue 10: Partial Forfeiture for Non-Use of a Water Right in Idaho*, 35 IDAHO L. REV. 179, 180 n.2 (1998) (citing State v. Hagerman Water Right Owners, Inc., 947 P.2d 400, 408 (1997)). For instance:

> [e]ven if the user is diverting water in compliance with the place, type, and season of the authorized beneficial use, partial forfeiture may still apply. The water right is also expressed as a maximum rate and duty, referred to as the "paper right." For example, a typical water right certificate reads as follows: "[T]he amount of water to which such right is entitled . . . is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.38 cubic feet per second . . . ." The

the right holder. These two different scenarios, namely partial forfeiture and complete forfeiture, present two different takings analyses.

1. Partial Forfeiture

Determining whether a partial forfeiture of a water right based on the new beneficial use doctrine—in other words, a regulatory taking—affects a taking is a matter of well-established common law. The first step in the regulatory takings analysis asks whether either of two "per se" rules applies to the governmental action. The first per se rule, enumerated in *Loretto v. Teleprompter Manhattan CATV Corp.*,[201] holds that any governmental action that results in a permanent physical occupation of private property is a taking requiring just compensation, regardless of the public interests that such an occupation may serve.[202] Despite the perception that the government is "physically occupying" the forfeited water following the imposition of the refashioned beneficial use doctrine, the application of the permanent-physical-occupation per se rule to the realm of western water law is probably not suitable. In all prior appropriation states of the West, the water right holder does not own the actual physical molecules of the water; the "property" of the water, the molecules, belongs to the public.[203] Instead, the water right holder owns a mere "usufructuary" property right in the water, or a right to use the water for a beneficial use.[204] As such, "the per se physical takings theory is especially inapt in takings cases involving water because a water-right holder has [no] legal right to the physical molecules themselves."[205]

> [Oregon] forfeiture statute provides for partial forfeiture if the water right holder does not use part of the maximum rate and duty.

Krista Koehl, *Partial Forfeiture of Water Rights: Oregon Compromises Traditional Principles to Achieve Flexibility*, 28 ENVTL. L. 1137, 1144 (1998).

201. 458 U.S. 419 (1982).

202. *Id.* at 426.

203. John D. Echeverria, *Is Regulation of Water a Constitutional Taking?*, 11 VT. J. ENVTL. L. 579, 591–92 (2010) (citing CAL. WATER CODE § 102 (West 2009) ("All water within the State is the property of the people of the State, but the right to the use of water may be acquired by appropriation in the manner provided by law.")).

204. *See id.*

205. *Id.* at 592; *but see* Casitas Mun. Water Dist. v. United States, 543 F.3d 1276, 1295 (Fed. Cir. 2008) (holding that requiring a dam operator to run a specified amount of water through a fish ladder constituted a per se physical taking claim). For a strong criticism of this case, see Echeverria, *supra* note 203.

The second per se rule, found in *Lucas v. South Carolina Coastal Council*,[206] holds that the destruction of all economically viable use of property is a taking requiring just compensation.[207] In the case of a partial forfeiture, however, a portion of the property—in this case the water right—remains in the possession of the water right holder and at least some economically viable use remains. Because this per se rule does not demonstrate a taking in the case of a partial forfeiture, the next step, as per the U.S. Supreme Court's holding in *Penn Central Transportation Co. v. New York City*,[208] is to determine, under an ad-hoc, multi-factor balancing analysis, whether considerations of equity indicate that there has been a taking. Factors to be considered in this analysis include the economic impact of the regulation on the property owner, the interference of the regulation with the owner's investment-backed expectations, and the character of the governmental action.[209] This multi-factor *Penn Central* analysis, however, rarely results in a finding of a taking. Courts are "extremely deferential" to governmental action that results merely in a diminution of value and not a complete economic wipeout.[210] Indeed, "[e]ven diminutions approaching 90% of value have been sustained without compensation. That has been the Court's unvarying position for many decades."[211] It is, therefore, quite unlikely that a takings claim based on a partial forfeiture resulting from the application of a refashioned beneficial use standard will succeed.

2. Total Forfeiture

Even if the refashioned beneficial use doctrine results in a complete forfeiture of a water right, the success of a takings claim is unlikely. The central rule in this scenario again is found in *Lucas v. South Carolina Coastal Council*,[212] wherein the Supreme Court stated that:

> Where the State seeks to sustain regulation that deprives land of all economically beneficial use, we think it may resist compensation only if the logically antecedent inquiry in-

206. 505 U.S. 1003 (1992).
207. *Id.* at 1019.
208. 438 U.S. 104 (1978).
209. *Id.* at 124.
210. Sax, *supra* note 197, at 263.
211. *Id.*
212. 505 U.S. 1003 (1992).

> to the nature of the owner's estate shows that the proscribed use interests were not part of his title to begin with. . . .
>
> . . . .
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> . . . Any limitation so severe cannot be newly legislated or decreed . . . but must inhere in the title itself, in the restrictions that background principles of the State's law of property . . . already place upon land ownership.[213]

Therefore, determining whether the elimination of a water right under a refashioned beneficial use doctrine is a taking, and thus requires just compensation, would force courts to analyze the nature of a water right itself.

Water rights have less protection than many other property rights.[214] This is because "their original definition, limited to beneficial and non-wasteful uses, imposes limits beyond those that constrain most property rights."[215] In other words, the nature of the water right is constrained right out of the box by each western state's definition of a water right within its prior appropriation system as limited by the requirement that water be put to a beneficial use; "the concept of 'beneficial use' . . . operates as a permissible limitation on water rights."[216] For example, the Colorado Constitution states that "[t]he right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied."[217] Therefore, the limitation of beneficial use upon a water right "inhere[s] in the title itself"[218] and forms a background principle of Colorado law that restricts the nature of the right. This is true of all western prior appropriation states where beneficial use restricts the use of water.[219]

Once it is established that the beneficial use requirement inheres in the water right, a state may statutorily or judicially clarify this vague term without running afoul of the constitutional prohibition against takings. For example, a Colorado statute states that "'[b]eneficial use' is the use of that amount of water that is reasonable and appropriate under reasonably

213. *Id.* at 1027, 1029.
214. Sax, *supra* note 197, at 260.
215. *Id.*
216. Dep't of Ecology v. Grimes, 852 P.2d 1044, 1055 (Wash. 1993).
217. COLO. CONST. art. XVI, § 6.
218. *Lucas*, 505 U.S. at 1029.
219. *See supra* Part I.B. (discussing the constitutional and statutory foundations of prior appropriation in the western states).

efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made."[220] If a water right is forfeited because the user is wasting water, the right holder does not have a viable takings claim because the requirement of beneficial use, as statutorily clarified to be the use of water without waste, inheres in the water right itself. Therefore, if the definition of beneficial use is refashioned as proposed in this Comment, and a water right is forfeited because the water is extremely energy intense and is being used for low-value purposes in the face of competing high-value needs, the right holder similarly has no viable takings claim because this refashioned restriction always inhered in the water right.[221]

CONCLUSION

The traditional system of prior appropriation and its component beneficial use standard, as currently interpreted and applied, have proven inadequate to address the increasing demand for, and decreasing supply of, fresh water in the western United States. Nonetheless, a wholesale abandonment of the deeply embedded doctrine is unrealistic. Therefore, to ensure that the West has continued access to fresh water, the beneficial use doctrine itself must be refashioned. This refashioning should have two complementary components. First, the beneficial use doctrine should be statutorily modified to reflect current values and needs, taking into consideration issues closely linked to water use. More specifically, the beneficial use of water should be determined on a basin-wide level, comparing relative value of use with a mind toward efficiency, while giving consideration to energy intensity and water pollution. Second, in order to ensure more regularized water management and

220. COLO. REV. STAT. § 37-92-103 (2010).

221. Importantly, however, applying this new beneficial use standard through a periodically renewable and reviewable permit system likely will dramatically increase the litigation burden on state courts. Moreover, the administrative burden on the State Engineer, already increased because of permit reviews, will be even more so if he or she is forced to frequently testify in court in water right takings cases. This potentially could be a large drawback of this refashioned western water law system. One possible solution to reduce the burden on the courts in particular is to allow a certain time period for a water right holder to comply with the beneficial use standard if the State Engineer finds during a periodic water right permit review that the right holder is not putting his or her right to a beneficial use. *See supra* note 166 and accompanying text. This could deter potential litigants from challenging the state's action and decrease overall takings litigation.

the effective application of the more comprehensive beneficial use doctrine, a periodically reviewable and renewable water right permit system should be established. This forced reexamination of water use throughout the West, based on the refashioned beneficial use doctrine, has the potential to allow the ever-thirstier western United States to move toward a more sustainable system of water allocation.