Chapter 11

Water Law in the Eastern United States: No Longer a Hypothetical Issue

Joseph W. Dellapenna
Professor of Law
Villanova University School of Law
Villanova, Pennsylvania

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§ 11.01. Introduction.

Historically, water disputes have been common in the 17 western states and rare in the rest of the United States. The reason for this is pretty obvious: 1 in the 17 western states, water often was relatively scarce, and demand for water quickly outstripped supplies. In such a setting, legal disputes became endemic. The rest of the country was much more humid and locally available supplies of fresh water were nearly always greater than local demand. In such a setting, legal disputes over water were rare and never occurred except in response to a (usually localized) short-term drought.

Because of their differing experiences regarding water, different parts of the United States developed very different approaches to property rights

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relating to water. Riparian rights, predicated on treating waters as common property, evolved in the humid eastern states.² In contrast, the right to use water in the 17 western states came to be treated as private property under appropriative rights.³ Today, water in the eastern states is no longer plentiful relative to supply. First, there was a nine-fold increase per capita in consumptive uses of water throughout the United States between 1950 and 1980⁴ even while the population of the country was doubling. While there has been a small decline in the withdrawals of water since 1980 driven largely by the costs of treating wastewater required for compliance with the Clean Water Act,⁵ overall water use nationally remains (whether measured absolutely or on a per capita basis) at levels far higher than anywhere else in the world. At the same time, supplies of water available for use have contracted—initially because of pollution, although that is actually a declining problem, but more recently because of changing patterns of precipitation⁶ and because the increasing reservation of water from use in order to provide for ecological needs.⁷

⁶ Heejung Chang, Barry M. Evans, and Daniel R. Easterling, “The Effects of Climate Change on Stream Flow and Nutrient Loading,” 37 J. Am. Water Resources Ass’n 973
One result of these changes has been a sudden upsurge in litigation over water allocation in the eastern states even as western states have struggled to cope with the rigidities of the appropriative rights system. We have seen


courts seeking to apply riparian rights to rival claims of two communities in Connecticut\(^8\) and to resolve challenges to a Corps of Engineers permit to divert water from a reservoir for use by the City of Virginia Beach,\(^9\) a major interstate dispute between Alabama, Florida, and Georgia over the waters of two transboundary river basins,\(^10\) and the felt need to rewrite the agreements that determine water usage in the vast Great Lakes basin.\(^11\) These and other disputes demonstrate that the factual premises of eastern water law no longer apply.

The sudden prospect of courts frequently applying riparian rights and having to supervise the use of water resources on a long-term basis have brought home the inadequacies of that system of law. Under common property systems like riparian rights, co-owners are left to their individual judgment to decide whether, when, and how to use the resource.\(^12\) Each owner receives the full benefit of any added use, while the cost of the benefit is spread over all owners. Garrett Hardin explained 37 years ago that when a common property system approaches the carrying capacity of the resource, a “tragedy of the commons” ensues.\(^13\) Acting purely rationally, each co-owner continues to place ever greater demands on the resource even as it

\(^8\) City of Waterbury v. Town of Washington, 800 A.2d 1102, 1147-60 (Conn. 2002).


\(^12\) Dellapenna, “Pure” Riparian Rights, supra note 2, §§ 7.02 to 7.03(e).

is exhausted, if only because other co-owners are doing likewise. Adding demand is the only way to appropriate a share of a resource being grabbed by all. The many actual examples include the exhaustion of fisheries in the high seas, national park access, and even the Federal treasury.\textsuperscript{14}

Just as with other common property systems, riparian rights leads to the tragedy of the commons as demand approaches the available supply. The resulting pressures on waters within the boundaries of about half of the eastern states have already forced them to abandon or to modify radically the system of riparian rights evolved on the assumption of permanent surpluses. These states have not, however, simply imported appropriative rights to solve these problems. Western states have struggled to find legal devices for introducing flexibility into a system the major effect of which was to freeze uses in place.\textsuperscript{15} Rather, eastern states have evolved a new system of


law based on treating the water as public property, a system that is coming to be called “regulated riparianism.”16 There are now three distinct systems of water law in use in the United States, each of which requires discussion in order to understand the present law relating to the allocation of the use of surface waters. The law of groundwater allocation exhibits similar changes, but is even more complex than the law of surface water allocation.

§ 11.02. Riparian Rights.

Today, every state has regulatory statutes dealing with at least certain aspects of water allocation,17 and thus no state relies solely on “pure” riparian rights. In the states that still basically follow common law riparian rights, regulation protects the public interest in water yet plays little part in the resolution of quantity disputes between such direct water users.18 In about half of the eastern states, the common law of riparian rights continues to apply to disputes over the allocation of water between individual users who withdraw water directly from a natural surface source. In these states, regulation plays little, if any, part in quantity disputes between direct water users.

Riparian rights derive from the premise that the right to use water is a natural attribute of land, dependent on the natural availability of water to the land.19 The word “riparian” itself comes from the Latin word “ripa,” meaning

17 Id. § 9.02.
19 See Tyler v. Wilkinson, 24 Fed. Cas. 472, 474 (No. 14,312)(D. R.I. 1827)(“The natural stream, existing by the bounty of Providence for the benefit of the land through which it flows, is an incident annexed, by operation of law, to the land itself.”). Justice Story’s opinion in that case is often cited as the first true riparian rights case. For a modern expression of the view that riparian rights are a natural attribute of the land abutting a watercourse, see Niagara
a riverbank. Land abutting or underlying a watercourse is termed “riparian land.” Courts in some early cases supported the theory that an owner of riparian land is entitled to have the natural flow of a watercourse come down to the land without change in quantity or quality. Under the modern understanding of riparian rights, each owner of riparian land is entitled to use water from a contiguous watercourse regardless of the effect on the natural flow of the watercourse so long as each user does not transgress the equal right of other riparians to use the water. While domestic uses are preferred over other uses, the only real restriction is that no use is legal if it “unreasonably harms” another riparian use.


The case of Harris v. Brooks illustrates modern riparian rights. The plaintiff operated a commercial dock on the shore of a small lake for renting boats to members of the general public for recreational fishing and boating. They also sold supplies and licenses to the renters. Brooks grew rice on land on the shore of the same lake—a crop that must be kept flooded during the growing season. Brooks pumped large quantities of water from the lake for his rice fields during a drought, lowering the lake level substantially. At about the same time, the public stopped renting boats, and the fish stopped biting. Brooks’ pumping clearly violated the natural flow theory, but for a court to apply that theory would have prohibited virtually all pumping for any purpose whatsoever. Instead, the court turned to the reasonable use


20 For an analysis of what constitutes riparian land, see Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.02.

21 Id. § 7.02(c).

22 Both the natural flow theory and the reasonable use theory trace back to Justice Story’s opinion in Tyler v. Wilkinson, 24 Fed. Cas. at 474. That opinion includes several references to the “perfect equality” of the rights of each riparian while mentioning both a right to the natural flow and a right to make a reasonable use. The two theories also appear in the even older case of Merrit v. Parker, 1 N.J.L. App. 460, 464-66 (1795).

23 See Dellapenna, “Pure” Riparian Rights, supra note 2, §§ 7.02(b)(1), 7.03

theory, stressing that the court’s goal was to assure the equal rights of each riparian “as near as may be.”

“Equality of right” needs explanation because the rights of different riparians in situations such as in *Harris* simply cannot be identical. A riparian, who makes a particular use that harms no one, is privileged to do so, while another riparian, making an identical use but with different effects, might be enjoined or have to pay damages. On the other hand, two riparians making dissimilar uses of water might be found entitled to equal—or vastly different—amounts of water. What reasonable use theory assures is that each riparian’s interest is considered in making legal decisions allocating water to, in so far as possible, maximize socially beneficial uses while minimizing the harm to the others. No riparian is free to disregard the needs of others, and no riparian’s needs should be disregarded.

This is a more complex problem than simply enjoining a use of water that causes injury to another use. Each use necessarily interferes with the other, and whichever prevails in a case like *Harris* necessarily destroys the other. Justice Paul Ward seemed to realize this, adopting the language of the first *Restatement of Torts*:

The determination in a particular case of the unreasonableness of a particular use is not and should not be an unreasoned, intuitive conclusion on the part of the court or jury. It is rather an evaluating of the conflicting interests of each of the contestants before the court in accordance with the standards of society, and a weighing of those,

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25 *Id.* at 133.

26 *See generally* Restatement (Second) of Torts § 850, cmt. d (1977) [“Restatement”]; DellaPenna, “*Pure* Riparian Rights, supra note 2, §§ 7.03(a), 7.03(b)(2), 7.03(c)(2).

27 R.H. Coase, “The Problem of Social Cost,” *3 J. Law & Econ.* 1, 3-15 (particularly at 12-13)(1960). Bill Rodgers has sought to make light of this insight by using as a model a chicken farmer competing with a neighboring fox rancher. *See* 1 William H. Rodgers, Jr., *Environmental Law: Air and Water* § 1.1B at 6 (1986)(“Causation-neutrality that attributes the spillover damage in equal parts to the hunger of foxes and the tastiness of chickens is a hard sell among people who can tell the difference between aggressor and victim.”). In a contest between a rice farmer and the operator of a boat livery, there is little, if any, of the intuitive sense of who is in the right that is so appealing in the fox/chicken example. *See generally* DellaPenna, *Introduction, supra* note 2, § 6.01(b)(1), at nn. 341-46.
one against the other . . . . [I]t is only when one riparian proprietor’s use of the water is unreasonable that another who is harmed by it can complain, even though the harm is intentional. Substantial intentional harm to another cannot be justified as reasonable unless the legal merit or utility of the activity which produces it outweighs the legal seriousness or gravity of the harm.28

This is a relational test, a weighing of the social value of the two uses against each other to determine which use is more valuable to society.29 In *Harris*, as in many other cases, however, the court provided no more than a vague discussion of how to balance the uses against each other. Such a balancing requires a court to undertake a polycentric process that, at the very least, strains the capacity of courts to act in the traditional mode of disinterested umpire rather than actively involved manager.30 The court ordered Brooks’ pumping to be enjoined whenever the lake level fell below 189.67 feet above sea level—the “normal level” of the lake. Justice Ward was careful to insist that it chose that level not because the level was normal, but because it was the level at which Brooks’ pumping for his rice fields unreasonably interfered with the plaintiffs’ use of the lake.31

The opinion in *Harris* is unclear about how a court should determine that commercial recreational boating and fishing is a more reasonable use than growing rice.32 Temporal priority is pretty much irrelevant:33 Brooks had been irrigating his rice for more than 20 years and the plaintiffs had only begun the boat livery in the very year of the suit.34 If the key is the relative economic value of the two activities, the court would have to reopen the suit whenever the product values change significantly. Such changes could occur

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28 *Harris*, 283 S.W.2d at 135 (quoting Restatement of Torts § 852, comment c (1939)).
29 See generally Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.02(d)(2).
31 *Harris*, 283 S.W.2d at 135-36.
32 On very similar facts, the Arkansas Supreme Court reached the opposite conclusion when the boating and fishing were for personal, rather than for commercial, recreation. Nilsson v. Latimer, 664 S.W.2d 447 (Ark. 1984).
33 Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.03(d).
34 *Harris*, 283 S.W.2d at 130-31.
through changes in the market values of the two products, or if Brooks were to acquire more land and therefore was able to produce more rice—by pumping even more water. The court was aware of this problem, adopting a specific lake level as the point where the Brooks’ pumping must cease precisely to avoid the possibility of the frequent relitigation of reasonableness. Yet it remains impossible to believe that courts would refuse to reconsider its decision if the relevant facts were to change dramatically.

Some courts have assumed that the rule of reasonable use requires a simple pro rata sharing among competing users when there is not enough water to go around. That is not true, as Harris amply demonstrates—the rice farmer was ordered to stop pumping, rendering his crop a total loss. On the other hand, only minimal, if any, attention is given to such non-economic questions as the natural characteristics of the stream, general social concerns, or abstract justice. On the other hand, the central concept of the right to use water as a consequence of the natural features of the land means that any use on non-riparian land is per se unreasonable. Who began use of the water first is simply not relevant—again, as Harris and numerous other cases demonstrate.

35 Id. at 136. Such an approach is more characteristic of dual-system states in which courts characteristically think in terms of specific appropriations of water even when they are dealing with vestigial riparian rights. See Dellapenna, supra note 1, § 8.03(b)(2).
36 Forty-five years later, the Arkansas Supreme Court declined to rule on the need to maintain the “normal level” of Horseshoe Lake. Taylor v. Zanone Props., 30 S.W.3d 74 (Ark. 2000).
38 These principles figure prominently in the Restatement even if they do not figure prominently in the cases. Restatement, supra note 19, § 850A. See Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.02(d)(3).
40 Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.03(d).

Riparian rights are vague and unpredictable in any conflict over water. Riparian rights lack any process for managing water during extreme shortages or for protecting public values, suffer from a systematic bias in favor of large users, and make it impractical to develop markets. Consider each problem in turn.

First, consider vagueness and instability. As in Harris v. Brooks, even long established uses can be cut off without compensation if a court decides that a recently begun use is more “reasonable.” Furthermore, courts cannot give a decision that is good for more than the day on which it is given, even as between the litigants themselves. If either of the competing uses changes in physical or economic terms, the calculus of reasonableness changes—what was reasonable may suddenly become unreasonable. Instability of result is a major problem for reasonable use theory. Courts in several western states used instability in the right to use water as a reason to justify rejecting riparian rights. Some observers consider this to be a serious impediment to private investment in water development.

The lack of a process for managing water in times of extreme shortage or for protecting public values under riparian rights is arguably even more important that vagueness and instability. The slow, laborious process of individual litigation is not adapted to such purposes, yet there is no

41 Id. §§ 7.02(d)(3) to 7.03(e). See also Frefogle, supra note 39, at 503-08.
43 Coffin v. Left Hand Ditch Co., 6 Colo. 443 (1882); Drake v. Earhart, 23 P. 541 (Idaho 1890); Jones v. Adams, 6 P. 442 (Nev. 1885).
45 See Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.05(a).
mechanism for determining or reviewing the rights of all users on a particular watercourse. Courts normally consider only the interests of the parties to the actual litigation, and seem ill equipped to address unrepresented interests of non-participating riparians, let alone the interest of the public generally. 46 This lack of efficient, system-wide management creates a systematic bias in favor of large users. 47 Small users will be less able to afford to litigate, or to organize collectively for litigation, if the water they need is taken by another, more affluent riparian. Furthermore, the balancing process generally favors large users over smaller users: The economic value of the water to the large user usually will outweigh the economic loss of a small user with the temerity to challenge the large user. Smaller users can effectively aggregate their claims by receiving their water through a public system, but the effectiveness of this approach is limited by legal doctrines limiting the “riparianness” of public systems. 48 Moreover, aggregation is brought about only through submission to a different sort of large-scale enterprise.

Finally, persons seeking to acquire the right to use water sometimes seek to buy riparian rights without buying riparian land, attempting to create a non-appurtenant riparian right. 49 What a buyer obtains in such a transaction remains far from clear. The conveyance binds the seller not to contest use by the buyer so long as it is within the terms of the sale. Some courts have concluded that the buyer obtains no rights whatsoever against riparians other than the seller. In such cases, a non-appurtenant riparian right amounts only to a contract by the seller not personally to contest the buyer’s right to use water from the common source. 50 In a few cases, courts have

47 See Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.02(d)(3).
48 See Pernell v. City of Henderson, 16 S.E.2d 449 (N.C. 1941); Town of Purcellville v. Potts, 19 S.E.2d 700 (Va. 1942). See generally Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.05(c).
49 See Dellapenna, “Pure” Riparian Rights, supra note 2, § 7.04(a)(3).
held that a buyer of a non-appurtenant riparian right acquired the right to make a reasonable use along with all the other riparian landowners. Yet it is not clear whether the right of use conveyed in these cases is measured by the reasonable needs of the seller (therefore avoiding possible prejudice to the other riparians) or of the buyer (thus treating the buyer as a full, equal riparian). As a result, a buyer of a non-appurtenant riparian right obtains little more than a hunting license that might or might not yield water. Such uncertainties explain the continuing dearth of such sales.

§ 11.03. Appropriate Rights.

Unlike the humid eastern states, “Anglo” settlers in the 17 western states found scant local supplies for the water they needed for mining, irrigation, industrial, and municipal uses. They concluded that these demands could not be satisfied under riparian rights, whether in its natural flow version or in its reasonable use version. Yet from the earliest years of Anglo settlement, the newcomers generally displaced aboriginal and Spanish-Mexican law without much concern about its possible utility. Aboriginal law, which


53 The few apparent survivals of Spanish-Mexican law seem actually to have been fictions invented by the imagination of common-law judges or lawyers. See, e.g., City of Los Angeles v. City of San Fernando, 537 P.2d 1250, 1265-67, 1273-77 (Cal. 1975); Lux v. Haggin, 10 P. 674, 715 (Cal. 1886); City of Albuquerque v. Reynolds, 379 P.2d 73 (N.M. 1962); In re Contests of Laredo, 675 S.W.2d 257, 267-78 (Tex. Ct. App. 1984), writ ref’d, n.r.e. See Dellapenna, supra note 1, § 8.02(a), § 8.02(b), at nn. 92-108, and § 8.02(c), at nn. 200-22. See generally Norris Hundley, Jr., The Great Thirst: Californians and their Water, 1770s-1990s, at 1-77 (1992); Pisani, Divided West, supra note 52, at 38-46; Daniel Tyler, The Mythical
might have proven better adapted to local conditions, was altogether ignored. Even in Hawaii, where aboriginal law survived somewhat, that law became vestigial.54

Westerners developed their own approach to water allocation, an approach that came to be known as “prior appropriation.” The result was appropriative rights, a private property approach to water allocation in which the water right is defined as to quantity, time, place, and manner of use,55 and according to its temporal priority relative to other uses.56 Despite the apparent success of this system in western states, careful analysis suggests that it could not be adopted successfully in an eastern state.


Appropriative rights grew out of the simple fact that early miners in California and elsewhere were trespassers.57 The sudden peopling of California occurred without an organized government in place.58 Sweeping

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57 Dellapenna, Dual Systems, supra note 1, § 8.01.

58 The non-aboriginal population of California jumped from around 15,000 to about 100,000 in the single year of 1849, and grew to 300,000 within five years. See Hundley, supra note
aside reliance on Spanish-Mexican law as well as any concern about aboriginal practices, the Yankee intruders used the only law with which they were familiar—the common law of the eastern United States. Yet for the two most important factors in their lives—land and water—they were unable to use that law. The lands were deemed to be public domain belonging to the federal government, and under riparian rights the right to use water was held by the owner of the land. Because “forty-niners” were unwilling to wait for the establishment of a regular government and the completion of comprehensive land surveys (necessary before the government would sell the land), the miners simply trespassed on the land and took the water they needed. The miners quickly sought to bring order to their lives through vigilante law. The result is a national mythology of violent disputes, blood feuds, and sudden death. Vigilante law applied the most elementary notion of justice—first in time, first in right. If someone were found occupying another person’s mining claim, the new occupant would hang if he could not prove justification for his presence. When governments were finally


59 While early statutes in several states, including California, sought to preserve the Spanish-Mexican irrigation law, such rights were subordinated to the needs of miners. Gordon Morris Bakken, The Development of Law on the Rocky Mountain Frontier: Civil Law and Society, 1850-1912, at 34 (1983); Betty Eakle Dobkins, The Spanish Element in Texas Water Law 136-39 (1959); Pisani, Divided West, supra note 52, at 38-44; Dellapenna, Dual Systems, supra note 1, § 8.02(b), at nn. 92-108, and § 8.02(c), at nn. 200-22.


61 Moore v. Smaw, 17 Cal. 199 (1861), overruling Hicks v. Bell, 3 Cal. 219 (1853).

62 See Hundley, supra note 53, at 67-73; Pisani, Divided West, supra note 52, at 31; Kanazawa, supra note 60, at 165-67. Historian Donald Pisani has documented the considerable support small miners gave to riparian rights in the face of the increasing concentration of water in the hands of large, capital intensive mining companies. Pisani, Divided West, supra note 52, at 23-26, 35-38.
organized (beginning in 1850), they could do little more than ratify the customs of the miners.63

The mining camps applied precisely the same principles to water as they did to land. Once again, organized governments had little choice but to follow along and ratify the customs of the miners.64 After 150 years, the miners’ rule has been developed with considerable elaboration into a complex and sophisticated system of water administration found, in one form or another, in every appropriative rights state.65 Successive mineral rushes to other Western states brought many of the same miners who had started out in California, bringing the customs of the California mining camps with them. Sometimes these customs were blended with misunderstood principles of Spanish-Mexican law.66 Eventually, appropriative rights displaced any other system in the 17 western states.67


Appropriative rights do not serve communities well in significant respects. The rights actually encourage waste and other bad practices under particular circumstances.68 There is also more uncertainty than the underlying principle—first in time, first in right—suggests. The earliest priorities predate the establishment of the modern administrative machinery.69 Despite expensive legal proceedings to put these claims on record, on some watercourses the oldest, and therefore most valuable,

63 Jennison v. Kirk, 98 U.S. 453, 457 (1878)(“[T]he miners . . . were emphatically the law-makers, as respects mining, upon the public lands in the State.”).
64 Irwin v. Phillips, 5 Cal. 140 (1855).
66 Dobkins, supra note 59; Reich, Mission Revival Jurisprudence, supra note 53; Reich, Hispanic Roots, supra note 53.
67 Dellapenna, Dual Systems, supra note 1, §§ 8.02 to 8.02(c).
69 The first statute creating a formal administrative system was enacted in 1890 in Wyoming; the most recently enacted was in Oklahoma in 1963. See Franco-Am. Charolaise, Ltd. v. Oklahoma Water Resources Bd., 855 P.2d 568 (Okla. 1990); Farm Inv. Co. v. Carpenter, 61 P. 258 (Wyo. 1900). See generally Dellapenna, Dual Systems, supra note 1, § 8.02(c).

Anglo settlement, with claims of appropriative rights, began as early as 1849 in California,
rights to use water have never been quantified. The following analysis briefly describes the shortcomings of the doctrine—shortcomings that became ever more pronounced unappropriated water disappears and with the growing recognition of the importance of non-consumptive uses of water.

The “first in time, first in right” principle fosters premature development in order to capture unappropriated waters to enjoy their later rents. To capture rents, appropriators want to use as much water as they possibly can. Withdrawing water, a cost to society, is a private gain to an appropriator, creating a basis for a claim to water in the future. Capturing waters requires the investment of real social capital to divert and store water, diverting capital from socially productive uses to capture sub-marginal resources. Excessive diversion capacity is the rule. Yet most appropriations of water are characterized by inadequate investment in post-diversionary aspects of development, especially those designed to save water. The introduction

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72 See generally Gaffney, supra note 42.
75 See Neuman, supra note 68.
of conditional rights makes it even easier to capture rents—by establishing an intent to appropriate that might not be realized for many years.\textsuperscript{77} Much of the water shortage of the arid west would disappear if appropriators had to pay an economic price for water, or even if appropriators simply started to think in terms of a zero price, instead of, as now, regarding the price as negative because of the gain they realize by piling up a history of use.

Another problem arises from the ranking of appropriators as senior and junior to one another along a scale from first to last. When water is short, juniors drop out first and lose everything before the next senior appropriator loses anything.\textsuperscript{78} Senior appropriators are protected by exaggerating the risk to junior appropriators. Two basic economizing principles are denied. One is marginal productivity.\textsuperscript{79} A junior appropriator who loses all access to water loses some marginal units of high productivity, while the senior appropriator retains marginal units of low productivity. The other is pooling of risk. There is no pooling of risk whatever. One’s supply is a piece of the larger common supply, but one’s piece is defined in a way that greatly increases the aggregate variability of supply above its natural variability and that distributes these risks unequally.


\textsuperscript{78} For one of the most extreme examples, see \textit{State ex rel. Cary v. Cochran}, 292 N.W. 239 (Neb. 1940).

Nor has there ever been a market for appropriative rights to any significant extent.80 Appropriative rights are not bought and sold freely, despite crying needs for water transfers in every area.81 The recognition and protection of third-party rights precludes true market transactions.82 Even


82 See, e.g., Santa Fe Trail Ranches Prop. Owners Ass’n v. Simpson, 990 P.2d 46 (Colo. 1999); Thompson v. Harvey, 519 P.2d 963 (Mont. 1974); In re Sleeper, 760 P.2d 787 (N.M. Ct. App. 1988); Crandall v. Water Res. Dep’t, 626 P.2d 877 (Or. 1981); White v. Bd. of Land
§ 11.03

The highly touted California Water Bank turns out, upon close examination, to have been an instance of administrative reallocation masquerading as a market. The case of *City and County of Denver v. Fulton Irrigating Ditch Co.* is a classic example of what happens when a buyer seeks water for a use that is fundamentally different or at a considerable remove from that of the seller.

The Coors Beer Co. was unable to produce enough beer to satisfy the demand for its product without a greatly enlarged supply of water. Being at the time unwilling to open satellite breweries, Coors’ agreed to swap its “clear mountain stream” to the City of Denver to augment the city’s municipal supplies in exchange for the right to use unlimited quantities of Denver sewage water in its brewery. The transaction failed not because of fears of possible outrage by beer drinkers, but because a group of farmers downstream from Denver (organized as the Fulton Irrigating Ditch Co.) obtained an injunction against the trade because it would deprive them of the water on which they were relying. The outcome in the case is all the more remarkable as the City and Coors were contracting regarding “imported water”—water from outside the watershed—over which the City would have even greater rights than it would have had if it were merely claiming...


Dellapenna, supra note 80, at 358-65.


City and County of Denver, 506 P.2d at 151-53.
the rights of a senior appropriator. In this case, the farmers had even contractually recognized the seniority of Denver’s rights over their own in a settlement of an earlier dispute, in exchange for Denver’s promise not to reuse any water, regardless of source, that “shall have been once used through its municipal water system.” The outcome in Fulton Irrigating Ditch Co. would not have depended on the existence of the contract if the water had not been “imported.”

Despite the third party rule, various commentators continue to insist that markets work under appropriative rights. One of their favored “examples,” the Imperial Valley Irrigation District “sale” to San Diego illustrates the unreality of such claims. A five-year drought at the turn of the millennium covering the entire southwest of the United States provoked the attempt to transfer Colorado River water from several of the large irrigation districts in southern California to the large cities in southern California. The city of San Diego asked the Imperial Valley Irrigation District to sell 800,000 ac.-ft. of water—about 11 percent of its allocation from the Colorado River.

When the District voted 3-2 in December 2002 to reject the proffered contract, the federal and state governments placed enormous pressure on the District. The Secretary of the Interior cut the District’s allocation of water

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86 Id. at 146-49.
87 Id. at 151.
89 See, e.g., Anderson and Snyder, supra note 81; Landry, supra note 81; National Research Council, supra note 81; Smith, supra note 80; Graff and Yardas, supra note 81; Howe et al., supra note 81; Israel and Lund, supra note 81; Kaiser and Binion, supra note 81; Kaiser and Phillips, supra note 81; MacDonnell and Rice, supra note 81; Sterne, supra note 81; Thomas and Miller, supra note 81; Thompson, supra note 80.
by 11 percent, to be restored only if it was sold under the terms of the rejected contract.\textsuperscript{93} The Irrigation District continued to resist the deal, even initiating an ultimately unsuccessful lawsuit against Secretary Gale Norton.\textsuperscript{94} The state legislature also threatened to intervene to take the water from the District.\textsuperscript{95} In the end, the District gave in and “accepted” the contract by another 3-2 vote.\textsuperscript{96} This, of course, is hardly evidence of a market transaction.\textsuperscript{97}


\textsuperscript{97} In contrast with the Imperial Irrigation District “sale,” the Coachella Valley Irrigation District reached a relatively quiet settlement to sell part of its water. “Last California District Approves Pact on Colorado River Water,” \textit{N.Y. Times}, Oct. 4, 2003, at A8. This is hardly a
The transaction provides an infusion of cash to the owners of the farms served by the district, but it provides nothing but unemployment for the farm workers on those farms as land is idled in order to free up water to transfer to San Diego, and disaster to the ecosystems that depend on return flow from the farms. Moreover, the Irrigation District held out against consenting to the transaction because even the landowners believed they were being short-changed. Taking into account the effects on farm workers about to lose their jobs, we see, as is usually the case in “water markets,” a transfer of wealth from the poor to the rich.

Grouping users within an irrigation district somewhat ameliorates the third party problem, for the irrigation district can at least manage the water with efficiency in mind. Where administered by irrigation districts, appropriative rights are applied within contained service areas. Where claimed by individuals, or smaller districts, service areas from given streams


are generally scattered. “First in time, first in right” puts a premium on jumping the gun. The farther one is from a source and the more convenient it is to others, the greater the motive to get there first to preclude the others. Typically, the first claimants on a source are scattered; soon the supply is fully claimed, and the included dry lands can never get water from this source.\textsuperscript{102} They can, however, search for more remote sources. The results may be observed throughout the arid states. Recent legal innovations designed to protect areas of origin have had very limited impacts.\textsuperscript{103}

Finally, the amount of water that courts recognize as being used “beneficially” is a function of, among other things, the amount of land that a user has.\textsuperscript{104} Moreover, courts traditionally made no effort to protect the public interest in the waters of the State or to distribute their fruits among the disadvantaged of society.\textsuperscript{105} Many appropriative rights states have now enacted statutes requiring consideration of the public interest in evaluating applications for new appropriation.\textsuperscript{106} Such statutes do not apply to existing water rights and thus have little practical effect in the many water basins in which most or all available water is already appropriated.\textsuperscript{107} And whether

\textsuperscript{102} See, e.g., State ex rel Carey v. Cochran, 292 N.W. 239 (Neb. 1940).
\textsuperscript{104} This is made explicit in laws defining a “duty of water”—amount of water that may be used lawfully to irrigate an acre of a particular crop. See, e.g., Farmers Highline Canal & Reservoir Co. v. City of Golden, 272 P.2d 629 (Colo. 1954); McDonald v. State, 722 P.2d 598 (Mont. 1986); State Dep’t of Ecology v. Grimes, 852 P.2d 1044 (Wash. 1993).
\textsuperscript{105} Gaffney, supra note 42, at 138.
\textsuperscript{107} See, e.g., Collins Bros. v. Dunn, 759 P.2d 891 (Idaho 1988); Shokal v. Dunn, 707 P.2d 441 (Idaho 1985). Two states seem to have defined the “public interest” as depending upon a cost-benefit analysis rather than a more wide-ranging analysis. Alaska Stat. § 46.15.80(b)(Michie 2000); Wash. Rev. Code Ann. § 90.54.020(2)(West 2001); Stempel v. Dep’t of Water Res.,
today the public interest supports protecting endangered species and providing water for other public values rather than for irrigation is at least an open question.\textsuperscript{108}


While miners were inventing appropriative rights in the 17 western states, farmers settling in other parts of those states applied riparian rights. Only in the Mountain Time zone states did courts conclude that riparian rights never played a role in the state’s water law.\textsuperscript{109} The Pacific coast states, from Alaska to California, and the high plains states, from North Dakota to Texas, all eventually chose to embrace appropriative rights and to end riparian rights.\textsuperscript{110} The change generally was brought about by legislation. Legislatures were unable to abolish riparian rights completely through inability or unwillingness to compensate the owners of riparian rights. Instead, legislatures chose to preserve uses under riparian rights that existed on the effective date of the appropriative rights statute.\textsuperscript{111} Vestigial


\textsuperscript{109} \textit{See} Dellapenna, \textit{Dual Systems}, \textit{supra} note 1, § 8.02(b).

\textsuperscript{110} \textit{Id.} §§ 8.02 to 8.02(c).

riparian rights thus survive in the Pacific coast states and the high plains states with little actual impact on how water is managed in those states.\textsuperscript{112} These transitions occurred when existing riparian uses were relatively few, yet they resulted in a dual system that combined the worst features of both bodies of law.\textsuperscript{113}

Mississippi is the only state east of Kansas City to adopt a dual system, which it did in 1956.\textsuperscript{114} Mississippi’s experience suggests why it would be futile to import appropriative rights into the hydrologically more developed regions east of Kansas City.\textsuperscript{115} During the 30 years that Mississippi had appropriative rights on the books, not one court in Mississippi ever referred to that statute in legal disputes over the allocation of water.\textsuperscript{116} In 1985, Mississippi repealed its appropriative rights statute, giving all persons claiming rights vested under the appropriation statute one year to file a document expressing their intention to preserve their appropriative right.\textsuperscript{117} No such documents were filed.

It is remarkable that not one judge (and presumably not one lawyer) considered the appropriative rights statute worth mentioning in any relevant reported case decided during the period it was on the books. The reason is

\begin{itemize}
  \item \textit{See}, e.g., Lux v. Haggins, 10 P. 674 (Cal. 1886). \textit{See generally} Dellapenna, \textit{Dual Systems}, \textit{supra} note 1, ch. 8.
  \item Dellapenna, \textit{Dual Systems}, \textit{supra} note 1, §§ 8.03, 8.04.
  \item Dellapenna, \textit{Dual Systems}, \textit{supra} note 1, § 8.05.
  \item Miss. Code Ann. §§ 51-3-5(2), (3), 51-3-29(a), (b), (c)(2002).
\end{itemize}
fairly obvious. Many consumptive uses of water had begun before 1956, and
claiming an appropriative right would only concede priority to an opponent
claiming a riparian right. Either the riparian right would prevail as the
earliest appropriation,\(^{118}\) or the appropriative right would be a permissive
non-riparian use that must fail in competition with a riparian use.\(^{119}\) The
best that an appropriator could hope would be that the appropriative use
would be balanced against a complaining riparian’s use, which brings us
full circle back to the reasonable use version of riparian rights.\(^{120}\) If an acute
general water shortage should develop, the appropriator rather than having
a more secure title than a riparian, would simply find no water to fulfill the
appropriation.

Professor George Gould, a champion of appropriative rights, has argued
that water is so plentiful in Mississippi that there simply is no need, yet, for
any kind of administered water rights in Mississippi.\(^{121}\) Mississippi is a wet
state with lots of water. Yet Mississippi did not simply repeal its appropriative
rights statute and return to more or less unregulated riparian rights. Instead,
Mississippi enacted a regulated riparian system, suggesting that the people
in the state felt strongly enough about the need for administered water rights
that they were willing to continue to pay the price for a permit system, but
not an appropriative rights permit system. They even extended the permit
system to groundwater as well as to surface waters.\(^{122}\)

Gould has argued that in a properly implemented dual system, nearly all
riparian rights would simply disappear.\(^{123}\) But the western states in which
this happened all had small populations, vast areas, and few existing riparian
uses when they made the transition. Vesting existing riparian uses would, as

\(^{118}\) See Dellapenna, *Dual Systems, supra* 1, § 8.04(a).

\(^{119}\) Id. § 8.04(b).

\(^{120}\) See, e.g., Wasserburger v. Coffee, 141 N.W.2d 738 (Neb.), modified on other grounds,

\(^{121}\) George A. Gould, “A Westerner Looks at Eastern Water Law: Reconsideration of Prior

\(^{122}\) Al Sage, “Mississippi,” 6 *Waters and Water Rights* at 445, 446 (Robert E. Beck ed.,
replacement ed. 1994).

\(^{123}\) Gould, *supra* note 121, at 105-08.
the states’ populations grew and their economies developed, result in most water uses being under appropriative rights. If a court were aggressively committed to eliminating even those ancient riparian rights, it could find means of doing so.124

Mississippi, and most eastern states, already have large population densities and highly developed economies with myriad established water users. Existing water users are simply too numerous for the water rights in question to be eliminated easily; and if they are not eliminated, they will continue to trump “junior” appropriative rights. Gould in fact concedes that appropriators would always lose in a dispute with someone exercising riparian rights and that generally there will be little water available for an appropriative right holder in times of acute shortage.125 While he does claim that markets will develop to take care of such problems, he nowhere explains why markets should develop more effectively under a dual system (with its inherent uncertainties) than they did under the considerably more certain appropriative rights systems of the West.126

In short, the Mississippi example strongly suggests that adding appropriative rights to an economically mature, humid eastern state hitherto committed to riparian rights would gain little, if anything, in terms of rational water management at a cost of establishing and maintaining the considerable bureaucratic machinery inherent in appropriative rights today. This reality ought to be quite enough to preclude serious consideration of appropriative rights as an alternative to riparian-based systems in the eastern United States even without considering the further arguments about the monopolistic and environmentally unsound biases of appropriative rights.127 As a result, eastern states making a sharp departure from more or less pure riparian rights have all gone to regulated riparianism rather than to appropriative rights.

124 Dellapenna, Dual Systems, supra note 1, §§ 8.03(b) to 8.03(b)(5).
125 Gould, supra note 121, at 107-08.
126 Id. at 108. On the dearth of true markets for water, see the authorities collected supra at note 80. See generally supra at nn. 49-51, 80-88 and accompanying text.
127 See supra at nn. 68-79, 89-108 and accompanying text.
§ 11.04.  Regulated Riparianism.

Since the 1950s, about half of the states east of Kansas City, along with Hawai‘i, have enacted administrative permit systems to replace tradition riparian rights.128 Rather than importing appropriative rights into the east, these states have developed a highly regulated system of water administration based on riparian principles that amounts to a transition to a public property system.129 The transition from extremely limited regulatory intervention to more or less comprehensive regulation often occurred incrementally rather than from a conscious design to transform the system of water rights. There thus is disagreement over when a true regulated riparian system emerged in a particular state and even today one could debate whether certain states have in fact crossed over from largely unregulated common law riparian rights to a regulated riparian system. Bearing this in mind, the following list indicates the states that have enacted regulated riparian systems and the approximate date of that step: Alabama (1993);130 Arkansas (1957);131 Connecticut (1982);132 Delaware (1959);133 Florida (1972);134 Georgia (1977);135 Hawai‘i (1987);136 Iowa (1957);137 Kentucky (1966);138 Maryland (1957);139 Massachusetts (1985);140 Minnesota (1973);141 Mississippi (1985);142 New

128 See generally Dellapenna, Regulated Riparianism, supra note 16.
129 See Dellapenna, Introduction, supra note 2, § 6.01(b)(1).
130 Ala. Code §§ 9-10B-1 to 9-10B-30 (LexisNexis 2001).
137 Iowa Code Ann. §§ 455B.261 to 455B.281 (West 2004).
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Jersey (1965);143 North Carolina (1973);144 New York (1979);145 Virginia (1989);146 and Wisconsin (1957).147 In addition, several states have applied a regulated riparian system to groundwater without applying it to surface waters.148

Even now, there is no fully recognized name for the new system of water allocation law. Peter Davis once suggested that the new regulatory system should be called “non-temporal priority permit systems.”149 This term aptly describes the new system, but it is a bit much to expect people to say or write very often. Others have simply given up on a name that tells you anything about the system, calling the new system simply “Eastern permit systems.”150 The name “regulated riparianism,” which I devised some twenty years ago,151 offends those to whom the words “regulate” and “riparian” are polar opposites.152 The name has the virtue, however, of emphasizing both that the administrative permit process proceeds on essentially riparian principles, and that the new system is a regulation of—rather than a taking

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of—riparian rights.¹⁵³ Regulated riparianism is also succinctly descriptive and has begun to gain general acceptance.¹⁵⁴

Little has been written about regulated riparianism, and most of what has been written has viewed regulated riparian statutes as minor modifications superimposed on the riparian rights that the authors saw as the remaining core of the law in these states.¹⁵⁵ Others have seen regulated riparian statutes as inartfully drafted appropriative rights statutes.¹⁵⁶ Few commentators have realized that regulated riparianism represent a truly different model of water law. The following summary description of regulated riparianism is based on the common core of principles found from examining the actual regulated riparian statutes and also by examining the Regulated Riparian Model Water Code of the American Society of Civil Engineers—an official

¹⁵³ Dellapenna, Regulated Riparianism, supra note 16, § 9.01.
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standard of the Society.\textsuperscript{157} No state has a system precisely like the one described here, although several come very close.\textsuperscript{158} References here are provided in the text to the \textit{Regulated Riparian Model Water Code} and to the relevant chapter of the treatise \textit{Waters and Water Rights}.\textsuperscript{159} These are the most convenient sources for more detailed reading on the structure and application of regulated riparianism, containing explanations of the issues and exhaustive references to actual regulated riparian statutes and the few cases construing those statutes.

\[1\] — Differences from Riparian Rights.

Under regulated riparian statutes, water generally is not to be withdrawn from a water source without a permit from the state within which the withdrawal occurs.\textsuperscript{160} Exceptions mostly are limited to small users,\textsuperscript{161} although two states exempt most or all agricultural users.\textsuperscript{162} Because the substantial majority of the withdrawals of water for consumptive uses in both states are for agricultural uses, the exemption severely limits the utility of the regulatory system.\textsuperscript{163} Apart from the exemptions, the right to use water is determined by the permits, not by the riparian nature of the use, yet the criteria by which permit applications are judged is whether the use would be “reasonable.”\textsuperscript{164}

\begin{itemize}
  \item \textsuperscript{159} Dellapenna, \textit{Regulated Riparianism}, \textit{supra} note 16.
  \item \textsuperscript{160} Model Code, \textit{supra} note 157, § 6R-1-01; Dellapenna, \textit{Regulated Riparianism}, \textit{supra} note 16, §§ 9.03(a) to 9.03(a)(2).
  \item \textsuperscript{161} Model Code, \textit{supra} note 157, § 6R-1-02; Dellapenna, \textit{supra} note 16, § 9.03(a)(3).
  \item \textsuperscript{164} Model Code, \textit{supra} note 157, §§ 2R-1-01, 2R-2-20, 6R-3-01, 6R-3-02; Dellapenna, \textit{Regulated Riparianism}, \textit{supra} note 16, §§ 9.03(b) to 9.03(b)(3). Some jurisdictions would substitute the terms “beneficial,” “reasonable-beneficial,” or “equitable” for “reasonable.”
\end{itemize}
The criterion of reasonableness under regulated riparian statutes is applied by an administering agency that decides before a use begins whether it is reasonable, both in terms of general social policy and in terms of the effects of the proposed use on other permitted uses.\textsuperscript{165} Water users therefore are able to know, for the duration of the permit, whether their use is reasonable; they cannot be caught unaware by a judicial decision wiping out their investment without compensation.\textsuperscript{166} The permit allows a potential investor to gauge whether the investment can be profitable and the proper scale of investment. The result is very different from the situation at common law, where a judge makes the decision after a crisis has arisen.

The administering agency subjects permits to conditions designed to protect other lawful users and public values.\textsuperscript{167} The statutes often contain preferences for certain classes of uses.\textsuperscript{168} Temporal priority has a strictly limited role in the permit process.\textsuperscript{169} Uses on non-riparian land are no longer unreasonable \textit{per se}; often one of the principle motives of the enactment of a regulated riparian statute was to authorize the use of water on non-riparian land.\textsuperscript{170} Finally, in many states, permits are issued only for a period of time (from three to 20 years, depending on the state).\textsuperscript{171} When a permit expires,

\begin{footnotesize}
\begin{enumerate}
\item[166] See, \textit{e.g.}, Joslin v. Marin Mun. Water Dist., 429 P.2d 889 (Cal. 1967); Harris v. Brooks, 283 S.W.2d 129 (1955). Harris is discussed in the text \textit{supra} at notes 24-40.
\item[167] Model Code, \textit{supra} note 157, § 7R-1-01; Dellapenna, \textit{Regulated Riparianism, supra} note 16, §§ 9.03(a)(5)(A), 9.05 to 9.05(c).
\item[168] Model Code, \textit{supra} note 157, §§ 6R-1-02, 6R-3-04; Dellapenna, \textit{Regulated Riparianism, supra} note 16, §§ 9.03(a)(3), 9.05(c).
\item[169] Model Code, \textit{supra} note 157, §§ 6R-1-03, 6R-3-02; Dellapenna, \textit{Regulated Riparianism, supra} note 16, § 9.03(a)(b)(3).
\item[170] Model Code, \textit{supra} note 157, § 2R-1-02; Dellapenna, \textit{Regulated Riparianism, supra} note 16, § 9.03(a)(2).
\item[171] Model Code, \textit{supra} note 157, § 7R-1-02; Dellapenna, \textit{Regulated Riparianism, supra} note 16, § 9.03(a)(4). For analysis of the merits of possible durations for the permits, see
\end{enumerate}
\end{footnotesize}
the question of the continued reasonableness of the use can be reexamined.\(^{172}\)

The *Regulated Riparian Model Water Code* sets 20 years as the duration of the permits.\(^{173}\)

Regulated riparian statutes contain elaborate enforcement provisions, including criminal penalties,\(^{174}\) civil penalties,\(^{175}\) injunctions,\(^{176}\) administrative orders,\(^{177}\) and actions for public and private damages.\(^{178}\) Such statutes provide for hearings within the agency\(^{179}\) and judicial review of agency decisions.\(^{180}\) The *Regulated Riparian Model Water Code* also includes provisions designed to support alternative dispute resolution.

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175 Model Code, *supra* note 157, §§ 5R-4-06 to 5R-4-08; Dellapenna, *Regulated Riparianism, supra* note 16, § 9.03(a)(5)(B), at nn. 480, 534-41.
179 Model Code, *supra* note 157, §§ 5R-1-01 to 5R-1-03.
resolution\textsuperscript{181} and the administrative resolution of disputes involving permit holders\textsuperscript{182}—provisions not generally found in most actual regulated riparian statutes.\textsuperscript{183}

Users are sometimes required to pay fees to the agency for the permits based on the amount of water they will use, but these fees cannot be considered payment for the water itself.\textsuperscript{184} This is clearly so when the fees are a uniform charge irrespective of the nature of the use or the amount of water used. Even when the fee is variable, however, it is usually set according to the presumed ability of the user to pay, rather than according to the value created through use of the water.\textsuperscript{185} Such provisions can be seen as a form of distributive equity. Such equitable provisions will result in the continued use of water for low-valued uses rather than its transfer to higher valued uses that, in extreme cases, might find no water available for their needs. The \textit{Regulated Riparian Model Water Code} breaks new ground in this respect, requiring water use fees that, to some extent at least, reflect the use value of the water.\textsuperscript{186}

These statutory requirements are based on a state’s police power to regulate water withdrawal and use in order to protect the public health,


\textsuperscript{184} Dellapenna, \textit{Regulated Riparianism}, \textit{supra} note 16, § 9.03(a)(5)(C).


\textsuperscript{186} Model Code, \textit{supra} note 157, § 4R-1-08.
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safety, and welfare.\textsuperscript{187} Still, fear of political or legal repercussions from such interference with traditional water rights has led many state legislatures to exempt from the permit requirement some classes of users who were using water when the new statute came into effect.\textsuperscript{188} This introduces a significant temporal element. A more sophisticated solution to this problem is to guarantee existing users an initial permit, thereafter subject to renewal on the same terms as any other permit,\textsuperscript{189} limiting the temporal preference to a single permit cycle. Users who do not apply for a permit within a short time are conclusively presumed to have abandoned their claim.\textsuperscript{190}

Regulated riparian statutes create mechanisms for long-term planning and to otherwise provide for the public interest in the waters of the State.\textsuperscript{191} One major purpose of regulated riparian permits is to gather the necessary information to enable on-going planning. The \textit{Regulated Riparian Model Water Code} also provides for a comprehensive statewide data system.\textsuperscript{192} The administering agency also usually has broad discretion to plan for and to deal with crises brought on by extreme water shortages.\textsuperscript{193} The agency


\textsuperscript{188} Dellapenna, \textit{Regulated Riparianism}, supra note 16, § 9.03(a)(3). \textit{See also} nn. 162, 163 and accompanying text.


\textsuperscript{191} Model Code, \textit{supra} note 157, §§ 4R-2-01 to 4R-2-04; Dellapenna, \textit{Regulated Riparianism}, \textit{supra} note 16, § 9.05(a) to 9.05(d).

\textsuperscript{192} Model Code, \textit{supra} note 157, § 4R-2-03.

\textsuperscript{193} \textit{Id.} §§ 7R-3-01 to 7R-3-07; Dellapenna, \textit{Regulated Riparianism}, \textit{supra} note 16, § 9.05(d).
can incorporate permit conditions based on its plans. The administering agency also is often authorized to restrict uses should the agency’s plans prove inadequate to an actual shortage notwithstanding any inconsistency with a permit. There is some evidence, however, that administering agencies prefer to use temporal priority or pro rata sharing as the allocative method least likely to provoke litigation or other difficulties for the agency. This sabotages the whole scheme of regulated riparianism, based as it is on expert appraisal of the uses that will best serve the needs of society, eschewing allocation without evaluation of social utility.

Today, the main threats to the availability of water in eastern states, as to both quantity and quality, are not pollution or withdrawal, but human-made physical and ecological transformation of the waters and the lands on or in which the waters are found. Regulated riparianism addresses these problems in two ways that are very different from appropriative rights. First, both the management of water allocation and water quality issues are usually vested in a single agency—an agency charged to integrate the consideration and granting of permits to use in light of both sets of policies. Second, regulated riparian statutes usually require the agency to define and protect some minimum flow, whether an historic average low flow, the amount necessary for the preservation of certain kinds of wildlife, or the amount necessary to protect human health or well-being. Other provisions authorize additional conditions designed to protect aesthetic or ecological concerns. Thus the Regulated Riparian Model Water Code requires the protection of the biological, chemical, and physical integrity of the water source, defined in terms of federal and other relevant legal standards.

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194 Model Code, supra note 157, § 7R-1-01.
195 Id. § 7R-3-01.
196 Dellapenna, Regulated Riparianism, supra note 16, § 9.05(d), at n. 954.
197 Model Code, supra note 157, §§ 4R-3-04, 6R-4-04.
199 Model Code, supra note 157, §§ 3R-2-01 to 3R-2-05.

Regulated riparianism does not solve all problems relating to the protection of private values and to the furtherance of public values. Two problems relate to private values: security of investment, and the transfer of water to higher valued uses. Investment security could be a problem if the time period of a permit is too short, leaving too little time for the initial cost of a project to be recovered before the permit expires. Additional uncertainty could arise when the administering agency has the power, as it often does, to modify permits in light of new developments, such as unforeseen water shortages. In the actual operation of regulated riparian systems, however, neither investment nor transfer insecurities seem to have caused actual difficulty. If anything, administering agencies might be accused of being too sensitive to the fears of large institutional investors. Administering agencies seldom flatly refuse to renew a permit, although new and more stringent conditions are sometimes attached at the time of renewal. Administering agencies also consult with major water users in crafting responses to water emergencies rather than making their own expert determinations regarding the matter.

Regulated riparian statutes usually make no express provision for the transfer of water rights or permits between potential users. The Regulated Riparian Model Water Code charges the administering agency to encourage market transfers of water. Given the dearth of markets under appropriative

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204 Model Code, *supra* note 157, §§ 1R-1-07, 7R-2-01 to 7R-2-04, 7R-3-05, 9R-1-01, 9R-1-02.
rights, however, one should doubt whether a market could develop for the transfer of water used under regulated riparian permits. Theoretically, one purpose of the regulated riparian system is to enable the administering agencies to force such transfers through the non-renewal of permits. In practice, however, the agencies free up less water through the renewal process than theory suggests because the agencies prefer to tighten conditions on existing uses rather than to deny renewals outright. Non-renewal of permits will remain an infrequent and cumbersome device unless states are willing to create a good deal of investment insecurity.

Finally, is such a system worth its costs? Clearly there will be significant financial costs in administering a regulated riparian system, and the tendency of government bureaucracies to replicate their errors throughout a state is another substantial cost. Yet given the increasing failure of traditional riparian rights (a common property system) to cope with the needs of modern societies, and the only slightly better performance of appropriative rights (as close to a private property system as we are likely to achieve), there seems little choice but to move to a regulated riparian system (a public property system). Regulated riparianism is not a perfect system, but it would appear to be the best suited to the cultural, economic, legal, hydrologic, and political settings of eastern states.

205 See the authorities collected supra at note 80. See generally the text supra at nn. 49-51, 80-88.
206 Model Code, supra note 157, § 7R-1-02.
209 See § 11.02 of this chapter.
210 See § 11.03 of this chapter.
§ 11.05. A Few Words on Groundwater.

Space does not allow an extended analysis of the current state of groundwater law. While groundwater as a source of water usage is growing in importance,211 the law relating to groundwater remains less developed and more complex than the water applicable to surface water.212 Not so long ago, courts were convinced that, except in rare situations, it was impossible to know how groundwater behaved213 and that therefore courts should leave the parties to a dispute over groundwater to their own devices for capturing or exploiting groundwater.214 Unfortunately, this refusal by American courts to become involved was frequently referred to as a doctrine of absolute dominion over the water beneath an owner’s land and therefore was conceived not as a refusal to decide but as a recognition of a property right of the overlying landowner.215 As a result, some courts still insist that neither they nor the legislature can change how groundwater is managed under the law without providing compensation to affected landowners.216

Far more often courts conclude that they or the legislature can change the legal regime for groundwater in their state without the change being a taking of private property. The result is a proliferation of groundwater regimes,

213 See, e.g., Frazier v. Brown, 12 Ohio St. 294, 311 (1861)(the “existence, origin, movement and course of such waters, and the causes which govern and direct their movements, are so secret, occult and concealed, that an attempt to administer any set of legal rules in respect to them would be involved in hopeless uncertainty, and would be, therefore, practically impossible.”). See generally Joseph W. Dellapenna, “Legal Classifications,” 3 Waters and Water Rights § 19.02 (Robert E. Beck ed. 2003 replacement vol.).
215 See Dellapenna, Absolute Dominion, supra note 214, § 20.04.
216 See Wiggin v. Brazil Clay and Coal Co., 452 N.E.2d 958 (Ind. 1983); Maddocks v. Giles, 728 A.2d 150 (Me. 1999); Sipriano v. Great Spring Waters of Am., Inc., 1 S.W.3d 75, 83 (Tex. 1999). See generally Dellapenna, Absolute Dominion, supra note 214, §§ 20.07 to 20.07(b).
three of which are directly parallel to the legal regimes for surface water: appropriative rights (private property);\textsuperscript{217} the reasonable use rule (common property);\textsuperscript{218} and regulated riparianism (public property).\textsuperscript{219} Additionally, along with the survival of the so-call absolute dominion rule in some states, there is also a rule call “correlative rights” which allocates groundwater strictly in proportion to the amount of overlying land a groundwater user owns.\textsuperscript{220}

In general, these regimes exhibit the same sort of strengths and weaknesses as do the comparable surface water regimes. The weaknesses, in particular, are accentuated by several particular qualities of groundwater. First, knowledge remains expensive (and sometimes difficult) to obtain.\textsuperscript{221} Second, groundwater frequently is more vulnerable to long-term damage from overpumping or pollution than is surface water even from nearby sources, and often is more difficult to remediate when such damage occurs.\textsuperscript{222} Third, groundwater depletion can cause far ranging subsidence and compaction affecting even landowners who are not using groundwater.\textsuperscript{223} Finally, managing groundwater recharge is more frequently necessary than for surface water sources, leading to more intense pressure to impose constraints on the use of private lands for the benefit of aquifers as well as expensive and extensive programs of artificial recharge.\textsuperscript{224}

\begin{itemize}
\item \textsuperscript{218} See generally Joseph W. Dellapenna, “The Reasonable Use Rule,” 3 Waters and Water Rights ch. 22 (Robert E. Beck ed. 2003 replacement vol.).
\item \textsuperscript{219} See generally Joseph W. Dellapenna, “The Regulated Riparian Approach to Groundwater,” 3 Waters and Water Rights ch. 23 (Robert E. Beck ed. 2003 replacement vol.).
\item \textsuperscript{220} See generally Joseph W. Dellapenna, “Correlative Rights Today,” 3 Waters and Water Rights ch. 21 (Robert E. Beck ed. 2003 replacement vol.).
\item \textsuperscript{221} Id. § 18.03(b).
\item \textsuperscript{222} Id. § 18.03(b).
\item \textsuperscript{223} Id. at nn. 122-33.
\item \textsuperscript{224} Id. §§ 18.02, 18.05, 19.05(b)(3).
\end{itemize}