Adapting Riparian Rights to the Twenty-First Century

Joseph W. Dellapenna
Villanova University

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ADAPTING RIPARIAN RIGHTS TO THE TWENTY-FIRST CENTURY

Joseph W. Dellapenna*

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I. INTRODUCTION

Water is found nearly everywhere, but, because of its variability in quantity and quality, it is often in the wrong place, or available at the wrong time, or inadequate in amount, or too impure. Usable water is a scarce and valuable commodity. Despite the limitations in the amount of usable water on the planet, there has been a nine-fold increase in per capita consumption of water

* Professor of Law, Villanova University; B.B.A., University of Michigan (1965); J.D., Detroit College of Law (1968); LL.M. in Public International & Comparative Law, George Washington University (1969); LL.M. (Environmental Law), Columbia University (1974); Director, the Model Water Code Project, American Society of Civil Engineers.

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1. Finite;
2. Measurable;
3. Regional; and
4. Permanently fixed; although
5. Fluctuating up or down through time.
Furthermore, the planet is undergoing significant and even alarming climate change. After nearly a millennium of a slow but steady cooling trend, the twentieth century saw a dramatic upsurge in average global temperatures that steadily accelerated as the century wore on. These changes — whether the result of human agency or otherwise — severely impact on precipitation patterns around the world. Our responses must be carefully planned in order to be


sustainable rather than ultimately self-destructive as were many of the adaptations at the end of the Ice Age.\textsuperscript{7}

Adaptations to global climate change will necessarily center on the management of water resources. Fresh water is, after all, one of the most essential resources for human survival, let alone for human thriving. Deprive us of air, and we die in minutes. Deprive us of water, and we die in days. Deprive us of food, and we can survive for weeks or months, depending on the amount of body fat we have stored and the general state of our health — as any number of people in concentration camps or on a hunger strike have proven. One can go on to less immediately important resources needed for human survival and thriving. In this regard, I am fond of quoting a Turkish businessman who commented, with only a little exaggeration, “Countless millions of people have lived without love, but none without water.”\textsuperscript{8}

Just how global climate change will impact on human societies might not be known precisely for a century or more. The impact of climate change on water resources — as on temperature and other relevant variables — will not be globally uniform. Thus, projecting the actual impact of climate change on the water available for human use, even in large river basins, remains highly uncertain. For example, Gene Stakhiv of the U.S. Army Corps of Engineers found that all but one of six projections of the impact of climate change on the flow of the Nile at Aswan predicted significant increases over the next century.\textsuperscript{9} Forecasted increases range from six percent to 137 percent, with one projection predicting a decline of fifteen percent. Stakhiv found similarly divergent projections for many rivers in the United States. With such uncertainty one cannot recommend a precise legal response to projected climate change even on the level of a river basin, let alone for the entire planet. Nonetheless, certain generalizations are possible.

Existing legal regimes are already struggling to respond to increasing and changing demands for water without unduly destabilizing existing expecta-


\textsuperscript{9} E.Z. Stakhiv, Policy Implications of Climate Change Impacts on Water Resources Management, 1 WATER POL’Y 159 (1998).
tions expressed in investments in water use facilities. Global climate change will add considerable stress onto existing legal regimes as water management systems struggle to adapt to the altered precipitation and flow patterns. In particular, the amount of water available will undergo dramatic and permanent changes, up or down. These changes might be so large that the resulting stresses might overcome the environmental and political concerns that have made it impossible to build new large dams or water conveyance systems in recent years in order to bring water to areas of increasing aridity from areas of increasing or continuing surplus. If importation remains impossible, water will remain a strictly regional resource with a vengeance.

To the extent that global climate change reduces the supply of water in particular basins, competition between new or enlarged uses with existing uses can only intensify, particularly if it proves impossible to import new water into the basin. If global climate change leads to an increase of water supplies in particular basins, it would at least temporarily ease stress on the water regime in that basin, although possibly creating a need for new legal responses to flooding or the like. The question then is whether existing legal regimes can be modified at the local, national, and international level to better accommodate change


13 DE VILLERS, supra note 1; IMPACT OF CLIMATE CHANGE, supra note 6; ROTHFELDER, supra note 1; Chang et al., supra note 6; Garner & Weis, supra note 10; Graff & Yardas, supra note 10; Ingram, supra note 10; Limaye et al., supra note 6; Lucero, supra note 10; MacDonnell & Rice, supra note 10; Miller et al., supra note 6; Morriss et al., supra note 10; Nichols et al., supra note 6; Stone et al., supra note 6; Tarlock & Van de Watering, supra note 10.

14 Changnon & Westcott, supra note 6; Mirza et al., supra note 6.
without so unsettling water users as to provoke extensive, and perhaps violent, resistance.\textsuperscript{15} Too much legal response can produce as much social turmoil as inadequate legal response certainly will. In light of such concerns and believing that existing engineering tools are fully adequate to manage the transition, Gene Stakhiv argues for "adaptive management" over what he terms an "anticipatory strategy."\textsuperscript{16} By this he means applying existing legal regimes with little or no change, counting on the flexibility already existing in such regimes to adapt gradually to the pressures induced by a combination of population growth, climate change, and technological innovation. This optimistic view overstates the existing flexibility in legal regimes applicable to water in most states. The first problem that needs to be confronted during the next several decades in states that have inadequately flexible legal regimes for water management is to reform those regimes to introduce an appropriate measure of flexibility into the regime.

In this Article, I explore the extent to which change is necessary to enable a system of traditional, more or less "pure," riparian rights as is found in West Virginia to adapt to the pressures of demand approaching or outstripping the available supply. In any state following traditional riparian rights, a new legal regime for water management will require changes in the way in which water is allocated to particular uses, the manner in which the state deals with water shortages or other water emergencies, and the ability of water users to transfer water to new uses, perhaps at new locations and with a different timing of the use. All of this must be accomplished with due respect for existing rights to use water without allowing those existing uses to stifle the necessary steps to respond to the changing circumstances confronting water users and managers within the state. In this Article, I describe nature of water as an economic and social good, the characteristics of traditional riparian rights, and the possible legal regimes that might be selected in its place. In doing so, I develop the crite-


ria whereby a choice should be made, recommend the optimal legal regime, and consider some of the legal problems that must be confronted in order to bring the existing legal regime into line with the recommended optimal regime.

II. WATER AS A PUBLIC GOOD

Water is not only one of our most essential resources, it also has long been considered to be the quintessential "public good."17 A growing number of economists, however, have argued that it is not a public good.18 This question therefore now requires careful consideration.

A. A Public Good, a Common Good, or a Private Good?

"Public goods," as distinguished from private goods, share two qualities: indivisibility and publicness.19 Because public goods are indivisible, one cannot divide them up or buy as much as one wants, and because the goods are public, one cannot keep others from accessing and enjoying the goods as long as anyone can access and enjoy them. In other words, a public good is one that all within the relevant public must enjoy more or less equally, or no one can enjoy the good at all.

Public goods generally are free goods because consumers cannot be excluded from enjoying the good.20 The only costs, if any, associated with a public good are the costs of capture, transportation, and delivery, where those are necessary, and not a cost for the good itself. How much can one charge others for viewing the blue sky over one's property? This creates an important problem: If you invest in developing or improving a public good, others who invest or pay nothing will enjoy the benefits of your investment.21 You cannot exclude them from enjoying the good.


18 See, e.g., TERRY L. ANDERSON & PAMELA SNYDER, WATER MARKETS: PRIMING THE INVISIBLE PUMP 113-14 (1997); Harbison, supra note 17, at 546-47.

19 ANDERSON & SNYDER, supra note 18, at 112-13; GLOBAL PUBLIC GOODS, supra note 17; STEPHEN J.K. WALTERS, ENTERPRISE, GOVERNMENT, AND THE PUBLIC (1993); Niva Elkin-Koren & Eli M. Salzberger, Law and Economics in Cyberspace, 19 INT'L REV. L. & ECON. 553, 559-61 (1999); Harbison, supra note 17, at 547.


21 See, e.g., Mehmet Bac, Incomplete Information and Incentives to Free Ride on International
Economists use a lighthouse as the classic example of a public good. A lighthouse warns all ships that come within sight regardless of whether the ship pays or not. One cannot solve the problem by sending a boat out to collect from the ship shortly before the lighthouse comes in sight, for the appearance of the boat would be just as effective a warning as the lighthouse — and the ship could simply change course without paying. Such “free riders” seriously inhibit investment, unless the government (or some other institution) is able to assure that all (or nearly all) pay for the benefits they receive. The market simply won’t work; regulation will.

As economist Ronald Coase demonstrated in *The Problem of Social Cost*, a private-property market system is a most efficient mechanism for allocating resources to particular uses when it works, but the system fails if there are significant barriers to the functioning of a market. Water is not indivisible and

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public in the strictest sense, leading to occasional arguments that water is not a public good. Yet even economists who make such arguments continue to use water metaphors when discussing what they concede are public goods: "common pool resource," "spill over effects," and so on.

Water, in some settings, can be a private good. We have all bought bottled water. This does not dispose of the question of whether bulk water — water in its natural condition — should be treated as a public good. Few things in this world are strictly indivisible and public. What a culture treats as a public good is determined not just by its physical characteristics, but also by its social and economic characteristics. When the costs to exclude others would be so high that it is impractical to exclude others from access to the good, or when there are


See authorities cited supra note 18.
other (perhaps cultural) reasons why a society will not exclude some of its members from access to the good, the good is treated as if it were a public good.

The social or economic characteristic that usually leads to treating something as a "public good" is that transaction costs are so high that no market can function with even minimal effectiveness. Ronald Coase has argued that analyses that ignore transaction costs are typical of the "blackboard economics" that he has concluded is the bane of most academic economists. The most important and consistent simplifying assumption that economists make is to assume a "frictionless market" — a market without transaction costs. Lawyers, on the other hand, focus precisely on the costs and frictions of the marketplace for their role is to minimize, accommodate, or overcome such problems. Lawyers are not concerned about how ideal markets would function — except as a baseline for measuring the failure of real markets.

Another reason for treating something as a public good is because social values require that all receive a "fair" share of the resource, or at least that one's access to the good not be subject to the strictures of the marketplace. When a good is considered essential for the minimum well being of members of society, governments undertake to provide the good to all without direct charge. This is especially true when transaction costs make markets impossible. Such goods could be termed socially created public goods. Examples of socially created public goods include fire protection or public education.


28 R. COASE, THE FIRM, THE MARKET, AND THE LAW 1-20 (1988). Coase also indicated that he considered the major point of his famous article was to persuade economists to begin to take transaction costs seriously, not to assure them that markets without transaction costs were worth studying. Id. at 13-15, 174. Another comment perhaps best sums up his attitude towards his fellow economists: "In my youth, it was said that what was too silly to be said may be sung. In modern economics it may be put into mathematics." Id. at 185. No wonder Coase has concluded, "My point of view has not in general commanded assent, nor has my argument, for the most part, been understood." Id. at 1.

29 Schwab, supra note 25, at 1188-98.


31 See generally CHANGING URBAN EDUCATION (Clarence N. Stone ed., 1998); CHOICE AND
Water is just such a commodity. This is most obvious for the protection of instream flows. Less obvious, but no less true, is the public nature of water when withdrawn for private use. While it is easy enough for someone to own and manage water unilaterally in small amounts (for example, bottled water), a river is an ambient resource that can never be fully controlled or owned. Doing something to water on a large scale necessarily affects many others, making it difficult to procure the contractual assent of all significantly affected persons. As we shall see, transaction costs on all but the smallest waterbodies quickly become prohibitive. This reality underlies the treating of water as a free good — a good available to all at no cost for the water itself, but only for the cost of capturing, transporting, and using the water. Those who insist that private markets should be the prime means for protecting instream values miss the point entirely.

Some economists complicate this picture by talking about “common goods” as distinct from “public goods.” These economists tell us that common


See infra text at notes 135-79.


See, e.g., COMMON PROPERTY RESOURCES: ECOSYSTEM AND COMMUNITY-BASED SUSTAINABLE DEVELOPMENT (Fikret Berkes ed., 1989); ELINOR OSTROM, GOVERNING THE COMMONS: THE
goods differ from public goods in that, while the goods are shared among a group of common owners, the goods can be exhausted and not everyone in the universe has equal access to the goods. In other words, public goods are “non-rivalrous,” but common goods are “rivalrous.” Because of these features, the consumption of common goods by one person reduces one or more other person’s ability to consume the same good. In other words, “common goods” exhibit some measure of subtractability and excludability — qualities that, they tell us, do not apply to true “public goods.”

Because of these qualities, the rate of consumption of a “common good” varies according to the number of users and the type of use. Nevertheless, it is possible for many consumers to benefit jointly from the resource as long as there are means for excluding others from using the resource.

If we take this third category of goods seriously, there are very few true public goods. Even a lighthouse, often presented as the paradigm of a true public good, is not used by everyone in the world, but only by those on ships coming within range of its light. Perhaps only the blue sky qualifies as a true public good. In fact, common goods are just public goods for which there is a limited group of “co-owners” and the level of demand has approached or exceeded the available supply. From a legal point of view, the most central managerial problem regarding public goods is precisely the most central managerial problem for common goods: How can one recover the cost of maintaining or enhancing the good when a significantly large group of people have access to, and the legal right to the use of, a good without direct charge for the use they make. This leads directly into the “tragedy of the commons.”

Advocates of markets for allocating and managing water are not entirely off base. They are demanding an end to the treatment of water as a free good. Water should not be a free good. Economic incentives including fees, taxes, and “water banks,” should be introduced for those who use water so they will more realistically evaluate the social consequences of their conduct. But resort to economic incentives should not obscure the fact that water remains the prime example of a public good for which prices cannot be set in a marketplace. The reality of transaction costs should give even the most free-market oriented economist pause to consider whether true markets could function effectively for water resources. Ultimately, true markets must remain marginal to the management of large quantities of water for numerous diverse users.

EVALUATION OF INSTITUTIONS FOR COLLECTIVE ACTION (1990).


37 See the text infra at notes 110-23.


39 See Howe et al., supra note 27.
B. Types of Property Rights or Types of Goods?

What determines whether institutional arrangements (property relations in this case) serve to achieve the optimum use of a resource is how society accords to particular individuals or to collectivities the power to determine how a resource is used. This depends not on the qualities of the goods themselves, but on the social relations created or confirmed by law regarding rights to use the good. Is the good subject to individual decisions by everyone with legal access to the goods (common property), or to individual decisions by persons with sole legal access to the goods (private property), or to collective decisions by all interested persons acting through a joint management mechanism (public property)?

The differing mix of climates and demand in varying parts of the United States led to three different approaches to property rights relating to water. To the east of Kansas City, despite occasional serious problems with water quality arising from human activities, water shortages historically were rare and short-lived. Riparian rights evolved in this setting. To the west of Kansas City,

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41 See generally Joseph W. Dellapenna, Dual Systems, in 1 WATERS AND WATER RIGHTS, supra note 40, ch. 8; Bernhard Grossfeld, Geography and Law, 82 MICH. L. REV. 1510 (1984). An ambitious study of the evolution of the common law of water from 1066 to the present posited that there are two forms of property in water, one based on the ownership of land (riparian rights), and the other on the protection of uses (appropriative rights). See Anthony Scott & Georgina Costalin, The Evolution of Water Rights, 35 NAT. RESOURCES J. 821 (1995). Their analysis overlooks the possibility of public management of water. Neither my analysis nor theirs counts the dual systems of riparian-appropriative rights found in ten western states. These systems are best understood in this context as variant forms of whichever system of water rights is conceptually dominant in the particular state. See generally Dellapenna, supra.

42 See infra text at notes 65-123. See generally Dellapenna, supra note 40, § 6.01(b)(1); Joseph W. Dellapenna, The Right to Consume Water Under “Pure” Riparian Rights, in 1 WATERS
people considered water scarce, or at least misplaced.\textsuperscript{43} Therefore, the right to use water in the West was treated as a species of private property under the law of appropriative rights.\textsuperscript{44} These legal regimes seemed to be firmly established and well adapted to local needs. Yet today, it is clear that these regimes — particularly riparian rights — are not well adapted to needs of the coming century.\textsuperscript{45} As a result, about half of the states that formerly followed riparian rights have now adopted a new system known as regulated riparianism.\textsuperscript{46}

The California Supreme Court, in the well-known case of Keys v. Romley,\textsuperscript{47} gave us an insightful analysis of different types of property relating not to the use of water, but to the drainage of diffused surface water. This analysis helps clarify the foregoing three types of right to use water. The defendant in Keys built an ice rink and paved the surrounding land as a parking lot. These and related changes produced an increased volume and velocity of runoff, resulting in considerable erosion of the plaintiff’s downhill property.\textsuperscript{48} Justice Stanley Mosk, writing for a unanimous court, quickly reviewed and dismissed the “common enemy rule” of surface drainage,\textsuperscript{49} focusing instead on choosing between the “natural servitude” rule\textsuperscript{50} and the “reasonable use” rule.\textsuperscript{51} Mosk described the natural servitude rule as a rule of property, and the reasonable use rule as a rule of tort, apparently in order to reconcile the two irreconcilable doctrines.\textsuperscript{52} He declined to choose unequivocally between the two rules, reaffirm-

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AND WATER RIGHTS, supra note 40, ch. 7 [hereinafter Dellapenna, “Pure” Riparian Rights].
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\textsuperscript{43} For the classic statement of this notion, see United States v. Gerlach Livestock Co., 339 U.S. 725 (1950).

\textsuperscript{44} See infra text at notes 124-209. See generally 2 WATERS AND WATER RIGHTS chs. 11-17 (Robert E. Beck ed., 1991 ed., repl. vol. 2001) (chapters written by various authors).


\textsuperscript{46} See infra text at notes 210-92. See generally Joseph W. Dellapenna, Regulated Riparianism, in 1 WATERS AND WATER RIGHTS, supra note 40, ch. 9.


\textsuperscript{48} Keys, 412 P.2d at 530-31.

\textsuperscript{49} Sometimes called the “common-law rule.” Id. at 531-32.

\textsuperscript{50} Also known as the “natural flow” rule or the “civil law” rule. Id. at 532-33.

\textsuperscript{51} Id. at 533-34.

\textsuperscript{52} Id. at 535-36; see also Locklin v. City of Lafayette, 867 P.2d 724, 741 (Cal. 1994); Horsieberger v. Mohlmaster, 657 N.E.2d 534, 537 (Ohio Ct. App. 1995) (“Under the reasonable use rule, unless the defendant’s conduct is unlawful or subject to strict liability, the defendant’s liability for interference with surface water flow is controlled by principles of common law negligence.”).
ing the natural servitude rule while recognizing a duty similar to the law of nuisance requiring that landowners not interfere unreasonably with the property of others.53

Justice Mosk’s observations about property and tort perhaps were more insightful than he recognized.54 Mosk apparently had in mind the sort of property concept that we usually associate with the fee simple absolute. A system that attempts to define rights or duties towards water in clear and certain terms, with the law protecting these entitlements from change except through market transactions, would indeed be a private property system of water management.55 The closest we come to such an arrangement in American water law is the system of appropriative rights.56

A rule that allows anyone with lawful access to use a common pool resource as long as the use is reasonable is, as Justice Mosk acknowledged, hardly a rule of property at all, at least not in the ordinary sense.57 Such a rule leaves courts to sort out conflicting claims of right to the common resource solely by evaluating the relative reasonableness of the use, a rule that is much more like a tort rule than a property rule.58 It actually is a rule of common property rather than a rule of private property, similar to tenants in common using or disputing the use of their jointly held land.59 The law of riparian rights as it has evolved in the last century is a prime example of such a legal regime in the United States.60


56 See infra text at notes 123-209.

57 Keys, 412 P.2d at 535-36; see also State v. Superior Ct., 93 Cal. Rptr. 2d 276 (Ct. App. 2000) (holding that the state’s “ownership” of unappropriated groundwater is ownership in a regulatory sense, not in a proprietary sense).


59 Another close analogy arises in the law of the open range in some western states, particularly when the law of adverse possession is held not to apply to common range. See, e.g., England v. Ally Ong Hing, 459 P.2d 498 (Ariz. 1969); McDonnell v. Weinacht, 465 S.W.2d 136 (Tex. 1971).

60 See infra text at notes 65-123; see also Dellapenna, “Pure” Riparian Rights, supra note 42, §§ 7.02(d)-7.03(e); Terry Frazier, Protecting Ecological Integrity Within the Balancing Function of Property Law, 28 EVNTL. L. 53 (1998); H. Marlow Green, Note, Common Law, Property Rights
Justice Mosk did not consider the possibility of active public management of surface drainage. While that possibility was not in issue in Keys, it is common in urban areas, including in California. When surface drainage is a public responsibility, private parties are required to "hook into" the public system and to conform to the public system's decisions. The newest system of American law applied to the allocation of surface water, which is termed "regulated riparianism," corresponds to a public ownership model.

The correspondence between modern forms of American water law and the several types of property is more than a simple curiosity. In light of the work done in recent decades on the theory of property, the correspondence of forms of water law to theoretical models enables us to predict with some certainty whether existing forms are adaptable to changing circumstances, or whether an entirely new form must be substituted when water demand or supply changes dramatically. It seems increasingly clear that riparian rights (the law now applied in West Virginia) — a common property system — cannot survive. A careful examination of our experience with markets for water, however, shows that a private property system for water, such as appropriative rights, also cannot solve the problems of a humid, eastern state. By a process of elimination, regulated riparianism appears to be the optimal model for the future law of water allocation.

III. RIPARIAN RIGHTS

West Virginia has long adhered to the doctrine of riparian rights for the allocation of water to particular uses. This doctrine has been recognized in a number of West Virginia statutes. And West Virginia courts, like courts in

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62 See infra text at notes 209-92. See generally Dellapenna, supra note 46.

63 See Abrams, Charting, supra note 10.

64 See the text infra at notes 65-72.


67 W. VA. CODE §§ 5D-1-5, 8-12-5(33), 17-2A-17, 17-17-17, 20-2-48, 22-11-24(d), 22-11-27,
nearly all states still adhering to traditional riparian rights, have long applied the reasonable use version of riparian rights. West Virginia, like all states applying traditional riparian rights, does not rely solely on "pure" riparian rights. It has in place any number of regulations directed at particular uses of the waters of the state or of lands the use of which will affect the waters of the state. Still, it remains true that in West Virginia disputes limited to the allocation of water among users is determined by the reasonable use rule and not any other body of law within the state. West Virginia courts have applied the more restrictive natural flow rule only in cases involving flooding or pollution. Given the changing patterns of demand for water in the state — including the possibility of demands for water by persons located in neighboring states, this body of law cannot stand for long.

A. The Reasonable Use Rule

Riparian rights are based on the premise that the right to use water is a natural attribute of land, dependent on the natural availability of water to the land. Indeed, the very word "riparian" derives from the Latin word "ripa" meaning a riverbank. Land abutting or underlying a watercourse is termed "riparian land." Under the reasonable use version of riparian rights, each

22-12-13(b), 31-3-9, 31-15-6(w), 54-1-10, 54-2-3, 61-3-47 (2003).


68 Dellapenna, "Pure" Riparian Rights, supra note 42, § 7.02(c), (d).
69 Roberts v. Martin, 77 S.E. 535 (W. Va. 1913); see also Morris Assocs., Inc. v. Priddy, 383 S.E.2d 770, 774 (W. Va. 1989) (dictum).
70 Dellapenna, supra note 46, §§ 9.01-9.02(d).
74 See Tyler v. Wilkinson, 24 F. Cas. 472, 474 (C.C.D.R.I. 1827) (No. 14,312) ("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. See also Hendricks v. Johnson, 6 Port. 472 (Ala. 1838); Buddington v. Bradley, 10 Conn. 213 (1834); Blanchard v. Baker, 8 Me. 253 (1832); Mayor of Balt. v. Appold, 42 Md. 442 (1875); Johnson v. Jordan, 43 Mass. (2 Met.) 234 (1841); Corning v. Troy Iron & Nail Factory, 40 N.Y. 191 (1869); JOHN GOULD, THE LAW OF WATERS § 148 (3d ed. 1900). For a modern expression of the view that riparian rights are a natural attribute of the land abutting a watercourse, see Niagara Mohawk Power Corp. v. Cutler, 492 N.Y.S.2d 137 (App. Div. 1985), aff'd mem., 492 N.E.2d 398 (N.Y. 1986).
76 For an analysis of what constitutes riparian land, see Dellapenna, "Pure" Riparian Rights, supra note 42, § 7.02.
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 reasonable use rule thus is a common property system, under which all who own land contiguous to a surface water body are co-owners of the right to use the water. As co-owners, they are left pretty much to their own individual judgment to decide whether, when, and how to use the resource. A court will intervene in these decisions only when a use by one co-owner interferes directly with a use by another co-owner. The well-known case of Harris v. Brooks illustrates the application of the reasonable use rule.

Harris involved a dispute in Arkansas between a commercial boat rental service operated on land leased on the shore of a small lake and a rice farmer who drew water for his fields from the same lake. The suit arose when a severe drought made it impossible to satisfy the needs of both water users. The court applied the reasonable use theory, stressing that the goal was to assure the equal rights of each riparian “as near as may be.” The reasonable use theory assures each riparian an equal claim to share in the water, with a court allocating water in a way that maximizes the social benefit of the use of the water while minimizing the harm to the others. This is not simply a question of stopping one water user from interfering with or harming another water user for, as economist Ronald Coase pointed out about six years later, in a case like this each use necessarily interferes with the other, and whichever prevails necessarily destroys the other. The court in Harris adopted the rule of the first Restatement of Torts:

Both points trace back to Justice Story’s opinion in Tyler v. Wilkinson, 24 F. 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 elements also appear in the even older case of Merritt v. Parker, 1 N.J.L. 526, 530-33 (1795).

See Della Penna, “Pure” Riparian Rights, supra note 42, §§ 7.02(b)(1), 7.03

Id. § 7.02-7.02(b).

Id. § 7.02(d)-7.02(d)(3).

Id. § 7.03-7.03(e).

283 S.W.2d 129 (Ark. 1955); see Della Penna, supra note 45, at 18-41.

Harris, 283 S.W.2d at 130-31.

Id. at 133.

See generally Restatement (Second) of Torts § 850 cmt. d. (1979).

Coase, supra note 23, at 3-15 (particularly at 12-13). William 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
The determination in a particular case of the unreasonableness of a particular use . . . should not be an unreasoned, intuitive conclusion on the part of the court or jury. It is . . . an evaluating of the conflicting interests of each . . . contestant[] before the court in accordance with the standards of society, and a weighing of those, one against the other . . . . [I]t is only when one riparian[‘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 [that] produces it outweighs the legal seriousness or gravity of the harm.  

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

While courts do not simply protect normal or natural flows (or levels) of water under the reasonable use rule, neither do they necessarily protect the use that began first. Frank Trelease, the Associate Reporter of the Restatement (Second) of Torts, argued that the court in Harris was protecting the use that 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 farm and a boat livery, there is little, if any, of the intuitive sense of which use is in the right that is so appealing in the fox/chicken example, and if one philosophically favors the “natural outcome,” does this make one unsympathetic to the fox? See generally Dellapenna, supra note 40, § 6.01(b)(1), at 6-71 to -73 nn.341-46.

87 Harris, 283 S.W.2d at 135 (quoting RESTATEMENT (SECOND) OF TORTS § 852 cmt. c).
88 See generally Dellapenna, “Pure” Riparian Rights, supra note 42, § 7.02(d)(2).
89 Harris, 283 S.W.2d at 135-36. 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. See Nilsson v. Latimer, 664 S.W.2d 447 (Ark. 1984).
90 Lon L. Fuller, Adjudication and the Rule of Law, 54 AM. SOC’Y INT’L L. PROC. 1 (1960); cf. Lawrence M. Friedman, Legal Rules and the Process of Social Change, 19 STAN. L. REV. 786 (1967) (arguing that the capacity of courts is a function of the political climate confronting a court rather than the nature of the problem before the court).
began first.91 That was true only for the particular year in question; however, the defendant had been irrigating rice for more than twenty years while the year of the suit was the first year the boat livery was in operation.92 Temporal priority has seldom, if ever, been relevant to the resolution of riparian rights cases.93

If one supposes that the key to cases like *Harris v. Brooks* is the economic value of the competing activities, the court will have to reopen the suit whenever product values change significantly. Thus, if the market values of the two products change, or if the rice farmer were to acquire more land and therefore was able to produce more rice by pumping even more water, the court would have to reevaluate the reasonableness of the competing uses. The Arkansas Supreme Court adopted a specific lake level as the point where the rice farmer’s pumping must cease precisely in order to avoid the possibility of the frequent relitigation of reasonableness.94 Yet, it is impossible to believe that the court would refuse to reconsider the question if a truly significant change in the relevant facts occurred.95

A few 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.96 That is not true, as the *Harris* decision demonstrates: The court ordered the rice farmer 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.97 Because the right to use water results from the riparian nature of

91 *RESTATEMENT (SECOND) OF TORTS* § 850A app., at 32 (1979) (assoc. reporter’s note f).

92 *Harris*, 283 S.W.2d at 130-31.

93 Dellapenna, “*Pure*” Riparian Rights, *supra* note 42, § 7.03(d). Dean Trelease was uncomfortable with his temporal analysis. In the illustration that he based on *Harris v. Brooks*, he suggested that the court ought to have conditioned the injunction on the plaintiffs reimbursing Brooks for half the value of his lost rice crop. *RESTATEMENT (SECOND) OF TORTS* § 850A illus. 9. He did not explain why the plaintiffs should pay only half of the defendant’s losses.

94 *Harris*, 283 S.W.2d 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 41, § 8.03(b)(2).

95 Forty-five years later, the Arkansas Supreme Court avoided ruling on the need to maintain the “normal level” of Horseshoe Lake. *See* Taylor v. Zanone Props., 30 S.W.3d 74 (Ark. 2000). This might not have been the same lake as in *Harris*.


97 These principles figure prominently in the *Restatement* even if they do not figure prominently in the cases. *See* *RESTATEMENT (SECOND) OF TORTS* § 850A. *See generally* Dellapenna, “*Pure*” Riparian Rights, *supra* note 42, § 7.02(d)(3).
the land, any use on non-riparian land is per se unreasonable. As in Harris, who began using the water first was simply not relevant.

B. The Problems with Riparian Rights in the Face of Changing Patterns of Demand and Supply

Riparian rights exhibit serious problems. These include the vagueness and unpredictability of the criteria of decision in any conflict over water, the lack of a process for managing water during extreme shortages or for protecting public values, a systematic bias in favor of large users, and the impracticality of developing markets under a legal regime that suffers from such shortcomings. Space allows only a brief mention of each of these problems.

First, consider the vagueness and unpredictability of the criteria of decision. 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. Just as seriously, courts only give a decision, even as between the litigants themselves, good for the day on which it is given. If either competing use changes in physical or economic terms, the calculus of reasonableness will change, and what was hitherto a reasonable use may suddenly become unreasonable. Instability of result is often considered the major problem in reasonable use theory, having been used to explain the attempted complete shift away from riparian rights in western states, and the shift to regulated riparianism in eastern states. This is a serious impediment to private investment in water development.

Another problem with riparian rights is that there is no process for managing water in times of extreme shortage or for otherwise protecting public val-

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98 See Dellapenna, "Pure" Riparian Rights, supra note 42, § 7.02(d)(1).
99 Id. § 7.03(d).
100 Id. §§ 7.02(d)(3)-7.03(e).
ues.\textsuperscript{103} The slow, laborious process of litigation between two individuals is not adapted to such purposes, yet there is no mechanism for determining and 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 consider unrepresented interests of riparians not involved in the suit or of the public generally.\textsuperscript{104}

Third, the lack of efficient, system-wide management creates a systematic bias in favor of large users.\textsuperscript{105} 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 strongly favors large users over smaller users because the economic value of the water to the large user usually will outweigh the economic loss of the small user. While smaller users can effectively aggregate their claims by receiving their water through a public system, the effectiveness of this approach is limited by legal doctrines limiting the riparianess of public systems.\textsuperscript{106} Moreover, aggregation requires submission to yet a different sort of large-scale enterprise.

Finally, persons seeking to acquire the right to use water might want to “buy” riparian rights without buying riparian land, attempting to create a “non-appurtenant” riparian right.\textsuperscript{107} Such a conveyance binds the seller not to contest any subsequent use by the buyer so long as it is within the terms of the sale. Beyond that, the effect of the sale is unclear. Some courts have concluded that the buyer obtains no rights whatsoever against riparians other than the seller and the 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.\textsuperscript{108} A few courts have held that a buyer of a non-appurtenant riparian right acquires a right to make a reasonable use along with the riparian landowners.\textsuperscript{109} But is

\begin{itemize}
\item \textsuperscript{103} See Dellapenna, “Pure” Riparian Rights, supra note 42, § 7.05(a).
\item \textsuperscript{104} See Butler, supra note 4, at 451-54; Ezra M. Holczer, Boomer Revisited: Using Experimental and Partial Injunctions in Private Nuisance Actions, 64 DEF. COUNS. J. 99 (1997); George D. Marlow, From Black Robes to White Lab Coats: The Ethical Implications of a Judge’s Sua Sponte, Ex Parte Acquisition of Social and Other Scientific Evidence During the Decision-Making Process, 72 ST. JOHN’S L. REV. 291 (1998).
\item \textsuperscript{105} Dellapenna, “Pure” Riparian Rights, supra note 42, § 7.02(d)(3).
\item \textsuperscript{106} See Stein v. Burden, 24 Ala. 130 (1854); Wallace v. City of Winfield, 149 P. 693 (Kan. 1915); City of Emporia v. Soden, 25 Kan. 588 (1881); Fagen v. Mayor of Wharton, 113 A. 920 (N.J. 1920); Sparks Mfg. Co. v. Town of Newton, 41 A. 385 (N.J. 1898); Smith v. City of Brooklyn, 54 N.E. 787 (N.Y. 1899); 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 42, § 7.05(c).
\item \textsuperscript{107} See Dellapenna, “Pure” Riparian Rights, supra note 42, § 7.04(a)(3).
\item \textsuperscript{109} Mianus Realty Co. v. Greenway, 193 A.2d 713 (Conn. 1963); Belvedere Dev. Corp. v. Dep’t of Transp., 476 So. 2d 649 (Fla. 1985); Pyle v. Gilbert, 265 S.E.2d 584 (Ga. 1980); Mid-America Terminal of Ky., Inc. v. Owensboro River Sand & Gravel Co., 532 S.W.2d 437 (Ky. 1975).
\end{itemize}
the right of use conveyed in these few cases 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)? The answer remains unclear. Given these uncertainties, a buyer of a non-appurtenant riparian right has obtained little more than a hunting license that might or might not yield water, and non-appurtenant sales remain almost non-existent under riparian rights.

C. Why Common Property Systems like Riparian Rights Cannot Survive

The problems with riparian rights are not simply accidents of how courts worked out the specifics of the legal doctrine. Rather, they inhere in the fact that riparian rights are a form of common property. All persons owning riparian land are co-owners of the right to use water. Each co-owner has equal rights with every other co-owner, and thus none can dictate usage to the others. Each is free to decide on his or her or its own when, where, and how to use the water. The result of such a common property system is clear — riparian rights cannot survive.

Biologist Garrett Hardin explained why about thirty-five years ago in his famous article, The Tragedy of the Commons. According to Hardin, a common property system can function only when the common pool resource is consistently available in much greater supply than the demand for the resource. Because each common owner can decide for herself whether to increase the use of the resource regardless of the effect on other common owners (except for direct interference with the uses of the others), each owner appropriates for herself the whole of each additional increment of use, but the whole group shares equally the cost imposed on the common resource. Hardin used cows grazing on a common pasture as his example. For each additional cow I add to the herd, I obtain the full benefit of the added cow, while the common owners as a group share the burden of the reduced carrying capacity of the pasture.

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10 Dellapenna, "Pure" Riparian Rights, supra note 42, § 7.02-7.02(b).


Economists and others have criticized Hardin for over simplifying the reality of how "commons" have functioned in earlier times or in remote areas. Hardin's critics have demonstrated that commons have functioned successfully over extended periods even when use was close to the carrying capacity of the resource through informal limits imposed by small communities sharing a commons. These examples are irrelevant for describing how a "commons" works in a larger society where most persons are strangers to each other, informal sanctions are not effective, and formal law recognizes no real limits on any one person's exploitation of the commons. When common owners are strangers to each other and each user receives the full incremental value of the changes she induces while bearing only a small fraction of the costs, the only rational course for each common owner is to increase her uses until the resource is exhausted.

This is more than merely a theoretical model. Common pool resources have been destroyed over and over again in the past century when the rule of common property was not displaced by a different rule. We have witnessed

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115 For attempts to describe optimal conditions under which a commons might function successfully in more developed economic settings, see Richard Cornes et al., The Commons and the Optimum Number of Firms, 100 Q.J. ECON. 641 (1986); Steven Hackett et al., The Role of Communications in Resolving Commons Dilemmas: Experimental Evidence with Heterogeneous Appropiatriors, 27 J. ENVTL. ECON. & MGT. 99 (1994); Ethan Ligon & Urvashi Narain, Government Management of Village Commons: Comparing Two Forest Policies, 37 J. ENVTL. ECON. & MGMT. 272 (1999); Charles Mason et al., Expectations, the Commons, and Optimal Group Size, 15 J. ENVTL. ECON. & MGT. 99 (1988); Charles Mason & Owen Phillips, Mitigating the Tragedy of the Commons Through Cooperation: An Experimental Evaluation, 34 J. ENVTL. ECON. & MGMT. 148 (1997); Carol M. Rose, Given-Ness and Gift: Property and the Quest for Environmental Ethics, 24 ENVTL. L. 1 (1994).

116 See generally MANAGING THE COMMONS (John A. Baden & Douglas S. Noonan eds., 2d ed. 1998); Keith Aoki, Neocolonialism, Anticommons Property, and Biopiracy in the (Not-so-Brave) New World Order of International Intellectual Property Protection, 6 IND. J. GLOBAL LEGAL
the tragedy of the commons, precisely as Hardin predicted, regarding (to name just a few examples) fish in the sea,\textsuperscript{117} national park access,\textsuperscript{118} and even (at times) national treasuries.\textsuperscript{119} I observed just such a tragedy on a visit to Nova Scotia in 1995.

When I was planning a vacation in Nova Scotia, I looked forward to having memorable lobster dinners there. One could always get, at least as compared to other parts of the United States, a fairly large lobster for a rather small price when visiting nearby Maine. Yet, when I went to a restaurant on the first night in Nova Scotia, they didn’t even have lobster on the menu. I asked the waitress, and she suggested I try another restaurant twenty or so miles down the road. The next night we went there. The second restaurant did indeed have lobster on the menu — a rather puny one-and-a-quarter-pound lobster, and not cheap either. I ordered it, only to be given two tiny lobsters that together weighed perhaps one-and-a-quarter pounds. I asked the waitress, “Where are the larger lobsters?” She answered, “We ate them all.” That seemed a bit too glib of an answer, so I undertook to visit lobster boats and warehouses that deal in lobsters. The correct answer is that they sold them all to consumers in the United States or elsewhere in Canada.

The problem was a classic tragedy of the commons. Each lobsterman determined for himself when, where, and how small to catch the lobsters until the whole industry was reduced to capturing lobsters too small to have repro-

\begin{itemize}
\item \textsc{Stud.} 11 (1998); \textsc{Erin A. Clancy, Note, The Tragedy of the Global Commons, 5 Ind. J. Global Legal Stud. 601 (1998).}
\item \textsc{Joseph L. Sax, Mountains Without Handrails} (1980).
\end{itemize}
duced. Suppose I were a Nova Scotia lobsterman who wanted to behave responsibly. I made a voluntary choice to release any lobster smaller than a certain size, a size that I settled on by estimating how big a lobster would have to be to have had a reasonable opportunity to reproduce before it was caught. As long as the lobster fishery is treated as common property in which each lobsterman engages in a free-for-all grab-fest for lobsters, I will have done little or nothing to benefit the lobsters by releasing lobsters smaller than my predetermined size. Someone else would simply catch the lobsters that I release (or, at least, most of them). Thus, I would have reduced my own income without having conferred much or any benefit on the lobsters. I bear the entire cost, while the benefit that results is shared by the less responsible lobstermen who capture the released lobsters. On the other hand, if I continue to grab every lobster I can, I maximize my income (I realize the benefit of my increased "use" of the resource), while the costs are spread over all the lobstermen. My only rational course would be to grab as many lobsters as I can.  

Hardin concluded that only a private property system, in which the costs as well as the benefits of resource management decisions are concentrated on a particular owner, could avoid the tragedy of the commons. He argued that appeals to moderation and similar forms of moral suasion could only be self-defeating; those who responded to the appeals would simply leave the field to the other common owners who would continue to increase their own exploitation of the resource to the point of exhaustion. Consider what would happen if, as a responsible lobsterman, I were to appeal, with a modicum of success, to other lobstermen to join me in voluntarily behaving responsibly towards the lobsters? Each would soon realize that by heeding the moral appeal they reduced their own gains with little or no benefit to the common resource. Even many who accept the message of the appeal would not change their behavior.

Hardin focused on the likelihood of over exploitation of a common pool resource. Our experience with riparian rights suggests another feature of common pool resources, a feature that might also be true for the Nova Scotia lobsters. If exploitation of a common pool resource requires significant capital investment, the inability of potential investors to keep others from preempting an investor’s uses will bring about under-investment in the resource.  

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120 Cf. R. Michael M’Gonigle, The “Economizing” of Ecology: Why Big, Rare Whales Still Die, 9 ECOLOGY L.Q. 119 (1980) (arguing that through application of standard economic theory, whales should be hunted to extinction so long as the anticipated rate of return from investing in the profits to be realized from killing the whales is higher than the reproduction rate of the whales).

121 Hardin, supra note 111; see also Bruce Yandle & Andrew P. Morriss, The Technologies of Property Rights: Choice Among Alternative Solutions to Tragedies of the Commons, 28 ECOLOGY L.Q. 123 (2001).

122 See, e.g., In re Waters of Long Valley Creek Stream Sys., 599 P.2d 656, 666-67 (Cal. 1979); Jerome W. Milliman, Water Law and Private Decision-Making: A Critique, 2 J.L. & ECON. 41, 47-51 (1959); Rose, supra note 102. For a serious challenge to this assumption, see Harrison C. Dunning, State Equitable Apportionment of Western Water Resources, 66 NEB. L.

https://researchrepository.wvu.edu/wvlr/vol106/iss3/5
fear caused the rejection of riparian rights in the drier, western states of the United States in favor of an attempt at a private property system that Hardin would argue was necessary for all commons more than a century later.\textsuperscript{123} Rather more puzzling is how, given the supposed superiority of private property over common property as a resource management system, the common property system we in the United States know as riparian rights came to be substituted for the earlier private property version of that system of law — the so-called "natural flow" theory of riparian rights.\textsuperscript{124} To resolve that question, one must consider strengths and weaknesses of appropriative rights — the closest water law comes to a private property system for water rights.

IV. APPROPRIATIVE RIGHTS

In the United States, the climate generally becomes drier as one goes from east to west, with truly arid regions between the Rocky Mountains and the coastal ranges, before reaching another, narrower humid region along the Pacific Coast, with predictable legal consequences for the law of water allocation.\textsuperscript{125} European settlers in the West needed water for mining, irrigation, and later industrial and municipal uses. These settlers concluded that their demands for water could not be satisfied under riparian rights, particularly in its natural flow version, but also in its reasonable use incarnation.\textsuperscript{126} Furthermore, from the earliest years of "Anglo" settlement, the newcomers generally displaced abo-


\textsuperscript{124} See generally Dellapenna, "Pure" Riparian Rights, supra note 42, §§ 7.01, 7.02.

\textsuperscript{125} See generally Dellapenna, supra note 41, § 8.01; Grossfeld, supra note 41. For a critique of the assumptions western courts made on these issues, see Freyfogle, supra note 54. See also DONALD J. WORSTER, RIVERS OF EMPIRE: WATER, ARIDITY, AND THE GROWTH OF THE AMERICAN WEST (1985); Gordon Morris Bakken, The Influence of the West on the Development of Law, 24 J. OF THE WEST 66 (1985); John B. Clayberg, The Genesis and Development of the Law of Waters in the Far West, 1 MICH. L. REV. 91 (1902); Robert G. Dunbar, The Adaptability of Water Law to the Aridity of the West, 24 J. OF THE WEST 57 (1985); Lucien Shaw, The Development of the Law of Waters in the West, 10 CAL. L. REV. 443 (1922). Complicating such concerns was the tendency of westerners to assume that eastern water law was a relatively static, unchanging system. See, e.g., Dunbar, supra, at 57; WALTER PRESCOTT WEBB, THE GREAT PLAINS 432 (1931); Gordon R. Miller, Shaping California Water Law, 1781-1828, 55 S. CAL. Q. 9, 23, 34 (1973); Donald J. Pisani, Enterprise and Equity: A Critique of Western Water Law in the Nineteenth Century, 18 W. Hist. Q. 15, 19 (1987); Harry N. Scheiber & Charles W. McCurdy, Eminent Domain Law and Western Agriculture, 1849-1900, 49 AGRIC. Hist. 113 (1975).
Aboriginal law might have proven better adapted to local conditions, but it was altogether ignored. Even in Hawaii, aboriginal law became at best vestigial. Instead, settlers in the West developed their own approach to water allocation — an approach that gave rise to the regime of appropriative rights.

Appropriative rights basically is a private property approach to water allocation in which water rights are defined as to quantity, time, place, and manner of use, and most importantly, according to their priority relative to other uses. Legislators in eastern states must examine appropriative rights not only in terms of how they operate in western states, but also for whether they could be adopted in a contemporary eastern setting. Careful analysis suggests that they could not be adopted successfully in an eastern state.


See Dellapenna, Related Systems, supra note 47, §§ 10.01-10.01(c); Elizabeth Ann Ho’oipo Kala‘ena‘aua Pa Martin et al., Cultures in Conflict in Hawai‘i: The Law and Politics of Native Hawaiian Water Rights, 18 U. HAW. L. REV. 71 (1996).


A. The Origins of Appropriate Rights

Appropriate rights did not arise from careful analysis of the legal needs of western states. The legal regime of appropriate rights arose simply because the early miners in California and elsewhere in the West were trespassers. The sudden peopling of California occurred without any organized government in place. The Yankee intruders swept away Spanish-Mexican law as well as any concern about aboriginal practices, relying on the only law with which they were familiar — the common law of the eastern United States. Yet regarding land and water, the two most important material factors in their lives, this law was useless.

The land itself was deemed to belong to the federal government (the "public domain"), while, under riparian rights, the right to use water was held by the owner of the land. Because the "forty-niners" were unwilling to wait for the establishment of a regular government and the completion of the comprehensive land surveys that would be necessary before the government could sell the land, the miners simply trespassed on the land and took what water they needed.

The miners quickly sought to bring order to their lives through vigilante law, creating a national mythology based on stories that were all too true: violent disputes, blood feuds, and sudden death.

Dellapenna, supra note 41, § 8.01.

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 127, at 64; Leonard Pitt, The Decline of the Californios: A Social History of the Spanish-Speaking Californians, 1846-1890, at 52 (1966); Doyce B. Nunis, Jr., Historical Introduction, in From Mexican Days to the Gold Rush, at xvii-xlvi (Doyce B. Nunis, Jr., ed. 1993); Andrew P. Morriss, Miners, Vigilantes & Cattlemen: Overcoming Free Rider Problems in the Private Provision of Law, 33 Land & Water L. Rev. 581, 594 (1998); Juan F. Perea, Demography and Distrust: An Essay on American Languages, Cultural Pluralism, and Official English, 77 Minn. L. Rev. 269, 318 (1992); Shaw, supra note 126, at 445-46.

While early statutes in several states, including California, preserved the Spanish-Mexican irrigation law, such rights were always 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 Dobkin, The Spanish Element in Texas Water Law 136-39 (1959); Howard Roberts Lamar, The Far Southwest, 1846-1912: A Territorial History 91 (1966); Pisani, supra note 127, at 38-44; see also Dellapenna, supra note 41, § 8.02(b), at nn.92-108, § 8.02(c), at nn.200-22.


See Moore v. Smaw, 17 Cal. 199, 200 (1861) (holding that minerals belong to the person who finds them, overruling Hicks v. Bell, 3 Cal. 219 (1853), which had held that minerals, even on private lands, belonged to the State).
Vigilante law was based upon the most elementary notion of justice — first in time, first in right.\textsuperscript{136} If someone were found occupying another person’s mining claim, the new occupant would hang if he could not justify his presence. When government was finally organized after 1850, the government could only ratify the customs of the miners.\textsuperscript{137} 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.\textsuperscript{138} 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 appropriation state.\textsuperscript{139}

Successive mineral rushes to other western territories brought the same miners who had begun their hunt for wealth in California — and, with them, the customs of the California mining camps. In some states, these customs blended with misunderstood principles of Spanish-Mexican law.\textsuperscript{140} When farmers settled part of a state before or simultaneously with miners, they tended to apply riparian rights. Eventually, nearly everywhere across the West, appropriative rights displaced riparian rights.\textsuperscript{141} In the Plains States and on the Pacific Coast, riparian rights remain vestigially, but usually with little actual impact on how water is managed in those states.\textsuperscript{142}

B. Evaluating Appropriative Rights

In significant respects, the appropriative rights doctrine did not and does not serve its communities well — not only failing to prevent wasteful and other


\textsuperscript{137} See 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.”).

\textsuperscript{138} See Irwin v. Phillips, 5 Cal. 140 (1855).

\textsuperscript{139} See generally C. Peter Goplerud III, The Permit Process and Colorado’s Exception, in 2 WATERS AND WATER RIGHTS, supra note 44, ch. 15.

\textsuperscript{140} DOBKEN, supra note 133; MICHAEL MEYER, WATER IN THE HISPANIC SOUTHWEST: A SOCIAL AND LEGAL HISTORY, 1550-1850 (1984); Reich, Mission Revival Jurisprudence, supra note 127; Reich, Hispanic Roots, supra note 127.

\textsuperscript{141} Dellantepenna, supra note 41, § 8.02.

\textsuperscript{142} Id. §§ 8.03-8.04(b).
bad practices, but actually encouraging such practices under particular circumstances.143 Appropriate rights also exhibit more uncertainty than the underlying principle — first in time, first in right — suggests. The earliest priority dates in almost every appropriate rights state predate the modern administrative machinery.144 Despite statutes and legal proceedings to facilitate putting these claims on record, it is still true on some watercourses that the most valuable rights to use water have never been precisely quantified.145 Prescriptive, abandoned, or forfeited rights also create gaps in the official record.146 The following analysis briefly describes the other shortcomings of the doctrine, shortcomings that became ever more pronounced as less and less water remains un-


144 The first statute creating a formal administrative system was enacted in 1890 in Wyoming; the most recently enacted was in Alaska in 1966. See generally Dellapenna, supra note 41, § 8.02(c); Goplerud, supra note 139. Anglo settlement, with claims of appropriative rights, began as early as 1849 in California, and at later dates in other states, always long before the creation of the administrative machinery.


appropriated and especially with the growing recognition of the importance of nonconsumptive uses of water.\textsuperscript{147}

The “first in time, first in right” principle fosters premature development because water users seek to capture unappropriated waters in order to enjoy their later rents.\textsuperscript{148} In order to capture rents, appropriators use as much water as they possibly can.\textsuperscript{149} Withdrawing water, a cost to society, to an appropriator is a private gain, creating a basis to claim water in the future. To capture water, one must invest real social capital to divert, store, and apply water. Capital is switched from socially productive uses to the capturing of sub-marginal resources. Excessive diversion capacity is the rule under appropriative rights,\textsuperscript{150} yet for most appropriations of water there are inadequate investment in the post-diversionary aspects of development, especially those designed to save water.\textsuperscript{151}

\textsuperscript{147} See generally Gaffney, supra note 101.


\textsuperscript{150} See Neuman, supra note 143; Shupe, supra note 143.

The introduction of conditional rights made it even easier to "capture" rents by establishing an intent to appropriate that might not result in an actual use for many years. Appropriators thus live in an environment where it is smart to over-irrigate or to waste water. Much of the water shortage of the arid west would disappear overnight if appropriators had to start paying a realistic price for water and the shortage would greatly abate if appropriators simply started thinking 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."

Under the rule of "first in time, first in right," appropriators are senior and junior to one another along a scale from the very first user to the most recent user. When water is short, a junior appropriator must drop out first and lose everything before the next senior appropriator loses anything. There is no pooling of risk whatsoever. Senior appropriators are protected by exaggerating the risk to junior appropriators. Two basic economizing principles are denied. One is marginal productivity. 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 ignored principle is the pooling of risk. Water rights derive from a larger common supply, but each watertight is defined in a way that introduces great changes in the aggregate variability of supply beyond the natural variability and that distributes these risks unequally.

When administered by irrigation districts, appropriative rights are applied to contained service areas. When claimed by individuals, or small dis-


153 Neuman, supra note 143. Authorities in some states have begun to take steps to eliminate wasteful uses, but this still occurs only rarely. See, e.g., Imperial Irrig. Dist. v. State Water Res. Control Bd., 275 Cal. Rptr. 250 (Ct. App. 1990). Even George Gould, in his spirited defense of the doctrine, conceded that enforcement was intermittent because of a "lack of political will." Gould, supra note 54, at 96.

154 For one of the most extreme examples of this, see State ex rel. Cary, 292 N.W. 239.

155 See generally ROBIN PAUL MALLOY, LAW AND ECONOMICS: A COMPARATIVE APPROACH TO THEORY AND PRACTICE 20-33 (1990); POSNER, supra note 27, § 1.1; Gaffney, supra note 101, at 140; Hovenkamp, supra note 25, at 783.
districts, service areas from any given stream 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 them. So, 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.156 They can, however, search about for other, more
remote sources. The results need not be imagined, they may be observed
throughout the arid states: canals ("ditches") crisscross the western states carry-
ing water in opposite directions as various appropriators exercise their rights.
Recent legal innovations designed to protect areas of origin have had limited
impact.157

The amount of water that courts will recognize as being used "benefi-
cially" is a function of, among other things, the amount of land that the user has.158 Appropriate rights thus tend to distribute public water to those who
already own private land, in proportion to the size of the landholding. Traditionally, no effort was made to protect the public interest in the waters of the
State or to distribute their fruits among the disadvantaged of society.159 Many
appropriative rights states have now enacted statutes requiring consideration of
the public interest in evaluating applications to make a new appropriation.160
These statutes, however, do not apply to existing water rights and thus have
little practical effect in the many water basins in which most or all available

156 See State ex rel Carey, 292 N.W. at 239.

158 This is made explicit in laws defining a "duty of water" — the amount of water that may be
used lawfully to irrigate acreages of particular crops. See, e.g., Farmers Highline Canal & Reser-
nvoir Co. v. City of Golden, 272 P.2d 629 (Colo. 1954); McDonald v. State, 722 P.2d 598 (Mont.
1986); Enterprise Irrig. Dist. v. Willis, 284 N.W. 326 (Neb. 1939); State Dep't of Ecology v.
1939).

159 Gaffney, supra note 101, at 138.
160 See, e.g., East Bay Mun. Util. Dist. v. Dep't of Pub. Works, 35 P.2d 1027 (Cal. 1934);
Collins Bros. Corp. v. Dunn, 759 P.2d 891 (Idaho 1988); Shokal v. Dunn, 707 P.2d 441 (Idaho
1985); Young & Norton v. Hinderlider, 110 P. 1045 (N.M. 1910). See generally Goplerud, supra
note 145, § 15.03(c)(3); Douglas L. Grant, Public Interest Review of Water Right Allocation and
water has already been appropriated.\(^{161}\) Whether in today's economy distributive equity favors protecting endangered species and providing water for other public values rather than for irrigation is at least an open question.\(^{162}\)

Cumulatively, these problems mean that appropriative rights are a rather peculiar form of private property. In particular, if one justifies privatizing property rights in order to avoid the tragedy of commons,\(^{163}\) one finds that rather than assuring efficient use of the resource, appropriative rights effectively freezes uses in place — unless the state intervenes directly and dramatically to transfer the water to other uses. To understand this, one must consider the reality of markets in this supposed private property system of property rights.

C. Markets Under Appropriate Rights

As a more or less private property system, one would expect appropriative rights to give rise to markets for water rights, yet there never has been a market for appropriative rights to any significant extent.\(^{164}\) Appropriate rights simply are not bought and sold freely, despite crying needs for water transfers in

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\(^{161}\) See, e.g., Collins Bros., 759 P.2d 891; Shokal, 707 P.2d 441. Two states seem to have defined the "public interest" as depending upon a cost-benefit analysis rather than a more wide-ranging investigation than a purely economic analysis. See Alaska Stat. § 46.15.080(b) (Lexis 2002); Wash. Rev. Code Ann. § 90.54.020(2) (West Supp. 2004); Stempel v. Dep't of Water Res., 508 P.2d 166 (Wash. 1973). See generally Johnson & DuMars, supra note 123.


\(^{163}\) See text supra notes 111-24.

every area.\textsuperscript{165} The reason is that the recognition and protection of third-party rights precludes true market transactions.\textsuperscript{166} Even the highly touted California


Water Bank turns out to have been administrative reallocation masquerading as a market.\textsuperscript{167}

\textit{City and County of Denver v. Fulton Irrigating Ditch Co.}\textsuperscript{168} shows what happens when a would-be buyer seeks water for a use fundamentally different from, or considerably removed from, that of the seller. The case arose from a proposed swap by the City of Denver with a brewery: Denver would take Coors' "clear mountain stream" to augment its municipal supplies; Coors would have the right to use unlimited quantities of Denver sewage water for its brewery.\textsuperscript{169} The transaction failed not because of possible outrage by beer drinkers, but because farmers downstream from Denver (organized as the Fulton Irrigating Ditch Co.) obtained an injunction against this trade because it would deprive them of the water on which they were relying.\textsuperscript{170} Denver and Coors were contracting about "imported water" — water from outside the watershed — over which the city had even greater rights than if it were merely claiming the rights of a senior appropriator.\textsuperscript{171} The farmers had recognized the seniority of Denver's rights over their own in a contract settling an earlier dispute in exchange for Denver's promise not to reuse any water that "shall have been once used through its municipal water system."\textsuperscript{172} The decision in the case would not have depended on the contract if the water had not been imported water.\textsuperscript{173}

Advocates of giving free play to markets for raw water have insisted that the protection of third-party rights signals an overly rigid legal regime.\textsuperscript{174}

\textsuperscript{167} See Dellapenna, supra note 65, at 358-65.


\textsuperscript{169} Fulton Irrigating Ditch Co., 506 P.2d at 151. This swap involves a sale by each party of its water rights to the other; it is immaterial for the points of this discussion which is considered the buyer and which the seller.

\textsuperscript{170} Id. at 151-53.

\textsuperscript{171} Id. at 146-49.

\textsuperscript{172} Id. at 151.


\textsuperscript{174} See, e.g., ANDERSON & SNYDER, supra note 18, at 17-29, 114-16; NAT'L RESEARCH
They suggest that if only such restraints were removed, private property rights would have their due and markets would flourish. This is not correct. Area-of-origin statutes, regulations prohibiting the export of water,175 interfere with pri-

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https://researchrepository.wvu.edu/wvlr/vol106/iss3/5
vate property and prevent market transactions; protections for third-party rights do not. Protections of third-party rights prevent market-generated externalities from destroying the property rights of third parties. Rather than representing government intervention that prevents or distorts markets, such protections are the minimum that is necessary to assure that property rights — each person's property rights — are transferred only through markets. Judge Richard Posner has fully described why such third-party rights must be protected if society is to assure that water is used efficiently even under a system that relies on markets as primary water management tools:

If the effects of return-flow were ignored, many water transfers would reduce overall value. Suppose A's water right is worth $100 to him and $125 to X, a municipality; but whereas A returns one half of the water he diverted to the stream, where it is used by B, X will return only one fourth of the water it obtains from A, and at a point far below B, where it will be appropriated by D. And suppose B would not sell his right to A's return flow for less than $50, while D would sell his right to the municipality's return flow for $10. To let A sell his water right to X because it is worth more to X than to A would be inefficient, for the total value of the water would be less in its new uses (X and D's) — $135 — than in its present uses (A and B's) — $150.

The law deals with this problem by requiring the parties to show that the transfer will not injure other users. In practice this means that A and X in our example, in order to complete their transaction, would have to compensate B for the loss of A's return flow; they would not do so; and the transaction would fall through, as under our assumptions it should. ¹⁷⁶

Where a transfer increases return flows, the arrangements necessary to protect each water right holder are even more complex. ¹⁷⁷ When one factors in the probability that much of the water sought to be transferred in the West was acquired through a Federal reclamation project, the complexities become greater

¹⁷⁶ POSNER, supra note 27, § 3.11, at 87-88; see also Jeffrey L. Jordan, Externalities, Water Prices, and Water Transfers, 35 J. AM. WATER RESOURCES ASS'N 1007 (1999).

¹⁷⁷ See POSNER, supra note 27, § 3.11, at 88.
still. Finally, there is the problem of structuring access to water supply facilities owned by yet another party not participating in the basic transaction.179

Because of such concerns, small-scale transfers of water rights among farmers or ranchers — all of whom are making similar uses at more or less the same place — are the only ones that regularly occurred under appropriative rights without state intervention.180 Small-scale, like-kind transactions are unlikely to affect third parties. The only large-scale transaction involving a significant change in the place or manner of use that can be achieved purely by market transactions would be when the transferor was the last beneficial user of the water.

Another issue besides economic efficiency must be considered — namely, distributive equity — although economists often are uncomfortable discussing it.181 In the nineteenth century, a time of limited and ineffective government, particularly in the United States, a transition from a private property system (which had the effect of freezing uses rather than of creating a market) to a common property system at least introduced a measure of flexibility into the possible uses and thereby promoted social and economic development.182


180 See supra the authorities collected at note 164.


182 MORTON HORWITZ, THE TRANSFORMATION OF AMERICAN LAW, 1780-1860, at 33-42 (1977); Abrams, Charting, supra note 4, at 1392-96; Scott & Costalin, supra note 41, at 871-98.
transition from private property to common property also, whether intended or not, worked a massive and continuing, if not haphazard, wealth redistribution.\textsuperscript{183} Generally, wealth is transferred from the poorest users of water (who hold the smallest water rights or no water rights at all, and in either case are unattractive to potential buyers) to the wealthier members of society — those who can afford to buy water rights but no longer need to worry about compensating the small water users who loose their expected return flows.\textsuperscript{184} Today, the transition to a common property system seems much less prudent as the demands for water outstrip supplies, creating a real risk of the tragedy of the commons for those parts of the United States that follow traditional riparian rights.\textsuperscript{185} Given also the probable regressive distributive effects on the allocation of water rights, one ought to be wary of any such transition in today's world.

\section{The Failure of Appropriative Rights in the East}

Despite the difficulties in the actual realization of private property rights in water under appropriative rights, the Pacific coast states, from Alaska to California, and the high plains states, from North Dakota to Texas, all eventually adopted appropriative rights to replace an earlier system of riparian rights.\textsuperscript{186} The change generally was brought about by legislation. The legislatures were unable to abolish riparian rights completely through either an inability or unwillingness to compensate the owners of riparian rights.\textsuperscript{187} Instead, the legislatures chose to preserve as valid riparian rights uses that existed on the effective date of the first appropriative rights statute.\textsuperscript{188} Even though most of transitions oc-

\begin{thebibliography}{99}
\bibitem{185}See supra the text at notes 111-24.
\bibitem{186}See Lux v. Haggin, 10 P. 674 (Cal. 1886). See generally Dellapenna, supra note 41, ch. 8.
\bibitem{187}See Dellapenna, supra note 41, § 8.03.
\end{thebibliography}
curred when existing water uses were relatively few in those states, the result was a dual system that combined the worst features of both bodies of law.\footnote{7 (1963); State ex rel. Emery v. Knapp, 207 P.2d 440 (Kan. 1949); Hickman v. Loup River Pub. Power Dist., 113 N.W.2d 617 (Neb. 1962); In re Application of Ainsworth Irrig. Dist., 102 N.W.2d 429 (Neb. 1960); Baeth v. Hoisveen, 157 N.W.2d 728 (N.D. 1968); City of Stillwater v. Okla. Water Res. Bd., 524 P.2d 938 (Okla. 1974); Okla. Water Res. Bd. v. Cent. Okla. Master Conserv'y Dist., 464 P.2d 748 (Okla. 1969), modifying on reh'g, 464 P.2d 748 (Okla. 1968); In re Hood River, 227 P. 1065 (Or. 1924), appeal dismissed sub nom. Pac. Power Co. v. Bayer, 273 U.S. 647 (1926); Norwood v. E. Or. Land Co., 227 P. 1111 (Or. 1924); In re Willow Creek, 144 P. 505 (Or. 1914), modified on reh'g, 146 P. 475 (Or. 1915); Belle Fourche Irrig. Dist. v. Smiley, 176 N.W.2d 233 (S.D. 1970); Knight v. Grimes, 127 N.W.2d 708 (S.D. 1964); In re Medina River, 670 S.W.2d 250 (Tex. 1984); In re Upper Guadalupe River, 642 S.W.2d 438 (Tex. 1982); In re Deadman Creek, 694 P.2d 1071 (Wash. 1985); Brown v. Chase, 217 P. 23 (Wash. 1923). But see Franco-Am. Charolaise, Ltd. v. Okla. Water Res. Bd., 855 P.2d 568 (Okla. 1990) (holding that the attempt to cut-off unused riparian rights is void as an attempt to take property without compensation).}

Mississippi became the only state east of Kansas City to adopt a dual system in 1956.\footnote{Dellapenna, supra note 41, §§ 8.03, 8.04.} Mississippi's experience suggests why it would be futile to import appropriative rights into the hydrologically more developed regions east of Kansas City.\footnote{MISS. CODE ANN. §§ 51-3-3(g)(3) to -7 (2003). See generally William M. Champion, Prior Appropriation in Mississippi — A Statutory Analysis, 39 MISS. L.J. 1 (1967).} During the thirty years that Mississippi had an appropriative rights statute on the books, not one court in Mississippi ever referred to the statute despite a number of legal disputes over the allocation of water.\footnote{Dellapenna, supra note 41, § 8.05-8.05(b).}

As I have written elsewhere,\footnote{See Anderson-Tully Co. v. Franklin, 307 F. Supp. 539 (N.D. Miss. 1969); Haisch v. Southaven Land Co., 274 F. Supp. 392 (N.D. Miss. 1967); Phillips v. Davis Timber Co., 468 So. 2d 72 (Miss. 1985); Black v. Wiliams, 417 So. 2d 911 (Miss. 1982); Hinds-Rankin Metro. Water & Sewer Ass'n v. Reid, 256 So. 2d 373 (Miss. 1971); Downes v. Crosby Chemls., Inc., 234 So. 2d 916 (Miss. 1970).} maybe the failure to mention the appropriation statute in any Mississippi case during this period simply reflects a failure to educate the bar and the judiciary on its existence or its provisions. Still, it is remarkable that not one judge (and presumably not one lawyer) found the statute or, at least, considered it worth mentioning in any relevant reported case decided during this period. On deeper reflection, however, one might conclude that the appropriation statute was not mentioned because it could have had little to contribute to the resolution of disputes over water in Mississippi. The reason is fairly obvious. Innumerable consumptive uses of water had begun before 1956, and claiming an appropriative right would only concede priority to an opponent claiming such a riparian right. Either the riparian right would prevail
as the earliest appropriation, or the appropriative right would be a permissive non-riparian use that must fail in competition with a riparian use. The best that an appropriator could hope would be that the appropriative use would be balanced against the complaining riparian's use, which brings us full circle back to the reasonable use version of riparian rights. If an acute general water shortage were to develop, an appropriator rather than having a more secure title than a riparian, would simply find no water to apply to the appropriation. Finally, the added uncertainty from the duality of the system would ensure that no markets would arise to remedy the defects of the bureaucratic system that was established to administer the appropriative rights.

When Mississippi repealed its appropriative rights statute, it gave all persons claiming rights vested under the appropriation statute one year to file a document expressing the intent to preserve their appropriative right. No such documents were filed. Mississippi did not, however, abandon the regulated system of water allocation that characterizes modern appropriative rights in favor of an unregulated system of traditional riparian rights. Mississippi replaced its abortive attempt to introduce the private property system of appropriative rights with another highly regulated system of water allocation — the public property system of regulated riparianism.

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 that is an inherent part of appropriative rights today. This reality itself ought to preclude serious consideration of appropriative rights as known in the West as an alternative to riparian based systems in the eastern United States even without the further arguments about the monopolistic and environmentally unsound biases of appropriative rights. As a result, eastern states wishing to make a sharp departure from the more or less pure riparian rights tradition uniformly have not gone in the direction of appropriative rights, but in the direction of the fundamentally different system of regulated riparianism.

194 See Dellapenna, supra 41, § 8.04(a).
195 Id. § 8.04(b).
197 On the dearth of true markets for water, see supra the authorities collected at note 164.
199 Dellapenna, supra note 45, at 31.
201 See supra the text at notes 143-63.
Professor George Gould, a champion of appropriative rights, has recently challenged the foregoing analysis.\textsuperscript{202} He makes two arguments for his challenge. Each deserves brief mention.

First he says that water is so plentiful that there simply is no need, yet, for any kind of administered water rights in Mississippi.\textsuperscript{203} This is an appealing argument, for Mississippi is a wet state with lots of water.\textsuperscript{204} Yet the argument overlooks the significant number of court suits over water rights during the thirty years the Mississippi appropriation statute was on the books,\textsuperscript{205} and that Mississippi did not simply repeal the 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, just not an appropriative rights permit system, and in the process extended that permit system to groundwater as well as surface waters.\textsuperscript{206}

Gould’s second argument is that in a properly implemented dual system state — a state that began with riparian rights, and then adopted a system of appropriative rights to displace the earlier law— nearly all riparian rights would simply disappear.\textsuperscript{207} This is in fact what did happen in most western states that made such a transition.\textsuperscript{208} But those were states with small populations and vast areas when they made the transition, with few existing riparian uses at that time. Thus vesting existing riparian uses would, as the states’ populations grew and their economies developed, result in most water uses being under appropriative rights. Indeed, if a court were aggressively committed to eliminating even these ancient riparian rights, it could find means of doing so.\textsuperscript{209} So much for the sanctity of property rights in appropriative rights states.\textsuperscript{210} But Mississippi, and most or all 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

\begin{footnotesize}
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\item \textsuperscript{202} See Gould, supra note 54.
\item \textsuperscript{203} Id. at 105.
\item \textsuperscript{204} See also Champion, supra note 190, at 1-2 (noting that Mississippi had enacted its statute after a severe drought, but that in the first decade of the statute’s operation no similar drought had occurred).
\item \textsuperscript{205} See the cases cited supra note 192.
\item \textsuperscript{207} Gould, supra note 54, at 105-08.
\item \textsuperscript{208} See Dellapenna, supra note 41.
\item \textsuperscript{209} Id. § 8.03(b)-8.03(b)(5).
\item \textsuperscript{210} For a court that took the sanctity of property rights seriously, see Franco-American Charolaïse, Ltd. v. Oklahoma Water Resources Board, 855 P.2d 568 (Okla. 1990).
\end{itemize}
\end{footnotesize}
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.\textsuperscript{211} While he claims 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.\textsuperscript{212}

\section*{V. REGULATED RIPARIANISM}

Since the 1950s, Hawaii and about half of the states east of Kansas City have developed administrative permit systems to replace traditional riparian rights.\textsuperscript{213} Rather than importing appropriative rights into the East, however, these states have developed a highly regulated system of water administration based on riparian principles that is best described as a system of public property.\textsuperscript{214} The transition from extremely limited regulatory intervention to more or less comprehensive regulation often occurred incrementally rather than from a conscious design to revolutionize the system of water rights. As a result, there is disagreement over when to date the emergence of a true regulated riparian system, and even today one could debate whether certain states have in fact crossed the boundary from relying largely on unregulated common law riparian rights to a regulated riparian system.\textsuperscript{215} The following indicates the states (listed

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\textsuperscript{211} Gould, supra note 54, at 107-08.
\textsuperscript{212} Id. at 108.
\textsuperscript{213} See generally Dellapenna, supra note 46.
\textsuperscript{214} See Dellapenna, supra note 40, § 6.01(b)(1).
\textsuperscript{215} There is still some dispute about the proper name for the new system of water allocation law. Peter Davis has used the name "non-temporal priority permit systems." Peter N. Davis, Australian and American Water Allocation Systems Compared, 9 B.C. INDUS. \& COM. L. REV. 647, 697-704 (1968). This term aptly describes the new system, but it is a bit too much of a mouthful to expect people to say (or write) very often. Others have used "Eastern permit systems" — a name that tells nothing about the system. See, e.g., NAT'L WATER COMM'N, A SUMMARY DIGEST OF STATE WATER LAWS 22-23 (Richard L. Dewsnup \& Dallin W. Jensen eds., 1973). I devised the name "regulated riparianism" some twenty years ago. See Joseph W. Dellapenna, Owning Surface Water in the Eastern United States, 6 PROC. E. MINERAL L. FOUND. 1-34 (1985). The name offends those to whom the words "regulate" and "riparian" are polar opposites. See, e.g., Frank J. Trelease, The Model Water Code, the Wise Administrator, and the Goddam Bureaucrat, 14 NAT. RESOURCES J. 207, 211-13 (1974). The name "regulated riparianism" emphasizes both that the administrative permit process proceeds on essentially riparian principles, and that the new system is a regulation of — rather than a taking of — riparian rights. Dellapenna, supra note 46, § 9.01.

"Regulated riparianism" is about as succinctly descriptive a name as one can hope for. In recent years, this name has begun to gain a more general acceptance. See, e.g., JOSEPH L. SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 80-92 (3d ed. 2000); Robert E. Beck, The Regulated
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alphabetically) that have enacted regulated riparian systems and the approximate date of that adoption:

1. Maryland (1933);[216]
2. Arkansas (1957);[217]
3. Iowa (1957);[218]
4. Wisconsin (1957);[219]
5. Delaware (1959);[220]
6. New Jersey (1965);[221]
7. Kentucky (1966);[222]
9. Florida (1972);[224]
10. Minnesota (1973);[225]
11. Georgia (1977);[226]
12. New York (1979);[227]
13. Connecticut (1982);[228]


In addition, four states apply a regulated riparian system to groundwater without applying it to surface waters.\footnote{234} The Delaware Basin Water Commission and the Susquehanna Basin Water Commission also operated a limited sort of regulated riparian system in the parts of states to which they apply, especially within parts of Pennsylvania.\footnote{235}

Little has been written about regulated riparianism, and most of what has been written on the topic describes regulated riparian statutes as a set of minor modifications superimposed on the riparian rights that the authors saw as the remaining core of the law in these states.\footnote{236} Others have construed regulated riparian statutes as inartfully drafted appropriative rights statutes.\footnote{237} Few commentators 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 in the actual regulated riparian statutes and articulated in the \textit{Regulated Riparian Model Water Code} of the American

\begin{itemize}
\item \footnote{230} \textit{Miss. Code Ann.} §§ 51-3-1 to -55 (2003).
\item \footnote{233} \textit{Ala. Code} §§ 9-10B-1 to -30 (2001).
\item \footnote{236} \textit{See, e.g.,} Scott & Coustalin, \textit{supra} note 41, at 899-901 (describing statutory — i.e., regulated riparian — permit systems as hastily enacted and not fitting with other bureaucratic systems in the state or province of enactment, as well as being of little consequence and not robust enough to deal with any true crisis); \textit{see also} Richard C. Ausness, \textit{Water Rights Legislation in the East — A Program for Reform}, 24 \textit{Wm. & Mary L. Rev.} 547 (1983); Peter N. Davis, \textit{Eastern Water Diversion Permit Statutes: Precedents for Missouri?}, 47 \textit{Mo. L. Rev.} 429 (1982).
\end{itemize}
Society of Civil Engineers. The Regulated Riparian Model Water Code has now been approved as an official standard of the Society. No state has a system precisely like the one described here or in the Model Code, although several come very close. References are provided in the text to the Regulated Riparian Model Water Code that deal with the points being mentioned and to the relevant chapter of the treatise Waters and Water Rights. These are the most convenient sources for understanding the structure and application of regulated riparianism. Both include detailed commentaries explaining the various provisions and exhaustive references to actual regulated riparian statutes.

A. Differences from Riparian Rights

The most fundamental departure from common law riparian rights under regulated riparianism is a requirement that generally no water is to be withdrawn from a water source without a time-limited permit from the state within which the withdrawal occurs. The permits determine water rights, not the riparian nature of the use, yet the criteria by which permit applications are judged is whether the proposed use is a "reasonable use" of the water. Under regulated riparianism, the criterion of "reasonable use" is applied very differently than at common law. The most important difference is that an administering agency decides before a use begins whether it is reasonable, both in terms of general social policy and in terms of the effects of the proposed use on other permitted uses. This has significant advantages for water users because they know — at least for the duration of the permit — whether their use is reasonable; they cannot be caught unaware by a judicial decision that wipes out their investment without a penny of compensation. The permit allows a potential investor to gauge whether the investment can be profitable and informs the potential investor about the proper scale of the investment.

The administering agency is charged to make the permit subject to conditions designed to protect other lawful users and public values. The statutes

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239 Dellapenna, supra note 46.

240 MODEL CODE, supra note 238, § 6R-1-01; Dellapenna, supra note 46, §§ 9.03(a)-9.03(a)(2).

241 MODEL CODE, supra note 238, §§ 2R-1-01, 2R-2-20, 6R-3-01, 6R-3-02; Dellapenna, supra note 46, § 9.03(b)-9.03(b)(3). Some jurisdictions would substitute the terms "beneficial," "reasonable-beneficial," or "equitable" for "reasonable."

242 MODEL CODE, supra note 238, §§ 6R-2-01 to -08, 6R-3-02, 6R-3-05; Dellapenna, supra note 46, § 9.03(a)(5)(A), 9.03(b)(1)-9.03(b)(3).


244 MODEL CODE, supra note 238, § 7R-1-01; Dellapenna, supra note 46, §§ 9.03(a)(5)(A), 9.05-9.05(c).
often contain preferences for certain classes of uses.\textsuperscript{245} Temporal priority has been accorded only a strictly limited role in the permit process.\textsuperscript{246} Nor are the traditional preferences for riparian land continued. Uses on non-riparian land are no longer unreasonable per se; often one of the principle motives for enacting a regulated riparian statute was to authorize the use of water on non-riparian land.\textsuperscript{247} Finally, in many states, permits are issued only for a period of time (three to twenty years).\textsuperscript{248} When a permit expires, the question of the continued reasonableness of the use can be reexamined, introducing a desirable flexibility into the development, use, and protection of water resources.\textsuperscript{249} The \textit{Regulated Riparian Model Water Code} sets twenty years as the duration of the permits.\textsuperscript{250}

Regulated riparian statutes contain elaborate enforcement provisions, including criminal penalties,\textsuperscript{251} civil penalties,\textsuperscript{252} injunctions,\textsuperscript{253} administrative orders,\textsuperscript{254} and actions for public and private damages.\textsuperscript{255} Such statutes also provide for hearings within the agency\textsuperscript{256} and judicial review of agency decisions.\textsuperscript{257} I have written at length about the merits of these various enforcement

\textsuperscript{245} Model Code, \textit{supra} note 238 §§ 6R-1-02, 6R-3-04; Dellapenna, \textit{supra} note 46, §§ 9.03(a)(3), 9.05(c).

\textsuperscript{246} Model Code, \textit{supra} note 238, §§ 6R-1-03, 6R-3-02; Dellapenna, \textit{supra} note 46, § 9.03(a)(3).

\textsuperscript{247} Model Code, \textit{supra} note 238, § 2R-1-02; Dellapenna, \textit{supra} note 46, § 9.03(a)(2).

\textsuperscript{248} Model Code, \textit{supra} note 238, § 7R-1-02; Dellapenna, \textit{supra} note 46, § 9.03(a)(4).

\textsuperscript{249} See Freyfogle, \textit{supra} note 54, at 515.

\textsuperscript{250} Model Code, \textit{supra} note 238, § 7R-1-02. For analysis of the merits of possible durations for the permits, see Maloney \textit{et al.}, \textit{supra} note 101, at 173-77; Nat'L Water Comm'N, \textit{Water Policies for the Future} 286-87 (1973); Ausness, \textit{supra} note 236, at 584-87; Dellapenna, \textit{supra} note 46, § 9.03(a)(4).

\textsuperscript{251} Model Code, \textit{supra} note 238, §§ 5R-5-01 to -03; Dellapenna, \textit{supra} note 46, § 9.03(a)(5)(B), at 9-70 n.480, 9-71 n.484, 9-74 to -79 nn.499-536, 9-81 to -82 nn.547-50.

\textsuperscript{252} Model Code, \textit{supra} note 238, §§ 5R-4-06 to -08; Dellapenna, \textit{supra} note 46, § 9.03(a)(5)(B), at 9-71 n.480, 9-79 to -80 nn.534-41.

\textsuperscript{253} Model Code, \textit{supra} note 238, § 5R-4-04; Dellapenna, \textit{supra} note 46, § 9.03(a)(5)(B), at 9-70 n. 478, 9-79 n.535, 9-81 nn.542-46.

\textsuperscript{254} Model Code, \textit{supra} note 238, § 5R-4-03; Dellapenna, \textit{supra} note 46, § 9.03(a)(5)(B), at 9-71 nn. 482-83, 9-79 to -80 nn.537-38.

\textsuperscript{255} Model Code, \textit{supra} note 238, § 5R-4-05; Dellapenna, \textit{supra} note 46, § 9.03(a)(5)(B), at 9-71 n.485, 9-74 n.498.

\textsuperscript{256} Model Code, \textit{supra} note 238, §§ 5R-1-01 to -03.

\textsuperscript{257} Model Code, \textit{supra} note 238, §§ 5R-3-01 to -03. Courts have generally been very deferential in reviewing agency decisions under regulated riparian statutes. \textit{See}, e.g., City of Fort Smith v. River Valley Reg'l Water Dist., 37 S.W.3d 631, 639 (Ark. 2001); Southwest Fla. Water Mgmt. Dist. v. Charlotte County, 774 So. 2d 903, 909 (Fla. Ct. App. 2001); Southwest Fla. Water Mgmt. Dist. v. Save the Manatee Club, Inc., 773 So. 2d 594 (Fla. Ct. App. 2000); \textit{In re Water Use Permit Applications}, 9 P.3d 409 (Haw. 2000); Oxon Hill Recreation Club, Inc. v. Water Res. Admin.,
mechanisms elsewhere.\textsuperscript{258} It is sufficient to note that criminal prosecutions are rare under regulated riparian statutes and most enforcement is achieved through civil or administrative remedies. The Regulated Riparian Model Water Code also includes provisions designed to support alternative dispute resolution\textsuperscript{259} and the administrative resolution of disputes among permit holders\textsuperscript{260} — provisions not generally found in actual regulated riparian statutes.\textsuperscript{261}

While users are sometimes required to pay fees to the agency for the permits based on the amount of water they use, the fees cannot be considered payment for the water itself.\textsuperscript{262} Statutes that set a uniform charge irrespective of the nature of the use or the amount of water used clearly are not charging for the water being used. Even when the fee is variable, however, it is set according to the presumed ability of the user to pay, rather than according to the value that could be created through use of the water.

The Regulated Riparian Model Water Code breaks new ground in this respect, requiring water use fees that, to some extent at least, reflect the use value of the water.\textsuperscript{263} The water use fee is to be set at a level that compensates the state for the reasonable value of the water consumed.\textsuperscript{264} Traditional water law, whether riparian rights or appropriative rights, has treated water as a “free good,” that is, a good provided without charge to all with lawful access to the

\textsuperscript{258} Dellapenna, supra note 46, § 9.03(a)(5)(B).

\textsuperscript{259} MODEL CODE, supra note 238, §§ 5R-2-01, 5R-2-02; Dellapenna, supra note 46, at 9-71 to -73 nn.486-88, 494-97.

\textsuperscript{260} MODEL CODE, supra note 238, § 5R-2-03; Dellapenna, supra note 46, § 9.03(c).


\textsuperscript{262} Dellapenna, supra note 46, §9.03(a)(5)(C).

\textsuperscript{263} MODEL CODE, supra note 238, § 4R-1-08.

\textsuperscript{264} Id. § 4R-1-08(1).
good. As economists and others have been arguing for decades, treating water as a “free good” creates a perverse incentive to waste water, or at least not to consider the social costs of consuming water. The charging of water use fees is designed to eliminate this problem and to provide economic incentives for the efficient use of water in a setting where markets are not likely to be effective. Such fees can be varied by class with the fees going into the general funds of the state. These extensive statutory regulations are based on a state’s police power to regulate water withdrawal and use in order to protect the public health, safety, and welfare. Still, fear of the political (if not the legal) repercussions of such radical interference with traditional water rights has led many state legislatures to exempt from the permit requirement some large classes of users (usually agricultural) who were using water when the new statute came into effect. 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, limiting the temporal preference to a single permit cycle. Existing users who refuse to apply for a permit within a short period of time can then be conclusively presumed to have abandoned their claim.


266 MODEL CODE, supra note 238, § 4R-1-08(2) (stating that water use fees are to be charged to every person using water under a permit issued pursuant to the Regulated Riparian Model Water Code). On the likely ineffectiveness of markets, see supra Part II.

267 MODEL CODE, supra note 238, § 4R-1-08(3).

268 Id. § 4R-1-08(4).

269 State v. Braun, 378 A.2d 640 (Del. 1977); Vill. of Tequesta v. Jupiter Inlet Corp., 371 So. 2d 663 (Fla. 1979); Iowa Natural Res. Council v. Van Zee, 158 N.W.2d 111 (Iowa 1968); Crookston Cattle Co. v. Minn. Dep’t of Natural Res., 300 N.W.2d 769 (Minn. 1980); Herschman v. State, 225 N.W.2d 841 (Minn. 1975); State v. Kuluvar, 123 N.W.2d 699 (Minn. 1963); Omernik v. State, 218 N.W.2d 734 (Wis. 1974). See generally Dellapenna, supra note 46, § 9.04(a).

270 Dellapenna, supra note 46, § 9.03(a)(3).

271 MODEL CODE, supra note 238, § 6R-1-03; Dellapenna, supra note 46, § 9.03(b)(3).

Regulated riparian statutes also include extensive provisions for protecting and implementing the public interest in water resources. The statutes create mechanisms for long-term planning and otherwise provide for the public interest in the waters of the State. One of the major purposes of regulated riparian permits is to assure the gathering of the necessary information to enable such planning to occur on an on-going basis. The *Regulated Riparian Model Water Code* would establish a particularly comprehensive statewide data system. The administering agency also is usually given broad discretion to plan for and to deal with crises brought on by extreme water shortages. The agency can incorporate permit conditions based on its plans.

B. Differences from Appropriative Rights

Despite the important differences between regulated riparianism and traditional riparian rights, the new system still proceeds on essentially riparian principles rather than on the scheme of temporal priority characteristic of appropriative rights. Thus, during a water crisis, the administering agency is often authorized to restrict uses either according to pre-announced plans or independently of such plans should the agency’s plans be inadequate to handle an actual shortage, notwithstanding any inconsistency with a permit. These decisions are to be made according to what restrictions are most reasonable in light of the actual situation. There is some evidence, however, that administering agencies prefer to use temporal priority or pro rata sharing as the allocative methods least likely to provoke litigation or other difficulties for the agency. This approach sabotages the whole scheme of regulated riparianism, based as it is on expert appraisal of which uses will best serve the needs of society and eschewing any simple rule of allocation without evaluation of social utility. Thus far, no clear way to prevent such sabotage of the administrative scheme has emerged.

Today, the main threats to the availability of water in eastern states, as to both quantity and quality, are not pollution or withdrawal, but the man-made physical and ecological transformation of water sources and the lands on or in which the sources are found. Regulated riparian statutes address these problems in two ways that are very different from statutes in appropriative rights states.

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273 MODEL CODE, *supra* note 238, §§ 4R-2-01 to -04; Dellapenna, *supra* note 46, § 9.05(a).

274 Dellapenna, *supra* note 46, § 9.05(b)-(d).

275 MODEL CODE, *supra* note 238, § 4R-2-03.

276 *Id.* §§ 7R-3-01 to -07; Dellapenna, *supra* note 46, § 9.05(d).

277 MODEL CODE, *supra* note 238, § 7R-1-01.

278 See *supra* Part III.

279 MODEL CODE, *supra* note 238, § 7R-3-01.

280 Dellapenna, *supra* note 46, § 9.05(d), at 9-148 n.954.
First, in most regulated riparian states 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 codes usually require the agency to define and protect some minimum flow, whether a 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. In a few states, whole streams may be withdrawn from private uses except for those uses existing before the transition to the new system of law. There may be provisions authorizing yet other kinds of conditions designed to protect aesthetic or ecological concerns. 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.

C. Unsolved Problems

Regulated riparianism has certain unsolved 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 would appear to be a problem if the duration 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 is often the case, 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 in water. Administering agencies seldom flatly refuse to renew a permit, although new and more stringent conditions are sometimes attached at the time of renewal.

281 MODEL CODE, supra note 238, §§ 4R-3-04, 6R-4-04.

282 Dellapenna, supra note 46, § 9.05(b).

283 MODEL CODE, supra note 238, §§ 3R-2-01 to -05.

284 MALONEY ET AL., supra note 101, at 175-77; NAT'L WATER COMM'N, supra note 249, at 175-77, 286-87; Ausness, supra note 236, at 568, 584-87; Dellapenna, supra note 46, § 9.03(a)(4); Gould, supra note 54, at 109-10.

285 Ausness, supra note 236, at 581-84; Dellapenna, supra note 46, §§ 9.03(d), 9.05(d); Freyfogle, supra note 54, at 515; Gould, supra note 54, at 110, 117-21.

286 Dellapenna, supra note 46, § 9.03(a)(4).

287 Such evidence as we have, suggests that the problem in actual practice is the opposite — agencies fail to exercise their managerial powers sufficiently rather than too aggressively. See, e.g., Alexander Lane, N.J. Too Generous with Water, Critics Say — State Permits for Big Users Rose Last Year, STAR LEDGER (Newark, N.J.), Sept. 28, 2003, at 21 (reporting increases in author-
states generally have consulted with major water users in crafting responses to water emergencies rather than making their own expert determinations regarding the matter.\textsuperscript{288} States also need to consider the cost of imposing an elaborate administrative system, and might elect to limit their regulated riparian system only to certain water basins or other areas of the state where the competition for water is most intense.\textsuperscript{289}

Usually there is no express provision for the transfer of water rights or permits between potential users.\textsuperscript{290} The Regulated Riparian Model Water Code actually charges the administering agency to encourage market transfers of water.\textsuperscript{291} Given the dearth of markets under appropriative rights, however, it remains unclear whether a market could develop to facilitate the transfer of water used under regulated riparian permits to higher valued uses.\textsuperscript{292} Theoretically, one purpose of the regulated riparian system is to enable the administering agencies to force such transfers through the non-renewal of permits.\textsuperscript{293} In practice, however, the agencies free up far 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.\textsuperscript{294} Non-renewal of permits probably will remain an infrequent and cumbersome device unless the state is willing to create a good deal of investment insecurity.

Occasional preferences regarding fees are based on relative inability to pay rather than the value of the use.\textsuperscript{295} These provisions can be seen as a form


\textsuperscript{290} Dellapenna, supra note 46, § 9.03(d).

\textsuperscript{291} MODEL CODE, supra note 238, §§ 1R-1-07, 7R-2-01 to -04, 7R-3-05, 9R-1-01, 9R-1-02.

\textsuperscript{292} On the dearth of true markets for water, see supra the authorities collected at note 180. See generally supra Part II. Regarding the likely dearth of markets for water permits under regulated riparianism, see Gould, supra note 54, at 110.

\textsuperscript{293} MODEL CODE, supra note 238, § 7R-1-02.

\textsuperscript{294} See Dellapenna, supra note 46, § 9.03(a)(4), at 9-61 to -62 nn. 428-32.

\textsuperscript{295} Id. § 9.03(a)(5)(C); see also Frank E. Matthews & Gabriel E. Nieto, Florida Water Policy: A Twenty-Five Year Mid-Course Correction, 25 FLA. ST. U. L. REV. 365, 373-75 (1998).
of distributive equity. Such equity arguably justifies exemptions from the permit requirement or other preferences conferred on small users or on other users unable to pay for the full value of the water they need. The result, however, will be 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.

This analysis leads to the bottom line: 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 the 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.


297 See supra Part II.

298 See supra Part III.