

Two models of surface water management for a water-short world

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Abstract Western states of the United States, facing steadily increasing demands for limited water resources in an arid region, have developed administrative regimes for regulating water use based on the judicially developed private property concepts derived from the customary appropriative rights dominant in the western states. Eastern states of the United States have declined to adopt appropriative rights but have instead developed a markedly different model of administrative rights based upon riparian principles. This new model of water law is best described as a "regulated riparian" system. Under regulated riparianism, water is treated as a form of public property rather than as a form of common property (as under riparian rights) or as a form of private property (as under appropriative rights). Water use depends upon the grant of a permit by the state and is not limited to riparian lands, but the allocation is made according to administrative determinations of the "reasonableness" of competing uses rather than upon temporal priority.

Dos modelos de gestion de aguas superficiales para un mundo con escasez de agua

Resumen Los estados occidentales de los Estados Unidos enfrentan una demanda creciente de los escasos recursos hídricos de una región árida, para lo cual han desarrollado sistemas administrativos para regular el uso del agua en base a conceptos legales de propiedad privada derivados de los derechos consuetudinarios de apropiación prevalecientes en el oeste. Los estados orientales de los Estados Unidos han declinado adoptar derechos de apropiación pero en su lugar han desarrollado modelos marcadamente diferentes de derecho administrativo que se basan en principios riparios. Este nuevo modelo de ley de agua se describe como un "sistema ripario regulado". Bajo el sistema ripario regulado el agua se considera una forma de propiedad pública y no una propiedad de uso común (como lo es bajo el derecho ripario) o propiedad privada (como bajo el derecho de apropiación). El uso del agua depende del otorgamiento de un permiso por parte del estado y no se limita a las tierras riparias, pero la concesión se efectúa de acuerdo con decisiones administrativas "razonables" de los usos en competencia antes que en prioridades de orden temporal.

INTRODUCTION

Few resources are more important or have more unusual qualities than water. Water is found nearly everywhere, and is always to some degree a renewable resource, yet it is of highly variable quantity and quality. Furthermore, water almost necessarily must be shared among users drawing from a common source. Thus, even though water is generally treated as a "free resource", or at least an inexpensive one, legal problems invariably arise among competing users, especially when variable supplies

create recurrent or chronic shortages. Nowhere is this more clear than in the contrast between the eastern and the western states of the United States, here divided at approximately the 98° meridian (Kansas City). People to the east of Kansas City have always considered water to be readily available at little or no cost. Although there have been increasingly serious problems with water quality arising mostly from human activities, shortages historically were rare and short-lived. There evolved in this setting a body of legal doctrine known as riparian rights, predicated on treating the resource as a species of common property. To the west of Kansas City, people considered water to be scarce, or at least misplaced. As a result, the right to use water in the western states has long been treated as a species of private property under the doctrine of appropriative rights.

RIPIARIAN RIGHTS IN EASTERN STATES

No state relies on "pure" riparian rights today. All states have at least a few regulatory statutes dealing with certain limited aspects of water quantity issues, at the least regulating public water systems and perhaps certain other major kinds of water use. Still, in nearly half of the eastern states, the common law of riparian rights continues as the basic law applicable to disputes over the allocation of water between direct users of water. In these states, the regulations serve to protect the public interest in water but play little or no part in the resolution of quantity disputes between individual users who withdraw water directly from a natural source.

Riparian rights evolved in the eastern states in the nineteenth century on the assumption of a condition of permanent water surplus. 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. Land abutting or underlying a water course is termed "riparian land". Each owner of riparian land is entitled to make any use of the water from the contiguous water course irrespective of the effect the use has on the natural flow of the water course so long as each user does not transgress the equal right of other riparians to make use of the water. While domestic uses (personal consumption, including kitchen gardens and livestock for the use of a family) are given preference over other uses, the only real restriction is that no user is to "unreasonably harm" another riparian user.

The case of "*Harris vs Brooks*" (Anon., 1955a, 1955b), illustrates the modern application of riparian rights. The plaintiffs in "*Harris vs Brooks*" conducted a commercial boat rental service on land they leased on the shore of a small lake; members of the general public rented boats for fishing and other recreational uses. Defendant Brooks grew rice on his land on the shore of the same lake; Brooks began to pump large quantities of water from the lake for his rice fields during a drought. Brooks' pumping speeded the lowering of the lake level, the fish stopped biting, and the public stopped renting boats. The court held that the pumping of water for the rice fields should stop when the lake level fell to a particular level on finding that at this point Brooks' pumping unreasonably interfered with the plaintiff's riparian use.

In "*Harris vs Brooks*", the court weighed the social value of the two uses to determine which use was more valuable to society. The court went so far as to state that even substantial intentional harm by one riparian to another would be reasonable

if "the legal merit or utility of the activity which produces it outweighs the legal seriousness or gravity of the harm". Unfortunately, in "Harris vs Brooks" as in other cases, the court remained vague about how to perform the calculus necessary to reach its conclusion. Basically, courts decide which use is unreasonably interfering with the other by comparing the cost to the plaintiff, caused by the defendant's conduct, against the cost to the defendant of modifying her conduct to accommodate the plaintiff's use. This often entails judicial consideration of the practicality of both users modifying their patterns of use to achieve an optimum mix or pattern of uses. The rule of reasonable use does not require, and often will not result in, simple *pro rata* sharing among competing users. Courts give minimal, if any, attention to non-economic questions such as the natural characteristics of the stream, general social concerns, or abstract justice.

A few points in this process are clear. The central concept that the right to use water is a consequence of the natural features of the land leads courts to hold that any use on non-riparian land is *per se* unreasonable. Nor is who first began to use the water relevant. In "Harris vs Brooks" itself, Brooks had been pumping water from the lake for years to irrigate his rice fields, while the plaintiff had opened his boat livery for the first time during the very year of the litigation. This brief discussion, however, suggests the weaknesses of riparian rights for allocating water from a source under stress. First is the vagueness and unpredictability of the criterion of decision in any conflict over water. Even long established uses can be cut off without compensation if a court decides that a recently begun use is more "reasonable". Just as serious is the reality that courts cannot give a decision, even as between the litigants themselves, which will be good for more than the day it is given. If either of the competing uses changes in physical or economic terms, the calculus of reasonableness will change: what before was a reasonable use may suddenly become unreasonable, and *vice versa*. The justification the court gave in "Harris vs Brooks" for adopting a specific lake level as the point where Brooks' pumping must cease was precisely to avoid the possibility of frequent re-litigation of the reasonableness of Brooks' interference with the boat livery. Notwithstanding its decision, the court would find it difficult to refuse to re-evaluate the situation if, for example, the market value of rice were to rise dramatically. The resulting vagueness, perhaps more than any other factor, explains why market transactions in riparian rights (as opposed to market transactions in riparian land where the intent was to obtain access to water rights) have been almost non-existent in eastern states.

Yet another problem with riparian rights is the lack of any process for managing water in times of extreme shortage or for otherwise protecting public values. The slow, expensive process of individual litigation is not well adapted to such purposes, yet there is no mechanism for determining the rights of all users on a particular water course. Courts normally consider only the interests of the parties to the actual litigation, and seem ill-equipped to address unrepresented interests of other riparians not participating in the suit, let alone the interest of the public generally. The lack of efficient, system-wide management also creates a systematic bias in favour of large users. Small users often 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 strongly favours large users over smaller users. The economic value of the water to the large user usually will

outweigh the economic loss of the small user. While smaller users can in effect aggregate their claims through receipt of their water through a public system, the effectiveness of this approach is limited by legal doctrines limiting the "riparianness" of the public system. Moreover, aggregation is brought about only through submission to yet a different sort of large-scale enterprise.

APPROPRIATIVE RIGHTS

Western states rely on appropriative rights as the primary means for allocating water among competing users. These rights build on the principle of "first in time is first in right", based on customs first applied in the mining camps to land claims and water claims after the California Gold Rush. After 150 years, this principle has been developed with considerable elaboration into a complex and sophisticated system of water administration found in every appropriation state. Despite the elaborate development, however, the basic rule remains: every appropriator of water senior in time to another appropriator is entitled to have the senior right fully satisfied before the junior right receives any water.

The appropriative rights system operates as a private property system whereby each appropriator has a prioritized right to a specific quantity of water from a specific source for application to a specific beneficial use. The effect of this system is to exaggerate the risks of water shortage for those with lower priorities in order to provide additional security for those with higher priorities. Thus, if a stream is "fully appropriated", but only 80% of the normal flow materializes in a given year, the entire shortage falls on the 20% of established users who last began their use, while those who began their uses earlier suffer no losses at all. This concentration of losses on the later users is in marked contrast with the pattern under riparian rights where the risk of shortage (and generally the actual shortages) is shared—according to the principle of reasonableness—among all users.

Appropriative rights states have highly developed permit requirements for the perfection of an appropriative right. Despite the importance of water management in the western states, many problems survive, and often are in fact aggravated by the legal system of appropriative rights. So long as the water is put to some use which has economic value, no matter how slight, it will be held to be beneficially used. Nor is the requirement of a beneficial use much of a limit on wasteful uses of water: courts have rarely found an economically valuable use of water to be wasteful regardless of the manner of use. Increasingly, however, the administrative bodies responsible for issuing permits have been given discretion to make certain policy determinations in choosing among competing applications to appropriate water. This is of little help, however, because of the great quantities of water already wastefully appropriated. The appropriative rights system not only does little to control waste, the rule of temporal priority actually gives a strong incentive to waste because through waste one establishes a history of use which gives title (if the forms of appropriation are followed) to the water used—thus preserving priority to the water for later developing uses, or for sale to later users. Appropriative rights also exhibit rather more uncertainty than the bare statement of the legal system would suggest. The earliest priorities predate the establishment of the modern administrative

machinery and, despite statutes to facilitate putting these claims on record, on some water courses the most valuable rights to use water still have never been precisely quantified. Furthermore, even after the advent of the modern administrative systems, prescriptive, abandoned, or forfeited rights can create gaps in the official record.

Perhaps the most interesting legal problem relating to water in western states is that sales of appropriative rights are relatively rare in practice, although generally easily permitted in theory. Most states closely limit changes in the manner or place of diversion to prevent harm to the interests of junior appropriators. This alone has the effect of making transfer of the water to another use rare. As a result, true markets have never really arisen under appropriative rights, and even the much touted "California Water Bank" that was active a few years ago existed only because of extensive state intervention. The California Water Bank is a most peculiar "market", in which a private party seeking to sell water has only one legal buyer—the state, in which a private party seeking to buy water has the only legal seller—the state, and in which the state determines the waters to be bought or sold, the sellers and buyers with which it will deal, and the prices which it will pay or accept (all without serious negotiation).

Despite these difficulties in the actual realization of private property rights in water under pure 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. The change generally was brought about by legislation. The legislatures of these states were unable to abolish riparian rights completely through inability or unwillingness to compensate the owners of riparian rights, preserving as valid riparian rights those uses actually made on the effective date of the first appropriative rights statute. Even though most of the transitions took place when existing water uses were fairly few in these states, the result was a dual system that combined the worst features of both bodies of law.

THE EVOLUTION OF REGULATED RIPARIANISM IN EASTERN STATES

Under a common property system like riparian rights, all co-owners of the property are left to judge individually when and how to use the resource. Each owner receives the full benefit of any additional use, while the cost of this benefit is spread over all co-owners. The paradigm is the common pasture. Garrett Hardin explained 25 years ago, however, that when a body of common property shared among strangers approaches the carrying capacity of the resource, it results in a "tragedy of the commons" (Hardin, 1968). Acting purely rationally, each co-owner continues to place ever greater demands on the resource even as it is exhausted, if only because other co-owners are doing likewise: adding demand is the only way to appropriate a share of a resource being gobbled up by all. The result is accelerated exhaustion, as is now occurring with high seas fisheries. In contrast, a private property system without any actual markets in practice produces a system where water use patterns are frozen according to the uses existing when a water source becomes fully appropriated. This reality explains the growing determination in many western states to override the appropriative rights systems with schemes of public management masquerading as markets.

In the eastern states, demand for water has continued to increase even while precipitation patterns seem to have become more erratic, resulting in recurring water shortages becoming more frequent. There simply no longer is enough water to satisfy all needs in eastern states. For the first time, eastern users of water frequently find that their need for water conflicts with the needs of other, formerly compatible users. Predictably, there has been a considerable increase in quantity disputes, although quality disputes resulting from the pollution of water remain better publicized. Pollution itself, however, remains one source of the growing inadequacy of water relative to demand in eastern states. This developing situation has forced many states in the east to abandon or modify the system of riparian rights. The option of adapting appropriative rights to eastern conditions was tried in one eastern state—Mississippi—and proved an utter failure.

Mississippi adopted appropriative rights in 1955, producing a “dual system” such as is found among certain western states, and abandoned it in 1985 in favour of regulated riparianism. During the 30 years that Mississippi had an appropriative rights statute on the books, the state’s supreme court never once referred to it even though it decided about a dozen disputes over the allocation of water. The reason is fairly obvious: most consumptive uses of water had begun before 1955, and claiming an appropriative right would only concede priority to an opponent claiming a riparian right. When Mississippi repealed its appropriative rights statute, it gave all persons claiming rights vested under the statute one year to file a document expressing an intent to preserve their appropriative right. None were filed. In even more fully hydrologically developed eastern states where existing water uses nearly exhaust the dependable supply, one can only expect a statute purporting to create an appropriative rights system to be an even more dead letter than it proved to be in Mississippi.

Since the 1950s, about half of the states east of Kansas City, along with Hawaii, have evolved a new system of law that I call “regulated riparianism”. 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 could best be described as a transition to a system of public property. The Delaware River basin and the Susquehanna River basin compacts also create regulated riparian systems in those basins (stretching across four and three states respectively) under management by interstate commissions. Little has been written about regulated riparianism, and most who have written seem to consider the regulated riparian statutes as minor modifications superimposed on the riparian rights that the authors see as remaining the core of the law in these states (Maloney *et al.*, 1972; Davis, 1982; Ausness, 1983; Abrams, 1990). Others have construed regulated riparian statutes as inartfully drafted appropriative rights statutes (Trelease, 1974). Few have realized that regulated riparianism represents a truly different model of water law.

The American Society of Civil Engineers has undertaken to produce a “Regulated Riparian Model Water Code” (ASCE, 1996) based on the common core of principles as found in the actual statutes enacted in eastern states and Hawaii. I directed the completion of the Regulated Riparian Model Water Code, work that was completed in 1996. The following describes the general features of the Regulated Riparian Model Water Code as representative of the better regulated riparian statutes or codes now in place in about 17 states. References are included to the sections of

the Regulated Riparian Model Water Code (ASCE, 1996) that deal with the points mentioned in the text.

The most fundamental departure from common law riparian rights in regulated riparian statutes is the requirement that, generally with only limited exceptions, no water is to be withdrawn from a water source without a permit from the state within which the withdrawal occurs (§ 6R-1-01). The rights of water users are determined by the permits, not by the riparian nature of the use, yet the criterion by which permit applications are judged is whether the proposed use is a "reasonable use" of the water (or in some jurisdictions, a "beneficial", "reasonable-beneficial", or "equitable" use) (§§ 2R-1-01, 6R-3-01). 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 the use is reasonable, both in terms of general social policy and in terms of the effects of the proposed use on other permitted uses (§§ 6R-2-01 to 6R-2-08, 6R-3-02, 6R-3-05). The administering agency is to issue permits subject to conditions designed to protect other lawful users and public values (§ 7R-1-01). The statutes often contain preferences for certain classes of uses (§§ 6R-1-02, 6R-3-04). Temporal priority has been accorded only a strictly limited role in the permit process (§§ 6R-1-03, 6R-3-02). Nor are the traditional preferences for riparian land continued: uses on non-riparian land are no longer unreasonable *per se* and often one of the principle motives of the enactment of a regulated riparian statute was to authorize the use of water on non-riparian land (§ 2R-1-02). Finally, permits are issued only for a period of time (3–20 years) so that when the permit expires the question of the continued reasonableness of the use can be re-examined (§ 7R-1-02).

Regulated riparian statutes contain elaborate enforcement provisions, including criminal penalties (§§ 5R-5-01 to 5R-5-03), civil penalties (§§ 5R-4-06 to 5R-4-08), injunctions (§ 5R-4-04) and administrative cease and restore orders (§ 5R-4-03), and actions for public and private damages (§ 5R-4-05). Such statutes also provide for hearings within the agency (§§ 5R-1-01 to 5R-1-03) and judicial review of agency decisions (§§ 5R-3-01 to 5R-3-03). The Regulated Riparian Model Water Code (ASCE, 1996) also includes provisions designed to support alternative dispute resolution (§§ 5R-2-01, 5R-2-02) and the administrative resolution of disputes among permit holders (§ 5R-2-03). While some states now require users to pay fees to the agency for the permits based on the amount of water they will use, these fees cannot be considered payment for the water itself. This is clearly so when the fees are a set, uniform charge irrespective of the nature of the use or the amount of water used. Even when the fee is variable, however, the actual statutes set according to the presumed ability of the user to pay, rather than according to the value which could be created through use of the water. The Regulated Riparian Model Water Code (ASCE, 1996) would break new ground in this respect, requiring water use fees that to some extent reflect the use value of the water (§ 4R-1-08).

Such extensive statutory requirements 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 so radically interfering with traditional rights in water 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, thus introducing 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 (§ 6R-1-03). This approach limits the temporal preference to a single permit cycle.

Regulated riparian statutes create mechanisms for long-term planning (§§ 4R-2-01 to 4R-2-04) and for otherwise providing 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 ongoing basis. The Regulated Riparian Model Water Code (ASCE, 1996) would establish a particularly comprehensive state-wide data system (§ 4R-2-03). The administering agency is usually given broad discretion, particularly for planning for and dealing with, crises brought on by extreme water shortages (§§ 7R-3-01 to 7R-3-07). The agency can incorporate conditions into the permits based on its plans (§ 7R-1-01). Furthermore, the administering agency is authorized to adopt restrictions on users should the agency's plans prove inadequate to an actual shortage notwithstanding any inconsistency with a permit (§ 7R-3-01). In actual practice, administering agencies often prefer to use temporal priority or *pro rata* sharing as least likely to provoke litigation or other difficulties for the agency. This, however, sabotages the underlying scheme of regulated riparianism, based as it is on expert appraisal of which uses will best serve the needs of society.

Today, the main threats to the availability of water in eastern states, both as to quantity and as to quality, are not pollution or withdrawal, but the physical and ecological transformation by human intervention of water sources and the lands on or in which the sources are found. Dams not only "withdraw" water, they disrupt temperature and nutrient patterns on which rivers depend for their ecological diversity, as does the "straightening" of a river. Repeated withdrawals of water from water sources both deplete the quantity of water remaining and alter the waste assimilative and other natural aspects of the water source, often to the detriment of potential users, whether human or non-human. Sediments from farms suffocate many of the smaller forms of aquatic life. Vacationers who cut trees to improve the view from summer homes may erode stream banks or lake shores. As a result, the stream then carries more sediment and becomes wider, shallower, and warmer, making the water unfit for many important organisms and for many significant uses.

Regulated riparian water codes deal with these problems in two ways that are very different from those found in the western states. First, the management of water allocation and water quality issues are usually vested in a single agency that is charged to integrate the consideration and permitting of uses in light of both sets of policies. Second, the regulated riparian codes usually provide that the agency is to define and protect some minimum flow, whether an historic average low flow, the amount necessary for the preservation of certain kinds of wildlife, or the amount necessary to protect human health or well-being. 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 (ASCE, 1996) requires the protection of the biological, chemical, and physical integrity of the water source; these integrities are defined in terms of federal and other relevant legal standards (§§ 3R-2-01 to 3R-2-05).

Regulated riparianism carries with it certain as yet unsolved problems, relating both to the protection of private values and to the furtherance of public values. Two problems are related 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 time period of a permit is inappropriate, 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 sort of uncertainty seems to have caused actual difficulty; if anything, the administering agencies might be accused of being too sensitive to the fears of large institutional investors in water. Permits are seldom flatly denied renewal, although new and more stringent conditions are sometimes attached at the time of renewal. Administering agencies generally consult with major water users in crafting responses to water emergencies. Usually there is no express provision for the transfer of water rights or permits between potential users. The Regulated Riparian Model Water Code (ASCE, 1996) actually charges the administering agency to encourage market transfers of water in various ways (§§ 1R-1-07, 7R-2-01 to 7R-2-04, 7R-3-06, 9R-1-01, 9R-1-02). 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. Theoretically, one purpose of the regulated riparian system is to enable the administering agencies to force such transfers through the non-renewal of permits (§ 7R-1-02). As noted, in practice the agencies free up far less water through the renewal process than the theory would suggest because the agencies prefer to tighten conditions on existing uses rather than to deny renewals outright. Nonrenewal of permits will remain an infrequent and cumbersome device unless the state is willing to create a great deal of investment insecurity.

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