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The Market for Property Rights in Water

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The market for any good or service will operate more or less efficiently depending on the structural characteristics of the market, the adequacy of the definition of the property rights being exchanged, the availability of information, and the cost of bargaining and reaching agreements among interested parties. Water, despite frequent allegations that it is somehow wholly unlike all other goods, is no exception. The oft-cited complaint that water flows uphill toward money not only fails to reflect the gravity of the situation, but raises what is in many cases a non-problem. Under certain conditions, the flow of water toward money is a perfectly desirable result. This paper examines those conditions and suggests changes in existing legal approaches to the problem of water allocation.

I. THE ROLE OF PROPERTY RIGHTS IN THE MARKETPLACE

The function of defined rights in property is perhaps best understood by considering the consequences of their absence. All the goods would, in effect, be "owned" in common. As a result, there would be no incentive to economize on the use of any good, to maintain the condition of the good, or to engage in investment to improve it or increase its quantity. The benefits of productive activity could not be appropriated by any agent in the economy; little productive activity would result. The absence of clearly defined property rights would assure a large scale and continuing tragedy of the commons.

The economic problem is fundamentally one of choice; alternative uses exist for virtually all goods and services, requiring that decisions be made to select from among these alternatives. Well defined rights give decision makers in the economy a guide as to what they can reasonably expect of others. If rights to the use of a particular asset clearly rest with an individual, then the results of that individual's use of the asset are internalized, forcing him or her to bear the costs and benefits of decisions made concerning that use. Property rights

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thus seek to internalize what would otherwise be externalities.¹ To be complete, this internalization must involve the exclusion of all other parties from the use of the right, and these parties must be unaffected by that individual's use. Where the use is collective in nature, as in the enjoyment of a beautiful stream, it may be appropriate to define exclusive ownership to some collection of individuals, represented perhaps by a government agency. Thus exclusive ownership may rest with a single individual or with an agent representing several individuals. The important thing is that rights to the use of a good or service rest exclusively with agents affected by that use.²

Once defined, property rights to the use of a good or service must be enforceable; owners must have the ability to seek relief for any violation of the rights owned.³ Finally, ownership of the rights to the use of any good or service should include the rights to appropriate returns from this and to transfer ownership rights for a price.⁴

The marketplace in which rights are to be exchanged should ideally be characterized by large numbers of buyers and sellers for rights to each good and service. Potential sellers should have ready access to each market, and information should be readily available concerning the terms at which rights are being sought and offered for sale. Bargaining costs should be low enough to assure that all parties with an interest in an exchange can participate in it. The satisfaction of these conditions should assure an efficient allocation of resources. Unhappily, one or more of these conditions is typically not met; the marketplace of the real world is an imperfect mechanism for allocating society's goods and services.

The market, whatever its imperfections, should serve in a rough way to face decision makers with the full costs and benefits of their decisions. Bids by buyers of a good generate price information about the benefits of using resources for the pro-

1. Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 350 (1967).

2. Cheung, *The Structure of a Contract and the Theory of a Non-Exclusive Resource*, in *THE ECONOMICS OF PROPERTY RIGHTS* 27 (E. Furubotn & S. Pejovich eds. 1974).

3. C. STONE, *SHOULD TREES HAVE STANDING? TOWARD LEGAL RIGHTS FOR NATURAL OBJECTS* 11 (1974).

4. Cheung, *supra* note 2.

duction of that good; bids by producers of other goods for those same resources generate price information about its cost. Where exclusion is not complete, the information provided by prices will be incorrect. If, for example, all beneficiaries of a beautiful stream are not excluded from enjoying it if they do not pay for it, prices will not reflect the value of the stream as an aesthetic or recreational resource. If potential bidders are left out of the exchange process because of inadequate information, prices will again provide incorrect signals. Markets dominated by a single seller (monopoly) or by a single buyer (monopsony) will generate prices which give, respectively, artificially high and low signals via the price mechanism. But if the market is working well, it will continuously generate valuable information in the form of prices, information which should guide resources toward their fabled "best use."

This notion of the ideal solution of a market model requires some cautions. First, the notion of "best" rests on each individual's perception of his or her own welfare. It is an axiom of economic analysis that individuals can and do make choices that they assume will make them better off. The added assertion that these individuals are the best judges of what is best for each of them is itself a value judgment for which there is no scientific foundation.⁵ It is, however, a value judgment to which most economists, including this one, subscribe. If one assumes that individuals are incapable of making choices in their own interest, then one is left with the perplexing problem of deciding who is able to make such choices for them.

The second problem of this model is the role of uncertainty. All choices must be made on the basis of expectations about the future; the benefits of an activity can only be guessed at before it is undertaken. The benefits of activities foregone for the activity chosen will never be known. It is not surprising that individuals often make choices that seem, in retrospect, to have been wrong. This problem is solved in much of economic analysis by assuming perfect certainty and, thus, the absence of error. It is a useful assumption; uncertainty is a mathematically messy addition to most economic analyses. The fact that uncertainty cannot be assumed away in the real

5. See, e.g., J. QUIRK, *INTERMEDIATE MICROECONOMICS* 59-60 (1976).

world does not by itself prove that individual choice must be abandoned; one would have to demonstrate that other mechanisms deal better with uncertainty. An important feature of a reasonably well-working marketplace is that it at least provides the incentive to make correct decisions. Mistakes will be made, but decision makers will presumably learn from such errors and attempt to avoid them in the future.

The notion of a "best," or "optimal" allocation of goods and services is thus more the stuff of mathematical models than of the real world. A more useful consideration by which one might test the market's usefulness is to inquire whether it, relative to other mechanisms for resource allocation that might be considered, tends more consistently to provide incentives that nudge decision makers along in the direction of improved resource allocation. Competitive markets with well-defined property rights, reasonably complete exclusion, and ready access to the exchange process should serve this more modest cause well.

II. THE INITIAL ALLOCATION OF RIGHTS IN WATER

A theory of the process by which rights are created has not been developed.⁶ In general, one would expect that those individuals who first needed a resource would simply start using it; other users could be expected to do the same. As the demand for the use of a resource increased to the point at which the use of any one individual conflicted with that of another, *i.e.*, the resource was no longer a free good, exclusive property rights would be defined. Riparian doctrine, which defines a sort of collective ownership to rivers by owners of adjacent lands, represents a half step in this process. On the one hand, it imposes exclusion of those who do not own adjacent land, but does not define individual ownership of the water itself. It is an odd sort of compromise, one that implies that water has become a scarce good, but that treats it essentially as a free one.⁷

A clearer definition of rights has been achieved under the doctrine of prior appropriation. This was simply the granting

6. One preliminary effort to assess the creation of rights in land is given in Anderson & Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J. LAW & ECON. 163 (1975).

7. G. RADOSEVICH, K. NOBE, D. ALLARDICE & C. KIRKWOOD, *EVOLUTION AND ADMINISTRATION OF COLORADO WATER LAW: 1876-1976* at 16 (1976).

of specific titles to rights in water on a first-come, first-served basis. From the point of view of economic efficiency, this is an adequate way to initiate a market in rights for water. A lottery would also suffice. In either case, the initial allocation defines a starting point from which exchange can take place. Rights will, over time, be allocated to those users who place the highest value on them, providing that exchange is possible.⁸

Equity is also a relevant concern in the selection of a method by which the initial allocation of water rights is to be determined. The initial assignment of property rights, together with initial endowments of abilities and interests, determines the distribution of wealth in the economy. Rights to water use represent valuable assets; it would not be unreasonable to base their initial allocation on social goals with respect to the distribution of wealth. On this criterion, it is not obvious that the first-come, first-served approach of prior appropriation is of particular merit.

But another form of definition of rights preceded most grants to appropriators. States using prior appropriation doctrine typically asserted that the waters of the state were the property of the state, or of the people of the state.⁹ These rights were then given to appropriators as they claimed them. This public largesse was impressive as well as surprising; it is not at all clear that gifts to first takers represent the most equitable means of transferring property from the public to the private sector.¹⁰ The question is of more than historical interest. The public sector, by transferring wealth from itself on behalf of all individuals to a few individuals, has weakened its ability to reenter the market for water rights to buy back rights needed

8. Costly transactions may suggest an advantage for prior appropriations because this approach may reduce the number of future transactions needed to allocate the water rights. See R. POSNER, *ECONOMIC ANALYSIS OF LAW* (1973).

9. COLO. CONST., art. 16, §5 states:

The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided.

10. N. Wollman argues that states should make use of the price mechanism by selling rights to the highest bidder. See Wollman, *Economic Factors in the Study of Water Use*, in *THE LAW OF WATER ALLOCATION IN THE EASTERN UNITED STATES* 565 (D. Haber & S. Bergen eds. 1958); for a differing view see Trelease, *Policies for Water Law: Property Rights, Economic Forces, and Public Regulation*, 5 NAT. RES. J. 1, 10 (1965).

for public use, as discussed below. To the extent that unappropriated rights remain, states should consider selling them rather than giving them away. The question is one of equity rather than efficiency, but equity is not an unimportant consideration in the allocation of goods and services.

III. BENEFICIAL USE AND THE SECURITY OF RIGHTS IN WATER

Status as the first claimant of a right under prior appropriation is (usually) a necessary but not sufficient condition to assure title to a right to use water.¹¹ The water claimed must be put to a beneficial use, a curious qualification that suggests all manner of limitations on rights in water. Some of these are indicated in the following excerpt from a Nevada case, *Union Mill & Mining Co. v. Dangberg*:¹²

Under the principles of prior appropriation, the law is well settled that the right to water flowing in the public streams may be acquired by an actual appropriation of the water for a beneficial use; that, if it is used for irrigation, the appropriator is only entitled to the amount of water that is necessary to irrigate his land, by making a reasonable use of the water; that the object had in view at the time of the appropriation and diversion of the water is to be considered in connection with the extent and right of appropriation; that if the capacity of the flume, ditch, canal, or other aqueduct, by means of which the water is conducted, is of greater capacity than is necessary to irrigate the lands of the appropriator, he will be restricted to the quantity of water needed for the purposes of irrigation, for watering his stock, and for domestic use; that the same rule applies to an appropriation made for any other beneficial use or purpose; that no person can, by virtue of his appropriation, acquire a right to any more water than is necessary for the purpose of his appropriation; that, if the water is used for the purpose of irrigating lands owned by the appropriator, the right is not confined to the amount of water used at the time the appropriation is made; the appropriator is entitled, not only to his needs and necessities at that time, but to such other and further amount of water, within the capacity of his ditch, as would be required for the future improvement and extended cultivation of his lands, if the right is otherwise kept up

. . . .

A water right must thus be used for purposes that are beneficial in nature and suitable for the purpose in amount. The right can

11. See G. RADOSEVICH, *supra* note 7, at 20.

12. 81 F. 73, 94 (C.C. Nev. 1897); quoted in G. RADOSEVICH, *supra* note 7, at 22-23.

exceed present use if justified by the prospect of expanded operations, at least in agriculture. While the general nature of non-beneficial uses is unclear, rights can be forfeited in the event of non-use.¹³ Existing legislation provides for the discontinuance of any diversion within a designated groundwater basin if the rights are no longer necessary for a beneficial use.¹⁴

In a world of freely exchanging rights in water, the doctrine of beneficial use would, of course, be unnecessary. Water use would be allocated to uses judged beneficial by the market. Non-use would not be a problem; owners of rights would have nothing to gain by holding them idle when they could be sold.¹⁵ To be sure, the market's estimate of beneficial use might differ from that of the public, or its legislature. Some might, for example, object to the use of water in the washroom of a pornographic theatre. But the solution to such a problem is surely to regulate the theatre rather than shutting off its water.

If the beneficial use doctrine were merely unnecessary, there would be no particular cause for concern. It would serve as an amusing example of an eccentricity in the law, and nothing more. But the doctrine of beneficial use may be harmful, and thus warrants further examination. As noted above, rights in property must be enforceable if the market is to work properly; the absence of enforcement would destroy the market for rights. One usually thinks of this requirement in terms of protection from thieves and frauds. But, as Ciriacy-Wantrup has pointed out, security of rights requires more than the protection against unlawful use by others. It also requires tenure certainty, *i.e.*, protection from encroachment by the legal acts of others.¹⁶ The doctrine of beneficial use, with its implications of judicial determination of need and non-use, in effect increases the uncertainty of title to rights in water, and therefore reduces their marketability. As Trelease has noted, the flexibil-

13. See *Wheeler v. Northern Colo. Irrigation Co.*, 10 Colo. 582, 17 P. 487 (1887).

14. See, *e.g.*, *Water Rights Determination and Administration Act of 1969*, COLO. REV. STAT. ANN. §§ 37-92-101 *et seq.* (1973); especially §37-92-502(2).

15. An appropriator might find it desirable to hold rights idle temporarily; an efficient market would provide such an owner the opportunity to rent out rights not currently needed, as suggested below.

16. Ciriacy-Wantrup, *Concepts used as Economic Criteria for a System of Water Rights*, 32 LAND ECON. 295, 297 (1956).

ity of use in water rights is best assured by making those rights as rigid and clear as possible, thus making exchange easier.¹⁷

A classic example of the judicial mischief to which the doctrine of beneficial use can lead is the ruling in *Young v. Hinderlider*.¹⁸ Hinderlider had made first application for certain water rights in New Mexico, intending to market the water to a number of farms. Young and Norton filed an application for the same water two months later, proposing to use the water to irrigate their own farm at a substantially lower cost per acre than that anticipated by Hinderlider. The District Court awarded the rights to Hinderlider on grounds that he had applied first. The Supreme Court, however, developed an interest in the economics of the problem, ruling that "[t]he mere fact that the irrigation under the [Hinderlider] project would cost more per acre than under the [Young and Norton] project is not conclusive that the former project should be rejected. But the attempt to cover too much land may have gone so far that the cost of irrigation under that project would be so excessive that the owners of land under the project could not pay the water rights and farm the lands at a profit."¹⁹ It ordered the District Court to reconsider which proposal suggested the more beneficial use on this basis. It is an intriguing exercise to consider the effects of such reasoning were it applied to the acquisition of property rights for all other forms of investment.

The doctrine of preferential use is similar in spirit to the beneficial use doctrine in that it imposes a non-market test of priorities in rights. In its most common form, the doctrine holds that domestic uses of water have priority over agricultural uses, which in turn have priority over manufacturing uses. The notion is quite silly. All economic activity is ultimately for domestic use, that is, consumption. The eating of food off of a manufactured plate does not seem greatly less domestic than washing the plate afterwards. The purpose of the priority structure imposed by this doctrine is to permit preferred uses to exercise powers of eminent domain in the

17. Trelease, *A Model State Water Code for River Basin Development*, 22 LAW & CONTEMP. PROB. 301, 314 (1957); see also J. HIRSCHLEIFER, J. DEHAVEN & J. MILLIMAN, WATER SUPPLY (1969).

18. 15 N.M. 666, 110 P. 1045 (1910).

19. 110 P. 1045, 1050 (1910).

acquisition of water rights.²⁰ The justification for such a provision is not apparent. As noted below, monopoly power is more likely to rest with municipal buyers than with sellers in the market for water; granting buyers additional power does not seem necessary.

IV. LIMITS ON THE TRANSFERABILITY OF WATER RIGHTS

Rights to water are typically expressed in terms of a rate of diversion at a specific point. Holders of rights do not own water that they return to the stream after they have used the rights. This definition results in two major sets of difficulties. First, it reduces the ability of the market to generate incentives to economize on the consumptive use of water.²¹ Second, it reduces the marketability of the rights.

If rights to divert water implied full ownership of the water, then holders of these rights could sell "leftover" water to other users. This would force these owners to face the opportunity cost of wasting water. Users of irrigation water would, for example, have a greater incentive to line and cover ditches if water not consumed could be resold. The concern of the National Water Commission, that "[u]sers of water, public or private, are now typically awarded the right to divert and use water free of charge and need to give no heed to values that some other use of the water might yield," would be eliminated.²² Some incentive to economize exists now, given that conservation measures can reduce the amount of water a user needs to divert, and thus allows that owner to sell some of his rights. Increasing the marketability of these rights by providing for a resale market for water recharged to the stream would increase the force of this incentive.

Because water rights are really rights to divert water for some use, the courts have imposed limitations on their sale when that sale involves a change in use. Agricultural rights in water, for example, involve a decreed right to divert a specific volume of water per unit of time. The citation from the *Union Mill & Mining* case quoted above suggests that the decreed right can exceed present use to the extent that expanded agri-

20. G. RADOSEVICH, *supra* note 7, at 64-65.

21. Trelease, *supra* note 10, at 27.

22. NATIONAL WATER COMMISSION, *WATER POLICIES FOR THE FUTURE* 251 (1973).

cultural operations are planned for the future. The greater the volume of water decreed, the greater the value of the right. When such rights are sold for domestic use, however, the nature of the right is changed. Because domestic use typically involves a continuous diversion of water and a greater degree of consumptive use, the full amount of water decreed to agricultural users cannot generally be sold. Instead, sales are limited to the amount of historical use, which must in addition be reasonable.²³ These rulings suggest that the volume of water implied by the right changes if the use changes, thus limiting the incentive for rights to transfer to what may be a more efficient use. Recognizing rights as decreed, and permitting the resale of water not used, would take care of the problem of incentives to conserve water as well as providing for the easy exchange of water among users.

Another legal limitation on the transferability of rights is the ban on the sale of rights to waters in one state to agents in other states.²⁴ This ban reduces the market's ability to communicate, through the price system, alternative needs for water. It also exacerbates a structural difficulty noted above. Interbasin transfers of water are characterized by the enormity of the scale with which they are carried out.²⁵ It is unlikely that within a state like Colorado there would be very many buyers able to build a large interbasin diversion project. This limits the number of domestic bidders for water in remote areas, thus resulting in possible monopoly power on the buyer's side, or monopsony. Monopsony power permits buyers to pay a price below the price that would exist in a competitive market. Eliminating competing purchasers from other states strengthens the bargaining power of local domestic buyers. As noted above, granting them powers of eminent domain makes things even worse.

23. In *Farmers' Highline Canal & Reservoir Co. v. City of Golden*, 129 Colo. 575, 272 P.2d 629 (1954), the court held that the amount of water claimed as historical agricultural use was excessive, and noted that the testimony of "any capable experienced farmer" could be used to determine a reasonable amount, which, in turn, would define the amount that could be sold for domestic use. See also *Enlarged Southside Irrigation Ditch Co. v. John's Flood Ditch Co.*, 116 Colo. 580, 183 P.2d 552 (1947); *City of Westminster v. Church*, 167 Colo. 1, 445 P.2d 52 (1968).

24. J. HIRCHLEIFER, *supra* note 17, at 242.

25. C. HOWE & K. EASTER, *INTERBASIN TRANSFERS OF WATER* 4-5 (1971).

V. MARKET FAILURE AND WATER RIGHTS

The discussion to this point has dealt with market problems in the exchange of water rights that result from public policy. But there are other difficulties inherent in the market process itself, difficulties that emerge when it is not possible to define property rights in a way that forces the market to incorporate all of the costs and benefits of decisions into the choice perspectives of the individuals making those decisions.

Some uses of water are not susceptible to easy exclusion of individuals that do not pay for them; a beautiful stream may be a difficult thing to price in the market. The benefits derived from the stream are no less economic as a result; the prices generated in the market will simply fail to reflect them adequately. The result will be too few unspoiled streams. In such cases, public purchase of water rights to preserve the streams may be justified. If the rights are already held by the public, the decision would involve a comparison of the public benefits of leaving the stream in its natural state with the bids offered for private purchase of the rights. The problem is the classic one of the public good.

A related objection to the market's allocation of water is the prospect that domestic users would be able to buy up all of the rights in water for irrigated agriculture. The fear is rather fanciful; water for irrigation accounts for such a high percentage of all water used that a relatively small percentage reduction in agricultural use would provide for a tremendous increase in residential or industrial use. In any event, if some diversion of water from agricultural use is expected, the problem is to determine whether such a market-induced diversion is undesirable. Food is not a public good; there is no problem there. But agricultural operations provide another service that has value; fields devoted to crops provide open space, which yields aesthetic benefits as well as flood control and reduced air pollution. The field that produces food thus produces other benefits at the same time. These other benefits are not characterized by exclusion; the price system therefore fails to reflect them. Farmers are thus forced to bid for factors of production, like water, with the deck stacked somewhat against them. If these public benefits are to be recognized, however, they suggest a payment to farmers for the open space benefits of their agricultural operations, not the provision of cheap water. The

latter approach makes no more sense than decreeing that farm workers should receive a low wage to encourage agricultural operations. Keeping the price of any factor artificially low results in the waste and inefficient allocation of that factor.²⁶

VI. TOWARD GREATER EFFICIENCY IN WATER MARKETS

A smoothly functioning market for rights in water would result in the easy exchange of water among agents and among uses, resulting in greater efficiency. Owners of water rights would continually be faced with bids reflecting the cost of their use of the rights; they would be induced in their own interest to economize on their use of water, and to sell their rights if some other agent placed a higher value on them. But observers of the water market commonly note that it does not work that way. The fact that water rights for agricultural uses sell for prices much lower than equivalent rights for other uses is evidence that the market does not work as smoothly as suggested here. This essay has explored some of the reasons for those rigidities; many of them can be eliminated by changing public policy.

But an added difficulty arises from the rather complex nature of water as a fluid resource. Rights in water are harder to define and to observe than, say, rights in basketballs. Purchasers and sellers of water rights face high information costs in determining which rights are available for sale and who may be buying them. Tracing the title to a water right is a complicated business. The authority of state water engineers and water allocation boards can be of great significance in dealing with these problems. If these agencies were to focus all their efforts on the problem of providing information about the rights owned in water, they would be providing a great service. Investment in information and the smooth functioning of the marketplace in water may yield benefits far greater than those of new water projects.²⁷

As information systems in water allocation improve, there is reason to believe that a variety of new methods of exchanging

26. Nancy L. Sidener has suggested that provision of cheap agricultural water could even be construed as a violation of the prohibition of subsidies to export industries in the General Agreement on Tariffs and Trade.

27. See Null, *Water Use as a Property Right*, 22 THE COLORADO QUARTERLY 317, 326 (1974).

rights might emerge. Rights could be leased from owners for short periods. Problems of temporary shortage, such as drought, could be dealt with through such lease arrangements. Associated problems of uncertainty might generate the same response in the water market that they have in other markets, the creation of futures markets. It may become commonplace in the future to hear December quotes on July South Platte water. Water brokers might increase in number.

The market is no panacea. As has been noted above, public intervention will be required to deal with public goods—and public bads, such as pollution. But the market for any good has the enormous virtue of generating large amounts of information, transmitting this information in the form of prices, and through these prices prodding decision makers in the direction of more efficient use of scarce resources. It has been insufficiently used in the allocation of water; investment in its increased use should be a high priority of water policy.

