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A MARKET-BASED APPROACH TO WATER RIGHTS:
EVALUATING COLORADO'S SYSTEM

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COLORADO WATER ISSUES AND OPTIONS:
THE 90'S AND BEYOND
Toward Maximum Beneficial Use
of Colorado's Water Resources

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A Market-Based Approach to Water Rights: Evaluating Colorado's System

by Stephen F. Williams

Introduction

Continuation of Colorado's prosperity obviously requires water. Its availability depends on facilitating transfers and on minimizing waste.¹ Happily, Colorado's current agricultural usage provides a generous pool from which underused or wasted water can be drawn. As of 1980, for example, agriculture was responsible for 87% of Colorado's consumptive water use.² Fairly trivial savings in the

¹ Throughout the paper I conceive of waste in economic terms, i.e., as "a preventable loss the value of which exceeds the cost of avoidance." S. L. MacDonald, Petroleum Conservation in the United States: An Economic Analysis 129 (1971). This obviously excludes some water uses that might fit the colloquial concept of waste. For example, if water is thrown upon the sidewalk in the course of watering, it appears to be wasted; but if the cost of avoiding it -- e.g., the use of more sprinkler heads, more finely tuned ones -- exceeds the value of the water saved, such a use would not be wasteful within the economic definition. The fundamental point is that all kinds of resources are valuable to a society, so that a single-minded focus on saving water will make society worse off.

² U.S. Geological Survey Circular 1001, Estimated Use of Water in the United States in 1980 (1983). The 87% figure comprises irrigation and other rural fresh-water use (Tables 3 and 5); the remaining 13% comprises public-supplied fresh-water, self-supplied industrial water, and thermoelectric power consumptive use (Tables 1, 7 and 9).

agricultural sector could, therefore, provide for a doubling or tripling of industrial and municipal consumption. How can these savings best be brought about?

The current system is, of course, a mix of market and government control, with the market element probably dominant. There are quite a few voices raised, however, in favor of increasing the regulatory component, in the form, for example, of using the "beneficial use" doctrine to mandate water-saving. These suggestions seem to me ill-conceived. The interest in getting the most value out of our water would best be served by moving in the opposite direction -- by diminishing the current fetters on the market.

The arguments for reliance on the market are the familiar ones. Above all, the market is an extraordinary system for generating information. Individuals and firms, buying and selling in a market, generate prices. Those prices, coupled with individual ingenuity, in turn enable people to make sensible decisions on how much to consume, how much to produce, and how to go about production. Thus a wheat farmer is able to decide how much fertilizer he will use, and of what types, without knowing anything about how the fertilizer is made. But his action in deciding how much to buy (and of course those of millions of others) give fertilizer manufacturers critical information about how much they should produce. And so on backwards through the productive process. No government agency could ever pull together the information needed to make these decisions.

Before discussing Colorado water law itself, let me respond in advance to the most common attack on reliance on the market in water -- "water is essential to life itself."

First, if the market is a good instrument for allocating non-essential resources, one might think that it was all the more important to use it for allocating an essential one.

Second, quite a few other elements are essential for life. Have you ever tried growing wheat without land? (or even practicing law?) Yet on the whole we allow the allocation of land to be market-determined. (I'll return to the comparison in more detail later.)

Third, none of the institutions that we discuss here today will ever jeopardize -- or even seriously affect -- the supply of water for the purposes that make us call it essential. Somewhere out in the great western desert there may be a person or two about to expire for want of water, but that will be because of an extremely local problem -- for example, he may inadequately prepared for a camping trip or for a journey across a long barren stretch of road. In this discussion, by contrast, we are talking as of water as an input to agriculture, or to industry, or to non-vital domestic uses. Suppose, for example, the domestic price of water were

to double.³ Lawns might shrink, cars might be cleaned less often (or more efficiently), but no one would die of thirst, or have to go about dirty, or even have to alter his cooking methods.

There a great western tradition of proclaiming water essential -- and then adopting institutions that guarantee its waste. We could perhaps do better by simply focussing on the issue of how to nurture institutions that will diminish waste.

This paper will first try to develop the necessary criteria for establishing a market that will secure adequate efficiency in the use of surface water. It will then consider the special case of instream uses. Finally it will address nontributary groundwater.

³ Of course in the part of Denver without water meters, the price of water to the user is zero. This is itself a curious comment on the reluctance of Coloradans to think seriously about water policy. There is powerful evidence that residential users' consumption is highly responsive to price. See J. Hirshleifer, J. C. deHaven & J. W. Milliman, Water Supply: Economics, Technology and Policy 309 (1960); Zach Willey (Environmental Defense Fund), Economic Development and Environmental Quality in California's Water System 35 n. 20 (Institute of Governmental Studies 1985) (hereinafter cited as EDF Report) (referring to evidence that the price elasticities of demand are about -0.92 in the urban sector and -0.91 in the agricultural sector). A price elasticity of -0.92 means that a consumer would reduce his consumption 9.2% in response to a 10% increase in price.

A. Criteria for Minimizing Waste of Surface Water

It is my thesis that waste can be adequately prevented by giving the holders of water rights conventional market incentives to avoid waste. The conditions that would establish such market incentives are as follows:

1. Owners of water rights will not waste water if they bear the cost of such waste.

For purposes of the above statement, "cost" means "opportunity cost."

2. Owners of water rights will bear the opportunity cost of waste if their rights are readily transferable.

3. Water rights meet the above test of ready transferability if

a. administrative/adjudicative costs are kept low;

b. water rights are clearly defined;

c. transfer is restricted only in the interest of protecting junior appropriators; and

d. the adjustments made in the interest of protecting juniors are the minimum consistent with that protection.

This section will elaborate on these criteria.

1. Owners of water rights will not waste water if they bear the cost of such waste.

For purposes of the above statement, "cost" means "opportunity cost."

Suppose a farmer could save⁴ 1000 acre feet of water (annually) by means of a device that he can install for \$5000. (To keep matters simple, assume the device has no operating costs and a perpetual life). The opportunity cost of not installing the device is the value of the water saved, less the cost of installation. If the water saved is worth \$20,000, then the opportunity cost of the farmer's inaction -- the farmer's waste -- is \$15,000.

There are various ways of making the farmer "bear" that cost. The state could fine him; it could penalize him by taking the water away from him; it could install the device and insist on payment from the farmer. None of these methods is very consistent with our institutions -- or at least our dominant institutions. All of them require that the state snoop around, determine that the particular waste-reduction is feasible, and bring the weight of its bureaucracy to bear on the farmer.

Not only are these methods inconsistent with our institutions, they are themselves monstrously inefficient. How reliable do you think the bureaucrat's decision -- that it

⁴ "Save" refers to real savings, i.e., to water otherwise lost through evapotranspiration. It does not refer to water that seeps out of a ditch and is put to use by downstream users.

is efficient for Farmer A to install such-and-such a device -- will be?

More basically, determination that a particular practice is wasteful requires some device for valuing the water saved; unless we know that value, we cannot determine whether the extra water is worth the expense. Determining a value for water essentially requires the existence of a decent water market to generate prices.⁵

Defects in the water market drive a wedge between between a farmer's and a bureaucrat's view of sensible water-saving methods. The bureaucrat may well value water at its incremental cost -- the cost of adding new water supplies through dam building, etc. This might amount to, say, \$500 per acre foot. But if the farmer is unable to realize that amount for water that is saved, he will clearly compare the cost of the savings against a much lower value. In the extreme case, where he cannot sell it and he cannot increase the yield from his land by increasing water use, he would value the extra water at zero.

For precisely this reason, a recent report for the Environmental Defense Fund⁶ takes a fairly skeptical view of

⁵ In a market individuals and firms create prices by their conduct -- indicating by selling that a particular quantity of water is, to them, not worth the market price, indicating by buying that they have a use that they deem at least as valuable as the market price. The ongoing pattern of these exchanges keeps driving the price to a level at which no further exchanges will provide any benefit; of course new developments constantly change people's evaluation of their own circumstances, so that new transactions, and new price changes, occur.

⁶ EDF Report, supra note 3, at 4-5.

bureaucratic enforcement of the concept of "reasonable and beneficial use." It points to a proceeding by the State Water Resources Control Board in California, in which the agency was valuing water at \$200 an acre foot (a very conservative estimate of the cost of new water supplies), while the farmers in the Imperial Irrigation District were valuing it at the \$9 per acre foot that the district paid. In such a case, the opposing parties will be talking at cross-purposes, farmers will fight enforcement with bitterness and at great cost, and in all probability only the most egregious of waste will be ended (if any). The EDF Report concluded that the episode

...illustrated the difficulty of this approach, clearly only second best when compared to the establishment of a market for water transfers.⁷

Because of the difficulty of agreeing on values for purposes of comparing expenses with water saved, a regulatory system for preventing waste cannot work unless accompanied by an adequate market. But, as I hope to show below, with an adequate market, there is no need for regulatory intervention.

There is, happily, a way of making the farmer bear the cost that is entirely consistent with our institutions: creation of an adequate market in water rights. With such a market, the farmer can quickly recognize that by failing to install the device, he is foregoing the \$20,000 that the water is worth; in our example, he is foregoing a net gain of \$15,000. (To put in in terms of "opportunity cost," he in

⁷ Id. at 4.

incurring an opportunity cost of \$15,000.) That should give him ample incentive to install the device.

2. Owners of water rights will bear the opportunity cost of waste if their rights are readily transferable.

With very limited exceptions, the state does not go around demanding that a landowner apply his or her land to specific uses. It imposes limitations on what he may do (zoning), but it does not affirmatively demand that he do anything very much. It does not, for example, insist that the owner of any parcel of downtown Denver real estate build on it.

How is it that the state evidently feels free to allow urban landowners to "neglect" their land (in the sense of underusing it, of failing to apply it to a beneficial use)? Is it because Denver real estate is not very valuable? Is it because urban landowners are smart and the owners of water rights are not?

My answer would be this: Real property law implicitly recognizes that the owner of urban real estate is disciplined by the market. It assumes that if he fails to apply his property to the most productive uses, there are plenty of people out there who can imagine how they might do so, and that he will sooner or later (probably sooner), see their

bids. He can indulge in the luxury of underuse only at the cost of foregoing those bids.⁸

While Colorado real property law has developed on the implicit premise that the land transfer market works well enough to discipline neglectful landowners, its water law has developed largely on the opposite premise -- that the water rights market cannot adequately discipline neglectful water rights owners.

Let me offer three samples of Colorado water law reflecting this more pessimistic premise: (1) the requirement of beneficial use; (2) the doctrine of abandonment; and (3) the concept that an appropriator does not ordinarily have a property interest in the return flow from his use (e.g., he cannot ordinarily obtain an injunction against a downstream junior whose use would, under prevailing stream flow conditions, be impossible without that return flow).

There are a variety of ideas likely to be invoked in favor of these rules: First, it may well be said that they prevent anyone from being a "dog in the manger." Second, they might be defended on the ground that, since water is a uniquely precious resource, the public interest in efficient water use requires state supervision. Thus, in the case of beneficial use, the public interest requires that no one use

⁸ Why, then, are there tracts used only as parking lots in downtown Denver? They may seem wasteful. But presumably the owners of such land hold off development in the belief that such a course will maximize the present discounted value of the land. Incidentally, some of them may be wrong, but, because they bear the primary cost of any error, we are willing to rely on their judgment.

water for a purpose that the state has not recognized as contributing to human well-being. In the case of abandonment, anyone who has failed to use his water over an extended period might be said to have established by his behavior that his use cannot be making much contribution to public well-being, so that the public interest requires its termination. In the case of return flow, it will be argued that allowing the owner to veto uses of his return flow would lead simply to waste of water.⁹

All of these arguments, however, are simply the assertion of an implicit premise that the market is not well enough developed to put adequate pressure on people either to use their water efficiently, or to sell it to one who can. So long as the market enables those with good ideas for the use of water to bid it away from current owners, there is no reason to believe that any of these doctrines is needed to assure efficient water use.

I would submit that this gloomy premise about the water rights market, if now true, can be changed. The section below addresses the criteria that must be met if water rights are to be transferable enough so that the market can discipline those inclined to waste.

⁹ A further argument would be that any other rule would allow the development of monopoly conditions. That seems to me most implausible, except insofar as instream uses are concerned. In an watershed where little water has been committed to consumptive use, appropriation by merely asserting an instream use might well lead to monopoly. The problem is treated separately in Part B.

3. Water rights meet the above test of ready transferability if

- a. administrative/adjudicative costs are kept low;
- b. water rights are clearly defined;
- c. transfer is restricted only in the interest of protecting junior appropriators; and
- d. the adjustments made in the interest of protecting juniors are the minimum consistent with that protection.

Below I will review each of the four subparts of these conditions for adequate transferability.

a. Administrative/adjudicative costs are kept low.

Clyde Martz has addressed this point. At least to an outsider, his argument that transfers could be eased by greater reliance on the administrative process seems persuasive.

b. Water rights are clearly defined. Each of the doctrines that I discussed in the first part of this paper tends to undermine the clear definition of water rights. The concept of beneficial use, for example, means that the vendor and vendee of water rights will, at least in some cases, be uncertain whether the would-be transferor has any right to transfer. Again, let me draw the contrast to the urban land market. If A owns a tract that he has used only as a parking lot for 15 years, he can clearly sell the area to which he initially acquired title, without anxiety that his use in that period may be deemed not "beneficial" and thus expose him to a

claim that he had abandoned his right. Nor will the quantity available for sale be reduced on the ground that his "historic use" was less than his paper title. But Colorado water law creates precisely such gaps between paper title and legally transferable right.

c. Transfer is restricted only in the interest of protecting junior appropriators. On this point, Colorado law conforms to the principles I've set out. Unlike some other states -- Wyoming comes to mind -- Colorado does not mandate an open-ended inquiry into whether the transfer serves the public interest. In my judgment, that is entirely correct. Any broadening of the inquiry would increase the risk of disapproval; anything that increases the risk of disapproval makes the owner's expectation of revenues from a sale more iffy; and anything that makes that expectation more iffy will dull the market's incentives.

Let me change my earlier hypo a little. Suppose the device costs \$15,000, so that the net saving is only \$5000. And suppose in the "review" process, a proposal of transfer has only a 50-50 chance of passing. At that point the prospect of an offer of \$20,000 has a value of only \$10,000 (after we've adjusted for the chance of defeat).¹⁰ (I am putting aside the out-of-pocket costs of the review process, covered in the first point above.) Any comparable broadening

¹⁰ This oversimplifies. Unless the review agency or court is hopelessly erratic, it should be possible to identify transfers with a good chance of passing, etc. For the sentence in the text to be accurate, then, it must refer to a particular type of potential transfer with a 50-50 chance of getting through the review agency or court.

of the inquiry that accompanies transfer will have a similarly dulling effect of waste-reduction incentives.

Although Colorado does not obstruct transfers except in the name of protecting juniors, federal law does so. The owner of a Bureau of Reclamation irrigation right, intending to sell the right to an industrial water user, is not allowed to enjoy the full capital gain. The Bureau conditions approval of transfer on its recapturing a substantial portion of the original subsidy.¹¹ The principle appears to be that a person should not profit unduly from transferring to industry a water right that was initially established because of a national program in favor of agriculture. I understand the principle, but let me state what is involved in a slightly different way. The rule requires that a valuable resource be wasted -- i.e., held below its most valuable use -- merely because a private person would enjoy an unintended gain as a consequence.

The country has already been through this issue in relation to capital gains. Because of a hostility to incidental profits, Congress gradually pushed the effective rate up to nearly 50% in the mid-1970s. By 1978, however, it recognized the deleterious effects for the country as a whole -- the recognition was completely bipartisan -- and sharply

¹¹ See National Water Commission, Water Policies for the Future 264-68 ((1973), for a review of Bureau of Reclamation policies and recommendations for diminishing the subsidy recapture burden. See also Ellis & duMars, The Two-Tiered Western Water Market, 57 Neb. L. Rev. 333, 335-49 (1978) (reviewing federal discretionary power over transfers of project water).

reduced rates. The Bureau of Reclamation recapture rules amount to a surtax on the capital gains derived from transfer of such a right; that surtax should be abolished.

My guess is that our representatives in Congress could free up far more water for Colorado if they took half the energy that they lavish on water projects and instead devoted it to the repeal of these rules.

d. The adjustments made in the interest of protecting juniors are the minimum consistent with that protection.

Here, I think, Colorado law could enjoy some improvement.

It is standard that an appropriator does not have a property right in his return flow. He could not, for example, obtain an injunction against a downstream junior on the ground that, without the return flow from his use, the junior would have no water.

Adequate transferability of water seems to me to require modification of that concept in the context of water transfers. When transfer occurs, the new right (or newly reconstituted right) should, I submit, be defined so that the owner has a property right in any return flow that would otherwise be a windfall to downstream users.

Let me illustrate. Suppose that A has a right to divert 10 cfs and his use is 50% consumptive. He proposes to transfer the right downstream. Suppose it is determined that, in order to protect juniors located between the two points of diversion, the water right must be cut in half, say from 10

cfs to 5 cfs. Further suppose that the new use is also 50% consumptive.

Juniors downstream of the new use will, under current law, enjoy a windfall. As the new use might have been 100% consumptive, they are getting extra security for their rights in the form of the 2.5 cfs that the transferor could have used himself, but doesn't.

This transfer is effectively taxed at a rate of 50%, when the law reduces the right from 10 to 5 cfs. Enabling the owner to enjoy a property right in the return flow -- which his action has conferred upon downstream juniors -- would offset that penalty. It would thus reduce the negative effects on transferability that flow from the protection of juniors.¹²

The standard objection will be made that this would allow the transferring party to be a "dog in the manger." It does so no more so than does allowing people to own parking lots in Denver. If A owns a parking lot, and B has the idea that he could put the land to a better use, and therefore starts building on it, we don't say to A: "Oh well, you weren't

¹² See L.M. Hartman & D. Seastone, *Water Transfers: Economic Efficiency & Alternative Institutions* 10-11 (1970), for advocacy of this solution.

A more radical concept would be a rule that all appropriators have a property right in their return flow. Under such a rule it would be a rare case where juniors' rights would be adversely affected by a transfer. (This puts aside persons using the water as a result of transactions with the appropriator whose return flow was involved and who could be expected to protect themselves by contract with their vendor or lessor.) Institution of such a system at this date is clearly impossible because of the massive restructuring of rights that it would entail.

using it adequately, so we'll let B go ahead." We let A veto B's intrusion. That is to say, we force B to use a market transaction to convince A -- i.e., to bid the land away from him. The same principle should, I submit, apply to water that is a windfall to downstream juniors as a result of a transfer. If he thinks he has a valuable use, let him bid for the water from the owner of the transferred right. In the absence of monopoly, and with the costs of transfer modest, the risk of waste should be minimal.

While this proposal may seem extreme, it in fact already applies in the limited area of water imported from another basin. In that instance, the importer is regarded as owning the return flow from his use.¹³

In the absence of a water market, direct government action to monitor and prohibit waste is doomed. It will generate antagonism between farmers and the enforcement agency, prolonged and expensive proceedings before agency and court; only on very rare occasions, in instances of extreme waste, would it actually save any water. With a reasonably functional water transfer market, no such direct governmental action would be necessary. Water users, with an eye to resale of any water savings, would adopt economical water saving devices on their own.

Enhancement of the water market in Colorado is a project that can unite adherents of the free market, typically located on the "right," and environmentalists, typically located on

¹³ City & County of Denver v. Fulton Irr. Ditch Co., 506 P. 2d 144 (Colo. 1972).

the left. Speaking of water transfer markets, the recent EDF Report argues:

Those who hold water rights could generate extra income by selling some water, and the water buyers could purchase water at prices lower than the costs of newly developed water supplies. Pressures to divert additional water from natural ecosystems would be reduced, thus benefitting the environment.¹⁴

Enhancement of the water transfer market establishes a game in which everyone can win.

B. Instream Uses

Instream uses have at best fitted awkwardly into the scheme of prior appropriation. Some of the difficulties have seemed doctrinal, but there are also some practical difficulties in fitting instream uses efficiently into the law of prior appropriation.

First I wish to put aside altogether the idea that instream uses are in some way inherently inferior or, as they have been found in some jurisdictions, non-beneficial. Governor Lamm has rightly pointed out the enormous contribution that instream uses make to the economy of the state, attracting fishermen and other vacationers from less attractive states. But surely we need not base the beneficial character of instream uses on its revenue potential. Even if not a dollar changed hands, clearly -- at least it is clear to

¹⁴ EDF Report, supra note 3, at 3-4.

me -- the aesthetic contribution of water, left alone in the stream, justifies its recognition as beneficial. Water in a stream, smooth or rippling or cascading over rocks, sunlight reflecting from the water, the light patterns on nearby trees -- all these are among the things that make life worth living. As did one of Shakespeare's characters, celebrating life outside of worldly competition, we can find "books in the running brooks...and good in everything."¹⁵

Despite the (to me) unquestioned value of water untouched by dam builders, there are real problems in assuring that the provision of instream uses does not end up radically distorting the total system for allocating water. Instream uses have their opportunity costs too. We should strive for a system in which water shifts out of instream uses when the cost exceeds its true value and into instream use when the opposite is true. I see three main problems: (1) risks of monopoly; (2) so-called free rider problems; and (3) assuring that holders of instream rights are exposed to the opportunity costs of continued instream use.

Monopoly. Historically, the diversion requirement has blocked establishment of instream rights in private persons (and, in some cases, even in public entities).¹⁶ In a watershed where much of the water is unappropriated, the

¹⁵ W. Shakespeare, As You Like It, II, 1, 16-17. The full passage is:

And this our life, exempt from public haunt,
Finds tongues in trees, books in the running brooks,
Sermons in stones, and good in everything.

¹⁶ Colorado River Water Conservation District v. Rocky Mountain Power Co, 158 Colo. 136, 406 P. 2d 798 (1965).

application of that rule tends to prevent the monopoly which would result from application of the other aspects of prior appropriation law (assuming instream uses were recognized as beneficial).¹⁷ If appropriation without diversion were valid at that stage, application of standard prior appropriation doctrine (i.e., treating commitment to a beneficial use as sufficient to establish a right) would allow a sharp operator to acquire an instream right to all the then unappropriated flow.

Consequently, until a stream is largely appropriated (and assuming continued reliance on prior appropriation as the basic device for initial allocation of water rights), permitting appropriation by private persons under the usual rules would be problematic. Restricting appropriation for instream purposes to government entities makes some sense, on the principle that such an entity would not seek a monopoly. However, one would want to be sure either that its membership was truly representative or, perhaps, that its acts became final only on legislative approval. Alternatively, one might allow private persons to appropriate for instream uses, subject to veto by a government review board. Presumably such a review board would look with special favor on appropriations by organizations permanently committed to instream recreation

¹⁷ Allocating rights initially by an auction rather than by a user's application to use would help circumvent this. See Williams, The Requirement of Beneficial Use as a Cause of Waste in Water Resource Development, 23 Nat. Res. J. 7, 20 (1983).

or to preservation of nature generally (such as Trout Unlimited or The Nature Conservancy).

Free riders. An instream use is likely to be enjoyed by individuals that the private owner of an instream right could not charge. To take the most obvious case, where a road or public park borders a stream, people can stop to fish or picnic or just watch the water. Many of those people would doubtless be willing to pay for the use, if the owner of the instream right could fence it and collect a fee. But in many instances the cost of fencing would be prohibitive in relation to the possible fee, and fencing might be undermined by access through public land.

Thus people would be able to get a "free ride" on the owner's rights. A well-accepted economic principle is that where such free-rider problems exist, the market is likely to undersupply the good in question. As entrepreneurs are unable to collect the equivalent of full market prices for the good, they will not supply it as amply as a good that is not subject to such free rides.

Thus, while the monopoly issue would (at least for a largely unappropriated stream) lead to excessive commitment of water to instream uses, the free rider problem would lead to the opposite direction.

There are various solutions here. First, people contribute voluntarily to organizations that preserve nature. Those contributions -- an implicit private sector recognition

of the free rider problem -- provide an offset at least to a degree.

Second, government can provide a subsidy. It already does so by allowing tax deductibility for charitable contributions since nature preservation is clearly among the permissible charitable purposes. But that subsidy could be increased, for example, by providing matching grants to organizations that acquired instream rights for public or semi-public use.

Third, government agencies could themselves acquire instream rights. As noted above, that is a potential solution to the problem of monopoly that would arise if private organizations were allowed to appropriate for instream purposes when a stream was largely unappropriated. This is, of course, the primary solution in the prior appropriation states.¹⁸

Undervalued opportunity costs. Instream uses limit possible diversions that are upstream of the point on the river where the instream use comes to an end. (This includes upstream transfers of pre-existing uses.) A government agency charged with holding instream use rights is not likely to be very sensitive to these opportunity costs. No matter how excellent the water transfer market may work in general, such a body will be extremely reluctant ever to relinquish, or diminish, an instream use right. Yet the value realized by

¹⁸ See generally Tarlock, Appropriation for Instream Flow Maintenance: A Progress Report on "New" Public Western Water Rights, 1978 Utah L. Rev. 211.

the shift of a use upstream is bound sometimes to exceed the value of the diminution in the instream use right.

A private organization dedicated generally to preserving nature -- The Nature Conservancy, the Audubon Society, etc. -- seems far more likely to be responsive to bids from competing users. It will typically enjoy a broad mandate in the general area of nature preservation, so that it will recognize the alternative uses of the revenue that partial relinquishments may yield. A concomitant will be budget flexibility typically lacking in a state agency.

Perhaps the most well known example of this is the Audubon Society's oil and gas leasing in the Rainey Preserve in Louisiana. The Society, comparing the potential revenue from oil and gas operations (conducted under severe and precise restraints), and the good it could accomplish with that revenue, with the relatively minor sacrifice of environmental quality at the preserve itself, found the transaction to be an overall benefit to its mission.¹⁹

Such flexibility seems almost unimaginable in a government agency. A transaction of that sort would be hailed as a "sell-uo" by the agency's constituency; it would probably have to turn the revenue back to the state treasury; its personnel would be demoralized by the shrinkage of the agency's turf.

Solutions. The above analysis suggests that the rule against appropriations by private persons for instream uses

¹⁹ J. Baden & R. Stroup, Saving the Wilderness -- A Radical Proposal, 13 Reason No. 3, pp. 28-36 (July 1981).

requires modification. A tentative proposal for a legal regime for instream use would be roughly as follows:

- o For initiation of rights, private charitable organizations dedicated to nature preservation should be allowed to make initial appropriations, subject to veto by a fairly representative government agency. This rule largely solves the risk of monopoly, while opening the door to instream holdings by non-state parties.

- o Private persons should be free to acquire non-instream rights and convert them to instream flow purposes, as such a conversion entails no serious risk of monopoly.

- o Subsidies for acquisition of instream rights by private charities are suitable as a response to the free rider problem, particularly in the form of matching grants or tax credits or deductions.

- o In general, holdings by private charitable organizations should be preferred to state holdings, because of their greater responsiveness to opportunity costs. Such organizations, so long as they fit a pre-defined class of entities committed to nature preservation, should be free to sell rights as well as acquire them, and to accept cash or other consideration in exchange for reductions in rights when those reductions are needed to allow upstream transfers of consumptive uses.

C. Nontributary Groundwater

The criteria discussed in Part A are applicable to nontributary groundwater. There are three significant differences, however: (1) the physical interaction between users is somewhat different; (2) exhaustion is possible (and, I would argue, in many cases desirable); and (3) groundwater law is not bedevilled by a century of the Rule of Capture.

The third point is perhaps most critical. For surface water law, escape from the Rule of Capture is a virtual impossibility. But for nontributary groundwater, the field is open.

I am startled that the Rule of Capture should even be a serious candidate for a nonrenewable fugacious resource. For 125 years, the story of oil and gas law has been the struggle to undo its ill effects. To use it as the starting point for a law on nontributary underground water seems to me to disregard that history.

The defects of the Rule of Capture are well known. Essentially it generates a race to extract. Putting aside some technicalities that are special to oil and gas, that race generates two costs: First, it is likely to lead to an excessive number of wells, as owners seek to get the oil or gas out before fellow owners can. Second, and again for the same reason, owners extract at too fast a rate: that is, they disregard the value that the oil or gas may have in the future. They do so for the very good reason that each owner has no assurance of being able to get it in the future -- he

may lose it to others if he fails to extract. While private property rights normally give an owner an incentive to conserve for the future, in order to maximize the present value of the property,²⁰ the uncorrected Rule of Capture obliterates that incentive.

When I say that the Rule of Capture remains a candidate for nontributary groundwater, I should say explicitly that I refer to the proposals of "Subgroup #2" of the Governor's Groundwater Legislation Committee. It is, however, inaccurate to refer to their proposals as simply a Rule of Capture. First, under their proposals, land ownership would not operate at all to limit potential extractors. Thus, one of the elements that limits the race to extract in oil and gas would be absent.

Second, in order to control the race to extract, the Subgroup #2 proposals would provide for very broad bureaucratic discretion. The state engineer, a revised Groundwater Commission, and local management authorities would, between them, determine the number and location of wells and the rate of extraction. The general idea is that waste-prevention must occur entirely through direct governmental action. Thus, although the doctrinal basis would be different, the premise that merely occupies the periphery of surface water law -- the assumption that the market cannot

²⁰ This is addressed in more detail below.

impose adequate constraints on neglectful water users²¹ -- would become central to nontributary groundwater.

Subgroup #2 dealt in harsh terms with the proposition that overlying ownership should determine the right to extract and that overlying owners should have an indefeasible right -- i.e., a right that others cannot destroy by going ahead with extraction. Let me briefly consider the Report's criticisms of overlying ownership:

1. The Report argues that the overlying ownership criterion is "[1] arbitrary, [2] nonresponsive to optimum reservoir development, [3] inflexible where flexibility may be needed for optimum water use and [4] possibly unreliable where aquifers may have significant tributary characteristics." (Report of Subgroup #2, July 24, 1984 ["Subgroup #2 Report"], p. 4.) (The characterizations are also applied to the statutory 100-year minimum life rule; as applied to that rule, they seem correct.)

All these statements [at least the first three] could be made about land ownership. What provides the flexibility, the responsiveness to optimum use, and the non-arbitrariness, is the capacity of owners to make transfers. Those attributes can and should apply to water rights based originally on overlying ownership.

Basing rights on overlying ownership should, however, be only the starting point. Even with such ownership, owners

²¹ See Part A and its discussion of the doctrines of beneficial use, abandonment, and non-ownership of return flows, at pp. 10-11 above.

would have an incentive to drill early in order to extract their share before extensive drilling had lowered the water level. Accordingly, a system of unitization, comparable to the one for oil and gas, should be adopted. Unitization should be made easy: agreement of, say, owners of 51% of the water should be enough for adoption of a unitization agreement binding the entire aquifer, and, except for administrative review to be sure that the agreement does not inflict serious unfairness on opposing owners, no other requirement should exist. (By contrast, many oil-and-gas unitization statutes condition compulsory unitization on, for example, its being necessary for secondary or tertiary recovery operations. No extraneous limitations of this sort should be imposed.)

By virtue of unitization, (1) owners can agree on a plan that is responsive to market forces but does not involve any race to extract; and (2) enjoyment of the beneficial interest can rest upon a combination of overlying ownership plus contribution to the expenses of extraction, rather than on accidents of well location. Such a regime should be available for groundwater.

2. The Report argues that under a rule of overlying ownership "no basis exists..., outside of a designated groundwater basin, for exercising conservation authority with respect to depletable sources of supply" or for "establishing local management districts to make value judgments on the best utilization and conservation of the resource." (Subgroup #2 Report, p. 5.)

Again, the Report assumes that a system of private property rights cannot induce appropriate conservation. But such rights -- if clearly defined, fully transferable, and not subject to major externalities -- provide an ample incentive to conservation. If an individual owns a resource, he bears the opportunity cost of accelerating its extraction. If deferring extraction will increase its present value, which will be true for many supplies if scarcity is expected to increase, the profit motive will persuade him to do so.²² (That is the reason why, for example, in the event of a freeze destroying much of the coffee crop, coffee owners withhold substantial quantities from the current market; they thereby shift coffee supply into the future and balance available supplies between current and future use.)

Now if the "local management district" referred to were simply an owners' committee, with representation proportional to water ownership, it would be at least analogous to a unitization agreement. Since Subgroup #2 rejects the ownership concept, however, that clearly is not the basis of

²² It pays to defer extraction of an underground resource if the value of the resource in the ground is rising at a rate exceeding the interest rate. In practice this means that expensive-to-extract reserves are deferred, cheap-to-extract ones are taken early. While this may seem an imposition on future generations, they would not be better off if society artificially held back from consumption of the reserves: if their in-ground value is rising more slowly than the interest rate, then the investments that society is in fact making are increasing the wealth available 10, 20 or 100 years from now more rapidly than would tighter conservation of the in-ground natural resource. (This of course assumes that the legal regime is not a Rule of Capture, which artificially accelerates withdrawal.) For an extended discussion of these matters, see Williams, Running Out: The Problem of Exhaustible Resources, 8 J. of Legal Stud. 165 (1978).

the proposal. Accordingly, it seems to me that not having "value judgments" made by such a committee is entirely desirable. In the absence of a serious market failure, there is no call for a committee to decide on the use of other people's property.²³

3. The Report argues that under the ownership concept "the landowner gets unprecedented and unearned bonus for water development. The owner of land, as in the oil and gas setting, may control access to be sure; but he cannot claim economic benefit from the lawful removal of resources from under his land. The rule of capture should apply to water as to oil and gas to the extent to which the user can put the resource to a beneficial use." (Subgroup #2 Report, pp. 6-7.)

First, there is obviously nothing unprecedented about a landowner receiving an economic benefit from resources under his land, even though he made no contribution to their existence. This is exactly what the legal system for oil and gas involves, when you combine the common law with wellspacing, allowables, and unitization. Nor it is unprecedented for water, for the old English Rule of Capture limits extraction to overlying owners (or persons acting with their consent). And clearly since adoption of Senate Bill 213 in 1973 [C.R.S. 37-90-137(4)], effectively giving overlying owners a veto with respect to the water under their land in an undesignated basin, it has had a precedent in Colorado.

²³ Subgroup #2 would in effect generate a very serious market failure, by establishing a Rule of Capture, and then bring in the bureaucrats to correct it.

Second, as to the "unearned" character of the bonus, the plain fact is that any natural resource generates unearned wealth. Economists refer to this value as "economic rent" -- the difference between the price necessary to elicit production of a good and the price that the good can command in the market. Thus if water can be extracted at a cost of \$.25 per acre foot and has a market value of \$1 per acre foot, it has an economic rent of \$.75. Whoever gets that economic rent, it is unearned.

For reasons that are not apparent, Subgroup #2 would allocate that rent to those who get their proposals past the state engineer (and other controlling bureaucracies). Such a rule, effectively empowering the state engineer to dole out the economic rent, sets off a competition for that value. In the course of the resulting competition, much of the value of the rent is likely to be destroyed. People have an incentive to invest large sums of money hiring lawyers and hydrologists to make their case before the deciding bureaucrat; they will tend to do so up to the point where those expenses equal the expected value of the rent (i.e., its value discounted by the likelihood of prevailing).²⁴

Putting the economic rent up for grabs -- that is, giving a state official the power to allocate it -- generates colossal waste. This is quite apart from the waste that is

²⁴ I.e., suppose that the value of the resource is \$100,000 and a claimant estimates his chances as one-in-ten. He will incline to spend as much as \$10,000 trying to persuade the agency to allocate the resource to him.

likely to result from the official's making erroneous decisions.

Thus, denying the overlying owner the economic rent, or as Subgroup #2 puts it, the "unearned bonus," leads to destruction of that "bonus." It seems to me far superior that it should go to the overlying owner (what's so terrible about him, anyway?) than be destroyed.

Accordingly, a suitable regime for nontributary groundwater is ownership in the overlying owner, coupled with provisions facilitating unitization of the aquifer, in whole or in part.