

TOWARD BETTER WATER TRANSFERS IN COLORADO AND CUMULATIVE COST AVOIDANCE

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ABSTRACT

This paper reports one view of sound leasing and water marketing ideas, as alternatives to "buy-and-dry", transfer of agricultural irrigation water to other uses. Drought, climate change and awareness of impending urban supply issues have stimulated new public policy processes, which themselves raise concerns over the timing and pace of belated considerations of the future and public interests. Because Colorado's strict prior appropriation water law has functioned as the state's water policy and plan, examination of cumulative impacts of water transfers has been minimal. Research on "what could go wrong?" with new recommended forms of water transfer has exposed potential problems for local governments and water providers. Among these problems are post-irrigation management issues; biological impacts from cessation of agricultural water distribution and return flows; and cumulative impacts to both social and environmental conditions. The paper suggests careful cost accounting for new forms of transfer, for the short and long-term. The means of transfer should be related to constituent and customer concerns.

THE COLORADO CONTEXT

After many years of calls for improved markets for water (reviewed in Western Water Policy Review Advisory Commission 1998, Easter et al. 1998), and for improved outcomes from water transfers (reviewed in Howe 2000), rapid population growth, drought, and climate conditions have stimulated changes in Colorado – or perhaps the appearance of changes. In a series of projects seeking improved water management through increased use of climate information, finding potential uses was easy, but many obstacles appeared. Only some obstacles involve technical understanding (e.g. Hansen 2002); others were also legal and institutional. The Water Bank Pilot Program (C.R.S. 37-80.5-101 et seq.) should have supported climate-responsive water management, but did not. Next, the Drought centered on 2002 (Pielke et al. 2005) stimulated creation in 2003 of the Statewide Water Supply Initiative (SWSI) (Colorado Water Conservation Board (hereafter CWCB) 2004, 2007), but the studies did not consider climate or all impacts of water transfers. In 2005 the new Interbasin Compact Commission and Basin Roundtables were created (Colorado Department of Natural Resources 2006 and continuing). The transfer mechanisms for better outcomes now are likely those needed for future adaptive capacity for the synergistic problems of rapid population growth and worse water stress eliciting more water re-allocation, but it is unclear whether their development will be timely.

In Western prior appropriation states, cities traditionally buy supply to meet dry years, as basic risk management, and have a surplus in average and wet years (NRC 1992, CWCB

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2004. Where the land is being "developed", buyers sometimes "lease back" the water to farmers on a short term basis, but unreliability of supply may discourage modernization and investment, diminishing viability of farming and encouraging land conversion. Over-all agricultural productivity gains from seed improvement, and intensification and improvements of inputs and equipment (Fuglie et al. 2007) have helped compensate for the loss of the best farmland (Environment Colorado 2006) and effects of loss of water security, (Dobrowolski et al. 2005). Now, based on water rates in some later-developed cities in Colorado topping \$1000 per acre-foot (Woodka 2005) and with very high new tap fees (Olinger and Plunkett 2005), good farming may not be able to hold water even with ethanol from corn subsidy effects (Westcott 2007).

Historically, water transfers – changes in place, timing and kind of use of water rights – were regulated with respect for two non-party interests. First was protection of other water rights. Second was simple administration, in a time of minimal technology and small staff, resulting in use of easily observable conditions (Cech 2004). Formerly-irrigated land was dried up, not to be irrigated again; that was easily observable. Now, in a world of satellites, telemetry and remote gauging, requiring dry-up seems wrong. It prevents finding better combinations of water rights and land, a loss to all. The social impacts of large transfers have been substantial, as increasingly large areas are dried up, and agricultural yields and activity are reduced. Small towns have been "dried up" as well (Howe and Goemans 2003, Howe, et al. 1990). Insisting on the simplest contract and administration and ignoring the economic inefficiencies that result is wasteful.

Intentionally or not, law has displaced policy and planning in Colorado. The SWSI effort informal mantra was, "this is not a state plan; we won't tell you what to do..." There is no state water plan, and severe limits on normal planning in unincorporated areas, and there is no limit on growth by lack of water so far (Nichols et al. 2001). Colorado water law is not participatory; only water rights holders have standing in water court. Questions about public interest have been long delayed, and are often treated as attacks on private property rather than defense of value (observation from dozens of meetings).

Recognition of non-water rights interests has been slow and small. Some recent changes were stimulated by conflict of historically unrepresented and unsecured recreational and environmental interests versus very rapid urban growth, and quasi-agricultural rural development based on amenity and recreational values. Among these changes are modifications to the modest in-stream flow protection program (Trout Unlimited 2002, 2003), authorized to accept loans as well as donations, and making the "recreational in-channel diversion" (aimed at kayak courses as an urban attraction and amenity) a beneficial use that can support a water right (C.R.S. 37-92-102 et seq.) Environmental interests in the form of Endangered Species responses have included the Platte River Recovery Program as well as the Colorado River Recovery Program (U.S. Bureau of Reclamation 2003, 2006, and Freeman 2003). The terrestrial case of the Preble's Jumping Mouse has garnered a great deal of attention (US Fish and Wildlife Service 2007) and inflamed antagonism to the idea of limitations on individual resource use (Brook et al. 2003). Agricultural land is being converted at rapid rates (Environment Colorado 2006, Carlson 2002), with unknown environmental impacts (Baron 2002).

Despite historic federal interests in soil conservation, there is no apparent recognition of a public interest in that. The lurking issue for environmental and socio-economic problems is general disregard of cumulative impacts.

WHAT WOULD BE “BETTER”?

Externalities Internalized — From Abstract Idea to Reality?

Improvements may be achieved through different distributions and qualities of the costs, impacts, and benefits of water transfers. The recognition of non-market and public goods or public interests in a market is difficult, but political regulation is subject to change for political reasons (e.g. Nadeau and Leibowitz 2003), and may not be efficient for re-allocation (Slaughter and Wiener 2007) so many favor use of private property and markets. Water transfers that include real opportunity for participation by all affected interests would be better, including recognition of third party, local government and environmental interests. Many rural local governments have had little opportunity to consider future interests, beyond direct injury to the tax base and may need assistance. The disconnect between land use planning (if any) and water issues may aggravate the loss of agricultural jobs and population without replacement (Colorado Department of Local Affairs 2007) while amenity drives growth elsewhere (McGranahan 1999).

Meaningful representation of socio-economic interests, quality of life and future interests may depend on development of preferences and plans that could be furthered in transfer deals. Some environmental and recreational interests are being better specified by the current SWSI process of non-consumptive needs assessments, but not local and regional amenity and recreation. Adverse impacts of transfers result in part from missing interests, so procedural steps are needed as well as interest identification. If mitigation of a particular impact is impossible, other costs and benefits may be allocated.

"New" forms of leasing, water marketing and fractional sales

Three changes to traditional water law appear to meet demands and reduce adverse impacts. These ideas have been widely endorsed in the abstract (e.g. “Colorado 64 Principles” noted below, and South Platte River Task Force 2007) but little public progress has been made. The three forms needed are spot-market short-term leasing (often done through some form of “water bank”; Clifford et al. 2004), long-term agricultural fallowing/rotating crop management leasing or partnerships, for municipal or industrial “base load” needs on a predictable basis, and long-term interruptible supply contracts or partnerships for needs in unusual years, to firm supplies, or for storage (aquifer storage and drought recovery) in wet years. The Water Bank Pilot Program was authorized in 2001, (C.R.S. 37-80.5–101 et seq.) but implementation failed. Reasons included the severe drought of 2002 and frustration of potential uses by design failures (Wiener 2005, Wiener 2006 USCID Proceedings). Authority was revised and made state-wide in 2003 (and made permanent in 2007, repealing the “sunset”), but the original effort was not improved and has not yet been revived though several new projects have been announced.

Long-term or permanent transfers are different. The Colorado rotational crop management authority follows the example of the Palo Verde Irrigation District in California (CWCB 2004; Palo Verde Irrigation District 2008). The idea of distributing intermittent impacts is the same, and making the transfer financially equal to or better than farming yield. Reduced production has secondary economic impacts to input and output linkages (Howe and Goemans 2003), but they would be geographically diffused (though some regional linkages and large-area service providers may not be helped much until recapitalization stimulates recovery of production levels). Continued irrigation even with fallowing dramatically reduces changes in tax bases and impacts on almost all local government interests. Long-term financial stability would be a change for most farmers, hopefully fostering better agronomy and management. The use of long-term interruptible supply contracts distributes impacts in the same way, though the crop rotations and management should reflect higher uncertainty of water availability. In both cases, wise planning will likely involve retaining some water, rather than “dry-up”, for weed and erosion control and perhaps cover crops or habitat. The basic ideas have been rediscovered often, and carefully documented (e.g. Saliba and Brush 1987, National Research Council 1992, Michelsen and Young 1993).

The frequent objection that long-term leasing is insufficiently permanent for those who sell a tap forever can be met by re-casting the deal as a fractional sale; there would be no practical difference in the engineering and legal expenses; in the end it is all partnership in distribution of the risks, costs and benefits. Perhaps the best explanation of the lack of change is the saying, “If you are winning, you probably like the rules.”

PROGRESS OR SOMETHING ELSE, SO FAR...

Colorado’s Statewide Water Supply Initiative

Under the added stress of the 2002-centered drought, the Legislature authorized the Statewide Water Supply Initiative (SWSI), to seek a consensus for action from a common understanding (CWCB 2004, 2007). Two serious limitations remain problems. First, each water provider (municipalities, water districts, etc.) was asked to report "projects and processes" in progress or planned for supply in 2030. Needs were independently analyzed with a sophisticated treatment of per capita use by county with adjustments for each sector and conservation trends and potential. The difference in 2030 was called “the gap”. Each provider seeks supply in a private and highly competitive market, and most have strong incentives to avoid the appearance of trouble. As policy, the SWSI study took supply claims at face value, and the Basin Roundtables, convened to provide local knowledge, explicitly declined to “handicap” projects (personal observation of almost all meetings of the Arkansas Basin and South Platte Basin, Phase 1, as well as participation in three of the four Technical Roundtables of Phase 2). It was clear that some projects and processes were incompatible, and that many were optimistic.

The second severe limitation on the SWSI study was that it excluded climate change in all but miniscule ways. (This is not unique, in the author’s observation. For example, climate change was simply ignored at the annual convention of the Colorado Water Congress until “suddenly” it appeared at the 2007 meeting.) The SWSI Phase 1

(published 2004) estimates of supply were made without respect to changing seasonality of snowpack, and so forth, as were estimates of demand. In 2007, the Colorado Water Conservation Board was authorized to contract for a hydro-climatic study of future Colorado River Basin supply, stimulated by the fears of a Colorado River “Compact Call” enforcing obligations to the Lower Basin; apparently, earlier studies were without weight (e.g. Powell Consortium 1995, Gleick et al. 2000, National Research Council 2007). Meanwhile, major cities with professional staffs, the Colorado River Conservancy District and others studied potential impacts (e.g. Herrman 1992). Asymmetry of information influences outcomes in a competitive market.

Mitigation of Impacts to Areas of Origin — Not Finished

Many legislative bills requiring mitigation of transfer impacts to areas of origin failed. It has been argued that any compensation to third parties (e.g. school boards which receive diminished funds due to lower farm populations and fewer children) will reduce the price paid to sellers, injuring property rights. And, the place-specificity issue, “one size does not fit all” has been used as the perfect killing the good – there is no perfect advance prescription, so there is no prescription. The Legislature, the new Interbasin Compact Commission, and all 64 Counties have approved the “Colorado 64 Principles” for water transfers calling for impact reduction (hence the name), (HJR03-1019 is the legislative endorsement). So far, there is only a possible requirements of 30 years "transition mitigation" payment in lieu of taxes lost from transfers of water if not already purchased before the effective date of the bill (2003, C.R.S. §§ 37-92-103, -302, -304, -305).

Legislation Still Needed — The Missing Form and Information Promotion

The piece-meal approach to legislation on transfer forms is also a problem. The uses of a spot-market are shown elsewhere (in Colorado, Howe and Goemans 2003; generally, Easter et al. 1998, Clifford et al. 2004). But there seems to be limited appreciation of the value of combining the authorized long-term leases for “base load” supplies with as-yet unauthorized long-term interruptible supply contracts, or “dry-year options”. The combination supplies water at one price every year, presumably sufficient in most years. At a higher but less-often paid price, supply in dry years would be from additional or more reliable higher priority water rights from an interruptible supply contract. The combination allows acquiring water on a “pay-as-you-go” basis, avoiding costs of bonding and debt for water acquisition, and still accessing the higher reliability rights. And, it avoids the problems of revegetation and post-irrigation land management. Agriculturally, this helps keep the “best water” available for farming the best remaining soils in most years, while keeping that premium combination viable by water prices which support soil erosion prevention and fertility maintenance in years when the crop might have failed. From the every-year transfers, capitalization of better farming might result in higher yields and revenues even with less acreage. The remarkable advantages of long-term stability and planning could make a huge difference in both credit availability and uses, and development of local markets and operations such as combined livestock and farming, dairy, and specialty operations including organics and direct sales. Using the two kinds of long-term contracts could maximize the potential values for the

whole system. The well-designed interruptible supply contract would also allow “wet-year options” so that non-irrigated farming could be conducted while high water supply allows aquifer recharge and reservoir re-filling.

Information promotion to improve markets is also desirable. The conditions for a well-working market (Stiglitz 1993) are not present in Colorado. Very high transactions costs are imposed by the water court litigated adjudication process for almost every transfer. There is also a high level of oligopsony and a remarkable asymmetry in the information available to the sellers compared to the buyers. There is no requirement for price disclosure, though prices can be revealed (usually by public entities), and some public-entity “disclosures” have in fact been misinformation to keep prices low (Olinger and Plunkett 2005). The involvement of water brokers also complicates pricing and the lack of information, since another party to many transactions benefits from ignorance on the part of both sellers and buyers, often at high public expense (Olinger and Plunkett 2005). Place-specificity and unique priority makes non-uniformity of water rights unavoidable, but this can be partly alleviated by reducing costs of determining the transferable fractions of a water right. If one believes in using the prior appropriation system without planning, one might wish the market to work more effectively. Early disclosure of infrastructure plans and added state verification of costs would allow potential cooperators to reach cost-effective and fair sharing arrangements (CWCB called this “project enhancement” and described it well but without noting all potential parties).

Explanation, Outreach and Education Needs

Limited understanding of innovations is a problem. The most important progress in the Water Bank Pilot Program was overlooked -- the agreement on presumptive figures for the transferable fraction of water rights from the major ditches in the lower Arkansas Valley. That would have reduced transactions costs enormously, had the program worked, but no transaction was attempted. What was needed and has not been forthcoming is credible outreach and education about all three of the new forms of transfer. Misunderstandings have already been reported concerning the following lease idea (Woodka 2007), overlooking the fact that the State Engineer administers water rights, wherever they are assigned. Decreed leases are not subject to discontinuation on a whim, yet that was apparently a widespread concern or reason for dismissal. Simplicity is overly revered, it seems. New transfers are innovations in agriculture, calling for proven means of introduction (Wiener 2005). Demonstrations are very likely the needed step, perhaps calling for additional support such as a standardized form for leasing.

New Basin Roundtables, the Inter-basin Compact Commission and the South Platte Task Force – An Observer’s View

The Statewide Water Supply Initiative Phase 1 Report in 2004 itself sharpened the sense of urgency and competition, contrasting with public preferences for increased cooperation in water transfers, and impact mitigation. The legislature passed the Colorado Water for the 21st Century Act (C.R.S. 37-75-101 et seq; HB05-1177). This followed the SWSI use of Basin Roundtables, with wide representation of economic sectors and areas in each Basin as fora for basin-specific discussions and inquiries

(Colorado Department of Natural Resources 2006), but with greater representation for rural towns and counties regardless of population. The new Roundtables began afresh with many appointees not previously involved in SWSI, though some carried over. The Basins were tasked with refining needs assessments; these are still in progress after substantial enlargement in non-consumptive needs assessments (environment and recreation needs) for which infrastructure in decision support and information is being developed. This is an important back-door means to achieve a sort of state planning. The Basins are intended to eventually deal with each other, and can propose interbasin compacts modeled on interstate compacts, to be supervised by the Interbasin Compact Commission. So far, some basins have spent time on representatives “understanding each other”, some agency presentations for background education, and participating in limited authority to help allocate a moderate amount of funding. Meanwhile, the private competitive market continues; disclosure of deals is not required until a change decree is sought; who owns or holds options on what is not known.

There is no authority to interfere with any exercise of water rights or contracts or transfers. After two years it is also apparent that some representatives have only a reactive view of their roles, while others are active and very well informed. Roundtable committees may hold the best promise for progress, but they may also be hampered by starting afresh, and there is no guarantee of influence whenever policy is produced. It may be too late, given the unknown market and fierce but invisible competition.

The painful process of fully imposing the priority system on groundwater use in the South Platte Basin was stimulated by litigation against continuing short-term permission to pump, persisting since incomplete initial efforts to implement 1969 water law reforms. After the dramatic shut-down of hundreds of wells and substantial economic loss, followed by bitter conflict and more litigation, a Task Force was appointed to consider all alternatives (South Platte Task Force 2007). Recommendations include water marketing, and leasing; that may result in legislative action, but has not yet (March 2008).

The Efforts in Progress: The Super Ditch Project

The presentation at this Conference by Smith and Winner, will provide up-to-date description of the Super Ditch project in the Lower Arkansas Valley. Misunderstanding due to the lack of other outreach, education and clarity and public standards about what is possible is a serious problem. Seeming failure without a useful trial, as happened in the Water Bank Pilot Program, and public misunderstanding of the reasons for failure could prevent or delay a great deal of potential progress.

WHAT COULD GO WRONG WITH NEW TRANSFERS?

Suppose new transfers are tried. Are there problems worse than or different from those resulting from traditional buy-and-dry? Starting with objections and concerns raised in many interviews about the idea of leasing water, a recent project focused on seeking expert opinion to get a better view of “what can go wrong”. This part of the paper summarizes highlights from four formal workshop events and on-going discussions as well as literature reviews of the issues.

Cumulative Impact Limits as Regulatory Threats to New Transfers

There is no cumulative impact consideration in prior appropriation water law transfers. Biological impacts of water flow regulation, diversion, and distribution have been gigantic (Baron 2002, Baron et al. 1998, Strange et al. 1999), but change is only assessed fractionally and locally where it intersects with some special jurisdiction or requirement such as an Endangered Species issue (see Doremus 2001). The lands and waters involved in agriculture-to-urban transfers are private, and we have poor information on what limits may appear or may turn out to be important. (This broad statement is based on a literature review of about 230 items and synthesis project underway; Wiener forthcoming.) The regulation of water quality has been separate, and imposed by federal laws (Getches 1999). Water quality regulation has not yet been very effective on non-point source pollution, so new standards for total maximum daily loads (TMDLs) may be next (National Research Council 2001). In new law, water quality may be considered in large transfers of greater than 1000 acre-feet to distant use, but it is not yet clear how or if that will apply beyond requiring a transferor to mitigate her additions to exceedance of water quality standards (C.R.S. 37-92-305). If a TMDL were in place, this might prevent worsening of exceedance, rather than preventing transfers, but there is also protection for "vested rights of others." Does that enlarge standing? Is there now a right to water quality, as has not previously been the case? Meanwhile, salinity in the Lower Arkansas frequently hits 5000 ppm, imposing substantial costs in lost productivity and additional water treatment (Gates et al. 2006). Kansas cares. The ecological impacts from more-widely distributed and intermittent impacts may be considerably reduced; the water quality risks may be reduced by judicious choices of land to fallow.

Shift the cost and beat the limit? The costs of finally hitting a limit of some sort are potentially quite uneven and substantial. Colorado has nominally directly spent more than \$50 million on Endangered Species recovery programs, (R. Brown, Colorado Water Conservation Board, 12 November 2007, Joint Meeting, South Platte, Metro Area and Arkansas Basin Roundtables) but that does not count any of the private costs incurred, or Federal costs, or all State staff efforts (Freeman 2003). And it does not indicate costs averted by large-area multi-state plans such the Platte River Recovery Program (U.S. Bureau of Reclamation 2003). The costs will almost certainly be unevenly distributed if further transactions are prevented or must be expensively mitigated. But transactions and parties which created the problem but were under the threshold will bear no burden. Should policy always covertly favor the alert and those able to act quickly, at the expense of tax-supported remediation and costs imposed on the less-alert or less able? A minimum of adequate planning and foresight where state interests are involved seems long overdue (see National Research Council 2007, 2001).

Biological Issues Apparently Unexamined

Changes to mainstems as well as loss of pre-development conditions. Conversion of riparian and bottomland areas to agricultural use along with flow regulation and re-timing have changed vegetation communities and succession as well as fluvial processes, habitat connectivity, and conditions supporting pre-development ecologies (Baron 2002,

Bernhardt et al. 2005, Johnson and Bouzaher 1996, Johnson 1997, 2002, Katz and Shafroth 2003, Katz et al. 2005, Knopf and Samson 1997, Nadeau and Leibowitz 2003, National Research Council 2002, Strange et al. 1999). Invasives play an increasing role as the generation of cottonwood-willow established right after flow regulation is senescent and not regenerating. The ability of the riparian zones to substitute for pre-development conditions may be deteriorating rapidly. The extreme loss of wetlands, particularly in areas used for cultivated agriculture, makes this important for many species, both resident and migrant.

The Return Flow Redistribution Problem. Meanwhile, off the mainstems, the irrigation ditches and the irrigation itself have created a remarkable “hybrid ecology” (Crifasi 2002, 2005). Of 100 units of water diverted from a flow, as much as 15 to 25 units may be seeped from earthen canals into surrounding areas, and then, of the 85 to 75 units actually applied, half or more of that used in furrow irrigation may be return flow to the river, through surface tail water or drainage, near-surface flows, or deep percolation. In water transfers, the historic pattern of return flows, in volume and timing, is maintained in the river, but only in river. All of the area unintentionally watered by seepage and return flow may be dried up along with former irrigated field. Given the lack of knowledge about these private lands, the ecological consequences are unknown.

The SWSI study (Phase 1, 2004) estimated that 12 to 23% of remaining irrigated acreage on the east side of Colorado could be dried up, (not counting the many thousands of acres already dried up, including more than 50,000 acres in Crowley County alone). That estimate was based on the “gap” and an estimate if a quarter of the claimed supplies fail; it is likely optimistic. Also, the extent of acreage involved may be greater than estimated, because the acreage irrigated by increasingly junior water rights should be larger than that irrigated by more senior rights. Economic rationality suggests that lower reliability water supply would be used for supplemental irrigation on crops of lower value, and perhaps spread more widely as well as less often (data on this are poor; see Bauder and Waskom 2006). And then, there is climate change to consider, affecting reliability of water rights as well as timing of flows (e.g., National Research Council 2007).

Post-irrigation soil management and revegetation issues

The use of land which has been previously irrigated and intensively cropped for more than a century is not simple (Sutherland et al. 1992). It was often urged in SWSI discussions that farmers would simply go to dryland crops, and that this has not been regarded as a problem; that presumes profitability of dry farming which may not always be as good as in the current ethanol-subsidy boom times (Westcott 2007). A workshop on farm management issues, however, confirmed that long irrigation and intensive cultivation changes the soil physically as well as chemically, so that passive “return to nature” will not be available soon if at all. The conditions created favor undesirable weeds and invasives, unless there is substantial management which may include irrigation for a transition, soil amendment, transitional vegetation, and so forth. This suggests avoiding dry-up where possible. Worse yet, the Soil and Water Conservation Society has reported (2003) that increased intensity of precipitation (the fraction in high-force high volume events, already known to be increasing) regardless of other changes in

climate will likely have substantial adverse impact on soil erosion. So far, the costs of revegetation imposed as a requirement for dried up farmland are being treated as proprietary information, though estimates appear to be steadily rising as efforts continue. Climate change other than increased precipitation intensity may also affect revegetation and invasive plant costs, through warming-increased evapotranspiration.

Management and Cost Accounting Issues and Questions

The money. On the ditch company and irrigation side, allocation of revenues from a lease may require difficult bargaining, since ditch companies often own several water rights with different priorities, and these have different values. Irrigators have land of different quality and achieve different results, so their marginal value product from use of water differs in complicated ways. Their personal interests and situations also differ, affecting their willingness to accept different amounts. Ditch companies also differ in investments in infrastructure enabling or inhibiting individual or lateral choice in leasing or declining. Large scale projects such as the Super Ditch face all these problems as well as the coordination of activities and financial agreement across several ditches.

On the urban side, there has been no public disclosure of the basis for claims that alternatives to “buy-and-dry” cost more. The undisclosed costs of revegetation have been noted, but there are also the costs of bonding to finance water purchases. At 3.25% and two points for bond establishment costs, a typical 30 year bond adds half again to the capital cost; that could be saved if there were no debt used for water acquisition. (Moving the water may be a larger cost than buying it in many cases, and re-timing storage may also be needed, but that cost is the same regardless of the form of transfer). There is also a big saving in infrastructure if the same plumbing can be used in dry as well as normal or wet years, by stacking the interruptible supply contract on the fallowing contract..

The Permanence Problem. And, there is the assertion that if you buy the water right, you have it (as well as the appreciation in value), where if you lease it, at the end you have nothing but unmet demand. This idea depends on an unimaginative sense of the possibilities and an unlikely set of deals. No careful manager would fail to include hard-bargained arrangements for the end of the lease term, and just as cities imagine being dependent on that water in 75 years, why would the farmers not be dependent on other parts of the deal? No other parts of the water management system are maintenance free. If permanence per se is demanded, fractional water sales should accomplish the same purposes with the same transactions costs. As always, water rights management and flows are administered by the state once the transferred amount is decreed or permitted.

Urban Preferences. Urban populations may want cheap water rates (and free lunches) but they have also voted 110 times in Colorado to tax themselves about \$3.8 Billion for open space, agricultural land preservation, and similar amenities and values (Trust for Public Land 2008), not to mention enormous private support for easements, and environmental qualities through many organizations. Although there is considerable evidence of popular interest in maintaining some agriculture and agricultural land (e.g. Governor’s

Commission on Saving Farms, Ranches and Open Space, 2000), it is not clear that those constituent values affect the often repeated claim that “my job as a water provider is to get supply as cheaply as possible.” Only that? What about all those other interests?

Rural Futures. Rural interests are also poorly known, since there has been so little effort at defining present and future amenity values as well as recreational and environmental conditions that will make places attractive to residents or newcomers and new investment. The contrast between that lack of anticipation and real estate development advertising touting all the charms of the latest “green acres” is striking. As agricultural primary income decreases, and farm employment and families decrease, rural areas may seek post-agricultural economies, but with what? The anti-planning problem is real.

The race is on... but some of the runners may not show up. Others may like that.

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