

# THE INCREASING IMPORTANCE OF WATER TRANSFERS AND THE NEED FOR INSTITUTIONAL REFORMS

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## The General Desirability of Water Transfers

Flexibility in the allocative pattern of any scarce resource is highly desirable from the point of view of economic efficiency. The resource can move from lower valued uses to emerging higher valued uses that result from demographic, economic, and public value changes. Naturally it is desirable that this flexibility be accompanied by security of tenure for those holding the resource so that longer term investments will not be endangered. These two attributes make water markets attractive as vehicles for effecting water transfers (Howe, et al, 1986).

The increasing economic and environmental costs of new water supplies reinforce the increasing popularity of water transfers (e.g. Frederick, 1986; Howe and Easter, 1971). The largest pool of water available for transfer is found in irrigated agriculture where about 80% of consumptive use in the western United States takes place (U.S.G.S., 1988).

The agricultural sector is currently under increasing pressure from international competition and increasing domestic resistance to farm price support programs. The outlook is for a continued fall in real prices for major agricultural commodities on world markets (Young, et al, 1988). Thus one would expect reallocations from agriculture to emerging non-agricultural uses, especially urban and industrial uses, provide the institutional framework permits such transfers.

## The Nature of Agricultural to Non-Agricultural Water Transfers

The economists' models of efficient competitive markets, if applied to water resources, would picture a smooth, relatively low-cost process of moving water from the lowest-value applications in agriculture to growing non-agricultural uses. Naturally, no one expects the process to work perfectly since water markets suffer from lack of information, heterogeneity of water itself (by location, seniority, quality, etc.), and possibly high transactions costs.

Some models of the transfer process, especially those of the linear-programming variety, overlook some of the realities of water as a tradable resource and thus may produce some misleading predictions (e.g. Mann, Sparling, and Young, 1987; Howe and Ahrens, 1988).

A study currently underway in Colorado (U.S.G.S. grant through the Colorado Water Resources Research Institute to the Natural Resources Law Center, University of Colorado, 1987) has investigated 743 completed transfers for which application was made in the decade 1976-84. These transfers exhibited the following characteristic:

agric. to agric.:	146
agric. to non-ag.:	531
non-ag. to non-ag.	66
1 cu. ft./sec. or less:	330 <sup>1</sup>
greater than 1 cfs.:	216
100 acre-feet or less:	148
greater than 100 af:	48

<sup>1</sup> Under the Colorado system of water administration, water rights and their transfers are often characterized by a flow rate only. Storage rights and some flow rights are volumetrically quantified.

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Thus what we observe is a large number of small water transfers accompanied by a few more eye-catching large transfers, dominated by agricultural to non-agricultural uses. Many of these are irrigation to stock-watering and rural domestic uses or transfers to small rural subdivisions. The public's awareness of transfers is limited to the large ones such as the transfer of 40,000 acre-feet of Colorado Canal Water (Arkansas River Valley) to the City of Colorado Springs or the still-to-be effected transfer of 52% of the Rocky Ford Ditch (9,300 a.f.) to the City of Aurora.

While the small water transfers appear to conform to the economists' model of a smoothly operating water market, the large transfers certainly do not: they involve large volumes of water from a single location; they typically involve very senior (reliable) water rights; and they frequently represent water that has been applied to the better soils, growing at least some valuable crops. What is wrong with the model?

The need for urban areas and industry to obtain reliable water every few years is not attractive to urban users. These senior rights were (by definition) developed early and typically applied to the best bottom lands as regional development progressed. Naturally, the fact that these rights are transferred out of agriculture doesn't necessarily imply that the crops they irrigated will stop being produced. It is likely (and evidence to date indicates) that high-valued crops that are market-limited in quantity, will be picked up by other farmers in the area. The crops that are forfeited are generally forage crops, small grains, and irrigated pasture.

The large volume of water involved in these big transfers at first glance appears to be explainable by economies of scale, both in physical transfer systems and in transaction costs. Some transfers require the construction of pipelines, tunnels, or canals--structures that exhibit great economies of scale in construction costs. If a city proposes to

transfer some water, why not a large volume that will reduce the unit costs of physical transfer.

The issue of transaction costs is not so simple. These costs include search costs for a buyer or seller; application costs to the court or state engineer; costs of hydrologic, engineering, and agronomic studies; court costs; and costs of countering or meeting objections to the transfer. At first glance, it would appear that these costs also would exhibit substantial economies of scale, i.e. that some of them would be fixed or at best would increase less than in proportion to the size of the transfer.. Preliminary analysis of Colorado data indicates that, while this is true for some of the minor cost items, the costs occasioned by opposition to the transfer increase rapidly as the size of transfer increases (Boggs, unpublished). Every sizeable transfer has opponents, sometimes dozens. Large water rights owners (cities and ditch companies) frequently retain counsel to oppose every proposed transfer as a matter of course. Thus, there appear to be (at least under the Colorado system) substantial diseconomies of scale in transaction costs.

## **Impacts of Water Transfers**

If all water transfers were economically efficient from, say, a state accounting stance, then state income would increase as a result of the transfer--at least in a present value sense. Can we expect transfers to be efficient? There are several reasons to expect at least some transfers to be inefficient from state or national accounting stances. First, certain important public values are not protected by administrative criteria in the approval process. Especially water quality, instream values, fish and wildlife, and other recreational values are variously omitted from state criteria. Of course, there could be net increases in these values as well as decreases, but frequently no protection is provided, so these values are likely to be ignored by the transferors of water.

Secondly, cities frequently accumulate water supplies far in excess of current needs, either in anticipation of future growth or to have “super safe” systems. While some of this excess water may be leased back to the agricultural sector until it is needed, a higher level of risk is introduced for the user, precluding higher valued uses. Since urban water costs are frequently hidden from urban water users (because of inappropriate pricing), urban managers adopt an excessively risk-averse attitude, making the accumulation of raw water supplies excessively large.

Even if water transfers are economically efficient from state or national points of view, there is no guarantee--indeed little likelihood--that the area or basin of origin will gain from the transfer. Most transfers are out of the basin of origin, so the benefits to the new user do not accrue to the basin of origin. Since many of the basins of origin are depressed or declining regions to begin with, the likelihood that the proceeds from the sale of water will be reinvested in that basin is small. Thus the phasing-out of agriculture will be accompanied by various negative local multiplier effects (forward or backward linkages) that are unlikely to be offset by new activities. Finally, the environmental effects on the basin of origin are almost always negative.

### **Institutional Reforms Needed to Maximize Net Benefits from Transfers**

It should be clear from the discussion above that unfettered free market transfers are unlikely to be economically efficient. What is needed is the protection of or accounting for public values that are not taken into account by buyers and sellers nor, in some states, incorporated in the water law. Since appropriations doctrine everywhere protects other water diverters, what is needed is an expansion of state water laws to recognize and protect the wider set of instream, recreational, and aesthetic values. The states of Idaho, Utah, Wyoming, and New Mexico have incorporated in their water law such criteria as non-degradation of water quality, protection of fish and wildlife, and even (Idaho) impacts on the

local economy and on family farming. The “public trust doctrine” that has been invoked in California in the Mono Lake case serves to protect an undefined set of public values--probably not a desirable policy development because of the uncertainty of the criteria being used.

Governance structures for irrigation and conservancy districts that are more representative of the populations affected by water systems would help in the introduction of broader social values in water management. Many irrigation or conservancy districts today incorporate towns and industries, yet continue to be governed by “old water boy” groups that have too little appreciation of the changing values of water to society. These districts often have excellent technical management and do what they do very well; it’s just that they are doing, in part, the wrong things.

Included among the issues is the need to make district boundaries and allowable water uses flexible. Districts typically distribute project water within specified boundaries that had significance historically but that grow out of date. Failure to allow water to be sold outside historical boundaries can introduce substantial inefficiencies in water allocation. An example is found in the contrasting water prices found in the Northern Colorado Water Conservancy District--about \$1,000 per acre-foot in perpetuity--and prices for comparable non-project water in the northern Denver suburban area--up to \$4,500 per acre-foot. While the Northern District’s management feels an obligation to keep Colorado-Big Thompson project water in the District, the farmers who still own most of the water see their water wealth diminished by a factor of 3 or 4, while Denver suburbs pay unnecessarily high prices for water or are backed into supporting unneeded new projects like the Two Forks Dam.

Other small federal and state policy changes could greatly facilitate socially responsible water transfers. Federal projects, originally authorized

by Congress for certain water uses only, should be freed up to serve any beneficial purposes able to buy the water and to repay federal cost obligations. States could streamline the administrative or court processes by which transfers are reviewed and approved (or modified) by using standard guidelines (e.g. for computing historical consumptive uses), by keeping better water rights and transfer records (today only a specialist lawyer or engineer dare venture a guess about the real nature of a water right), and by providing information on stream flows and storage that will help bring buyers and sellers together.

Water transfers are clearly destined to play an expanding role in the future. No major region of the country need fear water shortage if imaginative transfers are permitted and responsibly administered.

## RECENT DEVELOPMENTS IN WATER MARKETING AND WATER TRANSFERS

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Most of the West's renewable water resources are already appropriated and developed. Opportunities for additional development are limited by a number of factors. At the same time, demands for water in the West are undergoing major and lasting changes. Irrigated agriculture, long the dominant user of water in the West, is declining in relative economic importance. New consumptive demands now derive largely from urban growth. There is also a growing demand for "instream" uses of water. These conditions suggest the need for reallocation of a portion of developed water supplies to these new, higher value demands.

### Western Water Rights

## References

- Boggs, Carolyn S. 1989. Analysis of transaction costs of water transfers in Colorado. Unpublished Master of Arts Thesis, Department of Economics, University of Colorado, Boulder.
- Frederick, Kenneth D. Ed. 1986. Scarce Water and Institutional Change. Washington, D.C.: Resources for the Future.
- Howe, Charles W. and W. Ashley Ahrens. 1988. Water resources of the upper Colorado River basin: problems and policy alternatives. Chapter 5 in Mohamed El-Ashry and Diana Gibbons, water and Arid Lands of the Western United States. New York and Cambridge: Cambridge University Press.
- Howe, Charles W. and K. William Easter. 1971. Interbasin Transfers of Water. Economic Issues and Impacts. Baltimore: The Johns Hopkins University Press.
- Mann, Roger, Edward Sparling and Robert A. Young. 1987. Regional economic growth from irrigation development: evidence from the Northern High Plains Ogallala groundwater resource. Water Resources Research, 23 (11).
- U.S. Geological Survey. 1988. Estimated use of water in the United States in 1985. U.S.G.S. Circular 1004. Washington, D.C.: U.S. Government Printing Office.

Rights to use western water resources exist in a variety of forms. Appropriative water rights may provide either direct flows of water or storage rights. In many cases, rights to use ditch water or water in a reservoir are based on ownership shares. Water may be supplied for use on the basis of a contract. Rights to use water may derive from land ownership as, for example, with groundwater in some states. Reallocation occurs when any existing use or right to use is changed or transferred to a new use. The term "water marketing" applies to the lease or sale of any such right. Widespread attention in recent years has been focused on water marketing as a

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