THESIS

SURVEY AND ANALYSIS OF ISSUES IN RURAL TO URBAN WATER TRANSFERS IN COLORADO WATER DIVISIONS 1 AND 2

Submitted by

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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY MAUREEN MAXWELL ENTITLED *SURVEY AND ANALYSIS OF ISSUES IN RURAL TO URBAN WATER TRANSFERS IN COLORADO WATER DIVISIONS 1 AND 2* BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE.

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ABSTRACT OF THESIS

SURVEY AND ANALYSIS OF ISSUES IN RURAL TO URBAN WATER TRANSFERS IN COLORADO WATER DIVISIONS 1 AND 2

Historically, the dominant use of water in Colorado has been irrigation. However, new demand is being driven by urban needs. The amount of unappropriated water available for cities to claim is decreasing. Good dam and reservoir sites are becoming more scarce and costly to develop. Increasinglyy, the purchase of rural water rights for transfer to urban use is being used to help fulfill the demand.

The transfer of rural water to urban use, however, is controversial and has given rise to charges that important effects of water transfers are not given proper consideration in water allocation decision making. The questions that people are raising about the transfer of agricultural water to urban use -- economic and social changes in the areas of origin, environmental effects of transfers of water, access to the decision making process -- can be described as "livelihood" issues. The public debate highlights the issues that people think are important to water transfer. It does not make clear what is actually known about the relevance and details of these issues, nor is it clear whether these issues are considered by the water courts and to what extent. This study attempts to examine these livelihood issues and find out why they are important to the public and what the research reveals about them. The study also examines water court documents to determine if these issues play a role in water allocation decisions.

This study explores the livelihood issues surrounding agricultural-to-municipal transfers of water, examining the economics of such transfers; the social, cultural, and political issues for water importing and exporting areas; the environmental and ecological aspects of water transfers; and the institutions that allocate water in Colorado. The results of a study of water court applications to transfer rural water to cities are reported. The study examines agricultural-to-urban water transfer cases in Colorado Water Divisions 1 and 2 for the years 1977 through 1991. It attempts to develop a

picture of such transfers in the two busiest water basins in colorado, and to identify what information is available about these transfers in the legal system used to allocate water in Colorado, what issues of transfers are addressed by that system, and to identify who participates in the system.

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TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

CHAPTER 1

INTRODUCTION

Diverting water from a stream to another location, or from one basin to another, has been formalized in Colorado in the doctrine of prior appropriation. The need to use water someplace other than in the stream bed was the seed that started the doctrine, which assigns water rights on the principle of first in time, first in right. Reservoirs, canals, pipes, and tunnels have been used to move water all over Colorado, within water sheds, between water sheds, and from one side of the Continental Divide to the other.

Over two-thirds of the water diverted outside of the Southwest United States is for industrial purposes. However, nearly three-quarters of the total diversions the Southwest are used for irrigation. Approximately one-third of all irrigated acreage and close to half of all irrigation water used in the United States is concentrated within the six southwestern states of Arizona, California, Colorado, Nevada, New Mexico, and Utah..[1]

[1] Bonnie Colby Saliba and David B. Bush, *Water Markets in Theory and Practice*, Boulder: Westview Press,Inc., 1987, p. 42-44.

While irrigation is the dominant use of water in the Southwest, new demand for water is being driven by urban needs. More than three-quarters of the people in the western United states live in metropolitan areas.[2] 72.18 percent of Colorado's residents live in urbanized areas.[3] 75.64 percent live in places having 10,000 or more people.

THE PROBLEM

The amount of unappropriated water available for cities to claim is decreasing. Good dam and reservoir sites are becoming more scarce and costly to develop. Increasingly, the purchase of rural water rights for transfer to urban use is being used to help fulfill the demand.

However, the transfer of rural water to urban use is controversial and has given rise to charges that important effects of water transfers are not given proper consideration in water allocation decision making. The questions that people are raising about the transfer of agricultural water to urban use -- whittling down of agricultural communities, ignoring the economic contribution of recreational uses of water in rural areas, the destruction of

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[2] M. El-Ashey and D. Gibbons, eds., *Water and Arid Lands of the Western United States*, cited by Lawrence J. MacDonnell, Principal Investigator, *The Water Transfer Process as a Management Option for Meeting Changing Water Demands* (submitted to the U.S. Geological Survey, April 1990), Vol. I, p. 9.

[3] *1990 Census of Population*, United States Department of Commerce, Bureau of the Census. An urbanized area has a minimum of 50,000 persons, including urban fringe consisting of contiguous territory having a density of at least 1,000 persons per square mile.

the environment -- can be described as "livelihood" issues. Residents of rural areas are accusing cities of stealing their livelihood and future when irrigation water is transferred. Recreationists worry that transferred water will result in lower stream flows and changed fishing and rafting opportunities. Environmentalists point to the potential changes in river habitat. Farmers see the threat of blowing dust and spreading weeds from neighboring lands that are dried up as a result of water transfers. Colorado citizens, both urban and rural, are asking why these questions are not considered by the water courts when water transfer cases are determined. Some water right holders, lawyers, and public officials say that the courts will consider these issues when necessary; others say the courts are not and that the courts or some other forum should be directed to do so. Legislators have introduced legislation to protect areas-of-origin but have passed few bills amid debate between diverse interests.

All of this debate and discussion highlights the issues that members of the public think are important to water transfer. It does not make clear what is actually known about the relevance and details of these issues, nor is it clear whether these issues are considered by the water courts and to what extent. This study attempts to examine these livelihood issues and find out why they are important to the public and what the research reveals about them.. The study also examines water court documents to determine if these issues play a role in water allocation decisions.

THE APPROACH

The language used to talk about transfers indicates the place where the damage is perceived to be the greatest: "area-of-origin transfers" or "basin-of-origin transfers." Research in a variety of disciplines has examined the problem, looking at both the water exporting area and the water importing area.[4]

Several economists have examined the economic consequences of large water transfers, comparing the value of water in the old use, usually agricultural, with the new use, usually measuring municipal use. In addition, sociologists and political scientists have looked at the social, cultural and political problems that can arise in an area-of-origin when a large transfer of water occurs. Lawyers have analyzed the points of law that facilitate transfers and those that hinder them, as well as whom the law allows to participate in the water allocation process and whom it excludes. Finally, environmental and ecological questions have played an

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[4] The subject of transfers is generally referred to as "interbasin transfers of water." "Transbasin," "out-of-basin," and "interbasin" commonly are used to refer to a transfer of water from one of Colorado's seven water divisions to another. These administrative divisions correspond with major water basins in the state. "Basin-of-origin" refers to the basin from which water is transferred. "Area-of-origin" describes the area around the water body from which water is transferred and may refer to an entire division or to a smaller area. "Intrabasin" describes transfers that occur within a division. "Agricultural-to-municipal transfers of water" is used in this report to describe the specific type of transfer being investigated. These may be interbasin or intrabasin transfers.

increasing role in the fights over specific water transfers and in the discussion of potential legislative action.

This study explores the livelihood issues surrounding agricultural-to-municipal transfers, examining the economics of such transfers; the social, cultural, and political issues for water importing and exporting areas; the environmental and ecological aspects of water transfers; and the institutions that allocate water in Colorado. The literature review surveys these aspects, with particular emphasis on the economics of agriculture-to-municipal transfers. This paper does not pretend to provide an expert analysis or thorough literature review of the social, cultural, political, institutional, and environmental aspects of interbasin transfers of water. Many reasons for the controversial nature of such transfers, however, are found within these disciplines. Therefore a brief description of these aspects with reference to some of the research is made here to provide a more complete picture of the subject.

Following the literature review, the results of a study of water court applications to transfer agricultural water to municipal use are reported. Analysis and findings of court documents in selected cases are described. This study focuses on the current era of reduced federal support for large water projects and the increased public attention to the complex aspects of these transfers. The study is used to develop a detailed picture of agricultural-to-municipal transfers of water in the two busiest water basins

in Colorado. It is also used to identify what information is available about these transfers in the legal system used to allocate water in Colorado, what issues of transfers are addressed by that system, and to identify who participates in the system and who does not.

CHAPTER 2

WATER TRANSFERS AND THE PRIOR APPROPRIATION SYSTEM

HISTORY: How water transfers fit into the prior appropriation doctrine

Gold mining in the early West often took place on public lands, which were barely-known wildernesses to which the United States had title but over which it had not yet established governmental authority. Many of the mines were placer mines located some distance from water courses, but requiring water to operate. The miners were their own law, so they applied the doctrine of prior appropriation to their use of water just as they applied it to their mining claims. Based on the principle of "first in time, first in right," each miner could use the amount of water he had originally appropriated from the stream for his mining operation. If the water was not used for a period of time, it was considered abandoned, just as an unworked mining claim was considered abandoned.[5]

As the West opened up to agricultural settlement, the settlers realized that the prior appropriation method of allocating water in this arid region

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[5] Frank J. Trelease and George A. Gould, *Water Law Cases and Materials* (Fourth Edition, St. Paul, Minnesota: West Publishing Company, 1986) p. 19-20.

worked better than the riparian method used in the water abundant East.[6] It would have been impossible to develop what was called the Great American Desert without the ability to move water for use on lands that did not border a water course. Within a few decades, water came to be used far more heavily for irrigation than for mining. Therefore, the development of appropriative water law is more the development of irrigation law than of mining law.[7] Although much of the land in the Western United States was acquired by the federal government from foreign nations and Native Americans, the federal government left the establishment of private water rights on public lands to local custom, including the right to divert water across public land.[8] Colorado formally adopted the prior appropriation doctrine in its 1876 Constitution.

Much of the impetus for public support to build storage dams appears to have come from the decade of the 1880s, when the Western United States was hit first by a devastating blizzard, then a devastating drought, and the Eastern U.S. suffered a destructive and killing flood.[9] In addition, private irrigation efforts had shriveled up by the end of the 1880s: the good sites

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[6] *Ibid.*

[7] *Ibid.*, p. 22.

[8] David H. Getches, *Water Law in a Nut Shell* (St. Paul, Minnesota: West Publishing Co., 1990) p. 78.

[9] Marc Reisner, *Cadillac Desert* (New York: Viking Penguin Inc., 1986), p. 109-110.

were taken and it took more money than most settlers had to transport enough water far enough to irrigate a new homestead. Few of the irrigation companies, formed with Eastern capital and the intent to reclaim the desert West, survived longer than ten years.[10] Their two biggest problems were the difficulty in raising enough up-front capital, and the inability to compel prospective beneficiaries to participate.[11] Early special water districts received authority from states to levy financial assessments, but they suffered from over-optimism, inexperience, inadequate engineering, failure to attract enough settlers, opposition from established irrigators, and economic inefficiencies.[12]

By 1902, enough support for federal assistance in reclaiming the desert had developed in Washington for the Reclamation Act to become law. The creation of the Reclamation Service established the principle of federal funding for water projects. That, combined with the unemployment of the Depression years and a president determined to do something about it, and with the devastation of the Dust Bowl, led to an unmatched era of water project construction. Dams and reservoirs were built to increase the reliable supply of water and the federal government was able to provide the

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[10] *Ibid.*, p. 113.

[11] John D. Leshy, "Special Water Districts--The Historical Background," *Special Water Districts: Challenge for the Future*, Proceedings of the Workshop on Special Water Districts Held at the University of Colorado, Boulder, September 12-13, 1983, p. 14.

[12] *Ibid.*, p. 16.

funding unavailable in the private sector. In the 1930s, the four largest concrete dams ever built were erected: Hoover, Shasta, Bonneville, and Grand Coulee.[13]

In the presidential campaign of 1976, candidate Jimmy Carter promised to balance the federal budget by the end of his first term. His options for making substantial cuts in the 1978 budget left him by President Ford were limited: cut defense, entitlement programs, or a combination of discretionary programs, cuts that would carry political fallout. He decided he wanted all funding for nineteen water projects cut.[14] It was a dry year out West, and his "hit list" of water projects was incendiary. After the fire fight, Carter signed the bill appropriating money for all the hit list projects plus some. The next year, however, he vetoed the entire appropriations bill, at the same time that Proposition 13 passed in California. Public anger at government spending had become concrete. Congress failed to override Carter's veto.

Carter subsequently lost other water project battles and ended up being considered a political blunderer by some and a wild river fanatic by others. However, his actions, and the mounting federal deficit of the subsequent years severely reduced federal funding for projects. President Reagan in

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[13] Reisner, *Cadillac Desert*, p. 165.

[14] *Ibid.*, p. 325-326.

some sense carried on the endeavor begun by Carter by proposing that states be required to contribute up front to Reclamation projects. His Interior Secretary, James Watt, suggested 33 percent, three times the amount Carter had wanted the states to pay.[15] Congress did not go along with this proposal either, but the deficit and Reagan administration threats to veto led to the curtailment of water project authorizations. The era of heavy federal funding for water projects had come to a close.

As federal funding for water projects has decreased, and more of the expense of such projects must be born by the entities seeking the projects, these entities have looked around for other sources of water that might be less costly. At the same time, fewer and fewer people have been able to maintain a living in agriculture. For many, the water rights are the highest valued asset. These trends have led to an increasingly active water market for agricultural water rights that can be converted to municipal and other uses.

Howe and Easter noted in 1971 that interbasin transfers are nothing new, but that the conflict over them was intensifying.[16] They pointed to the increase in size, current proposals being ten times or more the size of

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[15] *Ibid.*, p. 342-343.

[16] Charles W. Howe and K. William Easter, *Interbasin Transfer of Water: Economic Issues and Impacts*, (Baltimore: The Johns Hopkins Press, 1971), p. 168.

existing transfers, combined with a growing population that is interested in economic growth.

THE LAW

The Colorado Constitution states that the right to "divert the unappropriated water of any natural stream to beneficial uses shall never be denied."[17] The first step of the appropriation process is to take a physical action toward diverting water, such as making a survey, with the intention of applying it to beneficial use. No permit is required to initiate a surface water right but is required in order to drill a well. The existence of the appropriation is confirmed and the water right priority determined in an adjudication proceeding before a water judge. The priority date is the date of initiation of appropriation. Until work is completed to accomplish the appropriation and put the water to beneficial use, the water right is called a "conditional right." The appropriator must demonstrate "due diligence," continuing work to complete the appropriation, to the water court every four years. Once the appropriation is complete or "perfected," the appropriator applies to make a water right absolute.[18] Colorado water law also recognizes appropriation by storage of water that subsequently will be used beneficially.[19]

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[17] *Constitution of Colorado*, Article XVI, Sec. 6.

[18] George Vranesh, *Colorado Citizens' Water Law Handbook*, Boulder, Colorado: Design Press, 1989, p. 17-18.

[19] *Ibid.*, p. 23.

In Colorado, ownership of water rights can be transferred in the same manner as other property rights. They can be transferred without legal review if the purchaser of the water right uses that right in the same manner with the same priority as the seller. However, if the purchaser wishes to change the point of diversion, place of use, time of use, or type of use, he must go through a formal change of water right proceeding through the Colorado water courts. Water rights may be decreed for more than one type of use.[20]

Prior to 1969, water rights adjudication in Colorado took place in the district court of each county.[21] The Water Rights Determination and Administration Act of 1969, C.R.S. Sec. 37-91-101 through -602, divided the state into seven water divisions corresponding to the seven major drainages. Now water courts in each division have jurisdiction over water right determinations.[22]

An applicant seeking change in one or more elements of the water right must show absence of injury to other water rights holders. If he does so to the court's satisfaction, the court must approve the change. Other parties

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[20] Lawrence J. MacDonnell, Principal Investigator, *The Water Transfer Process as a Management Option for Meeting Changing Water Demands* (submitted to U.S. Geological Survey, April 1990), Vol. II, Chap. 3, p. 4.

[21] Getches, *Water Law in a Nut Shell*, p. 155.

[22] *Ibid.*, p. 156.

may file statements of opposition to the application. The issue of injury is the most frequently disputed aspect in changing a water right.[23]

After an application is filed with the water court, other water right holders have up to sixty days to file a statement of opposition. The water court's resumes of each application are published in a newspaper in every county relevant to the specific application. In addition, interested parties, whether or not they own water rights, may request that their name be put on the resume mailing list of the water division. The water court in each division mails a monthly listing of water court applications. The cost of receiving this mailing is currently $1.00 per month.[24]

The only issue considered by the water court in a transfer case is property rights and the only effects to other parties taken into consideration are those affecting other water right holders. Analysis of the costs and benefits of the transfer are not considered.[25] The "no injury" rule protects water right holders in the continuation of the condition of flow relied upon to make their initial appropriations. Since 1954, the courts have taken an approach that attempts to keep the stream intact by prohibiting the

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[23] MacDonnell, *Water Transfer Process*, Vol. II, Ch. 3, p. 4.

[24] Interview with Lauris Pavlak, Deputy Water Clerk, Division 1 Water Court, Feb. 25, 1993.

[25] L.M. Hartman and Don Seastone, *Water Transfers: Economic Efficiency and Alternative Institutions* (Baltimore: The Johns Hopkins Press, 1970), p. 24.

depletion of the stream by the new use from exceeding the depletion of the stream caused by the original use. If stream conditions are not adversely affected by the change under consideration, then it is assumed there is not impairment to other appropriators.[26] Depriving an appropriator of the same quantity or quality of water available before the change are both considered injury, as well as increasing the appropriator's obligations to seniors. "It is the possibility of harm, and not a certainty it will occur, that must be proved."[27]

It is possible for a junior appropriator to be injured but not protected by the no injury rule in the case of reuse or more intensive consumptive use of water on the same land for the same purpose, changes in the use of imported water, and certain changes in the point of return flow.[28]

If the court determines that injury would result, it may require conditions preventing such injury. Such conditions may put a limit on the use of the water involved, may require a relinquishment of part of the decree or of another decree to prevent enlargement of use or a decrease in return flows, or may put a time limitation on the diversion of the water.[29] One such

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[26] MacDonnell, *Water Transfer Process*, Vol. II, Ch. 3, p. 4.

[27] Getches, *Water Law in a Nutshell*, p. 166.

[28] *Ibid.*, p. 164.

[29] *Colo. Rev. Stat.* Sec. 37-92-305(4) (1973).

condition is "compensatory storage," which is water stored to help provide for the future needs in an area of origin. It satisfies Colorado's legislative requirement that the Western Slope's present appropriations of water and future water needs be protected when water is transferred to the eastern half of the state.[30]

A water right is made up of a number of attributes: point of diversion, rate of diversion for a direct flow right or quantity of water for a storage right, implied or expressed time of use, implied or expressed place of use, implied or expressed type of use. Some of the controversy in change cases results from the uncertainly in the extent of the original water right. The elements of the original water right may not have been clearly defined, especially among earlier decrees. The courts rely on historic use of the right to provide definition. In addition, many early decrees described rates of diversion above the amount of water actually used. Transferring these excess amounts would result in injury to other appropriators, so the extent of a water right is determined by actual beneficial use.[31] Under the no injury rule, transfer of water is limited to transfer of that amount that was historically consumptively used: the difference between the amount of water diverted and the amount of water returned to the stream flow.[32] Historical

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[30] Getches, *Water Law in a Nutshell*, p. 162.

[31] MacDonnell, *Water Transfer Process*, Vol. II, Chap. 3, p. 3.

[32] *Ibid.*, p. 4; and Getches, *Water Law in a Nutshell*, p. 175.

use may be established by actual records or may be based on evidence of the amount of water that would be required for the use to which the water was put. Evidence may include soil conditions, proximity to the stream, crop water requirements minus average rainfall, and efficiency of irrigation.[33]

It is possible for the court to restrict a new use to less than the historical consumptive use. Compliance with the no injury rule may require that some of the historically consumptively used water, as well as the historical return flow, be left in the stream to assure that the same amount of water actually reaches the other appropriators who have claim to it.[34]

While holding water rights for speculative purposes is not permitted in Colorado -- the water must be put to beneficial use -- municipalities are permitted to appropriate more water than is needed currently because of their need to plan for future growth and development.[35]

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[33] Getches, *Water Law in a Nutshell*, p. 175.

[34] *Ibid.*, p. 177.

[35] MacDonnell, *Water Transfer Process*, Vol. II, Chap. 3, p. 11-12.

CHAPTER 3

WATER TRANSFER ISSUES:

DESCRIPTION AND LITERATURE REVIEW

THE ECONOMICS

If water were to be allocated strictly by economic criteria, it would be allocated to the use bringing the greatest return per unit of water at the least cost. There is not a water market in the West in the sense that there are markets for other natural resources: water is a fugitive resource that varies in volume from year to year. It cannot be shoveled into a train car, or sawed into shape and stacked, or picked from the walls of an underground tunnel. To hold a water right is to hold a right of use, not of ownership. Because return flow is used by other water right holders -- most diversionary uses return up to 50 percent of the original withdrawal -- the use of one's water right is interdependent with the users upstream and the users downstream.[36] The price structure for water is not so clearly determined as that of other resources, nor is there a world-wide spot market price with which to compare. There are sales of water rights and rentals of water use within some conservancy districts, and for rural-to-urban transfers.

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[36] Robert A. Young, "Why Are There So Few Transactions among Water Users?", *American Journal of Agricultural Economics*, Vol. 68, No. 5, December 1986, p. 1144.

One out of every four people living in the western United States gets their water from a supply system that imports from a source 100 miles or more away.[37] Today only three out of one hundred American workers are engaged in farming, compared to four out of ten in the year 1900.[38] As America's west becomes increasingly urbanized, new demand for water shifts from agricultural need to urban need. Most changes of water use in Colorado have historically been the result of urban encroachment into agricultural areas. Increasingly, water transfers involve changing the use of water rights already established, rather than appropriating unclaimed water as was done in many of the transfers of water across the Continental Divide.

As Saliba and Bush point out, the economic gains from transferring water to a new location and/or purpose of use must outweigh, or at least be perceived to outweigh, the costs of obtaining that water.[39] This means that all costs to the buyer, including court costs and any compensation costs, must be less than the expected benefits from the transfer. The controversies involved in rural-to-urban water transfer have increased the

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[37] Frank J. Quinn, "New Rivers and Old Realities: Why Westerners Disagree About Sharing Their Water Wealth," *Arizona Review* 20 (April 1971): p. 2.

[38] Albert Schaffer and Ruth C. Schaffer, "Social Impacts on Rural Communities," in *Water Scarcity: Impact on Western Agriculture*, ed. Ernest A. Engelbert and Ann Foley Scheuring (Berkeley: University of California Press, 1984), p. 309.

[39] Saliba and Bush, *Water Markets in Theory and Practice*, p. 4.

transaction costs, including such costs as public information and responses to the media regarding the transfer, revegetation costs, and the cost of defending a contested application in water court (as opposed to an unopposed application or one in which the points of contention can be settled to the satisfaction of the opposers and the water referee, obviating a court case). When Aurora purchased Rocky Ford Ditch water, drawn from the Arkansas River, the judge included as part of the court decree a requirement that the agricultural land dried up as a result of the transfer must be revegetated before the transfer could take place.[40] In addition, the Colorado legislature passed a law in 1992 requiring that revegetation plans be a part of any decree in an agriculture-to-municipal transfer.[41] In essence, many who oppose unfettered agricultural-to-municipal transfers of water are seeking a Pareto optimal situation. A Pareto optimum situation is one in which the well-being of one person cannot be increased without decreasing the well-being of another. Although the "well-being" sought by some parties may not be based solely on economic goals, the principle is still applicable.

Economists discuss two categories of measures of value. The private measure of the value of water would be the price negotiated between a buyer and a seller of a water right under competitive market conditions.

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[40] Jennifer Gavin, "Bill limits diversion of water," *The Denver Post*, 6 January 1991.

[41] *Ibid.*; and S.B. 92, 1992 Colorado Legislative Session.

This value would reflect the marginal value of the units of water exchanged. The social measure of value should account for impacts to those who are affected by the transaction but were not part of the price negotiation process.[42] These would include local governments affected by a declining tax base resulting from out-of-basin transfers of water, neighboring farmers whose lands receive blowing dust and weeds from dried-up crop land, and river users who experience a change in the quantity and quality of the river flow due to a transfer.

MacDonnell, Howe, Corbridge, and Ahrens argue that the Pareto criterion for decision making is closely related to both economic efficiency and to equity: the only way to be sure a new project is socially desirable is to be sure that no one is made worse off by the project.[43] Aggregate benefits must exceed aggregate costs and compensation in the amount of losses must actually be paid to all losers.

MacDonnell et. al. point out that the area within which costs are measured must be defined in order to determine if the benefits exceed costs.[44] This "accounting stance" can lead to conflicts between parties of varying

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[42] Saliba and Bush, *Water Markets in Theory and Practice*, p. 188.

[43] Lawrence J. MacDonnell, Charles W. Howe, James N. Corbridge, Jr., and W. Ashley Ahrens, *Guidelines for Developing Area-of-Origin Compensation*, Completion Report No. 139 (Ft. Collins, Colorado: Colorado Water Resources Research Institute, 1985), p. 45.

[44] *Ibid.*, p.49-50.

jurisdiction depending on the area measured and the resulting estimated costs and benefits. Measuring costs in too small an area might fail to account for some of the benefits and cost of a water transfer, while too large an area might lead to considering effects not legitimately attributable to the transfer.

Economic effects to be considered in an area-of-origin transfer fall into two categories: 1. direct effects and 2. indirect or secondary effects. The direct effects are those felt by the individuals who formerly used the water but have sold it to others. It also includes those who directly benefit from the importation of water. To measure the direct effects, the economist measures the value of crops foregone in an agricultural-to-municipal sale, for example, and the value of the water in municipal use. That is, what is the value of the crops grown with an acre-foot of water and what are municipal users willing to pay to use that same acre-foot of water? "Buyers will not undertake a transfer unless returns to water in their intended use outweigh both the price paid to the seller and all transaction and development costs borne by the purchaser. Sellers will not agree to a transfer unless the price they receive compensates them for the stream of future profits sacrificed by giving up water rights plus any out-of-pocket transaction costs borne by the seller."[45]

[45] Saliba and Bush, *Water Markets in Theory and Practice*, p. 6.

The indirect effects include those that are not the direct result of the application of the water but which are linked to its usage. These are referred to as "backward linked" or "induced by" activities, meaning those that contribute to the use of the water, and "forward linked" or "stemming from" activities, meaning those that result from the use of the water.[46] In agriculture, backward linked activities are those that contribute to the growing of the crops: the selling of seed and fertilizer to the farmers, the rental of planting equipment, the hiring of labor. Forward linked activities include the processing and packaging of the crops, and the transportation of them to point of final sale.

In the case of an interbasin transfer involving the sale and change of use of water rights, the area of origin experiences both direct and indirect economic impacts, as does the receiving area. In the case of an agricultural-to-municipal use transfer, the agricultural community will likely experience a reduction in the number of farmers and ranchers. While those individuals will be paid for their land and water rights, the secondary impacts of their departures are likely to be negative. Fewer farmers means fewer buyers of the backward linked activities: farm implements, seed and fertilizer, farm labor. It means fewer jobs and products to sell for the forward linked activities: processors, packagers, shippers. In addition, the departing farmers and their families may represent a substantial portion of the

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[46] Peter G. Sassone and William A. Schaffer, *Cost-Benefit Analysis--A Handbook* (San Diego, California: Academic Press, Inc., 1978), p.38.

clientele of local businesses: grocers, retailers, restaurants, banks, hair salons, car dealers. If their clientele is reduced enough, some of them will go out of business or relocate, further reducing the goods, services, and jobs available to those remaining in the area. If a small transfer is planned, or if alternative business and job opportunities can be generated in the area, these effects may be negligible. If several farms and associated water rights are purchased, the effect may be a downward spiral in the economic viability and population of an agricultural area.

On the receiving end, the water transported to a city may produce significant growth in jobs and business opportunities. It may help fuel the building of more houses, the businesses that accompany an expanding urban population, and provide a needed resource to industry. On the other hand, if the water is purchased for insurance against periods of drought, it is not needed on a regular basis. It may be withdrawn from agricultural production, and used only intermittently in the urban area, reducing its productivity to near zero.[47]

In addition, a person or entity contemplating a transfer of water, whether a new appropriation or a change of use of an existing water right, must consider what are called "transaction costs." These are the resources

[47] Ari M. Michelsen, "Economics of Optioning Agricultural Water Rights for Urban Water Supplies During Drought" (Dissertation, Colorado State University, 1988), p.6.

necessary to establish and maintain a system to move and allocate the water. Young divides these into the costs usually borne by the public sector and those borne by the transactors.[48] Public costs may be all or partly covered by the transactors with fees and taxes.

Howe's primer on assessing impact due to delay or cancellation of water storage projects described the complexity of determining what secondary benefits should be considered and how they should be valued.[49] An example he used is the building of a new elevator and feed mill near a new irrigation project. If the private investments came from within the state, then the net income generated in the elevator-mill operation is a legitimate secondary benefit. If the investment came from outside the state, however, the income should not be counted as a benefit. Howe said that secondary activities were rarely estimated because of difficulty in identifying them. Because these secondary benefits were not considered, "...there is a bias toward overstatement of secondary benefits and understatement of secondary costs. Certainly, gross sales in project-linked activities cannot be taken as indirect benefits since that measure makes no allowance for associated costs. On the other hand, if the expansion of secondary activities employs resources

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[48] Robert A. Young, "Why Are There So Few Transactions among Water Users?", *American Journal of Agricultural Economics*, Vol. 68, No. 5, December 1986, p. 1145.

[49] C.W. Howe, *Federal Water Storage Projects: Pluses and Minuses*, Information Series No. 35 (Fort Collins, Colorado: Colorado Water Resources Research Institute, 1979), p. 6.

that would not have been used otherwise over the long term, the net income from secondary activities may understate the actual secondary benefits."[50] He added that there is no accepted measure of value for aesthetic quality, such as urban parks, open spaces, green lawns, trees and shrubs. The loss of aesthetic value for the exporting community and the gain in aesthetic value for the importing community are real losses and gains but are extremely difficult to measure in the dollar units of other project costs and benefits.

The above elevator-mill operation is just a single illustration: multiply the examples of new businesses and employment as benefits and transportation, public services, health services and other needs generated by growth in a water importing area as costs; then compare this with loss of businesses, jobs, and public services, as well as any benefits such as improved water quality, in the water exporting and transit areas, and the cost-benefit analysis becomes infinitely more complex.

When there is competition between uses, for example, agricultural irrigation in the San Luis Valley versus water for the Denver suburbs, then economic analysis calls for the establishment and comparison of per unit (per acre foot) values. This becomes more complex as indirect costs and benefits are taken into consideration. Comparable prices require comparability in place,

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[50] *Ibid.*

time, and form.[51] Some values, as mentioned above, are not readily measured in the common denominator, for example, in market dollars. These values are called "incommensurables." Some values cannot be measured in economic terms at all and are called "intangibles." Values of this kind are part of the debate over large transfers of water and may not fit into a strict economic analysis of water allocation. They will be considered in other parts of this paper.

There is convincing economic evidence that some water transfers to cities will provide far greater returns per acre-foot than if left in rural areas. In the early 1980s, Young surveyed several analyses of the value of water measured in terms of foregone irrigation, and compared it to the value of water in industry, households, hydroelectric power generation, and water-based recreation.[52] He found that the direct net economic value foregone from partially reduced irrigation water supplies would most likely fall in the range $5-$30 per acre-foot, depending on location and type of use. The net value of that water transferred to industrial and household use is five to ten times or more as high as the losses in the agricultural sector.

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[51] S.L. Gray and R.A. Young, *Economic Issues in Resolving Conflicts in Water Use*, Completion Report 119 (Ft. Collins, Colorado: Colorado Water Resources Research Institute, 1983), p. 18-19.

[52] Robert A. Young, "Local and Regional Economic Impacts," in *Water Scarcity: Impacts on Western Agriculture*, ed. Ernest A. Engelbert and Ann Foley Scheuring (Berkeley: University of California Press, 1984), p. 244-265.

In addition, Young examined indirect impacts from reducing agricultural irrigation. Indirect impacts included effects on forward-linked activities and backward-linked activities. Young concluded that indirect losses to a region exporting irrigation water are not insignificant in terms of monetary flows or employment but they will be dwarfed by gains in the nonagricultural area. Impacts can be measured in stair steps, when looking at the returns per acre-foot. "...forages and food and feed grains, which account for over half of water use in western states, yield relatively small indirect employment and income effects, while the emerging manufacturing and service sectors yield relatively large increases per unit water of employed."[53]

Young concluded that in the long run, the least productive land will go out of production. Evidence is growing , however, that it is not necessarily the least productive agricultural land that is being sold for municipal and industrial transfers of water.[54] Water buyers are often willing and able to pay higher prices to buy land with the most secure and senior water rights, regardless of the kind of production or profitability of the farm.[55] This could

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[53] *Ibid.*, p. 261.

[54] Committee on Western Water Management, et. al., *Water Transfers in the West: Efficiency, Equity, and the Environment*, (Washington, D.C.: National Academy Press, 1992), p. 45-46.

[55] C.W. Howe, J.K. Lazo, and K.R. Weber, "The economic impacts of agriculture-to-urban water transfers on the area of origin: A case study of the Arkansas River valley in Colorado", as cited by National Research Council, *Water Transfers in the West: Efficiency, Equity, and the Environment* (Washington, D.C.: National Academy Press, 1992), p. 46.

increase the value of the losses to an area-of-origin and reduce the net benefits to the receiving area.

Young pointed out that specific communities may feel large proportional impacts of increased urban demands for water, impacts that may be masked by the use of state data. Rural communities losing water to urban areas may suffer significant loss of incomes and employment. He added that his consideration of indirect impacts of water transfer did not take into account impacts on public sector activities and investments such as schools, roads, health care, and public safety; nor were indirect impacts from instream uses included, due to lack of information available.[56] However, he believes that a reasonable scenario for urban water demand growth will result in only a 10 to 20 percent reduction of water supply to agriculture.[57] He reasoned that the last 10 to 20 percent of water used in irrigation is a tiny portion of the economy of any of the western states and will not produce the severe effects on western economies that some predict. In another article, Young stated that evidence shows that regional income and employment impacts of transfer were modest.[58] He pointed out the increasingly capital-intensive nature of irrigated crop production, requiring fewer workers, and the growing importation of farm production inputs from distant sources.

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[56] Young, "Local and Regional Economic Impacts," p. 261-262.

[57] *Ibid.*, p. 257.

[58] Young, "Why Are There So Few Transactions among Water Users," p. 1148.

The National Water Commission's 1973 report concluded that "increasing the price of water for irrigation in the 17 Western States would create the potential for release of substantial quantities of water from agriculture for uses in other sectors and locations without putting pressure on the Nation's food supplies or export potentialities or having other than minimal effects on the cost of food to the Nation's consumers."[59]

While those indirectly linked to irrigated agriculture do not have the protection against loss of assets that property rights afford to the primary users of water, Young sees a limited basis for concern and not much need for formal public action when there is a transfer of the irrigation water to other uses and locations. First, most individual transfers of irrigation water are not large and are not unexpected, providing time for adjustment. The high value of water in urban and industrial settings means that a small amount of agricultural water can lead to a large change in a region's industry and urban population. Slowly declining demand gives workers time to plan career changes and the business and public sectors time to depreciate investments without severe economic losses. He commented that there are few instances outside of the transfer of irrigation water in which the secondary impactees have been the subject of formal public policy

[59] Warren Viessman, Jr. and Christine DeMoncada, *State and National Water Use Trends to the Year 2000*, Congressional Research Service report published by the Committee on Environment and Public Works, Serial #96-12 (Washington, D.C.: U.S. Senate, May 1980), p. 248.

concern. "Risks are inherent in a changing market economy, as testified by the changes affecting millions of workers in the industrial Midwest."[60]

Howe, Lazo, and Weber also found that economic losses to rural areas resulting from transfer of water will be small compared to urban benefits.[61] In their study of seven counties on the Arkansas River in southeastern Colorado, they found that while agricultural-to-municipal transfers have a significant impact locally on farm employment and value added, at the state level, the impacts become insignificant. The loss of state net income of $53 per acre foot of water transferred is offset by cost savings to cities at a time when the cost of developing new water had risen to more than $2000 per acre foot.

Approximately 30 percent of all crops in the study area were irrigated and only 2.4 percent of irrigated crops were vegetables, fruit, or other specialty crops requiring further processing. The irrigated feed grain and hay crops supported the local feedlot industry. The authors pointed out that vegetable and specialty crop acreages remained steady for the study period 1955 to 1980, since there were always growers willing to step in should any of those already growing these crops under contract decide to sell their water and/or

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[60] Young, "Local and Regional Economic Impacts," p. 263.

[61] Charles W. Howe, Jeffrey K. Lazo, and Kenneth R. Weber, "The Economic Impacts of Agriculture-to-Urban Water Transfers on the Area of Origin: A Case Study of the Arkansas River Valley in Colorado," *American Agricultural Economics Association*, December, 1990, p. 1200-1204.

land. These crops, then, were "bumped" onto new lands when old lands were dried up. In addition, the authors found no evidence that phase-outs of feed grains, hay, and irrigated pasture limited expansion of feed lots during the study period.

At the state level, losses to agriculture and to the general economy are not significant. However, the authors cautioned, the costs are always felt by the area of origin of the transferred water, while the benefits are received in the area of new use. Since the transfers are usually outside of the agricultural economic area, the local economy experiences significant uncompensated costs. The authors concluded that transitional assistance is justified to help those affected by these costs.

SOCIAL, CULTURAL, AND POLITICAL ISSUES FOR WATER IMPORTING AND EXPORTING AREAS

Large transfers of water can produce significant social, cultural and political effects. Because of the interconnectedness of these three aspects of community life, they are discussed together here.

It is the closing of local businesses and decrease in local services and credit that represent a reallocation of not only water but also of wealth from the rural to urban communities. Furthermore, the migration of farmers, business, and professional people weakens leadership and undermines a rural community's capacity to adjust to the economic changes that a

transfer of water can induce.[62] These are the impacts that lead potential water exporting communities to fight against the transfer of water out of their basin, or at least to attach restrictions to it. While Young's regional analysis shows that on a regional or statewide basis, water transfer is not a large threat to western agriculture and western economies, to a person residing in a small town along the Arkansas river or in an agricultural community in the San Luis Valley, the loss of 150 jobs and half a dozen businesses resulting from the transfer of a few thousand acre feet of water is a big impact to that community.

It means changes in local lifestyles, splitting up of families when members can no longer find jobs locally, driving an extra few hours to get a farm implement or repair part that used to be sold locally, having to rely on a hospital one hundred miles away instead of ten, monitoring the county with three deputy sheriffs instead of half a dozen.

On the other hand, the opportunity to sell some or all of one's water rights has been a boon to some farmers. In the late 1960s, the Crowley Land and Development Co. offered $380 per acre for land and Colorado Canal water. More than half of the farmers took the offer.[63] Other ditch users, however, kept the water in the area by requiring a two-thirds vote of water users to

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[62] Schaffer and Schaffer, "Social Impacts on Rural Communities," p. 309.

[63] Associated Press, "County fears future without water rights," *Ft. Collins Coloradoan*, 12 July 1990.

move water elsewhere. In the 1980s, a farm depression led many farmers to sell their shares in Twin Lakes. In some cases, farmers have used the money from sale of their water rights to pay off their debts, then leased the water back and continued farming.[64] Several farmers in Ault also avoided bankruptcy by selling their farms and water rights to Thornton.[65]

The purchase of agricultural land and its water rights by cities can sometimes take on the look of a divide-and-conquer campaign. Comparisons to Owens Valley in California are frequently voiced by residents of current and potential exporting basins. The conventional view is that some farmers sell because they are driven to it by bad economic times for agriculture. In some cases this is true. "'Selling (the water) was a lot less expensive and embarrassing than bankruptcy," was the comment of Buck Barnhart, a former Arkansas Valley farmer, now a Pueblo real estate broker.[66] He added, however, that water is a property right and the owners have the right to take advantage of it.[67]

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[64] Chris Woodka, "Water sales, farm conditions both cut into valley irrigation," *Pueblo Chieftain*, June 1990.

[65] Kit Miniclier, "A mixed blessing for Ault," *Denver Post*, 5 April 1987, p. 4B.

[66] Chris Woodka, "Barnhart: Just no way to make farmers stay," *Pueblo Chieftain*, 3 June 1990, p. 6B.

[67] *Ibid.*

Young pointed out that land and water values have risen greatly in anticipation of urban, industrial, and energy demands. "The fact is that large acreages with associated water rights in regions of urban growth are held speculatively (by farmers and others) in anticipation of further asset appreciation."[68] Musick adds that the only difference between water marketing as practiced in the past and water marketing as it is developing today may be that in the past, water rights were bought and sold between end users. Today, water marketing more and more involves "brokers, promoters, intermediaries, and speculators unrelated to the present or subsequent user of water."[69] Only if water is valuable enough to be profitable to these players, as well as the end users selling the water rights, would they be drawn into the market.

Sometimes a pending transfer can draw together unusual allies. Unlike other agricultural areas where some farmers have sold and some have not, thereby splitting the community, ditch companies and pump irrigators

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[68] Young, "Local and Regional Economic Impacts," p. 262.

[69] John D. Musick, Jr., "Reweave the Gordian Knot: Water Futures, Water Marketing, and Western Mythology," reprinted in *Water Marketing in Colorado's Future: Debate and Analysis*, presented by The Institute for Advanced Legal Studies, University of Denver College of Law, October 11, 1991; originally printed in *The Proceedings of the 35th Annual Rocky Mountain Mineral Law Institute*, copyright c 1990 by Matthew Bender & Company, New York.

formerly in competition joined forces to fight the project in the San Luis Valley proposed by American Water Development, Inc. (AWDI).[70]

Ingram and Mumme examined the role of water in the southwestern United States in two ways: they surveyed several major newspapers of southwestern cities, and they examined the role of water in the cultures of the Papago Indian tribe of southern Arizona and of the Hispanic communities in the Upper Rio Grande River watershed in northern New Mexico and southern Colorado.[71] They concluded that residents of the Southwest regard water as a special resource that should not be subject to strict market conditions. Their survey of newspapers found that water was often described in ways that other natural resources are not, with such phrases as "the limiting factor," "lifeblood," "crucial fluid," and "water means survival."[72] In the two communities studied, control over water resources was regarded as vital to the continuation of their communities and cultures, more important than maximizing economic returns on their water assets. Ingram and Mumme concluded that treating water strictly as

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[70] Chris Woodka, "Gosar: A different view on the value of water," *Pueblo Chieftain*, 3 June 1990, p. 6B.

[71] Stephen P. Mumme and Helen M. Ingram, "Community Values in Southwest Water Management," *Policy Studies Review*, November 1985, Vol. 5, No. 2, p. 365-381; and "Public Perceptions of Water Issues in the Four Corners States as Indicated Through a Survey of Regional Newspapers: a Preliminary Report," paper presented at the Western Social Science Association's 25th Annual Conference, Albuquerque, New Mexico, April 27-30, 1983.

[72] Ingram and Mumme, "Community Values," p. 370.

an economic commodity would be detrimental to some water users, particularly low income rural communities in arid areas of the southwestern U.S.

In their examination of water and poor communities in the Southwest, Ingram and Brown stated that there is strong evidence that "the water development strategy most acceptable and desirable to rural communities involves irrigated agriculture."[73] They added that community and cultural attitudes toward water strongly promotes participation, particularly when the supply appears to be threatened. The findings of this thesis suggest that to preserve this strategy against water transfer proposals, members of these communities will need to work together in thoroughly examining and using the protections provided to water rights holders under Colorado water law.

An informal but extensive examination by this researcher of articles on water issues published in Colorado newspapers in early 1990 through early 1992 found that certain "gut issues" often form the debate over transfer projects before specific proposals have even been aired yet. These include rural distrust of the big city, West Slope-East Slope antagonism, and political rivalry. Some of these issues are as old as man and will always be there, for example, the distrust rural communities have for big cities.

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[73] F. Lee Brown and Helen M. Ingram, *Water and Poverty in the Southwest*, (Tucson: The University of Arizona Press, 1987), p. 2.

Others, such as the West Slope suspicion of the Front Range, are based on history. Even when one group of politicians are dead and barely remembered, a new group representing the same interests will have to carry the burden of the long memories in western Colorado of transfers they commonly refer to as water raids.

> "They'll say whatever they need to say to get the first drop and then there is no end. It'll be just like California. They (water developers) took those boys out of business," said Jason Kirkpatrick, San Luis Valley farmer, about the AWDI proposed project. [74]

> "Sending water over the hill mortgages your future," is the opinion of Gary Sprung of the High Country Citizens' Alliance, a litigant against the Collegiate Range project.[75]

> "My fear is that they'll put the heat on us. I don't know what we'll do then,"' mused Orville Tomky, a Crowley County farmer, about the cities that control the Colorado Canal Board.

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[74] Schuff, "High Stakes," p. 18.

[75] Karen Bowers, "Aurora ends bid to divert water from the West Slope," *Rocky Mountain News*,1 November 1990, p. 6.

"They're either going to tax us to death or put the screws to us somehow."[76]

"When you take water out, it's just like taking gas out of a gas tank. Things don't work as well,'" was Swink farmer Frank Milenski's explanation of his belief that water should not leave its historic area of use.[77]

Those who seek to transfer water out of the basin of origin need to be sensitive to these attitudes that represent a value to water that cannot be measured in commodity terms, an "intangible" value. These attitudes are not new but the number and volume of those voicing them is rising. They have led to several pieces of legislation being introduced in the Colorado legislature over the past several years, all trying to protect the area of origin. Consequences of these voices are being seen in the public arena and in the courts. For example, while the president of AWDI, Dale Schaffer, claimed the company's amended application filed with the water court in Alamosa addressed valley concerns about the export of the water and resulting reduction in available irrigation water, the record shows that

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[76] Chris Woodka, "Farmers resist pressure to sell water to cities," *Pueblo Chieftain*, 3 June 1990, p. 2A.

[77] Chris Woodka, "Milenski: The water belongs with the land," *Pueblo Chieftain*, 3 June 1990, p. 1B.

AWDI did not address those concerns in its original application until it became clear it would have to plead its claim in court.[78]

ENVIRONMENTAL/ECOLOGICAL ASPECTS OF WATER TRANSFERS

Measurable progress has been made nationwide to reduce pollution discharged directly into water courses from industrial plants, sewage treatment facilities, and other point sources. However, in spite of federal and state efforts, some categories of pollutants, including salts, agricultural chemicals, sediment and silt, have increased, especially in the West.[79]

At the same time, the largest demand for new consumptive water use is for municipal and domestic use.[80] This requires higher quality water than some other uses. In addition, there is significant new demand for non-consumptive instream uses: recreation, fisheries, and preservation of the natural environment. These also require certain levels of water quality.

The environmental impact of transferring water depends on the situation. If water is used for irrigation, the flow returning to the stream may carry

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[78] Schuff, "High Stakes," p. 11, 14.

[79] David H. Getches, Lawrence J. MacDonnell, and Teresa A. Rice, *Controlling Water Use: The Unfinished Business of Water Quality Protection* (Boulder, Colorado: Natural Resources Law Center, University of Colorado, 1991), p. 3.

[80] *Ibid.*, p. 5.

with it pesticide and fertilizer residue, in addition to salts accumulated as it percolates through the soil. If the consumptively used portion of the water is transferred, the remaining flow will be less saline and will increase the dilution ability of the water flowing in the stream. However, if water currently flowing downstream from Colorado to other states is appropriated and used within Colorado, the dilution capacity of the water flowing out of state is reduced. The water left in the stream after transferring the consumptively used water may be warmer than the water from ground water recharge from agriculture, and may affect the stream flora and fauna either positively or negatively. The timing, water level, temperature, and quality of return flows affect fish and wildlife, quality of water available to downstream users, recreational use of instream flows, and the level of erosion affecting the river condition.

The current state of the art is not sufficient to have a clear delineation of water quality issues to apply to every circumstance.[81] The environmental impact of each transfer must be specifically studied. This addresses the specific conditions that may result from a particular transfer, but the collection and analysis of site-specific data does increase the cost of the transfer, and should be taken into account by those planning a water transfer.

[81] Conversation with Dr. Robert Ward, Director of the Colorado Water Resources Research Institute, Fort Collins, Colorado, October 15, 1992.

Getches, MacDonnell and Rice list four categories of water quality problems resulting from water use:[82]

1. Depletion degradation: consuming water results in a higher concentration of pollutants because the remaining water is less able to dilute them.

2. Physical alteration: uses of water directly alter the physical characteristics of the water. For example, storing water in reservoirs causes changes in water temperature, sediment content, and oxygen content. Releases of stored water may have an adverse effect on downstream fishery habitat; or in some cases these changes in the characteristics of the water may be beneficial to downstream water users.

3. Pollution migration: water use causes pre-existing pollution to contaminate other waters. An example is the potential for groundwater pumping to cause natural or manmade pollution in or adjacent to an aquifer to spread.

4. Incidental pollution: uses of water cause pollutants to enter waterways other than from discrete point sources. For example,

[82] Getches, et.al., *Controlling Water Use*, p. 6-7.

irrigation leaches salts and selenium from soils, which then enter surface water and groundwater supplies as part of return flows.

As stated above, Colorado water law requires a legal review of a change application only with respect to possible injury to other water rights. Other interests may be affected, however, by the effects on water quality and level of instream flow resulting from a change in the type or place of use of a water right.

Historically, water rights have been based on the diversion and use of water. Colorado now has a program to establish certain instream water rights. Only if the Colorado Water Conservation Board holds an instream flow water right potentially injured by a proposed change may effects on streamflow-related values be protected. There are more than 1000 instream water rights that have been established under this program, representing more than 7000 miles of streams and rivers. These rights are limited because they seek to protect only cold-water fisheries. Other values based on instream flow, such as scenic views, recreation, water quality, and wetlands, are not considered in the application process.[83]

Krutilla stated that the "...economic justification for retaining a particular natural environment in an unmodified state requires that its aggregate

[83] *Ibid.*, p. 36.

amenity value exceed the value others may obtain from such a wild tract being allocated to another purpose."[84] If the measured aggregate amenity value does not somehow consider, or mention, the incommensurables and intangibles described earlier, it may exclude some values that are very important to the public affected by the proposed water transfer. The effort to balance these non-measurable values with the measurable ones is one of the more difficult responsibilities of public policy makers.

While the influence of environmentalists and recreational interests are very limited in the Colorado water courts, they are not without clout. For all the expertise and arguments lined up in favor of the Two Forks Dam, its application for an essential federal permit was denied on environmental grounds. The law under which it was denied was developed and passed in the first place partly due to the political clout of an earlier wave in the environmental movement.

Environmental and recreational interests can make themselves heard in situations of transfer proposals smaller in scale than the Two Forks Dams. They have a variety of avenues of action open to them other than the courts. While a particular environmental organization or recreational business may not have the legal standing to file a statement of opposition to a change

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[84] John V. Krutilla, "Reflections on Man's Relation to Nature," in *Natural Resources Economics and Policy Applications: Essays in Honor of James A. Crutchfield* (Seattle: University of Washington Press, 1986), p. 2.

application, they can participate in the activities of coalitions fighting out-of-basin transfers. Many such organizations have become adept at public education campaigns, using the media, the mail service, and public forums. Some are also adept at raising money and can help fund the court battles of opponents of transfers. Some have developed enough clout and expertise to become players in negotiated settlements of water disputes -- there was a time they could not even get in the door.

A common perception of environmentalists is that they are just spoilers and resisters. Some may be, but others seek to educate the public on the value of preserving a clean environment and using resources with a long-term rather than short-term perspective. They have come so far that one environmentalist was head of the Environmental Protection Agency in the Bush Administration and another involved in the Two Forks Dam controversy earned the headline "Attorney is dams' nemesis."[85] The attorney is actually scientist Dan Luecke, who didn't just oppose Two Forks: he sought to assure an assessment of water needs based on realistic growth predictions. He also advocated a serious metropolitan water conservation effort and suggested that rather than throwing farmers off the land, incentives should be provided them to help cities during drought years. He touted Michelsen's proposal that cities pay yearly drought insurance premiums to farmers, who would continue to farm. During drought years,

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[85] Bill Scanlon, "Attorney is dams' nemesis," *Rocky Mountain News*, 20 March 1991, p. 26.

cities could cash in their premiums and use the water normally used for irrigation while the farmers take a sabbatical year.[86]

Other examples of environmental and recreational issues, which might not have been considered two or three decades ago, include:

- the National Park Service has formally asked the Bureau of Reclamation to release more water in the spring from Blue Mesa Reservoir and reduce winter releases, in an attempt to help wildlife in the Black Canyon of the Gunnison National Monument, [87]

- water court depositions regarding plans by Aurora and Arapahoe County to divert Gunnison Basin water show that bald eagle habitat is threatened by the proposed Almont Reservoir, brown trout population in the Taylor River would be reduced by as much as 70 percent, at least 200 acres of federally protected wetlands would be endangered by the Collegiate Range and Union Park projects, and winter

[86] Michelsen, "Economics of Optioning Agricultural Water," p. 6.

[87] Mark Obmascik, "Park Service seeks water rights for Black Canyon," *Denver Post*, 10 May 1991, p. 1B.

grazing land for Rocky Mountain bighorn sheep, elk and deer would be inundated by the Almont project,[88] and

- the Animas-LaPlata has been put on the back burner by the U.S. Fish and Wildlife Service's call for a study of the impact of the project on an endangered species of fish.[89]

INSTITUTIONAL FACTORS IN WATER TRANSFERS

Data shows that Colorado water law generally supports transfers of water, especially permanent transfers. Changes are only denied if there is injury to other water rights holders that is unavoidable.[90] The legal categories of water and the different laws applying to them can make the transfers more complex. [91]

Although Colorado water law permits water rights holders to oppose transfer projects, it is up to them to spend the time and money to oppose

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[88] Bill McBean, "Gunnison Country' opposed to water plans," *Denver Post*, 16 April 1990, p. 1B, 4B.

[89] Kit Miniclier, "Animas-LaPlata project key to Indian coal cache," *Denver Post*, 9 August 1990, p. 1C, 11C.

[90] MacDonnell, *Water Transfer Process*, Vol. II, Ch. 3, p. 32.

[91] *Ibid.*

the project. It is not unusual for a water right change application to spend more than a year and a half in the legal process.

In the case of a contested change application, each side of the case provides reports from their own engineering, legal, and hydrology experts, and the court must determine which facts are accurate. According to MacDonnell, most issues under consideration in the change application case are factual: historic diversions, transport losses, consumptive use, return flows, other hydrologic and engineering issues. In a water transfer case involving opposition by one or more parties, the costs of providing expert testimony, both by the opposition and by the change applicant, can add considerably to the cost of the transfer.[92]

Only possible injury to other water rights trigger review of change applications under Colorado law -- other potentially effected interests may have no legal standing in the court. However, a water transfer can cause substantial economic, social, and cultural change in the area of origin and the area of transfer. For example, tourism is a prime industry in Colorado, much of it based on Colorado's scenery and availability of outdoor rural activities. It is logical that the economic contributions of such businesses as rafting, fishing, hiking and camping should be weighed when the transfer of the water supporting such businesses is determined. "Every western state

[92] *Ibid.*, p. 35.

except Colorado provides for some kind of public interest review of proposed new appropriations of water and at least eight states subject water transfers to this kind of review....there is no constitutional barrier to establishing a requirement that changes of water rights be in conformance with protection of interests beyond the property interests of other water right holders."[93]

A recent law passed by the Colorado legislature may offer additional protection for water users in basins facing potential exports. Under this 1989 law, the applicant is required to provide a proposed decree to the water courts in any case in which a statement of opposition has been filed. This proposed decree is to prevent injury to other water rights[94]. It delineates the proposed conditions governing the intended appropriation or transfer.

Colorado water law is complex and adversarial. MacDonnell's recent study of water transfers in six western states found that Colorado was the only state in which the approval period for an application for change in purpose or place of use averaged more than a year. However, 80 percent of the applications made within the study period (1975-1984) were approved[95].

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[93] *Ibid.*, p. 37.

[94] *Ibid.*, p. 5.

[95] *Ibid.*, p. 12.

Shifting water rights from agricultural to non-agricultural uses is the dominant pattern in Colorado[96].

One issue MacDonnell touched on briefly that may provide a gold mine of political science theses is the shift from agricultural to urban control of mutual ditch companies[97].

The shareholders of a mutual ditch or reservoir company are the users of the water and the equitable owners of the water rights, conveyance, and storage facilities. They are entitled to receive a *pro rata* quantity of water available to the company based on the number of shares of stock held by each user. The shares are considered to be a real and a personal property right, and those shares may be transferred according to state law and the mutual company's by-laws. Mutual ditch companies may establish requirements in their by-laws that will govern the transfer of share interests[98].

MacDonnell cited examples of mutual ditch companies that have experienced significant redistribution of share ownership as agricultural use has decreased. The Farmer's Highline Canal and Reservoir Company,

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[96] *Ibid.*, p. 53.

[97] *Ibid.*, p. 34.

[98] *Ibid.*, p. 10-11.

owning numerous Clear Creek water rights, had 51.1 percent of its stock held by municipalities, counties and special districts in 1974. Farmers and small landowners held 35.1 percent. In 1989, those figures were 79.2 percent and 11.0 percent respectively. The Church Ditch, originally constructed by a group of farmers in 1863, is currently owned by several cities. Broomfield is the largest shareholder, with 39 percent of the Ditch water, Westminster owns 14 percent. All together, municipal owners hold title to approximately 90 percent of the company's water in 1989[99].

MacDonnell did not offer an analysis of the nature of the changes in shareholder decisions governing the mutual ditch companies, but such analysis would yield an interesting comparison of the differing priorities and politics of the urban and rural stockholders. It would also be interesting to see a state-wide study of water supply organizations from the perspective of the question of when and how the critical mass of urban ownership begins (or began) to change water policy.

[99] *Ibid.*, p. 22.

CHAPTER 4

DATA, FINDINGS, AND ANALYSIS

How are affected parties using Colorado water law and the water court system to address issues of agricultural-to-municipal transfer of water? Will a snapshot of such cases provide insight into the reasons for the controversial nature of the issue and an understanding of how the affected parties are dealing with the subject? Will it show which issues are being addressed in the current legal system, and which ones are not? Who is participating in the system and who is not? What do policy makers need to know to determine what, if anything, the government should do to address the controversy surrounding agricultural-to-municipal transfers of water? What should legislators consider when deciding what, if anything, must be done legislatively to match the development of water law to the evolution of water needs and uses?

An examination was made of the agricultural-to-municipal change of use applications made in Colorado Water Divisions 1 and 2 from 1977 through 1991. Water court resumes were surveyed. In addition, a small number of cases were selected for in-depth examination of court documents.

METHOD OF ANALYSIS

As explained previously, those seeking to change the nature of a water right in Colorado must apply to the water court in the division from which the water is to come. Water court resumes, brief descriptions of water court applications, are written for every application and recorded by the seven Colorado water courts. Each court submits a monthly listing of these resumes to the State Engineer in Denver.

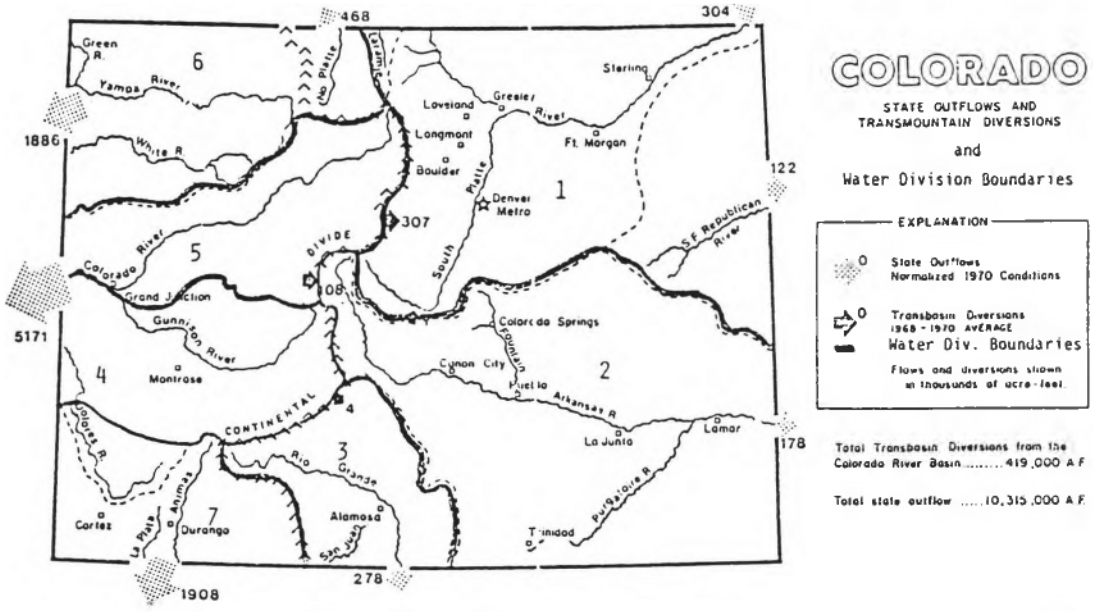
In addition, each water court maintains files of information relevant to each case, including copies of statements of opposition filed by interested parties, orders from the court to interested parties, stipulations signed between affected parties, and the final decree issued by the court describing the water right and any conditions placed on its use.

This examination was made to identify important trends and characteristics of applications for agricultural-to-municipal water transfers made during the years 1977 through 1991. 1977 was the year that President Jimmy Carter issued his so-called "hit list" of federally funded water projects. 1977 can be considered the year dividing the water project building years of the 1930s through the 1970s, and the years of declining federal support for large water projects and increasing range of issues that must be considered in the planning of such projects.

The examination focused on the kind of cases that seem to generate the greatest public debate and media coverage: large transfers of water from irrigation use to municipal use. The cases selected for review involved efforts to increase the water supply of municipalities. Change of use cases in which water was being transferred by a developer for a housing or tourist development were not included, unless the transfer specifically sought to add the water to an established municipal system.

Water Divisions 1 and 2 in Colorado, as shown in Figure 1, encompass the eastern half of the state. They are the first and second busiest divisions, respectively, of the seven divisions, in terms of water right applications to the water court. Included in their boundaries are the "Front Range" cities, variously defined but here taken to mean the string of cities, towns, and suburbs ranging along the eastern base of the Rocky Mountains from Pueblo north to Fort Collins. Included are such cities as Colorado Springs, Castle Rock, the metropolitan Denver area, Boulder, Louisville, Longmont, and Loveland. The bulk of new water need in Colorado is urban need, and the bulk of urban need arises from growth along this urban strip.

To identify the cases to be examined, the water resumes from January 1977 through December 1991 were examined and agricultural-to-municipal change-of-use applications were selected. Details routinely provided in the resumes include applicant's name and attorney, description of the water rights involved, including source, amount, location of use, historical use,



SOURCE: *Colorado Water*, League of Women Voters of Colorado, 1975. Water Division Boundaries have been added.

Figure 1: Colorado's Water Divisions, as shown in *Colorado Water Laws*, G. E. Radosovich, Ed., Info. Series No. 17, County Information Services and Environmental Resources Center, Colorado State University, 1979.

appropriation dates and original decree dates and court of jurisdiction. The researcher had hoped to include a survey of amount of land and types of crops to be taken out of production as a result of agricultural-to-municipal water transfers, but this information is not routinely provided as part of water court resumes. Further research revealed that this information is not always provided in other water court documents.

Initial identification for the agricultural-to-municipal cases was made with the assistance of the Division Engineer's office in Division 1 and the assistance of the Clerk of the Water Court in Division 2. The Engineer of Division 1 maintains a computer listing of water rights in chronological

order by priority with details of the water rights included in the read-out. This read-out provides adequate information, in a line or two, of each water right to be able to determine if it is an agricultural-to-municipal change-of-use application. Subsequent examination of the water court resumes provided details of these cases, eliminating a few that fell outside the desired case description. The Clerk of the Water Court in Division 2 provided a list of all change-of-use applications filed during the study years, as well as exchange cases. These two lists made it possible to read only change-of-use water court resumes without having to read all the resumes. There are hundreds of applications made to water court each year not only by municipalities, but by individuals and corporations seeking to confirm water rights, substitute new wells or diversion works for old ones, correct or clarify descriptions of water rights, transfer irrigation water from one piece of land to another or to other uses such as industrial or piscatorial, and applications by the Colorado Water Conservation Board establishing in-stream flow rights.

After the agricultural-to-municipal change-of-use cases were identified and the relevant details recorded, graphs were constructed to show the number of such applications made in each of the study years. This was done to see if there was an identifiable change in the number of such applications made during the period in which federal funding for large water projects was declining and economic, social, environmental, and recreational concerns were growing.

In addition, graphs were constructed to show the years of the original appropriations involved in the proposed transfers. This was done to get a picture of the seniority of the water rights cities are acquiring. Figure 2 shows the number of agricultural-to-municipal applications made in each of the study period years, 1977 through 1991. Those 67 applications sought to transfer a total of 768 water rights originally decreed to agricultural use. The 768 water rights are shown by year of appropriation on the lower portion of Figure 2. The majority of agricultural rights were established in the 1860s through the 1880s. In Division 2, in southeastern Colorado, 36 agricultural-to-municipal change of use cases were identified for the study years and are shown in Figure 3. The 36 applications sought to transfer a total of 163 water rights originally decreed for agricultural use. The majority of the 163 rights, shown by year of appropriation on the lower portion of Figure 3, also were established during the 1860s through the 1890s.

To develop a snapshot of the issues raised in agricultural-to-municipal transfers, several cases were selected from each division for in-depth examination of the applications, statements of opposition, and final decrees (when available) were examined. In each division, the agricultural-to-municipal cases identified through reading the resumes fell into subcategories that became obvious as the resumes were read. Cases were selected to represent these subcategories. Within these subcategories, any case was as likely as any other to be selected for examination.

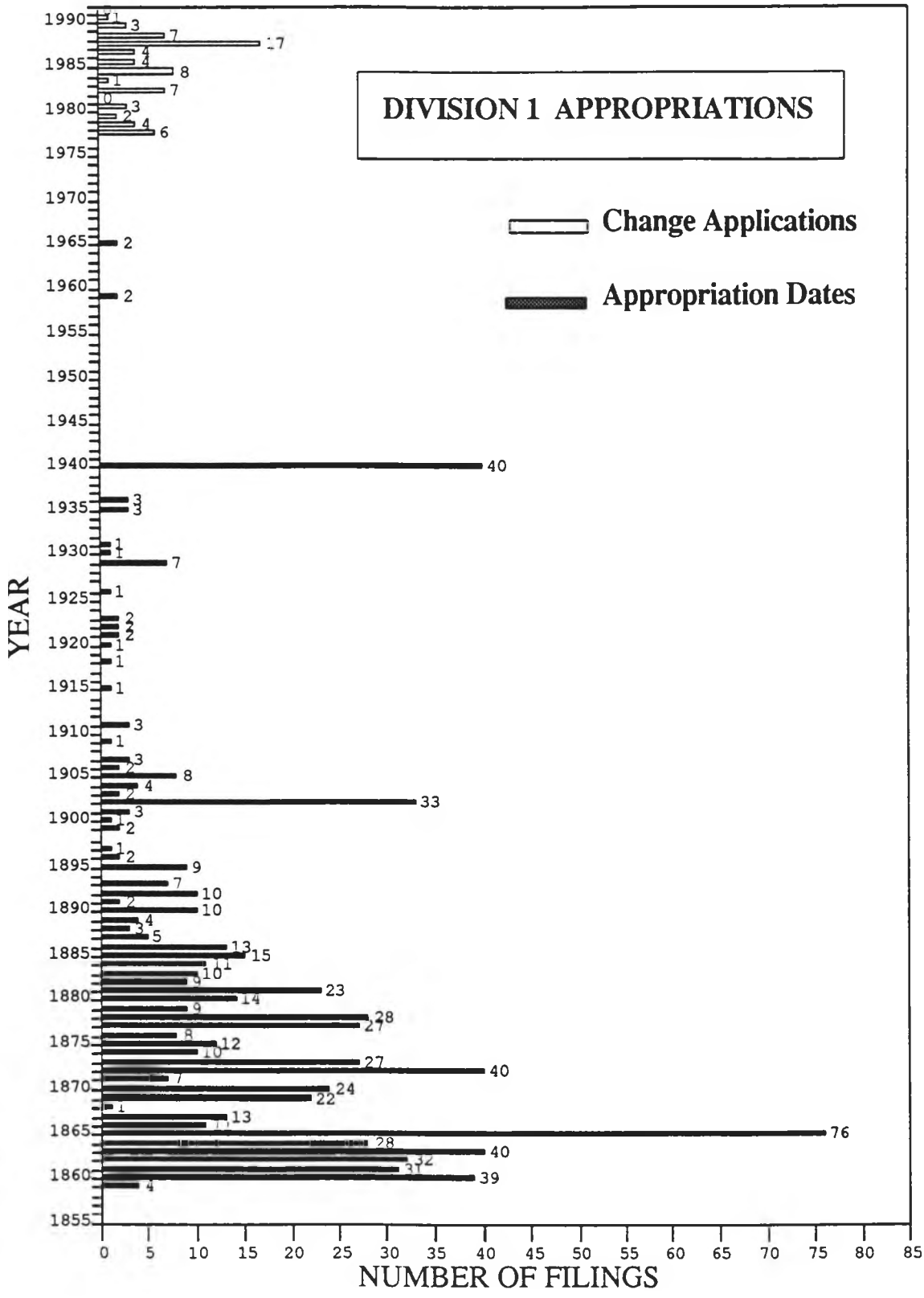


Figure 2: Agriculture-to-municipal change-of-use applications and original appropriations, tallied by year, Colo. Water Div. 1, 1977-1991. Data drawn from Water Court resumes, State Engineers Records Office, Denver, Colo.

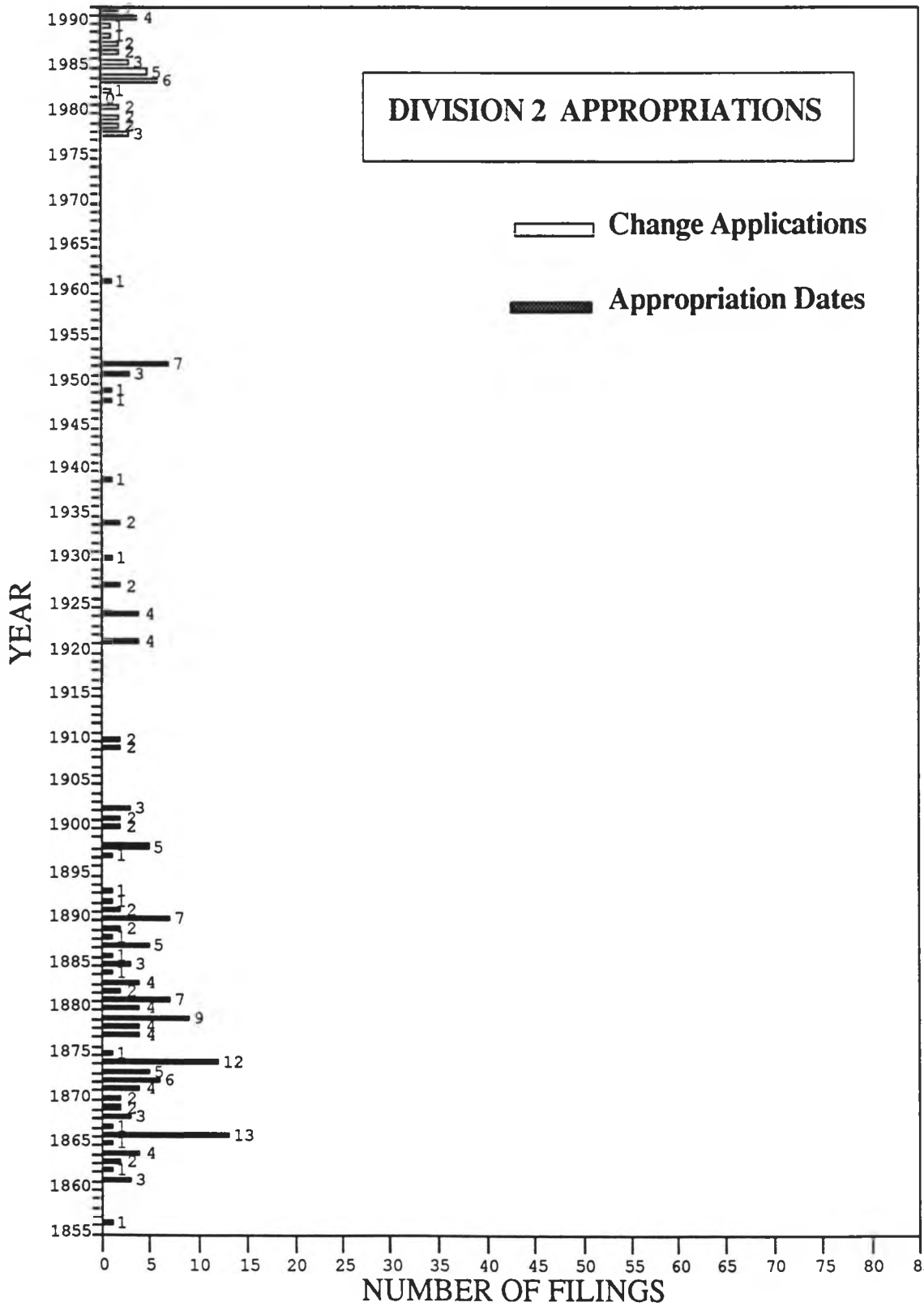


Figure 3: Agriculture-to-municipal change-of-use applications and original appropriations, tallied by year, Colo. Water Div. 2, 1977-1991. Data drawn from Water Court resumes, State Engineers Records Office, Denver, Colo.

In Division 1, all 67 identified cases involved intrabasin transfers. Several cities in Division 1 are served by the Northern Colorado Water Conservancy District (NCWCD), some of which are considered Front Range cities and some not. Cases involving NCWCD cities seeking to transfer irrigation water provided by NCWCD do not seem to generate the high level of controversy that surrounds many agricultural-to-municipal cases in which the water to be transferred will be moved to another area of the state. Several suburbs in the Denver metropolitan area which are not served by NCWCD have travelled into irrigated areas of northeast Colorado seeking water rights with the intention of piping the water to the metropolitan area. These cities are sometimes accused of treating rural areas as water farms, and these water transfers often generate far more controversy and media coverage than do the cases involving NCWCD cities and water. Cases were chosen to illustrate both kinds of transfers. Among the cases involving Denver area cities, two categories arose: cities that have sought irrigation water within Division 1 but not from Division 2, and cities that have sought water within Division 1 and within Division 2. Finally, cases representing cities that are not served by NCWCD and are not in the immediate circle of Denver suburbs were selected to examine similarities and differences between them and the other Division 1 cases. Division 1 had no interbasin transfer applications, meaning it had no applications seeking to transfer water from one division to another.

In Division 2, there were two subcategories among the 36 cases: 30 intrabasin cases and 6 interbasin cases. Among the intrabasin cases, applications from both Front Range cities and cities not generally considered part of the Front Range urban corridor were selected. All of the interbasin cases involved the city of Aurora, so two of those were selected, an earlier one to which some of the later Aurora applications referred, and one of the later applications.

DESCRIPTION OF SELECTED DIVISION 1 CASES

Brief descriptions of the cases selected for in-depth examination for Division 1 are provided below. The first two numbers of the case number indicate the year the application was filed, i.e. the application in Case No. 82CW202 was filed in 1982.

Case No. 82CW202: Applicant: Loveland and the Greeley and Loveland Irrigation Company. Loveland sought to change the type and place of use of water rights decreed to eight ditches and canals in Larimer and Boulder Counties, as well as to two lakes and four reservoirs. The source of all these rights was the Big Thompson River. Loveland wanted to add municipal to the decreed irrigation use and to use the water in areas owned by Loveland or served by the domestic water system of Loveland.

Four statements of opposition were filed, three by mutual reservoir and ditch companies: Consolidated Home Supply Ditch and Reservoir Company, the Handy Ditch Company, and the Big Thompson Ditch and Manufacturing Company; and one private company: the Great Western Sugar Company.

The application was granted with terms and conditions on June 18, 1985.

Case No. 87CW329: Applicant: Greeley. Greeley sought a change in shares and contract rights in the Seven Lakes Reservoir Company, the Greeley and Loveland Irrigation Company, and the Loveland and Greeley Reservoir Company, all supplied by the Big Thompson river. At the time of application, Greeley owned 62.08 of 400 shares in the Seven Lakes Reservoir Company, 344.3 of 1636 shares of the Greeley and Loveland Irrigation Company, and 24 of 300 rights of the Loveland and Greeley Reservoir Company. Additional shares were acquired later. The water involved in this application had historically been used to irrigate 22,933 acres of corn, beans, alfalfa, sugar beets, barley, and pasture grass. Greeley applied to add all municipal uses to the decreed irrigation uses, and new places of use.

Nine statements of opposition were filed. Two cities, Loveland and Thornton, objected, as did the Central Colorado Water Conservancy District; one irrigation district: the Henrylynn Irrigation District; two mutual ditch

and reservoir companies: the Fort Morgan Reservoir and Irrigation Company and the Farmers Reservoir and Irrigation Company; two water user associations: the Cache La Poudre Water Users Association and the Thompson Water Users Association; and the Public Service Company of Colorado.

The application was granted with terms and conditions on February 6, 1990.

Case No. 86CW397: Applicant: Westminster. Westminster owned 835.15 shares of the capital stock of the Farmers Reservoir and Irrigation Company allocated to the Standley Lake Division. Westminster applied to add to the already decreed domestic and irrigation uses all beneficial uses within the municipal water supply system and service area of Westminster. The water for the shares owned by Westminster came from Clear Creek, Ralston Creek, Leyden Creek, and Woman Creek in Jefferson County, and Coal Creek in Boulder County.

Seven of the fourteen statements of opposition filed in this case were filed by other cities: Arvada, Aurora, Broomfield, Englewood, Golden, Northglenn, and Thornton. Other objectors included the Central Colorado Water Conservancy District; one irrigation district: the Henrylynn Irrigation District; four objections from mutual ditch and reservoir companies: the Consolidated Mutual Water Company, the Farmers Reservoir and Irrigation

Company, the Consolidated Ditches Company of District No. 2, which represented 11 ditch companies, and a joint statement filed by the Agricultural Ditch and Reservoir Company and the Golden Canal and Reservoir Company; and the Adolph Coors Company.

The application was granted with terms and conditions on November 5, 1990.

Case No. W-9242-78 (1978): Applicant: Thornton. Thornton had acquired all of the water rights historically used for irrigation on the McDowell Ranch, the Platte-Ansley Ranch, and the Trout Creek Ranch. These water rights came from the Middle Fork of the South Platte, Trout Creek, and their tributaries. Thornton applied to change the use from land in Park County to any land capable of being served by Thornton's municipal system.

Four of the 12 statements of opposition were filed by cities: Aurora, Denver, Englewood, and Northglenn. Two individuals, Alexander A. and Rexie M. Ebel, filed a statement of opposition; as did the Upper South Platte Water Conservancy District; three mutual ditch and reservoir companies: the Burlington Ditch, Reservoir and Land Company, the Farmers Reservoir and Irrigation Company, and the Wellington Reservoir Company; and three private sector companies: the Mission Viejo Company, Adolph Coors Company, and the Public Service Company of Colorado.

The application was granted with terms and conditions March 20, 1985.

Case No. 84CW065: Bellamah Community Development and Indian Mountain Corp. Bellamah Community Development sought changes in its interest in water rights acquired from Indian Mountain Corp. in four ditches in Park County. One of the ditches was later dropped from the application. Bellamah sought to add all beneficial uses, including municipal, to the historic irrigation and stock watering use; and sought to change the place of use to all sites that could be served by the alternate points of diversion listed in the application. This would permit the water to be used by several of the Denver-area cities, as well as land owned by Bellamah in Douglas County.

Three of the seven statements of opposition were filed by cities: Aurora, Denver, and Englewood with the Upper South Platte Water Conservancy District. Three individuals filed a statement of opposition, as did the Colorado Water Conservation Board, and Lloyds Bank California, later replaced by Lodestone, Inc.

The application was granted with terms and conditions on August 10, 1988. An order amending the decree was issued May 27, 1992.

Case No. 84CW011: Applicant: Aurora. Aurora applied to change the use of 6.27 cfs of water used to flood-irrigate approximately 17 acres of native hay

on the Black Mountain Ranch in Park County. Aurora wished to transfer the water for use in its municipal system.

Six statements of opposition were filed; three were from cities: Denver, Thornton, and Westminster. Two mutual ditch and reservoir companies objected: the Farmers Reservoir and Irrigation Company, and the Burlington Ditch Reservoir and Land Company. The sixth objector was the Upper South Platte Water Conservancy District.

The application was dismissed February 17, 1989, by consent of all parties. The ruling of the referee does not state the reason of dismissal but other documents show that Denver may have owned some of the water rights.

Case No. 87CW301: Applicant: Morrison. Morrison had acquired a five-eighths (5/8) share in the Warrior Ditch Company. The water for the 5/8 share came from Bear Creek. The application was to supplement the two and one-half (2 1/2) shares Morrison had acquired earlier, which had been decreed in Case No. 82CW425 in 1985.

Among the seven statements of opposition filed, three were filed by cities: Denver, Englewood, and Forest Hills Metropolitan District. The U.S. Government filed an objection, and the Warrior Ditch Company, and two water users: the Genesee Water District and Willow Springs Enterprises, Inc.

The application was granted with terms and conditions on October 6, 1988.

Case No. 87CW240: Applicant: Castle Rock. Castle Rock purchased the water rights carried in Cook Creek Ditch and Hillside Ditch. The original owners retained a security interest in the water rights . Castle Rock applied to add all permissible uses, including municipal, and to use the water on any land capable of being served by Castle Rock.

Six statements of opposition were filed: three by Denver, Englewood, and Thornton, one by the State Engineer, and two by private companies: Mission Viejo Company and Highlands Ranch Development Corp., and the Castle Pines Land Company.

The application was granted with terms and conditions on May 11, 1989.

DESCRIPTION OF SELECTED DIVISION 2 CASES

Case No. 84CW62: Applicant: The Colorado Canal Company and Foxley & Co. The Colorado Canal Company is a nonprofit mutual ditch company and Foxley & Co. was a majority stockholder at the time of application. This case was ultimately combined with Cases 84CW63 and 84CW64. Colorado Springs was the beneficiary of the proposed transfer and filed a "motion to realign" itself to appear along with the applicants in the consolidated case. The applicants sought to change 756.28 c.f.s. of water from a direct flow irrigation right to storage in Lake Henry Reservoir, Lake Meredith

Reservoir or Pueblo Reservoir, adding municipal and all other beneficial uses to irrigation use. The applicants also sought permission to exchange or substitute water stored in the above-listed reservoirs upstream to Turquoise Reservoir, Twin Lakes Reservoir or Clear Creek Reservoir. The 756.26 c.f.s. historically had been used to irrigate 56,000 acres of land in Pueblo and Crowley Counties.

There were 12 statements of opposition and one motion to intervene filed on the application (a movement to intervene is a motion usually filed by objectors but may also be filed by proponents of the application; it can be used to establish an interest in participating in a case prior to determining exactly how the movant wants to participate). Three statements of opposition were filed by mutual ditch and reservoir companies: Holbrook Mutual Irrigating Co., the Fort Lyon Canal Company, and the Arkansas Valley Ditch Association. Three were filed by cities: Aspen, Pueblo, and Colorado Springs, which later became aligned with the applicant. One each was filed by the State Engineer, the Southeastern Colorado Water Conservancy District, the St. Charles Mesa Water Association, the Public Service Company of Colorado, the Resource Investment Group, Ltd., and one was filed by 222 individuals, companies, towns, and estates owning or having an interest in stock in the Colorado Canal Company, Lake Meredith Reservoir company, or Lake Henry Reservoir Company. The 23 persons who filed the motion to intervene later joined with the 222, the entire group called themselves The Proxy Group.

The application was granted with terms and conditions on October 21, 1985.

Case No. 86CW121: Applicant: Aschermann, et.al., who were a group of 102 minority shareholders of the Rocky Ford Ditch Company. They had formed an unincorporated association called the "Minority Shareholders of the Rocky Ford Ditch Company." The applicants sought to add municipal and all other beneficial uses to the direct flow irrigation rights they held, totaling 333.52 shares of the 800 outstanding shares of capital stock in the Rocky Ford Ditch Company. This water comes from the Arkansas River. The applicants also sought to add alternative points of diversion at Pueblo Reservoir and the Colorado Canal; to store water in Dye and Holbrook Reservoirs; as well as the right to substitute or exchange upstream to storage in either Turquoise, Twin Lakes, or Clear Creek Reservoirs. This water had historically been used to irrigate over 4000 acres of land in Otero County.

Fourteen statements of opposition included two statements from cities: Aurora and Colorado Springs; statements from two groups of individual stockholders in Colorado Canal, Lake Meredith, and Lake Henry; three from state agencies: State Division of Wildlife, Colorado State Board of Agriculture, and the State Engineer. The Southeastern Colorado Water Conservancy District and the Upper Arkansas Water Conservancy District each filed objections; as did four mutual ditch and reservoir companies: the Holbrook Mutual Irrigating Company, the Fort Lyon Canal Company, the

Arkansas Valley Ditch Association on behalf of its nine members, and the Colorado Canal Company with the Lake Meredith Reservoir Company and the Lake Henry Reservoir Company. One water user, the St. Charles Mesa Water Association, and one private company, Public Service Company of Colorado, also filed statements of opposition.

On October 24, 1988, the Referee dismissed the application, citing a letter from the applicants' attorney stating that the applicants were financially unable to pursue the application.

Case No. 83CW88: Applicant: Buena Vista. Buena Vista acquired water rights in nine ditches fed by the Arkansas River. It applied to change the type of use of this water to include municipal uses.

Six statements of opposition were filed. Aurora was the only city filing in this case. One state agency, the Colorado Water Conservation Board, and one water user, the St. Charles Mesa Water Association, filed. Three statements were filed by private companies: Young Life, Water Development Inc., and Public Service Company of Colorado.

Case No. 84CW158: Applicant: Salida. Salida applied to change to municipal use 5.5 c.f.s. of water from the Harringon Ditch, fed by Pasquale Spring, a tributary of the Arkansas River. The water had originally been used to irrigate 275 acres in Chaffee County.

Seven applications were filed. Two cities filed: Colorado Springs and Pueblo. Glen H. Vandaveer and Harold Vandaveer filed a statement of opposition as individuals,. Two state agencies, the State Engineer and the Colorado Division of Wildlife, filed, as did one conservancy district, the Upper Arkansas Water Conservancy District. One private company, the Public Service Company of Colorado, filed a statement.

The application was granted with terms and conditions on November 5, 1987.

Case No. 83CW18: Applicant: Resource Investment Group, Inc.; Montini Cattle Company; Valco, Inc.; Frank L. and Patricia Gilbert; Roy E. and Alice Moffett; John K. and Mildred Gause; John K. and Donald Gause and Irene Gause. The applicants sought to transfer and use for municipal purposes 424 shares of the total 800 shares of the Rocky Ford Ditch. The water came from the South Fork of the Purgatoire River and originally irrigated 4600 acres.

Eighteen statements of opposition were filed in this case. Two statements were filed by individuals: Carl N. McClure and Verniece E. McClure; and another by 42 individuals who were shareholders in the Rocky Ford Ditch. Two were filed by state agencies: the State Engineer, and the East Otero Soil Conservation District. Two conservancy districts filed: the Upper Arkansas Water Conservancy District and the Southeastern Colorado Water

Conservancy District. Seven statements of opposition were filed by mutual ditch and reservoir companies: the Holbrook Mutual Irrigating Company; the Las Animas Consolidated Canal Company; the Colorado Canal Company with the Lake Meredith Reservoir Company and the Lake Henry Reservoir Company; the Fort Lyon Canal Company; the Arkansas Valley Ditch Association for its nine member companies; the Bessemer Irrigation Ditch Company with the Catlin Canal Company, the High Line Canal Company, and the Oxford Farmers Ditch Company; and the Amity Mutual Irrigation Company and District 67 Irrigation Association. Two water user associations, the St. Charles Mesa Water Association and the Lower Arkansas Watershed Association, filed, as did three private companies: the Public Service Company of Colorado, the Conexsel Group, and Limousine West, Inc. with Avondale, Ranch, N.V. Aurora filed an "Entry of Appearance" and is the beneficiary of the transfer.

The application was granted with terms and conditions on November 3, 1986.

Case No. 89CW42: Applicant: Buffalo Park Development Co., Inc. and the City of Aurora. The applicants sought change of use and location of use for water rights acquired in nine ditches fed by Halfmoon Creek, a tributary of the Arkansas River. The new use would be in the service area of Aurora. Ten statements of opposition were filed, including one city, Pueblo, and three by individuals: William K. Sommerville; Edith Seppi, Bernard J.

Smith, Jon R. Mellette, and Kirk R. Jensen, all residing in or near Leadville; and Hugh E. Ledbetter. Two state agencies filed: the Colorado Water Conservation Board, and the State Engineer. One conservancy district, the Southeastern Colorado Water Conservancy District, filed, as did one mutual ditch company, the Fort Lyon Canal Company. One water user association, the Parkville Water District, and one private company, RES-ASARCO Joint Venture, filed statements objecting to the application.

The application was granted with terms and conditions on march 27, 1992.

DESCRIPTION OF FINDINGS

As noted above, very few of the cases were interbasin transfers of water. All of the 67 agricultural-to-municipal change-of-use cases identified in Division 1 for 1977 through 1991 involved intrabasin transfers. Thirty of the 36 agricultural-to-municipal cases identified in Division 2 were intrabasin; only six involved transfers of water across divisional lines.

Figures 2 and 3 show the water rights by appropriation date that the applications were seeking to transfer to municipal use. Cities want the most stable and reliable water supply they can get, and the graphs show that they are seeking rights with early seniority.

The water court resumes, which are taken from the wording of the applications for change, proved to be an inadequate source of information

for analyzing the amount of acreage and the kinds of crops to be removed from irrigation once the proposed transfers were decreed and implemented. Only eighteen of the 67 resumes for the Division 1 cases listed the amount of acreage historically irrigated by the water rights in question, and all 18 identified one or more crops historically irrigated. These were mostly grains and feed crops. Four cases also involved water rights used for the growing of sugar beets and one included stock watering among the historic uses of the water rights in question. In Division 2, only nine of the 36 cases listed the acreage historically watered, and only one listed the crops historically grown. Probably the only way to obtain a complete picture of the land and crops to be taken out of production as a result of this kind of water transfer would be to examine the decrees of each of the agricultural-to-municipal change of use cases, and conduct follow-up interviews with the applicants as necessary to complete the information obtained from the decrees.

Table 1 shows the categories of objectors, including cities, individuals or groups of individuals, federal and state agencies, conservancy districts, irrigation districts, mutual ditch and reservoir companies, and companies. City departments with jurisdiction over water, such as the City of Greeley Water and Sewer Board, were classified as cities. Generally speaking, the cases in Division 1 were more likely to involve opposition from cities than cases in Division 2, and less likely to see opposition from individuals. Only one of the eight cases examined in Division 1 did not include any statements of opposition from another city, and six of the other cases had at

Table 1: Tally of objectors by categories for Divisions 1 and 2, Colorado.

Case Number	Cities	Individuals	Federal Agencies	State Agencies	Conservancy Districts	Irrigation Districts	Mutual Ditch & Reservoir Companies	Water User Associations & Water Districts	Private Sector Companies	Total
DIVISION 1										
82CW202 Loveland							3		1	4
87CW329 Greeley	2				1	1	2	2	1	9
86CW397 Westminster	7				1	1	4		1	14
W-9242-78 Thornton	4	1			1		3		3	12
84CW65 Bellamah Community Development and Indian Mountain Corp.	3	1		1	1				1	7
84CW11 Aurora	3				1		2			6
87CW301 Morrison	3		1				1	2		7
87CW240 Castle Rock	3			1					2	6
DIVISION 2										
84CW62 Colorado Canal Co. and Foxley & Co.	3	2		1	1		3	1	2	13
86CW121 Aschermann et. al.	2	2		3	2		4	1	1	15
83CW88 Buena Vista	1			1				1	3	6
84CW158 Salida	2	1		2	1				1	7
83CW18 Resource Investment Group, Ltd. et. al.		2		2	2		7	2	3	18
89CW42 Buffalo Park Dev. Company and Aurora	1	3		2	1		1	1	1	10

least three statements of opposition filed by other cities. In Division 2, only one case did not have statements of opposition filed by other cities, and only one had more than two statements filed by other cities. That one case had three such statements, and one of those three objectors was Colorado Springs, which later became "aligned as applicant" -- Colorado Springs was ultimately the beneficiary of the transfer. Objections were filed in nearly every case by mutual ditch and reservoir companies, excepting only two cases in Division 1 and two cases in Division 2. Five of the eight Division 1 cases and five of the six Division 2 cases included statements of opposition from conservancy districts. Only one of the total fourteen cases examined did not receive a statement of opposition from either a water supply organization or a water user association.

In an irrigation company, the water is tied to the land. Therefore, to any application that could impact water and land that is under the jurisdiction of the irrigation company, no matter how small the amount of affected land, the company will file a statement of opposition.[100] Mutual ditch and reservoir companies, however, are owned by stockholders. They usually have an elected board of directors, who determines which applications should receive statements of opposition from the company. Shareholders can file independent statements of opposition. John Akolt, attorney for Farmers Reservoir and Irrigation Company, explained that large municipal

[100] Phone conversation with Lawrence Gerkin, District Manager, Henrylynn Irrigation District, March 9, 1993.

shareholders are especially likely to file their own statements of opposition.[101] In addition, he said that individuals may ask the company to file an objection. The company may file many statements of opposition each year but only significantly pursue a few.

Tables 2 and 3 show the characterizations of statements of opposition as summarized for Water Divisions 1 and 2. With regard to the characterization of statements of opposition, the most common features were a general statement that the proposed transfer would or could injure the rights of the objector, that the application contained insufficient information to fully ascertain potential injury, and that the objector retained the right to raise additional objections as more details became available. Many of the statements of opposition stopped with these three points, others were more extensive. Caution should be exercised in making generalizations based on the summary tables. A general statement of potential injury is all that an objector needs to submit to the water court, within 60 days following the date that the change-of-use application was filed, in order to participate in the case. Many objectors submit a general statement of opposition, then later address specific concerns during case proceedings.

[101] Phone conversation with John Akolt, Attorney, Farmers Reservoir and Irrigation Company, March 16, 1993.

Table 2: Summary of statements of opposition to selected agricultural-to-municipal change-of-use applications to water court, Colorado Water Division 1. Objectors often gave more than one reason for opposition.

Reasons for opposition	Cities	Individuals	Federal Agencies	State Agencies	Conservancy Districts	Irrigation Districts	Mutual Ditch & Reservoir Companies	Water User Associations & Water Districts	Private Sector Companies
General statement of injury if transfer is approved	15	1		1	3	2	10	3	8
Specific injury	6	1			1		6	2	1
Failure to list conditions for implementing transfer	2			1			1	1	
Inadequate conditions for implementing transfer	3			1		1	2		
Conditions suggested by objector	14	1		1	3		4	2	3
Require strict proof	10						5	2	4
Transfer would or could enlarge water right	2				1		2		
Inaccurate description of water rights sought	7						1	1	2
Inadequate description of water rights sought	5			1			2		1
Environmental damage				1					
Applicants don't own the water rights in question		1							
Structures may be inadequate	1								
Applicant is not entitled to priority date sought								1	
Lack of contract to use proposed structures	19	1		1	3	1	7	3	7
Insufficient information in application	25	1	1	1	3	1	8	4	8
Reserve right to further object	4		1						

Table 3: Summary of statements of opposition to selected agricultural-to-municipal change-of-use applications to water court, Colorado Water Division 2. Objectors often gave more than one reason for opposition.

Reasons for opposition	Cities	Individuals	Federal Agencies	State Agencies	Conservancy Districts	Irrigation Districts	Mutual Ditch & Reservoir Companies	Water User Associations & Water Districts	Private Sector Companies
General statement of injury if transfer is approved	9	6		6	5		10	3	10
Specific injury	3	1		5	4		7	2	
Failure to list conditions for implementing transfer	2	3		2	2		11	2	2
Inadequate conditions for implementing transfer	1			3	3		7	1	1
Conditions suggested by objector	6	2		3	4		7	1	7
Require strict proof	5	3		1			1		9
Transfer would or could enlarge water right	4	2			4		4	1	1
Inaccurate description of water rights sought	2	1			4		5	2	2
Inadequate description of water rights sought	2	1		1	1		2	1	1
Environmental damage				3			1		
Lack of contract to use proposed structures	1	3		1	4		7	1	
Insufficient information in application	6	3		8			7	2	8
Reservation to further object	6	5		8	7		9	3	9
Application is speculative		2			4		7	1	1
Violation of Arkansas River Compact					3				
Applicant may not dry up formerly irrigated land					3		2		1
Other		2			3		1		

The next most commonly raised points in statements of opposition in Division 1 were suggested conditions to be placed on the final decree, if granted; and the requirement that the applicant must provide strict proof of the attributes of the water rights claimed, planned use, and/or that the new use would not injure other water rights. Suggested conditions ranged from a general demand that the decree impose terms and conditions to protect the rights of other water users, through slightly more specific demands that the decree conditions protect against enlargement of the historically used proportion of the water rights in question, to detailed lists of terms and conditions that the objector wanted to cover every aspect of the transfer.

In Division 2, all of the above features were common, as well as claims that the applicants failed to include in their applications proposed terms and conditions to protect the water rights of others. Also in Division 2, specific descriptions of potential injury to the objectors were more common than in Division 1, as were claims that the applicant lacked a contract or legal authority to use the facilities proposed to implement the transfers. In three of the six Division 2 cases, violation of the Arkansas River Compact was raised by objectors, while interstate compacts played no role in the cases examined in Division 1. In three of the Division 2 cases, charges were made that the application was speculative, in each case made by several of the objectors. This charge was not raised in any of the eight Division 1 cases.

The issue of environmental damage was raised in five cases, one in Division 1 and four in Division 2. In Case 84CW65, Division 1, the Colorado Water Conservation Board stated that the granting of the application might adversely affect the natural environment on Tarryall Creek, in which the objector held water rights for the protection of the natural environment. In Case 89CW42, Division 2, the Board objected to the application on the grounds that the diversion of the water rights in question could deplete the Board's instream flow rights. The Board made the same objection to Buena Vista's application in Case 83CW88. In Case 83CW18, the East Otero Soil Conservation District expressed concern about damage to the soils in the area resulting from the transfer of Rocky Ford Ditch water. The District pointed out that soil analyses in Crowley County showed that the salt content of previously irrigated land was higher that local soils never irrigated, creating a barrier to the establishment of a permanent dry land grass cover. The District urged the court to require the applicant to provide a plan for reseeding and said that the Soil Conservation Service and the District was willing to assist in developing the plan. In Case 84CW62, both the Arkansas Valley Ditch Association and the Holbrook Mutual Irrigating Company raised the concern that the quality of water available for irrigation after the transfer would be decreased.

State agencies objected in every one of the six examined Division 2 cases, but in only two of the Division 1 cases. One of the Division 1 cases involved the objection of the Colorado Water Conservation Board, described in the

preceding paragraph. To Castle Rock's application, Case 87CW240, the State Engineer and Division 1 Engineer stated that the applicant failed to adequately document the historic use of the water in questions, failed to provide adequate terms and conditions to protect other water rights holders, and must have the diversion quantities limited to prevent an expansion or change in the timing of consumptive use. In the five cases in which the State Engineer and the Division 2 Engineer filed statements of opposition, the Engineers stated a general possibility of injury to other water rights holders. They added suggested specific conditions in two cases, claimed an inadequate description of the rights sought in two cases and an inadequate description of terms and conditions for carrying out the transfer in two cases, and pointed out the lack of a contract for the applicant to use facilities intended to implement the water transfer in one case. The Colorado Division of Wildlife filed statements of opposition in two of the Division 2 cases, stating in both that the Division's water rights, particularly those associated with the Mt. Shavano Fish Hatchery, could be adversely affected by the applications.

For purposes of Table 1, the East Otero Soil Conservation District was classified as a state agency. It was described by an employee at the United States Soil Conservation Service as a "local state entity."[102] Soil

[102] Phone conversation with Ray Bosn, U.S. Soil Conservation Service, Denver, Colorado, March 9, 1993.

conservation districts are local districts, with a local board of directors, established under state law. They receive federal assistance.

Federal opposition arose in only one case. In Morrison's application in Case No. 87CW301, Bear Creek Reservoir was proposed for storage of the water rights, once their use was changed to municipal. The United States, through the Department of Justice, argued that municipal use was not an authorized use of the reservoir, owned and operated by the U.S., and the use proposed would require a change in the Flood Control Act of 1968, Public Law 90-483. The U.S. stated that the applicant could not demonstrate that it had the ability and reasonable expectation of securing federal authorization for its plan.

Other points raised in statements of opposition were inaccuracy or inadequacy of the applicant's description of the water rights in question, inclusion in the application of water rights that objectors claimed had been abandoned and therefor not available for transfer, inclusion of water rights owned by objector and not the applicant, claims that the applicant's proposed use would enlarge the transferred water right, inadequacy of proposed terms and conditions, and the claim that the applicant might not or could not dry up the land upon which the water had historically been used.

The decrees focussed on factual quantitative points. Each listed the applicant and the objectors, and gave a technical description of the water rights involved, including source, location of point of diversion, priority date, and historic use. Terms and conditions for implementing and managing the transfer were spelled out, as well as reporting requirements. The decrees do not list and address the objections of each statement of opposition; they list the final determination of the attributes of the water rights to be transferred, and the terms and conditions, without comment.

Reporting requirements were usually in terms of measurement and reports to the Division Engineer, to be made by the applicant. In one case in Division 2, Case No. 83CW18, Resources Investment Group, Ltd. (RIG) was required to furnish an employee to the Division Engineer's office for eight months each year for five years to implement the terms and conditions, including the daily administration and accounting. RIG was required to pay the salary of that person, who had to have the experience, education, and background qualifications acceptable to the Division Engineer.

Frequently stipulations between the applicant and one or more of the objectors were reached during consideration of the case. These stipulations addressed the particular concerns of the objectors and were generally included as part of the final decrees.

In granting the application, the judge specifies the period of time for which the court retains jurisdiction over the case. During this time, parties to the case can request that it be reopened. In the cases examined, this ranged from three years to permanent. Different time periods might be specified for different points in the case. For example, in Case No. 84CW158, Salida's Engineer used one method to calculate the depletion and return flow factors for lawn grass irrigation, while the State Engineer indicated he might use a different method. The decree required Salida to maintain records using both methods for at least five years. The Court retained jurisdiction for six years to reconsider the accuracy and reasonableness of these methods. In the same decree, the Judge retained jurisdiction for three years over the question of injury to other water right holders.

The application was granted, with terms and conditions, in 12 of the 14 cases examined. One case in Division 2, Case No. 86CW121, was dismissed by the Referee at the request of the applicants' attorney, who stated that they were financially unable to proceed. The application in 84CW011 was dismissed by consent of all parties.

ANALYSIS

The most striking fact arising from the data is how very few of the cases involved interbasin transfers. None of the 67 agricultural-to-municipal change-of-use cases identified in Division 1, and only six of the 36 cases identified in Division 2 involved transfers of water across division

boundaries. The term "interbasin transfers of water" is often used to label the controversy over transfers of water, including transfers from irrigation to municipal use. It is a term that came into use in the days of water projects built for the purpose of transferring water across the Continental Divide and for providing compensatory storage for the West Slope. At least for Division 1 and 2, where the bulk of new water demand in Colorado arises, the term has become a misnomer for agricultural-to-municipal transfers of water.

The other five water divisions in the state do not have as heavy traffic in water court applications as do Divisions 1 and 2. However, an examination of agricultural-to-municipal change of use cases in those divisions, especially Division 5, containing the main stem of the Colorado River, might show some more activity in interbasin transfers of irrigation water to municipal use. There has been some activity in Division 4, the Gunnison River Basin, with purchases of irrigation water by the city of Grand Junction.[103] In terms of intrabasin transfers, the concentration of urban centers on the Front Range suggests that this examination of Division 1 and 2 gives a fairly thorough look at agricultural-to-municipal transfers by cities in Colorado.

[103] Phone conversation with Aaron Clay, Division 4 Water Court Referee, September 24, 1991.

Figures 2 and 3 give a sort of picture of the changing eras of water management. The lower portions of the figures give some sense of the period of influx into Colorado of settlers seeking homesteads. A complete picture would have to come from a look at all the water rights in each division, not just those currently involved in agriculture-to-municipal transfers. However, it is likely that such a look would yield figures of roughly the same shape, with heavy influx of settlers and initiation of irrigation during the 1860s through the 1880s.

The lower portions of Figures 2 and 3 show the agricultural rights, by appropriation date, that the cities applied to transfer to municipal use. Cities naturally want the most stable and reliable water supply they can get, and the figures indicate that they are purchasing and transferring water rights with early appropriation dates. Under the doctrine of prior appropriation, senior rights -- those with early appropriation dates -- are more stable and reliable, and in times of drought, can place calls on the rivers ahead of all other rights.

The upper portions of Figures 2 and 3 show the agriculture-to-municipal change-of-use applications by cities during the study period 1977 through 1991. This period was chosen to represent the era of reduced federal support for large water projects, beginning in the year of the publication of the water project "hit list." Because most water in Colorado is appropriated, this era will be one of management of currently used

resources, not one of seeking and appropriating new water. In essence, the upper portion of the figures represents this new era of water management.

It was found that no clear trend can be identified from this data that would show an increase or decrease in the number of applications annually by cities seeking to increase their water supply with irrigation water. Some cities use one application to change a long list of irrigation rights acquired over a period of years. Some divide such rights into separate cases, sometimes filing one application for each separate ditch or storage right, as Longmont did when it filed a series of 11 cases in 1987, each involving a different ditch or storage right. In contrast, for example, an application filed by Aurora in 1987 involved water rights in 13 ditches. In order to quantify a changing trend in the amount of Colorado's agricultural water rights being transferred to municipal use, a survey must be made of the final decrees in all of the agricultural-to-municipal change-of-use cases identified here, as well as applications in which developers seek water for housing projects and resort developments. The water rights would all need to be converted to a common denominator, most likely average annual acre feet per year. Alternatively, it might be possible to draw this data from annual water use records at the offices of division engineers.

Questions of quantification -- how much water does the applicant have legal claim to, how much water can be transferred without injuring other water right holders -- are the only questions considered by the court. The Water

Court is very thorough and exact in its description of the water rights involved and the conditions under which they may be used. In stating their reasons for making the applications, for filing statements of opposition, and for approving the applications, the applicants, objectors, and judges stick solely to the issue of quantity. Economic, social, and environmental reasons for or against the transfer are not voiced, nor are these effects measured. Cost/benefit analyses comparing agricultural to municipal uses, analyses of changes in local economies that could result from water transfers, social changes resulting from current and future water uses, estimates of environmental changes to the stream, are not part of the consideration of the transfer. The sole determination is how much property, in this case water, can be moved around without damaging anyone else's property. Considering the livelihood concerns frequently voiced in the media and in public discussions of agriculture-to-municipal transfers, this strict and narrow focus of the court seems to be out of synchronization with public anxiety over these changes in the use of water.

This is not to condemn the water rights system but to point out the limits of its focus. Colorado's water law probably saved many an individual and family in the early days of irrigated farming from losing their livelihood. It protects all kinds of water rights holders today, from someone who may hold a few shares in a ditch company for irrigating a small farm, to cities that must provide for growing populations and businesses.

This does point out that there are important aspects of water transfers that are not adequately considered under Colorado's water allocation system. Colorado appears to be entering a new era of water reallocation rather than new appropriations, an era when some of the aspects not previously of concern or consideration in water appropriation are taking on new importance. Colorado water law and water management have adjusted over the years to changing demands and uses. It may be time to consider another adjustment.

CHAPTER 5

CONCLUSION

This thesis is an exploration of the issues surrounding the controversial transfer of water from agricultural use to urban use in Colorado. It examined the livelihood issues that are raised in the media stories and in the public debate over these transfers, issues of economic stability and growth, social and political change, environmental and ecological damage. It reviews the literature on these points and considers some of the institutional aspects of agricultural-to-municipal transfers.

A picture of agricultural-to-municipal transfers in Colorado's Water Divisions 1 and 2 was developed by examining applications made to the Water Court to transfer water historically used for agriculture to be used in municipal water systems. This picture showed that the majority of these transfers are occurring within water divisions, which are drawn around major river basins, rather than across divisional lines. It showed that the water rights involved in these transfers were established mostly during the 1860s through the 1890s. It showed that the number of applications by cities for agricultural water does not indicate an increasing or decreasing move by cities to look to agriculture for their water supply. Finally, this

picture showed the strict focus of Colorado's water allocation system on quantification of water.

Two major conclusions arise from this study. First, the public must decide the proper forum for considering the economic, social, political, and environmental questions they are debating. Second, a publication that centralizes and makes accessible the information and research existing on water issues would be very helpful in assisting the public and its decision makers in managing Colorado's water.

Much of the literature on water transfers analyzes the subject from the perspective of the area-of-origin. The needs of the cities, where the bulk of Colorado's population lives and where much of the economic growth of the state is predicted to occur, are not discussed as thoroughly probably because the cities are able to hold water rights in excess of their needs under Colorado law and so might seem to have an advantage over rural area in terms of being able to provide for future water needs under Colorado's legal system. Members of rural communities can participate in the legal process only if they can raise the issue of injury to water rights they own. The same is true of urban areas, small and large, whose leaders might fear limits to their cities' growth as a result of water transfers implemented by other cities.

The sole issue considered by the courts is quantification: who owns how much water and in the case of a transfer, what conditions must be placed on the transferred quantity so as not to interfere with the quantities subject to other water rights. Although there is plenty of writing about Colorado's water rights system, until one has looked at actual court documents, the narrowness of the focus on quantification is not so apparent.

This narrowness may seem obvious to anyone who has participated in Colorado's water system. To one who has read literature in a variety of disciplines about water rights and attended conferences where the controversies over agriculture-to-municipal water transfers are debated, the very narrow focus of the court is something of a shock. When so much has been written, spoken, and reported on the economic, social, political, and environmental effects of water transfer, the silence on these issues within the legal system for allocating the water is resounding. The frustration of area-of-origin residents facing potential and actual transfers of water to cities becomes understandable.

Although the cities need water to assure future economic growth and to assure supplies to meet the needs of projected population growth, and although objectors need to protect their supply of water for their uses, usually economic production, the discussion of economics and of alternative economic use of the water does not enter the points raised in the application, the objections raised by protestants, or in the decisions of the

court. In spite of the basic livelihood questions that allocation of water determines, basic quantification of water is the issue the court considers, not the measurement of one economic use against another, or any of the social and environmental questions discussed previously. Although much of the recent public discussion over transfers of water, particularly agricultural-to-municipal transfers, has been about economic, social, political, and environmental issues, when it comes down to a formal, legally sanctioned allocation of water, quantity and priority alone are determined.

Consideration of the economic and social impacts of water transfers during examination of a water transfer application is one of the ideas being discussed by people interested in legislation. There is wide variation in opinion on whether the water court or some other entity, perhaps the state or local government, should examine and rule on these issues. In the case of water court consideration, the current system of each side in a contested application providing their own experts would require the addition of economists, sociologists, and other experts in addition to the current engineers, and hydrologists. If MacDonnell's suggestion is followed, it would make sense to establish neutral experts on social and economic issues also. In either case, the cost of water transfer applications will increase, either to the applicant and objectors, or to the taxpayers, regardless of the merits of considering these issues.

Are the courts the proper forum for consideration of these diverse issues? David Robbins, an attorney representing Colorado in the case brought by Kansas over delivery of Arkansas River water, made an eloquent case for not involving the water court in these issues. [104] The water court, he argued, needs to remain a court of special jurisdiction. Its judges are not chosen nor empowered to consider economic, social and political issues. He warned that there is broad language in Colorado's statutes about impacts of water transfers, and that if these issues are not dealt with legislatively, the courts will eventually make decisions on them. Attorneys will bring these issues up and argue them in the interest of their clients, whether or not the public wants these issues determined in that forum. Judge Behrman, Water Court Judge for Division 1, echoed Robbins in a recent speech, raising the point that the water courts and judges are not equipped to rule on the diverse issues beyond those of property rights.[105]

On the other hand, courts do consider economic and social problems every day, in custody cases, in malpractice suits, in consumer injury cases, and in other kinds of court cases. Are they capable, or should they be required to

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[104] David Robbins, speaker on panel on "Is There a Need for Statutory Protection in Out-of-Basin Transfer?", *1993 Colorado Water Convention: Front Range Water Alternatives and Transfer of Water from One Area of the State to Another*, January 4-5, 1993, Denver, Colorado.

[105] Judge Robert A. Behrman, speech at the Symposium on Western Water Law and Policy, *Implications for Wetland and Riparian Ecosystems*, February 24-26, 1993, Denver, Colorado, sponsored by the Rocky Mountain Chapter of the Society of Wetland Scientists.

be capable, of making decisions on the economic, social, and environmental future of whole areas of the state? Are we, the public, prepared to direct our legislators in writing the laws needed to establish the standards and limits under which these issues should be considered? Or would we prefer an alternative forum assigned to weigh these issues, one appointed or elected to represent the various aspects and interests, with people who have both a local perspective and a state-wide view? This is one of the most basic questions that will have to be resolved in the era of reallocation of water.

Another area of need became clear during the research for this study and that is the need for a forum or publication that would collect and present in an easily readable manner the information that is available on the various facets of agricultural-to-municipal transfers of water, and on water in general. All of the information used in this study is publicly available, but that is not to be confused with easily accessible. A single publication, with diverse information, indices, graphs, opinions, presented in an accessible manner would be very useful to the public, to Colorado's decision makers and to Colorado's water users. Something with a format similar to that of the Wall Street Journal, with summary information on the front, and indices, in-depth articles, and opinion pages inside, might obviate the need for extensive legislation by drawing together the available information in one place. Some decisions on water allocation, reallocation, and management, might become obvious if all aspects of the relevant

information could be drawn together. Maybe Colorado needs a Rocky Mountain Water/Environment Journal.[106]

Such a publication could disseminate the research that has already been completed on water transfers. There are several areas of addition research that would give a more complete picture of agricultural-to-municipal transfer of water in Colorado. They are listed below.

1. A search, similar to this one, of the other five water districts in Colorado to identify agriculture-to-municipal transfers, the kind of water being transferred, and the location of new use. Divisions 4 and 5 should be the first two studied, since they are the third and fourth busiest divisions in the state in terms of number of applications, and the most likely to be looked at as sources of water for growing cities.

2. This study focused on the effort of cities to expand their municipal supply of water. The researcher noted that there are many applications to the courts by developers seeking water for their projects, ranging from housing developments at the edge of cities to nearby recreation and tourism developments in mountain areas. A

[106] Robert C. Ward and Maureen Maxwell, "An Ecological Newspaper - So We Can All Sing Off the Same Sheet of Music!", paper presented to the Symposium on Western Water Law and Policy, *Implications for Wetland and Riparian Ecosystems*, February 24-26, 1993, Denver, Colorado. Sponsored by the Rocky Mountain Chapter of the Society of Wetland Scientists.

complete picture of agriculture-to-municipal transfers requires an identification of the portion of the issue represented by these transfers. Use of court records would identify these cases, but as this study shows, the number of applications does not indicate the increase or decrease in the use of agricultural-to-municipal transfers. An examination of the amount of water involved, with before-and-after comparisons of the percentage of water devoted to agricultural use and the percentage of water devoted to urban use, is needed to complete the picture.

3. Analysis of the effects of transfers on areas-of-origin, and on areas-of-need. Before and after comparisons of economic changes, population shifts, social and political differences, and environmental alterations would bring some factual clarity to the policy debate over what, if anything, should be done through legislation and regulation to address the controversy over these transfers.

Specific areas of study might include a mail survey of share holders of the Fort Lyon Canal Company on their thoughts on the effort by Colorado Water Supply to purchase a majority of the shares of the canal. Such a questionnaire could include questions about the sectors of the economy in which they spend their income, to be used to predict the effect on the local economy of a CWS-like purchase. The goal of the survey would be to obtain data on both the direct economic

effects of the use of water and the indirect effects, thereby giving the kind of information that could be used to estimate how a large transfer of water would effect a particular community. An additional survey to businesses in the area would help this analysis. A similar survey in areas that have experienced a transfer would make an interesting comparison.

A look at the actual use of transferred water by cities which purchased agricultural water would clarify the other half of the issue, that of the areas-of-need. Looking at the use of the water five, ten, twenty years after the awarding of the transfer decree, studying actual population growth and needs compared to the predictions used when the water was first purchased, and comparing different cities' ways of managing the water would be invaluable to policy makers. When comparing actual water use to previous predictions, an important factor to consider would be such water saving programs as the one implemented over the last few years by the Denver Water Department.

4. In the "Institutional Factors of Water Transfer" section, the question was asked whether changing ownership of mutual ditch companies is changing the nature of these companies' decision making. This is certainly an aspect of the management of water in Colorado that will affect water use for decades to come. An examination of when the

change in ownership from individual farmers to cities reaches the critical mass necessary to influence decision making by the ditch company would have to take into consideration existing decrees, including some of the ones considered in this study. This is because these decrees sometimes include conditions specifically directing the applicant's use of the water being transferred should the applicant later own or control the ditch company.

The volume of debate over water transfers is rising. It will be noisy and difficult to resolve the contention. A commitment to wise management of Colorado's water resources, however, will keep many hard at work to address the questions arising from the economic, social, political, and environmental aspects of agricultural-to-municipal water transfers, and to retain the valuable property rights principles currently embodied in the law. Perhaps the suggestions above can help in this effort. In the past, Colorado water law and water management, like Colorado's water, has been changed to fit changing needs. In this era of water reallocation, it probably can and will be changed again.

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APPENDIX

AGRICULTURAL-TO-MUNICIPAL CHANGE-OF-USE CASES

Listed below are the 67 agricultural-to-municipal change-of-use cases, by case number and applicant name, identified in Colorado Water Division 1 for the study period 1977-1991. These applications were made for the purpose of increasing city water supplies and do not include agricultural-to-municipal change-of-use cases seeking water for particular housing or resort developments. The list is followed by a list of the 36 cases identified in Division 2. The first two digits of the case number indicate the year (except for 1977 and 1978) the application was filed. Numbers for cases filed in 1977 and 1978 begin with "W" and end in "77" or "78" respectively.

DIVISION 1

Case Number	Applicant
W-8520-77	Boulder
W-8500-77	Louisville
W-8743-77	Westminster
W-8762-77	Arvada
W-8763-77	Arvada
W-8764-77	Arvada
W-9173-78	Brighton
W-9234-78	Aurora
W-9242-78	Thornton
W-9448-78	Aurora
79CW274	Aurora
79CW351	Aurora
80CW451	Louisville
80CW468	Lafayette
80CW469	Lafayette
82CW052	Erie
82CW202	Loveland
82CW359	Arvada
82CW375	Louisville
82CW376	Louisville
82CW425	Morrison
83CW319	Lousiville
84CW010	Aurora
84CW055	Thornton
84CW056	Thornton
84CW057	Thornton
84CW058	First City Invest., Inc.
84CW065	Bellamah Community Development and Indian Mountain Corp.
84CW165	The Blue Mountain Water District
85CW022	Broomfield
85CW119	Lafayette
85CW409	Arvada
85CW410	Arvada
86CW222	Thornton
86CW223	Thornton
86CW397	Westminster
86CW398	Westminster
87CW107	Thornton
87CW178	Loveland
87CW212	Longmont
87CW213	Longmont
87CW214	Longmont
87CW215	Longmont
87CW216	Longmont
87CW217	Longmont
87CW218	Longmont
87CW219	Longmont
87CW220	Longmont
87CW221	Longmont
87CW222	Longmont
87CW240	Castle Rock
87CW301	Morrison
87CW327	Louisville
87CW329	Greeley
87CW334	Thornton
88CW202	Englewood
88CW203	Englewood
88CW217	Arvada
88CW228	Aurora and Thornton
88CW262	Thornton
88CW263	Thornton
88CW266	Westminster
89CW090	Loveland
89CW129	Westminster
89CW132	Thornton
90CW101	Westminster

DIVISION 2

Case Number	Applicant
W-4728-77	Trinidad
W-4629-77	Trinidad
W-4630-77	Trinidad
W-4784-78	Trainor Ranch, Inc.
W-4799-78	Aurora
79CW011	Board of County Commissioners, Crowley
79CW185	Fowler
80CW90	Leo Adams & Celesta Adams
80CW164	St. Charles Mesa Water Association
82CW130	Jake O. Broyles
83CW18	Resource Investment Group, Inc., et.al.
83CW88	Buena Vista
83CW128	North Central Energy Company and Wyoming Fuel Company
83CW129	North Central Energy Company and Wyoming Fuel Company
83CW130	North Central Energy Company and Wyoming Fuel Company
84CW12	Lee R. Senter & Associates and Valco, Inc.
84CW62	Colorado Canal Company and Foxley & Co.
84CW83	Lake Meredith Reservoir Company and Foxley & Co.
84CW84	Lake Henry Reservoir Company and Foxley & Co.
84CW158	Salida
84CW165	Blue Mountain Water District
85CW103	Cory Company, Inc. and Aurora
85CW104	Cory Company, Inc. and Aurora
85CW105	Cory Company, Inc. and Aurora
86CW31	Colorado Center Metropolitan District
86CW121	Minority Shareholders of the Rocky Ford Ditch Co.
87CW63	Aurora
87CW70	Aries Properties, Inc.
87CW71	Aries Properties, Inc.
88CW61	Trinidad
89CW42	Buffalo Park Development Company and Aurora
90CW52	Pueblo
90CW53	Pueblo
90CW54	Pueblo
90CW55	Pueblo
91CW19	Upper Arkansas Water Conservancy District
91CW44	Cascade Town Company and Cascade Public Service Company