1990

The Water Transfer Process as a Management Option for Meeting Changing Water Demands, Volume II

Robert S. Robinson

Lawrence J. MacDonnell

Charles W. Howe

Teresa A. Rice

Mark Squillace

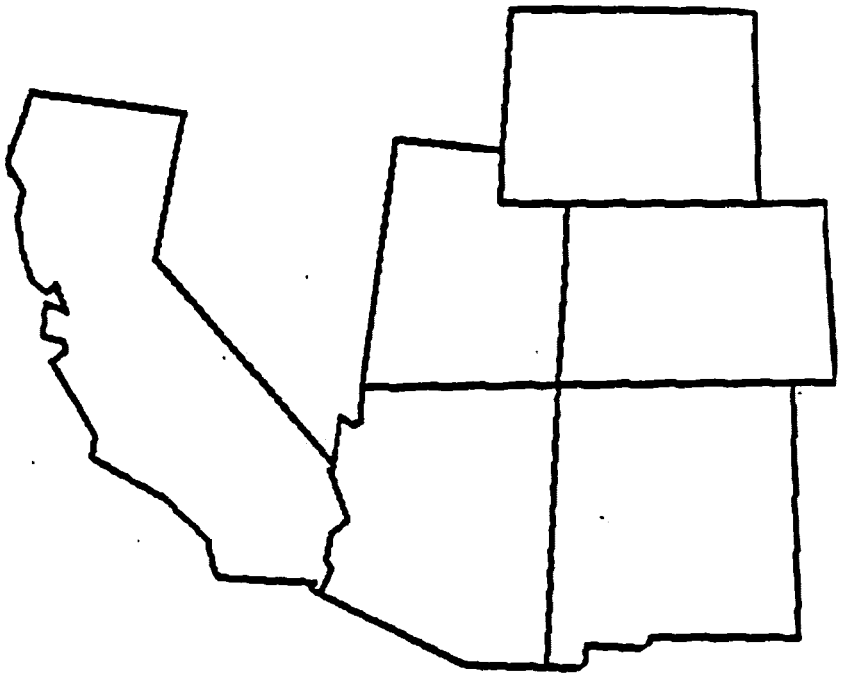
See next page for additional authors

Authors

Robert S. Robinson, Lawrence J. MacDonnell, Charles W. Howe, Teresa A. Rice, Mark Squillace, Geological Survey (U.S.), and University of Colorado Boulder. Natural Resources Law Center

ROBERT S. ROBINSON & LAWRENCE J. MACDONNELL, THE WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS, VOLUME II (Natural Res. Law Ctr., Univ. of Colo. Sch. of Law 1990).

THE WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS



VOLUME II

Submitted to the U.S. Geological Survey
in Fulfillment of
Grant Award Number 14-08-0001-G1538

Dr. Robert S. Robinson, Project Officer

by

Dr. Lawrence J. MacDonnell, Principal Investigator
April 1990

VOLUME II
GENERAL TABLE OF CONTENTS

CHAPTER 1

WATER TRANSFERS IN ARIZONA

Gary C. Woodard
Cara S. McCarthy

Policy Analysis Unit
Division of Economic and Business Research
College of Business and Public Administration

The University of Arizona

CHAPTER 1

TABLE OF CONTENTS

TABLES AND FIGURES

Tables

Figures

Introduction

Historically, new water users in the West appropriated water rights to which no previous claims had been established and constructed water development projects to capture, store and transport water to areas where local supplies were perceived as inadequate. The federal government subsidized these projects so heavily that direct beneficiaries of projects constructed in the 1950s and 1960s typically bore only 30 percent of project costs. During this era, there was little incentive to bid water rights away from existing users because appropriation of unclaimed water and subsidized supply development provided an attractive alternative to market transfers.

More recently, surface water supplies in many areas have become fully appropriated and some states have set limits on new groundwater pumping so that it is no longer an inexpensive and straightforward matter to acquire new water rights. The costs of water development projects continue to rise as the best reservoir sites long since have been developed, and environmental considerations prompt litigation, project delays and costly impact studies. The local share of costs are rising, too, as budgetary constraints have made the federal government unwilling to subsidize project costs to the extent it did in the past.

These changes, combined with a gradual shift in the economy of the West from agriculture and mining towards municipal growth, industry and tourism, are generating increasing pressure for developing means to acquire existing water rights. Some areas have well-developed water markets with many transactions occurring every year. In these areas, professional water brokers, with ready access to information on recent prices and water rights availability, facilitate transactions. In most of the West, however, sales of water rights historically have been confined to exchanges among similar water uses. In many western states, the rules governing water rights transfers are in a state of flux. In these areas, transactions occur sporadically, information on quantities and prices of water sold is hard to obtain, and the attorneys and real estate brokers who facilitate water transactions do so as a sideline to their regular business activities. This is the current situation in Arizona.

Despite being an arid state with relatively little surface water, Arizona has seen surprisingly few transfers of water rights. Between 1975 and 1984, 30 sever and transfer requests involving a change in the place or purpose and place of use were filed, fewer than in any other study state except California. Half of these applications involved changes of use within the agricultural sector and only one in five involved a shift from agricultural to non-agricultural uses.

There are a number of reasons for this dearth of traditional transfer activity. Historically, Arizona courts were not receptive to the concept of water transfers. In 1901, the Arizona Supreme Court ruled that water rights were appurtenant to the land and could be transferred only if the land itself became unusable through natural causes. The court was concerned about potential abuses involving absentee owners of canal companies who rented shares to farmers for irrigation. To prevent this, the court ruled that appropriators must own the land on which the water was to be used. This decision was enacted into law in 1919.

Other reasons for the lack of traditional water transfers applications include the prohibition against transferring water outside the boundaries of the Salt River Project, the state's largest water provider. Also, Arizona law prohibits temporary

transfers of water, which are common elsewhere, particularly in California.

In addition, the more populous basin and range provinces of central and southern Arizona are characterized by extensive groundwater aquifers. The absence of legal recognition of the hydrologic connection between surface water flows and groundwater pumping and the ability to overdraft these immense, high-quality aquifers postponed the need to reallocate the state's limited renewable supplies. Pumping groundwater allows one to postpone the day of reckoning to a far greater extent than when relying primarily on surface water. Even when the rate of consumptive use exceeds the rate of recharge, there is no immediate crisis, since wells can be sunk several hundred feet deep. The overdraft causes groundwater levels to decline, but usually no more than a few feet per year. Furthermore, since groundwater aquifers are relatively unaffected by periods of drought, there is no sense of urgency, no reason to panic.

Water transfers in Arizona involving groundwater rather than surface water present engineering difficulties in transporting the water from its area of origin to a distant intended point of use. Whereas surface water rights purchased near their headwaters generally can be transported by gravity flow, groundwater is pumped out of basins at low elevation; transporting it hundreds of miles across basin-and-range terrain may be prohibitively expensive.

The small number of sever and transfer applications is seriously misleading as to the amount of water that is being shifted from one use to another in Arizona, particularly over the last decade. Only those surface appropriative water rights that are being severed from the original place of use undergo state review. So long as the use stays with the land, no permission or notification is required. As land uses in irrigation districts and water user associations change, so too do the water uses.

Effluent, only recently recognized as a valuable water resource, has been found by the courts to be neither surface nor groundwater but rather a distinct and largely unregulated form of water. Sales and exchanges of effluent are increasingly common.

Changes in Arizona's groundwater code made in 1980 have triggered new types of water transfer activity. Quantified marketable rights to pump groundwater were created within those areas of the state suffering the greatest groundwater declines. Assured Water Supply rules have driven municipal providers to look for additional sources of water outside these areas, where legal barriers to transfers of groundwater have been lowered. The ensuing "water farming" phenomenon, or the acquisition of large tracts of remote rural land solely for access to surface and/or groundwater, has resulted in changes in control of vast amounts of water and land.

This report summarizes current Arizona water law as it relates to transfers and the legal and social forces driving the current water farming activity. The several methods by which the purpose and/or place of water use is changing in Arizona are discussed, and the level of activity in each is described. Particular emphasis is given to water farming and legislative attempts to deal with related policy issues. Statistical analysis of the various transfer approaches and how Arizona transfers activity compares with other study states is presented, followed by discussion of unresolved issues and problems related to water transfers.

Section 1: A Summary of Arizona Water Transfer Law[1]

The transferability of water in Arizona depends on its legal classification. Water is divided into two broad categories under Arizona law: surface water and groundwater. Each is broken into subcategories that are subject to different restrictions regarding water rights transfers and water transport. Surface water is defined as the waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, with the exception of effluent, whether perennial or intermittent, flood, waste or surplus water, and of lakes, ponds and springs on the surface. Groundwater is defined as all water under the surface of the earth except water flowing in underground streams with ascertainable beds and banks. Effluent is considered neither surface nor groundwater, but still may be regulated as water.

Surface Water Transfers

Non-Colorado River water

Under Arizona law, surface water belongs to the public and is subject to private appropriation. Current surface water law was enacted in 1962. Under Arizona's prior appropriation system, a permanent water right is granted to those who first appropriate surface waters. The "first in time, first in right" nature of this doctrine means that, in times of shortage, junior appropriators -- those with later-dated rights -- may not be satisfied, making the priority date a very important characteristic of the right. A surface water right is established and maintained by the diversion and application of water to a specific beneficial use. If appropriated surface water goes unused for five consecutive years the right may be forfeited and become available to new appropriators.

In Arizona, as in most western states, the *point of diversion* of a water right may be changed provided the source of the water does not change and other users' rights are not adversely affected. Surface water rights may be transferred to a new *place of use* only with state approval. Prior to approval, an application for severance and transfer is made, followed by a hearing at which any interested person may contest the application.

Changes in purpose of use also require state approval. Although the statutes are silent regarding criteria for deciding on applications for change of use, the case law clearly establishes that a lawful change of use may not have any adverse effect on other vested water rights. In addition, Arizona alone among the study states has no provision for authorizing temporary transfers of water.

Transfers of water rights within water service organizations such as irrigation districts, agricultural improvement districts or water users associations, are permitted only with the prior written consent of the organization. In the case of a transfer involving water from a watershed or drainage area which supplies water to lands within a water service organization, the transfer must be consented to by each organization within the drainage basin. This provision prohibits the state from even accepting an application for severance and transfer of a water right unless the consent of downstream water service organizations first is obtained. Consequently, water districts can veto a water transfer within their watershed without having to prove they would be damaged. This provision was promoted by the Salt River Project (SRP) at a time when there was minimal regulation of water rights, in an effort to ensure that SRP rights were not impaired through water transfers.

Colorado River water

Colorado River water is a large resource likely to become the focus of future water transfers. Some transfers of Colorado River water already have occurred, and others are being considered. The rules and regulations governing the Colorado River, known as the "Law of the River", have evolved from a combination of inter-state compacts, federal and state statutes, a major court decision, international agreements, and various administrative decisions. The legal status of Colorado River water is complicated, as it falls under many jurisdictions.

Interested parties have raised the possibility of interstate transfers of Colorado River water. The topic is controversial, as some believe the Colorado River Compact clearly precludes transfers between the Upper and Lower basins, while others disagree. Similarly, whether interstate transfers within the lower basin are prohibited is a matter of dispute. Whether a person can sell their Colorado River entitlement at all, or whether it automatically becomes available to the next junior appropriator is one of the many unresolved questions regarding the transfer of Colorado River water. Despite the complexities and controversies surrounding this issue, transfers of Colorado River water are possible, and cannot be ruled out.

Groundwater Transfers

Much of the water supply in Arizona is groundwater. Prior to 1980, groundwater pumping in Arizona was essentially unregulated. In 1980, the Arizona Legislature was called into special session to enact a groundwater code that replaced the patchwork of common law and legal decisions that regulated groundwater use. Passage of the 1980 Groundwater Management Act (GWMA) ostensibly was motivated by the obvious need for Arizona to deal with some serious long-standing water resource problems. Several parts of the state, including the two major urban areas, were experiencing long-term groundwater level declines. More immediate motivation came in the forms of a threatened cut-off of federal funding of the Central Arizona Project (CAP)[2] and the growing realization that out-of-state perceptions of Arizona as a state running out of water eventually would dry up sources of investment capital as well.

The withdrawal, use, and transportation of groundwater is regulated by the provisions of the 1980 Groundwater Management Act. The GWMA was motivated, in part, by a need to resolve uncertainties created by court-made rules limiting the transportability of groundwater. Early decisions gave injunctive relief to neighboring pumpers who could prove they were harmed. Subsequent decisions allowed purchasers of irrigated agricultural land to retire the land and transfer the historic consumptive use. Provisions of the act removed some limitations on the transportation of groundwater to promote development. For example, the act eliminated injunctive relief as a remedy for a neighboring landowner damaged by water transport and specified a set of circumstances and conditions under which a rightholder who has suffered injury may sue to recover damages. This means that a damaged party cannot stop the transport, but can, under certain circumstances, be compensated for any losses suffered. An action to recover damages usually is allowed when groundwater is moved across a basin or sub-basin boundary, but injury is not presumed merely from the fact of transportation.

The Groundwater Code established four Active Management Areas (AMAs) in the state, focusing water management efforts in those areas with severe groundwater overdraft conditions (see map, Figure 1). Ap-

proximately 80 percent of the state's population resides within these AMAs, and about 70 percent of water consumption occurs there. The goal of the management efforts in the Phoenix, Prescott and Tucson AMAs is to achieve safe yield, defined as a balance between average demand for groundwater and the average rate of replenishment. The goal in the Pinal AMA is to preserve the agricultural economy for as long as possible while reserving some groundwater supplies for non-irrigation uses.

The legal nature of groundwater varies depending on whether the water is withdrawn from outside or from within an AMA. A landowner within an AMA is not automatically granted the right to withdraw groundwater. Unless the well qualifies as an exempt domestic well, groundwater users within AMAs must have one of the following rights or permits to withdraw groundwater: grandfathered rights, service area rights, withdrawal permits, or storage and recovery permits. The transferability of groundwater within an AMA depends on the type of right to which the groundwater is associated. Groundwater transfers within AMAs generally involve only grandfathered rights.

Rights to pump groundwater to irrigate lands within AMAs are based on historic patterns of use. These rights are quantified on the basis of a "water duty", the amount of water in acre-feet[3] per acre that is reasonable to apply to irrigated land, as determined by the Director of the Arizona Department of Water Resources (ADWR) for each AMA. As state water conservation requirements become more stringent, water duties gradually are being reduced.

There are three types of grandfathered rights: irrigation grandfathered rights (IGRs), Type I rights, and Type II rights. IGRs are quantified based on historic patterns of use and may not be sold apart from the associated land; in other words, the right is appurtenant to the land. The groundwater withdrawn under this right may be used only to irrigate the land to which the right pertains. In order to apply an irrigation grandfathered right to a non-irrigation use it first must be converted to a Type 1 right.

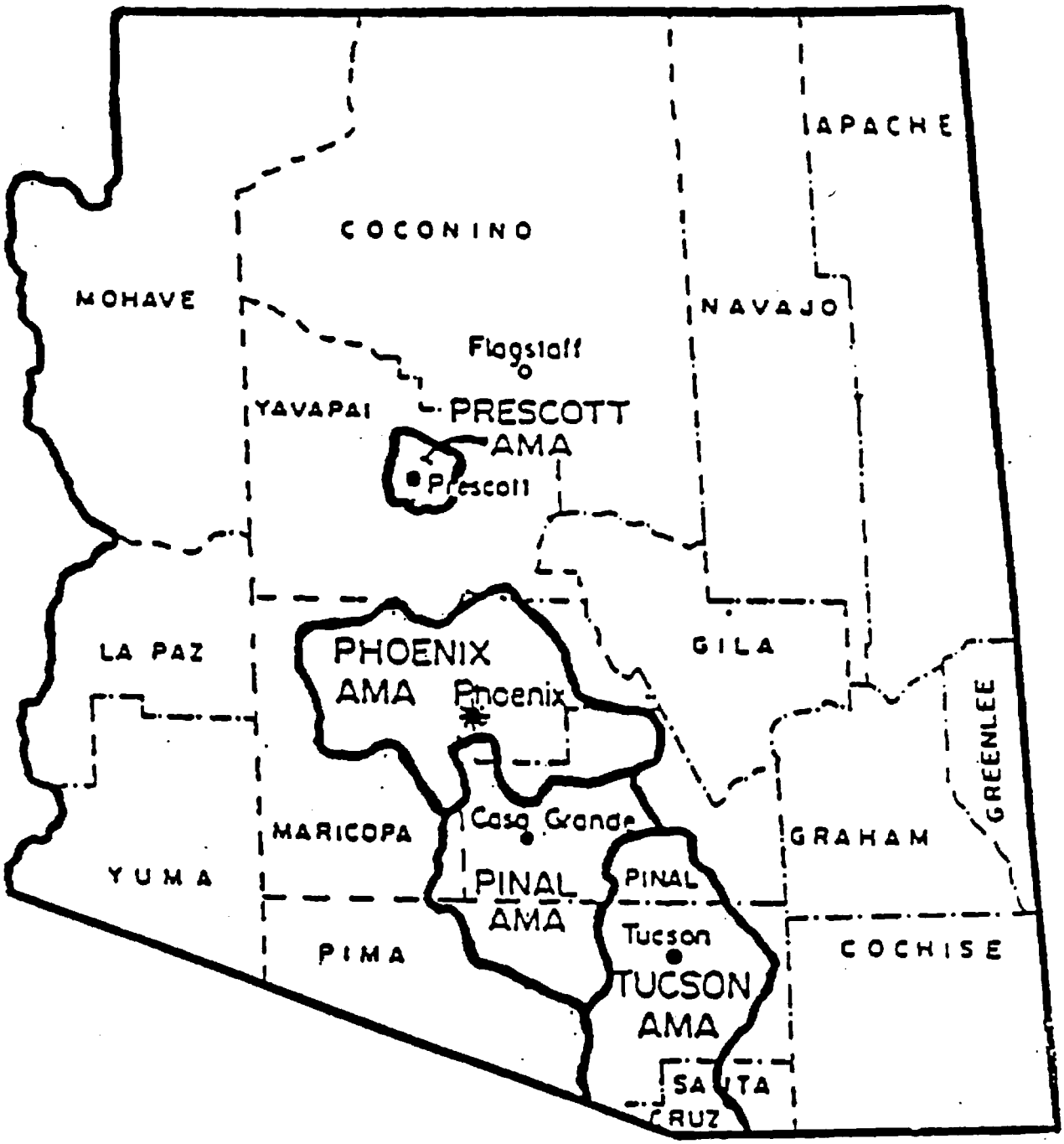
Type 1 non-irrigation grandfathered rights allow the owner of land which was retired from agriculture in anticipation of a non-irrigation purpose to retain entitlement to use water. A new Type 1 right is created by retiring and converting an irrigation grandfathered right; once converted to a Type 1 right, the land associated with the right may never be returned to irrigation. With few exceptions, the irrigated land being retired must be located outside the service area of a city, town or private water company. The quantity of groundwater that can be pumped annually pursuant to a Type 1 right is fixed at the time of conversion from an irrigation grandfathered right and is equal to the lesser of estimated historic consumptive use or three acre-feet per acre.

The rules governing Type 1 rights are complex. The original owner of a Type 1 right may withdraw the groundwater from the associated retired farmland for use at any location, for any permissible non-irrigation purpose, subject to limitations if the land is within a service area, either on or off the associated land. The original owner also may withdraw the groundwater from a well that is not located on the retired farmland; however, in this case the water can be used only on the retired farmland associated with the right.

Like an irrigation grandfathered right, a Type 1 right may be sold only with the land to which it is appurtenant. Once sold, a Type 1 right is more restricted; the new owner can withdraw the water only from the land to which the right is appurtenant, though the water withdrawn still can be used, under

Figure 1

Arizona Department of Water Resources
Active Management Areas



certain circumstances, either on or off the associated land.

The law regarding inter-basin transfer of water pumped pursuant to a Type 1 right was amended by the legislature shortly after the City of Mesa acquired some 11,600 acres of farmland within the Pinal AMA. No one purchasing Type 1 rights may transport water pumped pursuant to those water rights out of that AMA if the rights were acquired after April 18, 1986. However, water pumped pursuant to IGRs acquired for the purpose of subsequently converting them to Type 1 rights under the "development plan" provisions of the law still may be transported out of the AMA. Transportation of groundwater withdrawn under a Type 1 right is not subject to payment of damages even if the pumping adversely affects adjacent groundwater users.

A Type 2 right is based on historical pumping of groundwater for uses other than crop irrigation such as for livestock watering, golf course irrigation, mining, power generation or industrial purposes. Unlike an irrigation or Type 1 right, a Type 2 right is not appurtenant to any land and may be sold or leased for some non-irrigation purpose within the same AMA. The point of withdrawal may be changed as long as it remains within the same AMA. The law was amended in 1987 to clarify the right to lease Type 2 rights. The whole Type 2 right or a portion of the right may be leased; if sold, however, the right must be sold in its entirety. Transportation of water withdrawn under a Type 2 right across basin or sub-basin boundaries is, unlike Type 1 rights, subject to the payment of damages.

Service area rights permit cities, towns, private water companies and irrigation districts to withdraw groundwater to serve their customers. The service area right is an unquantified right limited only by the ADWR management plans which contain specific water conservation requirements aimed at achieving the management goals established for the AMAs. Service area rights are transferable when, for example, a city purchases a private water company and pumps pursuant to the former water company's service area right. Groundwater withdrawn under a service area right may be transported to any point within the service area, though transport across basin or sub-basin boundaries is subject to the payment of damages.

There are no quantified groundwater rights outside of an AMA. Instead, a landowner simply has the right to pump water underlying the land. The groundwater must be withdrawn for "reasonable and beneficial" use -- a fairly loose standard -- but aside from this standard there are no limitations on the amount withdrawn or on the place of use. If water is transported across basin or sub-basin boundaries, however, the transporter is liable for any damages to neighboring rightholders shown to be caused by the transport.

Transfers of Effluent

In recent years treated sewage effluent has received increased attention in Arizona for its potential as a marketable resource, in conserving water through exchanges of potable for nonpotable supplies, for recharging groundwater aquifers, and in satisfying Indian water entitlements. New golf courses in the state's urban areas are required to use primarily effluent, and existing golf courses are being encouraged to switch from potable water to effluent. Regulations prohibiting the filling of decorative lakes and ponds with potable groundwater also are increasing the demand for effluent.

Some 10 percent of Tucson's 60,000 acre-feet per year of effluent currently is reused by golf courses and parks; that percentage is expected to rise to 25 percent

by 1995, as new golf courses come on line and schoolyards are connected to the expanding distribution system. An agreement to provide effluent to the San Xavier District of the Tohono O'odham Reservation was a key component of the SAWARSA water rights settlement.[4]

Phoenix currently sells some 35 percent of its effluent to the Palo Verde nuclear power plant. This sale was the focus of recent litigation over issues of ownership, appropriation and transport of effluent. That litigation concerned contracts entered into by defendant municipalities to deliver effluent via pipeline for use in cooling towers of a nuclear power plant owned by defendant utilities. Two plaintiff ranches claimed an appropriative right in the effluent that for years had been discharged into the Salt River channel, and asserted that the city must therefore continue the discharge. A plaintiff developer, claimed that the groundwater component of the effluent had to be put to reasonable and beneficial use on the land from which it was withdrawn or be recharged into the aquifer.

Defendants claimed that, unlike surface and groundwater which is owned by the public in Arizona and to which one can have only a right to *use*, they owned the effluent outright and could do with it as they pleased. They based this on the argument that the water had lost its character as surface or groundwater and was the property of the party that had expended funds to create it.

The questions as posed by the court were: "(1) Can the Cities contract to sell sewage effluent for use on lands other than those involved in the original appropriation? And (2) once the Cities dump sewage effluent into a stream and such effluent is appropriated by downstream users, must the Cities continue such dumping ad infinitum?" In reaching decisions on these issues, the court had to decide whether effluent that began as surface or groundwater remained such, or became a different type of water, or was in fact no longer water at all. The court also considered whether flows of effluent were appropriable and, if so, what the legal limits of that appropriation were.

The court concluded that effluent was indeed water, but that Arizona statutes distinguished between surface water, groundwater and effluent, making it a distinct type of water with which the cities could do as they chose, within the broad limits of "reasonable and beneficial use." The court also found that the plaintiff ranches did indeed have an appropriative right in the effluent, but that the right could be exercised only against other, more junior appropriators and could not be used to compel the cities to continue discharging effluent into the riverbed. Finding effluent synonymous with "waste water", the court concluded that mandating permanent discharges would force cities to continue "wasting" water.

Argument of the case was hindered by a lack of relevant, contemporary precedents. The problem was compounded by the fact that, between the time the first contract was entered into in 1973 and the time that the case was decided, sewage effluent had metamorphosed from a nuisance to be disposed of as cheaply as possible into a valuable commodity and an important water resource. In selecting one outdated case to support their conclusions and distinguishing it from other equally dated cases, the court may have inadvertently placed some unfortunate restrictions on transfers of effluent.

Language in the decision implies that if effluent is treated to some higher level, it stops becoming effluent and reverts to being surface or groundwater, and must be returned to its source. New treatment technology

makes it practicable to produce higher quality effluent fit for higher-valued uses, such as industrial or even potable uses. It would be an unfortunate result if disincentives were created to using latest technology to treat effluent for higher-valued uses.

It also appears that effluent cannot necessarily be transported via the cheapest, most efficient method available. Had it been practical for Phoenix to deliver effluent to the nuclear power plant via the river channel, the plaintiff ranches would have been able to exercise their appropriative rights in the effluent flow against the utilities as junior appropriators. Construction of the expensive pipeline would have been necessary, because once the effluent was discharged into the riverbed, Phoenix apparently would have no water right to sell.

In finding that the effluent was neither surface nor groundwater, the court removed the use of effluent from regulation under the surface water code and the groundwater code. If the decision remains the last word on the subject, then effluent may be one of the most marketable water commodities in Arizona. However, when the court ruled that effluent was indeed water, it established that it was subject to legislative and regulatory controls. The court pointedly and repeatedly invited the Arizona legislature to fill this vacuum in state water law.

The transferability, transportability and other relevant characteristics of various types of water resources in Arizona are summarized in Table 1. Anticipated legislative actions may modify the transferability of some of these types of water.

Section 2: Types of Water Transfer Activity

Surface Water Transfers

Relatively few sever and transfer applications involving appropriated surface water rights have been filed in Arizona. During the study period 1975 through 1984, 30 applications were filed, fewer than any other study state except California (see Table 2). The applications were distributed over time as follows:

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Apps.	0	0	0	0	1	2	14	8	4	1

It is not clear whether the flurry of applications centered around 1981 was caused by passage of the 1980 Groundwater Management Act.

Of the 30 applications filed, 28 were approved. This 93 percent approval rating is second only to New Mexico (see Table 2). The average length of time between application and decision was 8.2 months, which was second only to New Mexico in quickness (Table 2).

Five of the 30 cases, or 17 percent were protested or opposed. This is a higher rate of protest than Utah and New Mexico, but lower than the other three study states (Table 2). Comparisons of Arizona transfer characteristics with the other study states are shown graphically in Figures 2 - 5.

The 28 approved transfers in Arizona are broken down into change in purpose of use categories in Table 3. Changes in purpose of use for transfers in Arizona are compared graphically with those of the other study states in Figure 5. Arizona has the

TABLE 1

TRANSFERABILITY AND OTHER CHARACTERISTICS
OF ARIZONA WATER RIGHTS

TYPE OF RIGHT			IS THE RIGHT TRANSFERABLE?	CAN THE WATER BE TRANSPORTED?	LIMITS TO RIGHT	OTHER IMPORTANT CHARACTERISTICS
GROUNDWATER	AMA	IGR	Yes, but only with the appurtenant land.	No, the right is tied to specific acres.	Limited by the water duty for the AMA.	IGR must first be converted to a Type 1 right to be applied to a non-irrigation use.
		Type 1	Yes, but only with the appurtenant land.	Yes, with no liability for damages, but new owner can't move water out of AMA.	Limited to the lesser of historic consumptive use or 3 acre-feet per acre.	New Type 1 rights created by the retirement and conversion of an IGR.
		Type 2	Yes, and may be sold apart from the land, but can't leave AMA.	Yes, but subject to payment for damages.	Right is quantified and is indivisible, but may be leased.	Does not enhance the assured water supply of AMA. Very flexible since it is not appurtenant to any land.
		Service Area Right	Yes, via purchase of private water companies or the acquisition of city-owned service areas.	Yes, but only within a service area and subject to payment for damages only across sub-basins.	Limited by conservation requirements for the AMA.	Does not enhance the assured water supply of the AMA.
	Non-AMA		Yes, the right to pump water underlying the land is transferable with the land.	Yes, subject to payment for damages.	Water must be applied to "reasonable and beneficial use."	Since no quantified groundwater rights exist outside AMAs, the amount of water which can be withdrawn is virtually unlimited.
SURFACE	Non-Colorado River Right		Yes, with the land to which the right pertains.	Yes, provided no other rightsholders are damaged.	Water must be applied to "reasonable and beneficial" use on appurtenant land.	Right subject to forfeiture for non-use. Seniority of right determines priority in times of shortage.
	Colorado River Right		Not clear. Non-use by holder may free up water for junior rightsholders.	Not clear for interstate transfers and particularly for interbasin transfers.	Water must be applied to "reasonable and beneficial use." Limited by contract with Sec. of Interior.	Seniority of right determines priority in times of shortage.
EFFLUENT			Yes, and with no attachments to the land.	Yes, but if placed in a natural streambed, it reverts to surface water. No liabilities for damages, even outside an AMA.	Water must be applied to "reasonable and beneficial use."	May be subject to future legislative regulation.

TABLE 2
SEVER AND TRANSFER APPLICATIONS BY STATE
(1975-84)

State	Number of Applications	Percent Approved	Mean Months to Decision	Percent Protested
Arizona	30	93	8.2	17
California	3	83	N/A	48
Colorado	858	80	19.5	61
New Mexico	1,133	96	5.8	6
Utah	3,853	90	9.4	9
Wyoming	41	75	17.7	32

highest percentage of agriculture to agriculture transfers, the highest percentage of non-agriculture to agriculture transfers and thelowest percentage of agriculture to non-agriculture transfers. These figures, coupled with the relatively few applications filed in the state, demonstrate that while the sever and transfer process is relatively quick and certain in Arizona, it is not being used to shift significant amounts of water into new and presumably higher-valued uses.

As stated earlier, statistics on sever and transfer applications give a misleading view of transfers activity in Arizona. Only those surface appropriative water rights that are being severed from the original place of use undergo state review. So long as the use stays with the land, no permission or notification is required. As land uses in irrigation districts and water user associations change, so too do the water uses.

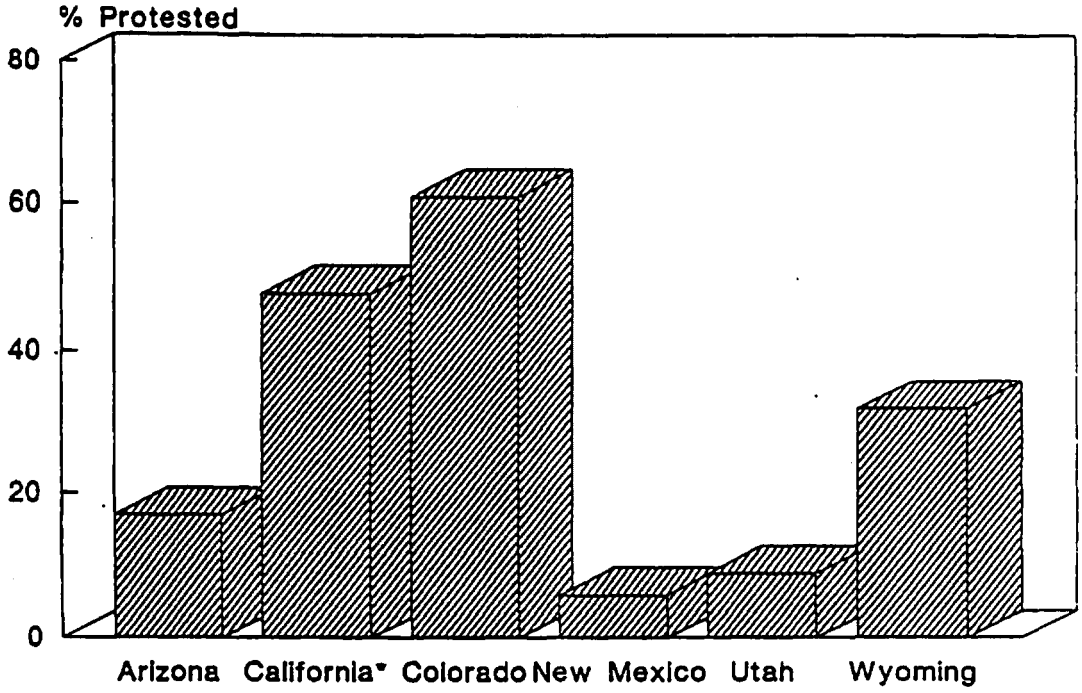
The best example of this is the Salt River Project (SRP), a rapidly urbanizing area in the Phoenix metropolitan area. As SRP land is converted from irrigated agriculture into various urban uses, the associated water rights revert back to the same parcels but in the form of domestic water delivered to municipal providers. The shift in land and water use is shown in Table 4 and the trends are depicted in Figures 6 and 7. In 1950, less than 14 percent of the Project's 240,000 acres were urbanized. By 1980, 57 percent was urbanized and today nearly 75 percent of the land and 60 percent of the water are devoted to urban uses.

The current decade will witness the near-total conversion of SRP from an agricultural water provider with incidental electrical generating capacity to a major urban electrical utility that also delivers significant amounts of urban water. This on-going process, coupled with the fact that urban development has generally lower consumptive uses per acre than the irrigated agriculture it supplants, likely will increase pressures to find a way to effectively transfer water across Project boundaries.

Early Arizona Groundwater Transfers

Groundwater transfers for municipal use occurred in Arizona as early as 1948, when the City of Prescott purchased farmland in the nearby Chino Valley. The city developed a well field on the land and began pumping water for domestic use in Prescott. The transfer proved controversial from the start, as local farmers charged that the pumping by Prescott exceeded that normally needed for agriculture, leading to water level declines in the basin and prolonged litigation. The dispute today is over Chino Valley's

Figure 2 Percentage of All Applications Formally Protested or Opposed, By Study State



* For applications filed between 1982 and 1989

Figure 3 Average Months to Decision, Approved Cases, By State

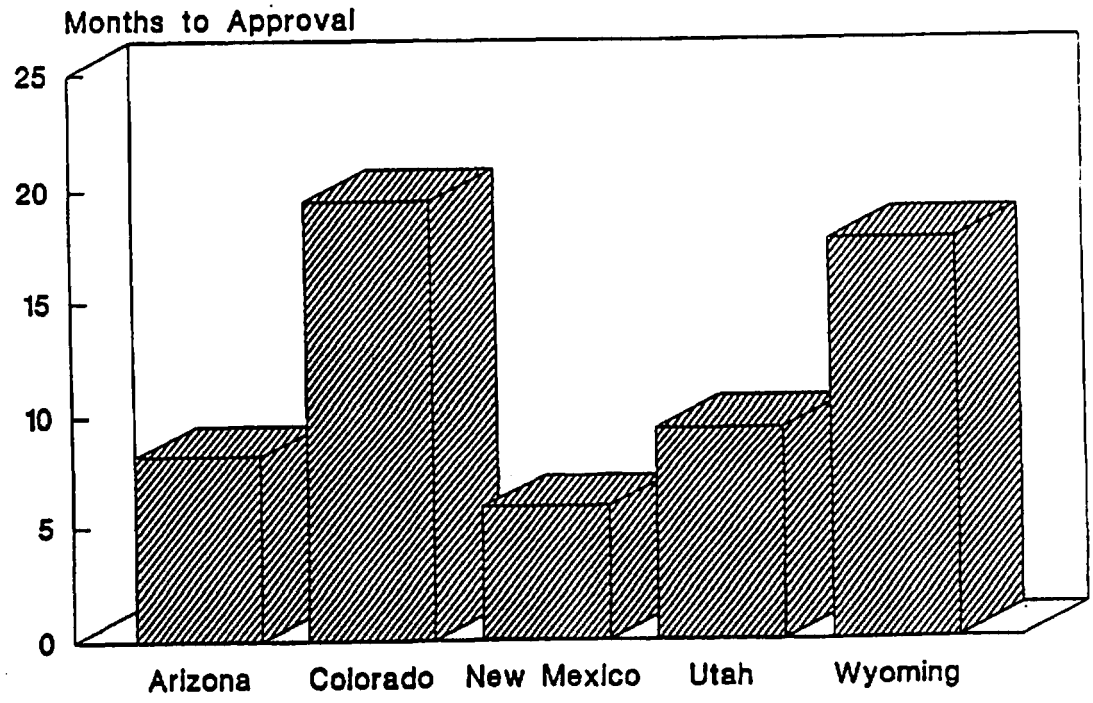
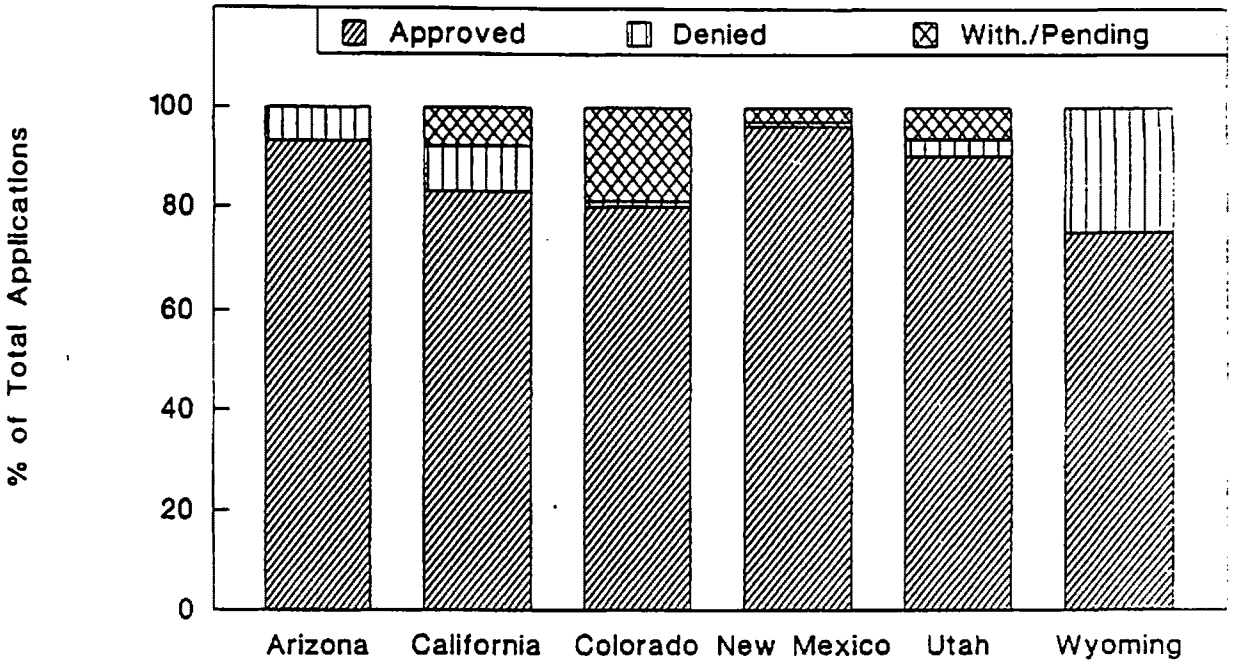
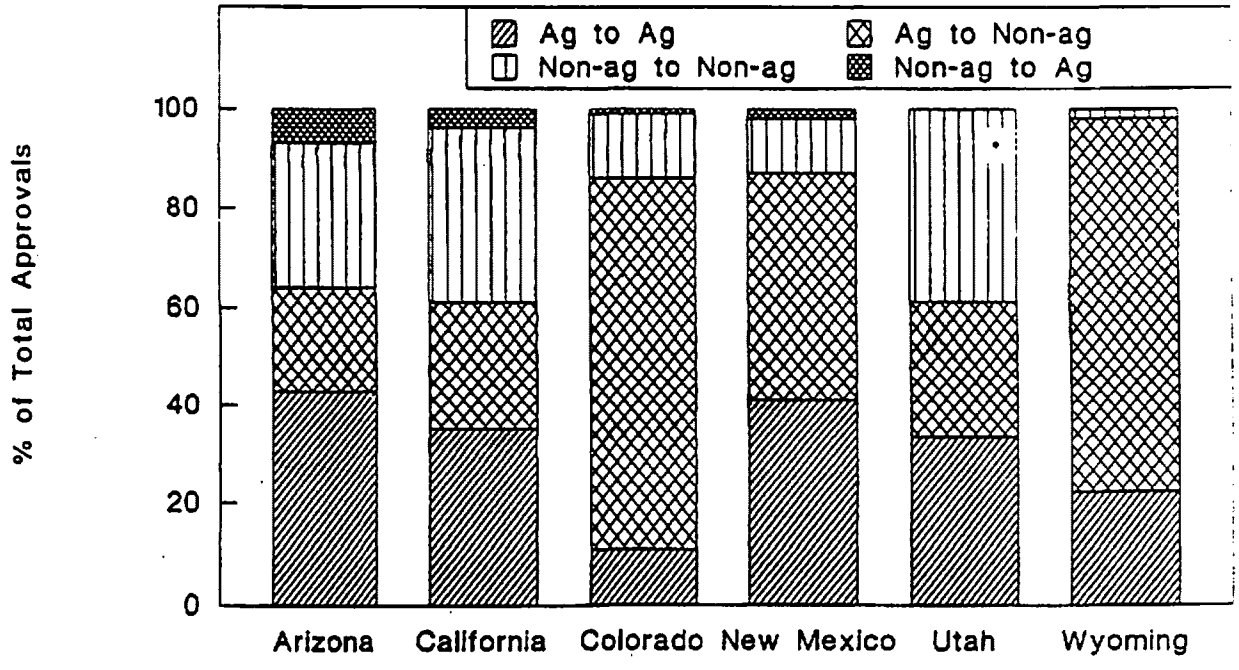


Figure 4 Disposition of Applications Filed Between 1975 and 1984, By Study State *



* California data reflect cases filed between 1982 and 1989

Figure 5 Approved Changes of Water Rights By Purpose of Use, By Study State (Percent of Total Approvals)



* From non-ag but new use could be for any use

power to tax Prescott's wellfield, pumps, pipeline and other facilities located within Chino Valley.

Additional water farming activity took place in the 1970s. The City of Tucson began purchasing and retiring farmland in the Avra Valley, located about 15 miles northwest of Tucson, in 1971. Initially, Tucson purchased a small tract of raw desert land and began constructing a wellfield and pipeline, but local farmers sued and won injunctive relief in a case known as Jarvis 1. In the subsequent Jarvis 2 case, the state supreme court ruled that if one purchased and retired farmland, one could transfer water equal to historic consumptive use. This limit was defined in Jarvis 3 at no more than three acre-feet per acre. Thus, Tucson began to purchase and retire cotton farms. Between 1971 and 1979, 21 properties were purchased (see Table 5).

Purchases were halted in 1979 due to ongoing negotiations that led to the 1980 GWMA. After a five-year hiatus between 1979 and 1984, 12 additional purchases were made through 1986. The City claimed, and historic crop yield data verify, that they generally purchased the least productive and therefore cheapest property available. However, reduction in total acreage of cotton forced the closing of one of two local gins and a general deterioration of farming infrastructure. Most of the highly productive farms negotiated sales in 1984.

The 33 purchases total nearly 22,518 acres for a total purchase price of $24.7 million, or an average price of $1,100 per acre. At one time, the city planned to acquire a total of 30,000 acres in the Avra Valley; any additional purchases are pending clarification of state water transfers law, as proposed changes in Arizona's water law make the value of obtaining additional Avra Valley acreage uncertain.

While these purchases initially caused considerable concern in their areas of origin and led to major precedent-setting lawsuits,[5] they did not create the kind of intense, statewide controversy that Arizona currently is experiencing. These purchases differed from those occurring recently in several important respects:

(1) the area of origin was relatively near the area of use;
(2) the water was in the same hydrologic basin, although in different sub-basins;
(3) the land was in the same county, so that most property tax impacts were internalized; and
(4) the cities incorporated the purchased land into their service areas, assuring an adequate water supply for the areas of origin.

These water transfers were limited in scope and driven by a relatively immediate need for water. In most respects, they bear little resemblance to the transactions characterizing Arizona's developing water farm market today.

TABLE 3
APPROVED ARIZONA TRANSFERS BY CHANGE IN PURPOSE OF USE

Type of Change in Purpose of Use	Number of *Transfers*	*Percent*
Agriculture to Agriculture	13	43
Agriculture to Non-Agriculture	6	21
Non-Agriculture to Non-Agriculture	9	29
Non-Agriculture to Agriculture	2	7

TABLE 4
CONVERSION OF AGRICULTURAL ACREAGE AND WATER TO URBAN USES
Salt River Project, Arizona 1950-1988[1]

Year	Project Acreage	Agricul. Acreage	Urban Acreage	% Ag. Land	% Urban Land	Agric.2 Water	Urban[3] Water
1950	240,999	207,779	33,220	86.2	13.8	935,006	79,728
1951	240,904	205,727	35,177	85.4	14.6	925,772	84,425
1952	240,661	201,259	39,402	83.6	16.4	905,666	94,565
1953	240,388	197,798	42,590	82.3	17.7	890,091	102,216
1954	240,261	195,435	44,826	81.3	18.7	879,458	107,582
1955	239,908	192,825	47,083	80.4	19.6	867,712	112,999
1956	239,645	190,597	49,048	79.5	20.5	857,686	117,715
1957	239,289	188,354	50,935	78.7	21.3	847,593	122,244
1958	238,787	185,920	52,867	77.9	22.1	836,640	126,881
1959	238,582	181,136	57,446	75.9	24.1	815,112	137,870
1960	238,342	176,712	61,630	74.1	25.9	795,204	147,912
1961	238,191	173,839	64,352	73.0	27.0	782,276	154,445
1962	238,082	171,262	66,820	71.9	28.1	770,679	160,368
1963	238,252	169,834	68,418	71.3	28.7	764,253	164,203
1964	238,252	167,922	70,330	70.5	29.5	755,649	168,792
1965	238,252	167,120	71,132	70.1	29.9	752,040	170,717
1966	238,252	165,276	72,976	69.4	30.6	743,742	175,142
1967	238,252	164,495	73,757	69.0	31.0	740,228	177,017
1968	238,252	162,514	75,738	68.2	31.8	731,313	181,771
1969	238,262	162,874	75,388	68.4	31.6	732,933	180,931
1970	238,264	158,136	80,128	66.4	33.6	711,612	192,307
1971	238,264	153,558	84,706	64.4	35.6	691,011	203,294
1972	238,264	148,128	90,136	62.2	37.8	666,576	216,326
1973	238,264	142,931	95,333	60.0	40.0	643,190	228,799
1974	238,264	125,741	112,523	52.8	47.2	565,834	270,055
1975	238,264	124,452	113,812	52.2	47.8	560,034	273,149
1976	238,266	121,761	116,505	51.1	48.9	547,924	279,612
1977	238,220	118,951	119,269	49.9	50.1	535,280	286,246
1978	238,220	114,392	123,828	48.0	52.0	514,764	297,187
1979	238,221	109,223	128,998	45.8	54.2	491,504	309,595
1980	238,221	105,771	132,450	44.4	55.6	475,970	317,880
1981	238,221	102,105	136,116	42.9	57.1	459,472	326,678
1982	238,172	98,546	139,626	41.4	58.6	443,457	335,102
1983	238,172	95,292	142,880	40.0	60.0	428,814	342,912
1984	238,171	89,268	148,903	37.5	62.5	401,706	357,367
1985	238,170	81,911	156,259	34.4	65.6	368,600	375,022
1986	238,170	74,746	163,424	31.4	68.6	336,357	392,218
1987	238,170	71,245	166,925	29.9	70.1	320,602	400,620
1988	238,266	69,271	168,995	29.1	70.9	311,720	405,588

[1] Sources: Various SRP reports from 1977 and 1988.
[2] Assumes 4.5 acre-feet per acre, the 1980 agricultural use rate.
[3] Assumes 2.4 acre-feet per acre, the 1980 urban use rate.
Double figure 6 & 7

6 Conversion of SRP Land from Agricultural to Urban Uses
7 Estimated SRP Water Deliveries for Agricultural and Urban Uses

Figure 6

Conversion of SRP Land from Agricultural to Urban Uses

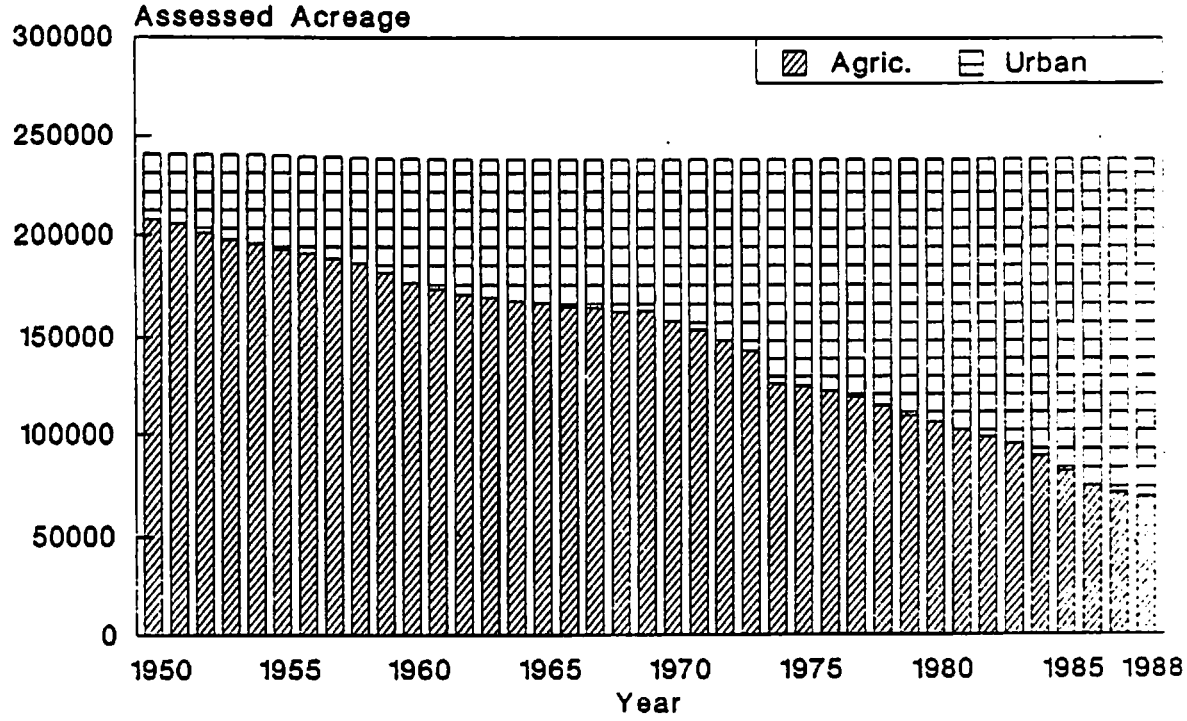
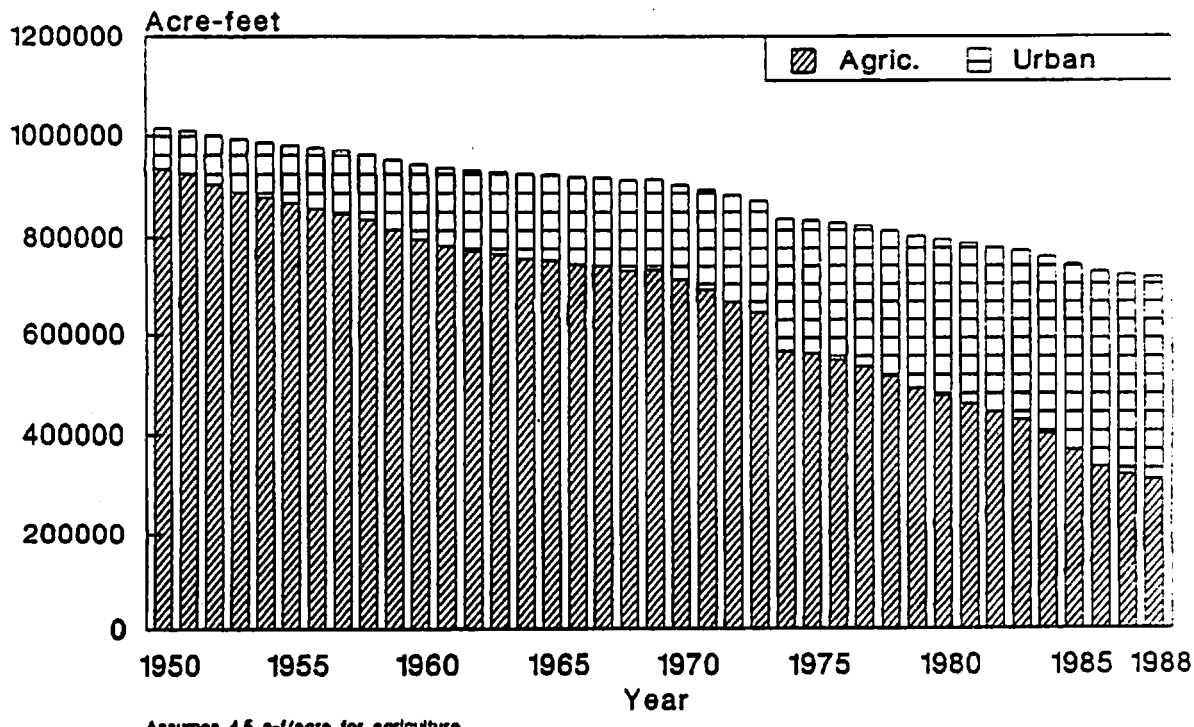


Figure 7

Estimated SRP Water Deliveries for Agricultural and Urban Uses



Assumes 4.5 a-f/acre for agriculture and 2.4 a-f/acre for urban land

TABLE 5
TUCSON WATER PURCHASES IN AVRA VALLEY

Year	Number of *Purchases*	Total *Acreage*	Total Pur-*chase Price*	Average *per Acre*
1971	1	317	$156,000	$492
1972	2	2,286	1,089,000	476
1973	0	0	0	--
1974	0	0	0	--
1975	4	1,283	1,249,212	974
1976	11	6,553	5,390,500	823
1977	1	1,278	905,000	708
1978	0	0	0	--
1979	2	926	526,250	568
1980	0	0	0	--
1981	0	0	0	--
1982	0	0	0	--
1983	0	0	0	--
1984	8	6,465	10,842,000	1,677
1985	0	0	0	--
1986	*4*	*2,947*	*4,569,750*	*1,551*
Total	33	22,518	$24,727,712	$1,098

TABLE 6
TYPE I RIGHTS
Original and IGR Conversions

Year	Number *Converted*	Total *Acres*	Total Water *(acre-feet)*
1985	11	3,605	11,444
1986	8	968	4,356
1987	16	4,465	14,126
1988	10	2,080	5,482
1989	4	637	1,741
1990	*1*	*30*	*87*
Total IGR Conversions	50 + *19* split 69	11,785	37,236
Original Type I Rights	*123*	*30,342*	*92,074*
Total Type I Rights	192	42,127	129,310

TABLE 7
TYPE II RIGHTS BY AMA

AMA	Number of Rights	Total acre-feet	Average acre-feet	Median acre-feet
Phoenix	389	105,096	270	–
Pinal	104	10,969	106	12.5
Prescott	17	3,935	232	15.2
Tucson	*375*	*106,000*	*283*	*11.0*
Total	885	226,000	255	–

TABLE 8
SALES OF TYPE II RIGHTS
(as of December 1989)

Number of Times Sold	Number of Rights	Total acre-feet	Mean acre-feet	Median acre-feet
never sold	698	137,035	196	–
1	136	35,155	258	23
2	41	41,475	1,012	46
3	7	11,636	1,662	138
4	2	550	275	275
5	*1*	*149*	–	–
> 1	187	88,965	476	31
All Rights	885	226,000	255	–

Transfers of Grandfathered Rights

As described above, the GWMA created certain quantified rights to pump groundwater within AMAs. There are three types of grandfathered rights: irrigation grandfathered rights (IGRs), Type I rights, and Type II rights. The conversion of IGRs to Type I rights and sales of Type I and Type II rights are described below.

IGR conversions and Type I rights

Currently there are 192 Type I rights totalling 129,310 acre-feet of annual pumping in the four AMAs. Of these, 123 or 64 percent are original Type I rights and the remaining 69 are the result of conversions of 50 irrigation grandfathered rights, 19 of which were divided into multiple rights after conversion to Type I rights (see Table 6). The conversions break down by AMA as follows: 40 converted IGRs in the Phoenix AMA; 7 in the Pinal AMA; 0 in the Prescott AMA; and 3 in the Tucson AMA.

Type II rights

Type II rights account for 226,000 acre-feet of pumping rights within the four AMAs. Some 86 percent of the rights accounting for 93 percent of allowable Type II pumpage are evenly split between the Phoenix and Tucson AMAs, with most of the balance in the Pinal AMA (see Table 7). Type II rights average 255 acre-feet per year,

although rights in the Pinal AMA are substantially smaller. Large numbers of rights have very low (< 5 acre-feet/yr.) pumping quantities and a small number of rights are very large. This is evidenced by the great disparity between mean and median pumping quantities. Typically, the amount of water pumped per year pursuant to all Type II rights is only about half the allowed pumpage, suggesting a substantial supply of underutilized rights that could be marketed. However, as mentioned above, Type II rights cannot be split.

Of the 885 Type II rights that exist, 187 or 21 percent have been sold at least once. Some have been sold several times, with a total of 252 transactions having occurred (see Table 8). Those rights that have sold tend to be larger than those never sold, with an average quantified pumping right of 476 acre-feet for the former and 196 acre-feet for the latter. It also appears that larger rights tend to be sold more often than smaller ones.

Many Type II rights are associated with domestic wells or wells supplying small businesses, and many of the sales are associated with the sale of these homes and businesses. In addition, Type II rights are classified as general non-irrigation, mineral extraction and electrical generation, and must remain within those use classifications. Therefore, it is difficult to measure the degree to which these transfers of ownership represent changes in place and/or purpose of use.

The right to lease Type II rights was clarified in 1987. The whole Type II right or a portion of the right may be leased. There are no data on the amount of leasing activity.

While the types of water transfers discussed above play important roles in water resource reallocation in Arizona, there are severe restrictions associated with service area rules and Assured Water Supply rules that sharply limit the use of grandfathered rights for supplying new urban development. At the same time, a new type of transfer has quickly dominated all others in terms of the amounts of water, land, money and political attention involved. Water farming is the subject of the following section.

Section 3: The Water Farming Phenomenon

Introduction

Most municipal water providers in Arizona currently rely on some combination of groundwater, imported Colorado River water and/or other surface waters for their water supplies. Anticipating that population growth and provisions of the state's Groundwater Management Act will prove these supplies insufficient to meet projected demands, water providers and developers are turning to water transfers for an abundant source of water.

During the past few years, municipalities, developers, and investors have spent over one-third billion dollars to acquire a half million acres of land in rural Arizona, not for the value of the land or its crops or any structures on it, but for its access to surface or groundwater. This phenomenon, termed "water farming," has generated significant controversy over the potential effects on rural areas in which the water originates.

Driving Forces Behind Recent Water Transfers

Several factors are responsible for the flurry of water farming activity occurring since 1984. Chief among these is the 1980 Groundwater Management Act with its Assured Water Supply and safe yield

provisions. Other factors include: the continued rapid growth in Arizona's urban areas; recent Indian water rights settlements; a depressed agricultural economy; and construction of the Central Arizona Project aqueduct.

The 1980 Groundwater Management Act

Arizona's 1980 Groundwater Management Act is the primary driving force behind water farm purchases in Arizona. The GWMA created the Arizona Department of Water Resources (ADWR), which was given an array of regulatory tools and the goal of eliminating groundwater overdraft, or reaching "safe yield" by the year 2025. There are three primary tools available to ADWR to eliminate groundwater mining in the AMAs: mandatory conservation programs to reduce demand in all water-using sectors; an augmentation program to increase available supplies; and the Assured Water Supply program.

The 1980 GWMA made demonstration of Assured Water Supply a precondition to sales of subdivided property within AMAs. Defined as enough water of a suitable quality to serve the proposed uses for 100 years, Assured Water Supply rules are intended to protect the public by ensuring that water is physically available. The new rules incorporated the concept that proposed water uses must be consistent with the management plan and management goal for the AMA. This has been interpreted by ADWR as meaning that the practice of basing new development on mined groundwater must be phased out. Therefore, the maximum groundwater pumpage allowed that can be counted towards an Assured Water Supply is decreasing over time. Cities and towns which have signed contracts to receive CAP water are presumed to have Assured Water Supplies until the year 2001. At this time the determination is subject to review by the Director.

Water farm buyers include cities, developers, speculators and the federal government. Cities feel that their growth after 2001 is jeopardized by the need to prove a 100-year Assured Water Supply. The uncertainty created by this provision drives many municipalities with seemingly adequate CAP supplies to seek additional water rights outside their AMAs. In addition to municipalities, private developers are buying water farms in rural areas to guarantee a water supply for their development projects within AMAs. Eventually, developers may transport the water for use within an AMA, or may instead seek to trade water farm acreage to a municipal government in exchange for guaranteed water service to property that could be developed within the AMA. Private investment companies have been actively acquiring water rights, as a perception prevails in the West that the value of water will rise as depletion of finite supplies leads to increased scarcity. The federal government also is in the market for additional water to satisfy tribal water claims and compensate urban areas for loss of proposed storage facilities.

The 1980 GWMA not only created a demand for water transfers, it helped create the supply as well, by making it easier to transport water from areas outside AMAs. Prior to 1980, neighboring pumpers harmed by transport of groundwater off appurtenant lands could sue for injunctive relief. The GWMA clarified the rights of landowners to pump and transport water off their land and limited relief of neighboring pumpers to suing for damages.

The virtual absence of restrictions on the withdrawal and transport of groundwater from lands outside AMAs stimulates interest

in purchasing these lands for water farms. One can buy just enough land outside an AMA to build a well field and then withdraw and transport as much water as desired, as long as the water is applied to some "reasonable and beneficial use." Most water farm purchasers, however, are avoiding potential damage claims and precluding the possibility of competing pumpers by buying large tracts of land, in some cases, entire sub-basins or aquifers. This strategy has the added benefit of assuring that the purchasers still will be entitled to large quantities of water if at some future date their land is included within a new AMA, since water rights within AMAs are based on historical pumping. Purchase of the entire farm also benefits the farmer, whose land has little economic value independent of its water.

It is not yet clear what quantity of water these purchases will contribute to the buyers' 100 years Assured Water Supplies. In general, purchasers of reliable surface water rights will be credited with a quantity equal to their consumptive use right; purchasers of land overlying groundwater aquifers probably will be credited with estimated annual recharge to the aquifer plus 1/100 of the estimated groundwater stored to some particular depth. Most water farm purchases to date involve groundwater aquifers with insignificant recharge rates, meaning that what is available for transfer to urban areas essentially is non-renewable or "mined" groundwater.

Urban growth

Arizona has experienced some of the most rapid population growth in the U.S. since 1970. Most of this growth has occurred in the state's two major urban areas, resulting in greatly increased water demand in arid regions with existing concerns about the long-term adequacy of the water supply. This was the principle motivator of Tucson's pre-1980 purchases and has been a contributing factor in subsequent purchases by Mesa, Phoenix, Scottsdale and others.

In addition to purchases by municipalities, private developers are buying water farms to guarantee a water supply for their developments. Developers may transport the water themselves or trade their water farms to nearby municipalities in exchange for guaranteed water service. A perception that the value of water in the West must inevitably rise due to increasing scarcity has led speculators to invest in water farms.[6] Water-intensive industries, particularly in the mining and energy sectors, require reliable water supplies at reasonable costs at sites for future mines or plants. Additionally, the Central Arizona Water Conservation District, which oversees the CAP, may acquire water for backup supplies during periods of drought. Currently, the CAWCD is negotiating to purchase a half interest in a 27,000 acre, $69 million water farm capable of supplying up to 93,000 acre-feet per year in times of insufficient Colorado River flows.

Some observers claim that Arizona's future urban demand can be satisfied by the water farm purchases already made; others disagree, contending that as much as an additional 100,000 acre-feet per year will be needed by the year 2025, with several times that needed over the next century. Differences of opinion on future water demand result from various sets of assumptions concerning factors that affect municipal water demand, including: population growth rates and demographic factors; land use patterns and housing densities; landscaping tastes; conservation efforts; plumbing codes; reuse of effluent; and the price of water. In addition, uncertainties about *where* development will occur cause the sum of local demand projections to exceed regional demand estimates.

Indian water rights settlements

The federal government's desire to find water to satisfy Indian water entitlements without building new projects also is generating interest in water transfers. The Southern Arizona Water Rights Settlement Act (SAWARSA), which involved claims of the Tohono O'odham Nation, and the Ak-Chin Settlement Act both involved the transfer of Colorado River water. Similar provisions recently were negotiated in the Salt River Pima-Maricopa Indian Water Rights Settlement Act. The Gila and Little Colorado River general stream adjudications, currently in progress, may necessitate additional annual water deliveries of up to one million acre-feet to Indian reservations in Arizona.

Since most tribes lack the capital needed to develop their "paper rights" into reliable water supplies, Indians may find themselves in a position to lease portions of their water entitlements. There is much legal uncertainty, however, regarding the marketability of Indian water rights. Although tribes commonly lease water to non-Indians for use *on* the reservations, congressional approval generally is needed for Indian water to be marketed and transferred for use *off* the reservation. Such approval only has been granted in a very limited number of cases.[7]

Other factors

A recent decline in the agricultural sector of Arizona's economy has created a pool of willing water farm sellers. Many farmers in distressed financial positions are eager to sell their land. In addition, some irrigation districts are similarly willing to trade water for financial relief. Periods of economic hardship in agriculture are a recurring phenomenon, however, and an upturn in the sector eventually should occur. Nevertheless, the current situation is characterized as a buyers' market.

As the Central Arizona Water Conservation District begins deliveries of CAP water, Arizona's municipalities become increasingly dependent on CAP allocations that are less reliable than the groundwater supplies they replace. Not only do Colorado River flows vary from year to year, but the CAP has a low priority compared to other categories of Colorado River water. These abundant senior rights to Colorado River water are attractive to municipal providers seeking secure water supplies. Additional forces driving water transfers include the interest shown by other states, particularly California, to acquire water from Arizona and continuing attempts to modify the distribution of Colorado River water.

Role of the CAP Aqueduct

The CAP aqueduct occupies a unique role in Arizona's water transfer picture. The high cost of moving groundwater poses a serious impediment to groundwater transfers in the state. The costs of physically transporting water from area of origin to area of use often are of the same order of magnitude as the costs of purchasing the water farm or appurtenant land for surface water rights. Transport costs are particularly significant if natural channels or existing infrastructure cannot be used and new infrastructure must be built. Costs also are high if considerable energy is required to lift the water, as is the case for most proposed groundwater transfers in Arizona.[8]

The CAP aqueduct offers potentially cheap and reliable transport of vast quantities of water from rural to urban areas of the state, allowing the supply and demand of water to meet. However, many important details, such as the amount and distribution of excess aqueduct capacity over time, priority of

use and the terms and conditions under which this capacity will be available to would-be transferrors, are uncertain.

In spite of these uncertainties, nearly every major water farm purchased in the state is located near the CAP aqueduct, demonstrating its attractiveness as a potential means of moving water to central Arizona (see map, figure 8). Phoenix area cities and private developers with water farms all are assuming they will be able to use the aqueduct to move water, and the CAWCD is drafting proposals to estimate and allocate surplus aqueduct capacity. The tendency to purchase water farms near the CAP aqueduct has had the additional effect of concentrating any adverse effects associated with water farms in one part of the state.

All told, approximately one-third billion dollars has been spent to acquire more than half a million acres of deeded and leased land for this purpose over the last few years. Some of these purchases contain significant amounts of irrigated farmland, which eventually will be retired. Other purchases consist entirely of undeveloped land overlying untapped aquifers. In either case, to this point, there has been a transfer of ownership only -- not a transfer in the purpose and/or place of use.

Section 4: Analysis of the Water Farm Market

Water Farms Characterized

There are approximately 18 completed and pending water farm transactions in Arizona.[9] The transactions, while few in number, involve considerable amounts of land, water and money. Nearly all the properties are located in La Paz or western Maricopa Counties. A typical transaction is a $15 million purchase of land providing 15,000 acre-feet per year, based on a 100-year pumping regime for groundwater. Characteristics of the known transactions are summarized in Table 9. Note that the transactions total over a half million acres of land, just under a half million acre-feet per year of water and nearly one-third billion dollars.

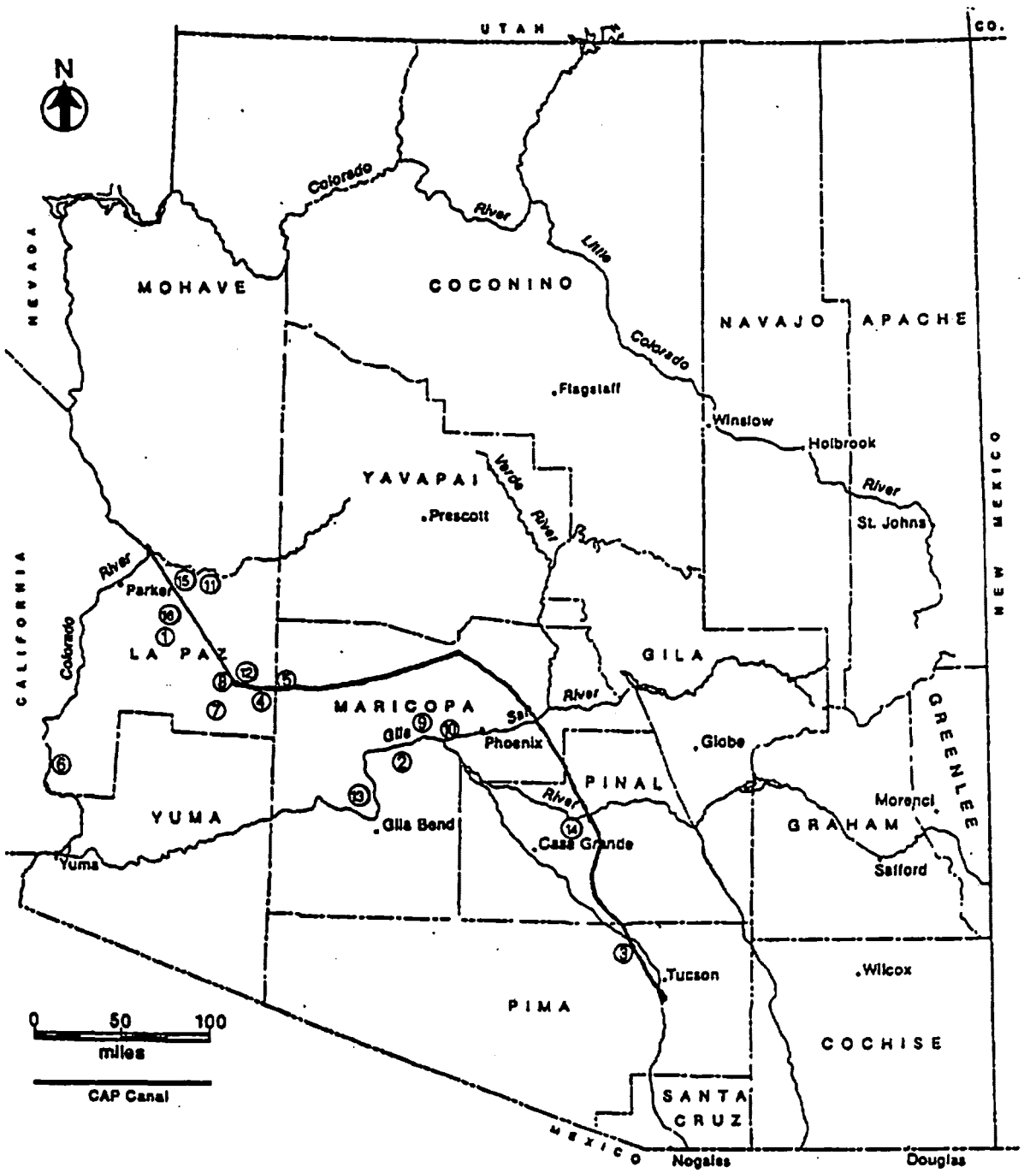
Another way of looking at the resources involved is to consider what can be supported with this quantity of water. If the water all were used for municipal and industrial uses at the rate of 140 gallons per person per day (the municipal consumption rate target set by ADWR), then these water farms contain enough water for 3.2 million persons. Arizona's current population is 3.7 million.

While 18 cases do not constitute an adequate data base for determining patterns and trends, certain observations can be made. First, as noted above, very little transfers of wet water have actually occurred with respect to any of these water farms. In most cases, methods and costs of physically transporting and treating the water remain to be worked out. For these reasons and others, very little transactions costs data are available. Also, since there currently is no state permitting process especially for *groundwater* transfers, one cannot use length of time between application and approval as a proxy for transactions costs.

While there are little transactions costs data, there are reasonable pricing data. Estimates of prices paid for the property exist for all but one case, and annual transferable water quantity estimates exist for all but two cases, giving price estimates per acre-foot for the water in 15 of 18 cases. The data are summarized below:

Figure 8

Location of Major Water Farms and the CAP Canal



1. Arizona Public Service
2. Arlington Canal Company
3. Avra Valley
4. Birmingham
5. B. J. Ranch
6. Cibola
7. Crowder-Weiser Ranch
8. Fullmer Ranch
9. G. P. Farms
10. Hidden Valley Farms
11. Lincoln Ranch
12. McMullen Valley
13. Paloma Ranch
14. Pinal County Farms
15. Planet Ranch
16. Ranegras Plain

WATER FARMING ACTIVITY IN ARIZONA

NAME	OWNER	AREA/COUNTY	ACRES	ACRE-FEET/YEAR	PRICES	PURCHASE DATE
Arlington Canal Company	Arlington Canal Company	West of Phoenix/Maricopa	4,800 deeded	57,000 surface water 29,250 ground water	Listed @ $30M $348/acre-foot	(For sale)
Avra Valley	City of Tucson	Tucson AMA /Pima	22,878 deeded	60,000 gw	$25M $417/a-f	Early '70s on
Birmingham	Birmingham Invest.,Ltd.	Harquahala Valley /La Paz	5,618 deeded	Unavailable, all gw	>$5.6M	1986 to 1988
Big Chino Valley	Option to buy held by City of Prescott	Big Chino Valley /Yavapai	30,000 deeded 20,000 state leased	Prelim. est. 9,000 gw	$15M $1,667/a-f	April 1990 (Proposed)
BJ Ranch	Held for BJ Ranch Partners	Harquahala Valley /La Paz & Maricopa	759 deeded 36,184 state leased 157,000 BLM leased	10,000 gw	$1.5M $150/a-f	1987/1988
Cibola Valley Irrigation District	Proposed sale to U.S. for Plan 6	Adjoins Cibola Nat'l Wild. Refuge /La Paz	3,500 deeded 1,100 state leased	14,700 surface	est. $13.3M $905/a-f	1989 (Proposed)
Crowder-Weiser Ranch	3/4 Amer. Continental 1/4 C.V. Malley	Near Vicksburg /La Paz	7,670 deeded 6,251 state leased	51-60,000 gw	$12M $216/a-f	1985/1986
Fullmer Ranch	James Fullmer	McMullen, Harquahala, & Harcuvar Valleys /La Paz & Maricopa	3,961 deeded 10,078 state leased 128,466 BLM leased	4,500 surface 24,359 gw	Listed @ $9.6M $333/a-f	Late 1970s (Now for sale)
G.P. Farms	American Continental	Phoenix AMA /Maricopa	2,489 deeded 40 state leased	6,493 Type I convertible	$7.8M $1,201/a-f	1985
Harquahala Valley Irrigation District	Proposed sale to Central Arizona Water Conserv. District; federal government; Peoria, Glendale, possibly Tempe, Chandler, & other cities	Harquahala Valley /La Paz & Maricopa	27,000 deeded	93,000 gw 24,000 M&I priority CAP water from HVID	$67.5M $577/a-f	1989 (Proposed)
Hidden Valley Farms	American Continental	Phoenix AMA /Maricopa	6,069 deeded	15,341 Type I convertible	$18.3M $1,193/a-f	1986
Lincoln Ranch	Lincoln Ranch Partner	On Bill Williams River /La Paz	1,040 deeded	6,300 surface 5,200 gw	$5M $446/a-f	1984
McMullen Valley Farmland	City of Phoenix	Near Wenden /La Paz	14,000 deeded 2,000 state leased	30,000 gw	$30.5M $1,017/a-f	1986
Mohave Valley Irrigation District	Proposed sale to U.S. for Plan 6 replacement	Near Mohave Indian Res. /Mohave	1,700 deeded	3,400 surface	est. $14.8M $4,353/a-f	1989 (Proposed)
AND Five Landowners on Colorado River		On Colorado River /Yuma & La Paz	1,300 deeded	1,300 surface	Unknown	
Pinal County Farmland	City of Mesa	Pinal AMA /Pinal	11,607 deeded	29,352 Type I convertible	$29M $988/a-f	1985
Planet Ranch	City of Scottsdale	On Bill Williams River /La Paz	8,400 deeded	13,500 surface	$11.6M $859/a-f	1984
Ranegras Plain	Agricom Management	30 mi SE of Parker/La Paz	35,000 deeded	Unavailable, all gw	est. @ $20M	1987/1988
18 Properties	9 Private or I.D.'s 5 Municipalities 4 Federal or State		187,791 deeded 75,653 state leased 285,466 BLM leased	124,700 surface water >367,495 ground water >492,195 total	>$316.5M $643/a-f	

Table 9

	(n)	*low*	*median*	*high*
Quantity of water (a-f)	(16)	1,300	15,000	117,000
Price paid ($ millions)	(17)	1.5	15	67.5
Price per a-f per year	(15)	$150	$859	$4,353

As can be seen from Table 9, 75 percent of the water acquired is groundwater. Water farms by water source break down as follows:

Water Source	*Number*
Groundwater	10
Surface water	4*
Both	4

*(3 are Colorado River)

A simple survey of factors affecting price paid for water was undertaken. Time series analysis shows no relationship between year and price. Similarly, the source of water does not appear to affect price. Median price paid for water farms with groundwater is $988/acre-foot; those with surface water sold for a median price of $859. Instead, individual features of water farms seem to be important factors. Transportability of the water, usually measured in terms of access to the Central Arizona Project Canal, is key. Also important are water quality and the value of the acquired land for other purposes.

A comparison of water source and type of purchaser is shown below:

	Source of Water			
Purchaser	*Groundwater*	*Surface*	*Both*	*Total*
Private	6	0	3	9
Municipal	4	1	0.5	5.5
State/federal	*0*	*3*	*0.5*	*3.5*
Total	10	4	4	18

It appears that state and federal interests are avoiding groundwater and seeking out surface water rights. On the other hand, the state/federal negotiations have been more recent, and the apparent interest in surface water might reflect continued uncertainties over state regulation of groundwater transfers.

Finally, the median price per acre foot differs from the mean price per acre in a way that suggests that the price per acre-foot declines somewhat with the quantity purchased. Figure 9 is a scatter plot of price per acre-foot as a function of quantity of transferable water. The data are at most suggestive of a downward-sloping price curve consistent with economies of scale. Individual characteristics of water farm properties appear to overwhelm any trends.

Due to the small number of water farm transactions occurring in Arizona, all were included as case studies for purposes of this report. Detailed information on each has been gathered and is contained in the appendix to this chapter.

Section 5: Unresolved Issues and Recommendations

Spurred primarily by water farming, new water transfer law has continued to be introduced in the legislature. The purchase

ARIZONA WATER FARMS
PRICE vs. QUANTITY

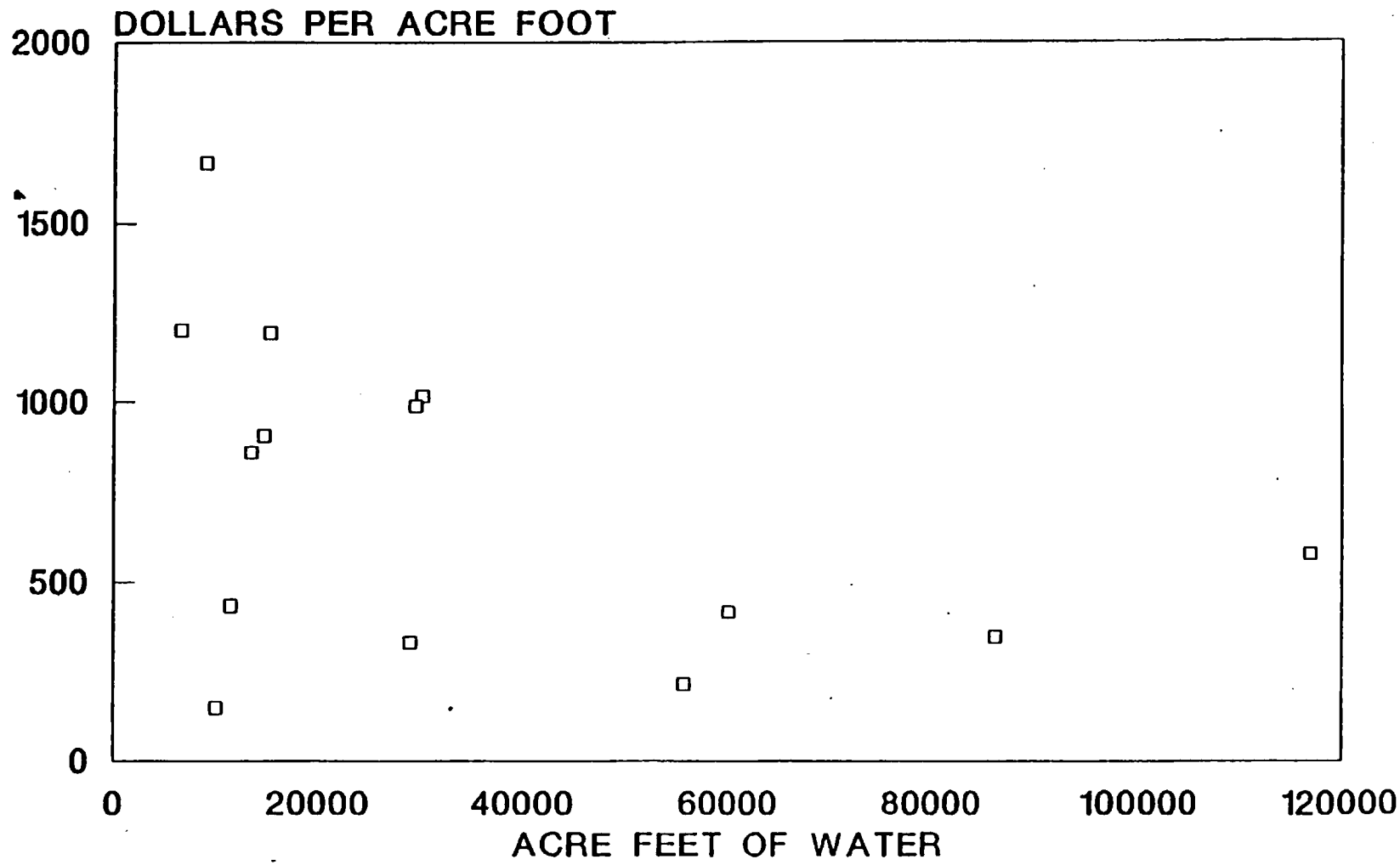


Figure 9

of vast tracts of land for water farms has led to concern among residents of rural areas of origin who fear the effects of such acquisitions on their tax base and agricultural economies. They also fear the impacts on prospects for future economic development. Others are concerned about potential environmental impacts. The result is a serious urban-rural controversy, which the legislature has addressed in the last three sessions. While bills dealing with specific aspects of the problem have been passed, comprehensive legislation to deal with all water farming issues proposed in 1988 and again in 1989 failed to pass.

Comprehensive legislation has been proposed again in the 1990 session, but currently transfers from rural areas of origin to urban areas of use remain largely unregulated in Arizona. Principal issues revolve around third party interests in areas of origin, including forms of compensation for fiscal and economic damages traced to water farm purchases and reserving some portion of water for local use. Other water transfer issues to be addressed include out-of-state transfers, the transfers of effluent, and an overall state-wide system to regulate supply and demand.

Impacts of Water Farming

Several consequences of water farm purchases can occur in the rural areas of origin. These can occur: 1) immediately upon purchase; 2) when the land is retired from agricultural production; or 3) when the water actually is transported out of the area to a municipality or other user.

Fiscal repercussions occur as soon as the land is purchased by any tax-exempt entity. They result primarily from the constitutional exemption of municipally-owned lands from county taxes. Fiscal impacts include the loss of property tax base and bonding capacity, tighter spending limitations, and effects on revenue sharing.[10]

Direct economic and certain environmental impacts occur when farmland is retired. Farmland may be retired or substantially reduced at time of purchase or not until many years later. Direct economic impacts include the loss of farm sector jobs and income. Indirect economic consequences follow, as businesses that provide goods and services to farmers are affected. These include seed and agricultural chemical suppliers, farm equipment dealers, processors, and crop dusters. Eventually, all businesses in the area, including retail shops and restaurants, are affected by the general economic decline. Environmental consequences of retiring agricultural land to conserve the groundwater for transfer include soil erosion, blowing dust, and tumbleweeds that arise after crop production ceases and the land is left vacant.

Economic development in the area of origin is inhibited both at the time the land is purchased and the area is labelled as a water farming area, and later when the water is transported from the area. A declining tax base and uncertainties about future availability of water and land can scare off development. Additional environmental impacts can occur if groundwater pumping or surface water diversions threaten any of the state's increasingly rare streams, rivers, marshlands or other riparian habitats. Quantifying these damages is extremely difficult, yet the potential harm is significant.

When assigned a dollar value, the losses suffered by areas of origin may appear insignificant compared to the total state economy or even to the substantial benefits of additional water supply which may accrue to importing municipalities. Such losses, however, tend to be concentrated in particular areas and can seriously impair the

viability of small, rural communities which may lack the economic strength and diversity to respond to such rapidly changing conditions.[11] In addition, when a significant amount of local real property is owned by outside municipalities and developers and is earmarked for uses that do not contribute to the local economy, the future of that region depends to a large degree on decisions made elsewhere by persons with little stake in the local welfare. When such a situation is unexpected and occurs over a relatively short period of time, strong feelings of fear, anger, and frustration are inevitable.

Rural Arizonans in areas experiencing water farm purchases are making two fundamental assertions: that they are being harmed by these water farming transactions; and that what is happening is unfair. Urban interests respond that the state's groundwater law precipitated the purchases, and that any actions on the part of the legislature to protect areas of origin may reduce the number of water farming transactions, or at least make them more costly to accomplish.

Legislative Efforts to Date

Existing state water law developed prior to the increased water farming activity of the mid 1980s has proved inadequate to protect rural areas of origin from the adverse effects of water transfers. Earlier statutes were aimed at protecting only water right holders and water service organizations from injury due to water transfers. Currently in Arizona, the only third party impacts that must be mitigated or compensated are those impairing neighboring pumpers or downstream diverters; however, there are several instances of buyers negotiating with third parties over other types of impacts. This is because, despite the lack of statutory or regulatory mandates to compensate or mitigate, buyers are aware that intense political reactions to transfers in areas of origin may be costly in terms of legislative response and political fallout in the area of use.[12] Despite the legislature's failure to pass comprehensive water transfer legislation, several measures have been enacted which respond to specific concerns.

In-lieu tax payments

House Bill 2264 enacted in 1986 provides the authority for municipalities which own water farms to make voluntary contributions, in lieu of taxes, to the county and other taxing authorities in which the city's rural property is located. This addresses the concern that tax payers residing in a city owning a water farm could sue to stop any voluntary tax payments to the area of origin because of the constitutional prohibition on taxing municipal property. It stipulates the time frame and methods for determining the amount of the contribution. The legislation also provided for control of noxious weeds and tumbleweeds on the water farms.

While the legislation addressed an immediate concern, the statute is not considered a long-term solution to the tax base problem. Rural counties want in-lieu tax payments to be mandatory, to provide some assurance that payments will be made now and in the future. Such assurances are needed for areas of origin to sell tax-free bonds backed by in-lieu tax payments. While such a measure may require an amendment to the constitution, the legislature has sought other ways to assure payment of in-lieu taxes. In addition, rural counties want water farms to be assessed at a rate other than the agricultural rate used prior to purchase by municipalities. Arizona's agricultural land is taxed on the basis of its production value, rather than on its market value, and market-value tax assessments generally are considerably higher.

Property tax base

House Bill 2462 (1987) further addressed the problems of eroding tax bases in areas of origin created by the constitutional exemption of municipally-held lands from county tax rolls. The new law allows for municipally-held lands to be included in a county's net assessed valuation for the purpose of distributing state-shared sales taxes to counties. This legislation also permits municipal holdings to be counted in assessed valuation for determining county levy limits, but only if the municipality agrees, through an intergovernmental agreement, to pay in-lieu taxes to the county. The constitutionality of this provision as it relates to bonding capacity is in doubt. The legislature attempted to deal with the problem of municipal immunity from local property taxes without amending the constitution by encouraging municipalities to enter into binding intergovernmental agreements to make in-lieu of tax payments. That they may not have succeeded in this is suggested by the several bills introduced in the last legislative session that attempted to modify the current provision.

Out-of-state transfers

State law authorizing the Director of ADWR to approve or deny at his discretion any proposed out-of-state transfer was replaced when HB 2429 passed in the 1989 session. The decision to approve or deny a transfers permit still lies with the Director, but a number of conditions and criteria are defined, including: whether the proposed action is consistent with the conservation of water; potential harm to the public welfare of Arizonans; adequacy of supply of water and current and future water demand in Arizona in general and the proposed area of origin in particular; feasibility of intrastate transportation of the water; availability of other sources of water to proposed area of use; and demands placed on the applicant's supply.

The issue of restrictions on inter-state transfers raised in the *Sporhase* decision have been litigated in an ongoing dispute between El Paso and New Mexico; however, the extent to which states can place restrictions on out-of-state water transfers without running afoul of the Commerce Clause still is unclear. Existing cases strongly suggest that one cannot treat potential out-or-state transferrors differently from potential in-state transferrors. Yet, the law in Arizona appears to do that, while hinging its legality on a legislative finding that Arizona has a chronic shortage of water and that maintaining an adequate and reliable supply of water is critically important and essential to social stability and to the public health, safety and welfare.

The statute's permitting approach has been strongly opposed by in-state municipalities, and a "comfort clause" makes it clear that the permitting provisions apply only to out-of-state transferrors. Another striking distinction between out-of-state and in-state transfers is that permits for out-of-state transfers cannot be for a period of more than 50 years. By contrast, in-state transfers are quantified on the assumption that they will continue for 100 years, as required to meet the Assured Water Supply rules.

Unresolved Policy Issues

The need for additional water transfers legislation is widely accepted in Arizona. During the last three legislative sessions, over 20 bills have been introduced on the subject. Most of these bills dealt with specific aspects of water farming. However, attempts to negotiate and legislate a comprehensive water transfers package have been unsuccessful to date, leaving several key issues unsettled.

While eventual passage of comprehensive legislation is widely assumed, this does not guarantee that all important issues will be settled. The comprehensive bill that passed the House before dying in the Senate last session addressed issues such as the amount of water to be reserved for areas-of-origin, the amounts and timings of taxes and fees paid, and how terms and conditions of transfers could be spelled out in statutory language rather than requiring a case-by-case permitting process.

While these are important points, more fundamental questions were not confronted, including: what will the future demand for urban water be; what should be the roles of mined groundwater, renewable surface water, treated effluent and conservation in meeting these demands; and are the Groundwater Management Act's 100 years assured supply provisions and safe yield goals the best tools for implementing state water resource policy? A clear statement of Arizona's policy with respect to water transfers is difficult to find. It is clear that the drafters of the 1980 GWMA deliberately removed some of the barriers to transferring water to urban areas. It also is apparent that the provisions of the GWMA and not any near-term need for wet water are driving current water farm activity. However, the degree to which these consequences were foreseen or intended in 1980 is a matter of disagreement among those present at the negotiations.

The fundamental policy underlying the GWMA is equally unclear. It appears to embody a principal of gradually eliminating the dependence of urban development on mined groundwater. However, the negotiations were motivated not by a sudden awakening to the problem of urban groundwater overdraft but by a threatened cut-off of federal funding for the CAP. Making a good-faith effort to conserve groundwater to assure continued CAP funding and assuring nervous sources of out-of-state investment capital that Arizona's urban areas have secure water supplies also were key considerations.

If one assumes that the GWMA embodies a policy of assuring that urban water supplies will not be based on declining groundwater aquifers, then the current water farming phenomenon is troubling. The majority of water being acquired through water farming is groundwater underlying arid basins that receive negligible amounts of natural recharge. There is an inherent logical flaw in importing mined groundwater for the purposes of meeting the Assured Water Supply provisions of the GWMA, to eliminate overdraft of aquifers underlying urban areas by mining and transporting the groundwater beneath remote, rural areas of origin. So far, this has not been addressed in transfer legislation.

Eventually, the Arizona legislature must determine the function of interbasin water transfers in managing water resources state-wide and must define the state's role in regulating the water farming phenomenon. An encouraging development is recent discussion of the merits of the "super agency" concept. A public entity with water supply responsibilities for a larger geographic area would better be able to weigh supply and demand management options, acquire a diverse portfolio of water rights and credits, and eliminate the current "land rush" atmosphere of frantic secrecy and heated competition among cities, other government agencies, developers, and speculators in the water farm market.

Currently, formation of augmentation agencies for Arizona's two metropolitan areas is viewed as a promising approach to settling a number of transfers-related issues. The concept appeared in the final agonies of the 1989 Water Transfer Legislation as a possible

panacea for the predator-prey relationship that has developed between rural and urban interests. Having a regional or statewide agency in the business of procuring supplies would minimize the number of players in the game, thereby minimizing the rush to buy farms to acquire water supplies that may never be needed.

Water supply (augmentation) agencies could address a number of specific issues, including: resolving regional conflicts in purchase and delivery of new supplies; developing cooperative projects, such as conveyance mechanisms, with greater economies of scale; promoting the use of renewable supplies rather than mined groundwater; and managing water farms or other water rights owned by participants. In addition, having one entity holding a portfolio of water rights for an entire metropolitan area allows spreading of risks and pursuing certain supply options on a state-wide basis that may be presently unattainable by individual water users, including leases of Colorado River Indian Tribe water and Colorado River exchange options.

Another area of uncertainty involves physical transport of water from areas of origin to areas of use. All water farm purchases to date involve property located near to the CAP aqueduct, which could be used to move water to Arizona's urban areas. However, uncertainties as to the future excess capacity of the aqueduct, the amount of non-project water that could be transported, the costs involved and the terms and conditions under which such transport would be allowed all are unknown. The Central Arizona Water Conservation District, which governs the use of the CAP and is the repayment entity to the federal government, has stated that it will allow non-CAP water in the aqueduct based on a priority system. However, excess capacity in the aqueduct, the costs involved, and the terms and conditions under which such transport would be allowed remain unclear. The results of these uncertainties include delay and decision-making with incomplete information.

Finally, the legislature must address the ownership, use and transferability of effluent. Currently, use of this ever-growing, increasingly valuable water resource essentially is unregulated.

The potential for transferring water in Arizona has only begun to be explored. Future innovative transfer strategies are likely to include some new players, including Indian tribes, special water districts, augmentation agencies or even the Arizona Department of Water Resources. There is a growing need for overhauling the state's statutory and regulatory framework so as to accommodate the new realities of water transfers in Arizona.

APPENDIX

WATER RANCHES IN ARIZONA:

Farms and Ranches Which Have Been Sold or
Which May be Sold for Their Water Rights
as of October 1989

ARLINGTON CANAL COMPANY

Owner: About 15 different member farmers.

Location: Just west of Phoenix metropolitan area along the Gila River. Located within the Phoenix Active Management Area. Water tables are shallow and groundwater overdraft has not been a problem. The canal company is trying to remove itself from the Phoenix AMA.

Description of Property: 4,800 acres of land within the company service area, of which 4,500 have grandfathered irrigation rights.

Water Rights and Resources:

- 57,000 acre-feet of surface rights in the Gila River;

- 29,250 acre-feet of grandfathered groundwater irrigation rights; the company is asking ADWR to increase their allotment of grandfathered groundwater irrigation rights from 29,250 acre-feet to 64,800 acre-feet;

- unspecified quantity of tailwater and drainage water available from Buckeye Irrigation district;

- unspecified quantity of reclaimed effluent from city of Buckeye (currently in dispute) and water treatment plant discharge.

- abundant groundwater recharge due to Gila River flow.

Water quality: Poor water quality. Very high TDS, in the 3,000 - 4,000 ppm range. Also may have nitrate problems.

Prices and Costs: All land, structures, and water rights are being offered for $30 million, or over $6,000 per acre.

Current Land Use: All irrigable land currently is being farmed.

Additional Comments: There is some uncertainty over how much water actually would be available for transfer to users outside the water company service area.

AVRA VALLEY

Owner: City of Tucson

Location: About 15 miles northwest of Tucson. All the lands are located within the Tucson Active Management Area.

Description of Property:

state leased farmland: a few hundred acres

fee title: 22,878 acres

Geographical distribution of the lands purchased thus far are as follows: about 1,500 acres in the southernmost portion of the Avra Valley around Three Points, about 2,200 acres in southern Avra Valley north of Three Points, about 16,500 acres in the central portion of Avra Valley, and about 2,500 in northern Avra Valley, west and southwest of Marana.

Over 17,200 acres of the land acquired by Tucson had been under cultivation prior to its sale to the city.

Water Rights and Resources: Tucson owns a Type II nonirrigation groundwater certificate for about 9,000 acre-feet, about another 30,000 feet in three different Type I nonirrigation groundwater certificates, and numerous small irrigation groundwater rights. These water rights were created by the Department of Water Resources in the early 1980s, following passage of the Groundwater Management Act. The Type I and Type II rights replaced the certificate of exemption that was granted to Tucson in the late 1970s to permit exportation of water from the Avra Valley. The irrigation groundwater rights are appurtenant to lands in the Avra Valley that Tucson has acquired since 1984. The irrigation water rights eventually will be converted to about another 20,000 acre-feet of Type I nonirrigation groundwater rights. The total of all of Tucson's Type I, Type II, and convertible irrigation groundwater rights in the Avra Valley is about 60,000 acre-feet.

However, Tucson's grandfathered groundwater rights do not define the limit of Tucson's legal right to pump groundwater in the Avra Valley. The Avra Valley is within the boundaries of Tucson's "service area," and the city's pumping rights in the Avra Valley are administered as service area rights, not grandfathered groundwater rights. Unlike other types of groundwater rights in Arizona, service area rights are not strictly quantified. Tucson has the right to pump as much water from the Avra Valley as it "needs" to serve its customers, limited only by the Department of Water Resource's water conservation requirements for municipal water providers. Tucson is buying land in the Avra Valley more to control its water resources than it is to acquire water rights. That is, the primary motivation for purchasing land in the Avra Valley is simply to eliminate competing groundwater users.

Water quality: Generally very high.

Prices and Costs: In terms of 1986 real prices, and ignoring any possible value attributable to

the land, Tucson generally paid between $400 and $700 per acre-foot of "water rights" from 1971 until 1979, and between $650 and $1,100 per acre-foot since purchases resumed in 1984; prices over the period 1971 to 1986 have ranged from a low of $400 per acre-foot up to a high of $1,650 per acre-foot.

Total nominal (not adjusted for inflation) dollar expenditures by Tucson for land purchases in the Avra Valley between 1971 and 1986 total about $25 million. Adjusting the value of these expenditures to constant 1986 dollars, Tucson spent about $40 million.

Current Land Use: Originally there were around 40,000 acres of irrigated land in the Avra Valley; about half of this land now is controlled by Tucson, and about half remains in other hands. All cultivated lands acquired by Tucson have been retired from agriculture. Currently Tucson is pumping between 5,000 and 10,000 acre-feet of water per year from the Avra Valley. Pumpage levels are expected to fall to only a few thousand acre feet per year after CAP water arrives, but will increase again gradually as urban demand begins to outstrip the CAP supply.

Tucson hopes to acquire the rest of the private land in the Avra Valley within the next couple of decades.

BIG CHINO VALLEY

Owner: Merwyn C. Davis

Location: 30 miles north of Prescott. The northernmost boundary is about six miles south of the town of Seligman and the southernmost boundary is about nine miles north of the town of Paulden.

Description of Property:

deeded	-	30,000 acres
state leased	-	20,000 acres

Water Rights and Resources: Preliminary estimate of 9,000 acre-feet of groundwater per year from the Big Chino Aquifer.

Prices and Costs: The City of Prescott paid $3,000 for a one year option to buy the land. Purchase price is $15 million.

Current Land Use: Ranching.

Additional Comments: THe option has been extended to April 1990.

BIRMINGHAM

Owner: Birmingham Investments, Ltd.

Purchases were begun in 1986, and continued through 1987 and into 1988. To date, 5,618 acres have been purchased.

Location: Harquahala Valley along the CAP aqueduct route.

Price: Over $1,000 per acre for mostly raw desert.

Parcels include the following acreages:

600
800
1,300
2,078
23
43
119
4,963

BJ RANCH

Owner: Robert Goodman, principle (limited partnership) Highway Electric company

Most of the fee title land associated with the ranch is in escrow for sale to a general partnership in Phoenix, headed by Ron Todd and Steve McTaggert. Closing was expected in 1988.

Location: Straddles the Maricopa-La Paz County lines in the Harquahala Valley. Not within an Active Management Area. Bisected by aqueduct.

Description of Property:

deeded acres	-	958.79
state leased	-	2,004.61 (farmland)
		34,180.63 (grazing)
federal leased	-	approximately 246 sections (about 157,000 acres - BLM grazing)

Water Rights and Resources: Estimated groundwater in storage is still under evaluation. Estimated exportable safe yield is 10,000 acre feet per year.

Prices and Costs: The ranch has been sold in two parts. The first part, sold to a rancher, includes about 200 acres of deeded land and all the state and federal grazing leases. The package, a lease-purchase agreement, will cost a total of about $320,000.

The ranch was appraised at $2.7 million in September of 1986. BJ Ranch Partners originally agreed to pay $3.2 million for the property in November of 1987, but failed to make the initial payment. Subsequently, the ranch went into bankruptcy proceedings and was under court order to liquidate by January 1988. It was auctioned off on 29 February 1988 in Phoenix. The partnership voiced the high bid of $1.5 million. They put 10 percent of the money down and had until 10 March to pay the balance and take title.

The remaining 760 acres of deeded land and the (1985) state leased farmland has been sold for $3.2 million to a general partnership forming in Phoenix. The partners intend to hold the ranch for investment purposes, ultimately to resell it for its water rights.

Current Land Use: A limited partnership was formed in around 1976 or 1977 to operate the B. J. Ranch. Drip irrigation systems were installed for cotton farming. No crops other than cotton are being grown. Currently, 1737 acres exist with cotton allotments.

Additional Comments: BJ Ranch Partners are in the process of evaluating alternatives for both managing the farmland until water begins to be exported for M&I purposes and the system for exporting the water.

BJ Partners feels that it is unlikely the lands will be developed for any nonagricultural purposes after water exportation begins. Phoenix was offered this ranch last year.

Good recharge capacity, but there may be problems exporting water from state leased land. Also, some neighbors are on the same aquifer. Groundwater is deep (450 - 550 feet).

CIBOLA VALLEY IRRIGATION DISTRICT

Owner: 18 landowners in Cibola Valley Irrigation District

Location: Adjoins the Cibola National Wildlife Refuge. The refuge is located about 25 miles south of Interstate 10 along the Colorado River in La Paz County.

Description of Property: U.S. Government is currently negotiating to buy approximately 4,600 acres which includes 1,100 state leased acres.

Water Rights and Resources: 14,700 acre feet of surface rights in the Colorado River. Priority is post-1968 even though diversion began pre-1968. Attempts are being made to have the priority upgraded.

Prices and Costs: Phoenix area cities, who will receive the water, will incur costs only for the water, not the land, and have stated their price at $650/acre foot for post-1968 water. Only one appraisal has been done indicating a value of $2900 per acre for both the land and the water.

Current Land Use: Mostly under irrigation.

Additional Comments: Cibola is part of a package with Mohave Valley Irrigation District and five individual landowners along the Colorado. The U.S. will deliver surface water to the Phoenix area as compensation for loss of Cliff Dam as a result of changes in Plan 6. Phoenix, Mesa, Chandler, Scottsdale, Tempe, and Glendale are the cities directly involved in negotiations.

See also Mohave Valley.

CROWDER-WEISER RANCH
(a.k.a. Agua Bonita)

Owner: 3/4 interest held by American Continental Corporation, and a 1/4 joint tenancy interest held by C. V. Nalley

Location: Near Vicksburg in La Paz County. Not located within an Active Management Area.

Description of Property: deeded acres - 7,670.5
state leased acres - 2,388.43 (developed farmland)
1,116.72 (undeveloped farmland)
2,746.27 (grazing)

The land was purchased from Crowder in two separate transactions. About 3,900 acres of fee title land and all the leases were purchased on April 23, 1985. The remaining 3,700 acres of fee title land was acquired October 10, 1986.

Water Rights and Resources: Estimates of the quantity of exportable groundwater vary between about 51,000 and 60,000 acre-feet of groundwater per year. Good local geology and well production. Static water level is 250 to 350 feet. Adjacent to CAP right-of-way. Good location for a recharge/recovery project.

Water quality: Water quality varies throughout property.

Prices and Costs: The initial purchase by American Continental in 1985 for 6,250 acres of state leased land and 3,905.73 acres of deeded land cost approximately $10 million. Additional purchases by American Continental totaling another 3,765 deeded acres continued through 1986. It is not clear how much they paid for the additional acreage, but it is believed it cost between $1.8 and $2 million, bringing the total nominal dollar cost of the acquisition to about $12 million.

On September 29, 1986, American Continental sold a 1/4 joint tenancy interest in Crowder-Weiser to C. V. Nalley for $19,726,314, of which $5 million was paid down in cash. The city of Glendale claims that in 1987 American Continental offered to sell Crowder-Weiser to the city of Goodyear and Glendale for $50 million.

Current Land Use: About 2,500 acres currently are under cultivation. It is not known when the irrigated lands will be retired from production and the water resources developed for municipal use.

Additional Comments: The rather puzzling transactions involving this property may be explained by the filing of a federal lawsuit against American Continental alleging that the sale and repurchase of a portion of the property constituted a scheme to generate paper profits for Lincoln Savings and Loan, a wholly owned subsidiary of American Continental. The charge has been made that C.V. Nalley was a straw man and that his purpose of a portion of the property was used to declare a profit for the Savings and Loan which then paid to the parent American Continental several million dollars towards the expected tax liability. Apparently, C.V. Nalley never made any payments on the property and made a profit upon its resale to American Continental.

FULLMER RANCH
(aka Salome Farm)

Owner: James Fullmer
Fullmer Properties
(714) 861-6633

Location: Straddling Maricopa - La Paz County line, very near CAP aqueduct. Located in McMullen and Harquahala and/or Harcuvar Valleys. The Salome farm lies southeast of Salome. Lone Mountain Farm and Nord Ranch are located in the Harrisburg Valley and the Harquahala Plain along the Centennial Wash. The leased land lies generally south of the Harquahala and Little Harquahala Mountains and south across the Ranegras Plain to the Little Horn Mountains.

Description of Property: The property is generally known as Fullmer Ranch. The land was first developed in the early 1950s by D.M. and Kemper Brown. It was later purchased by the Salome Land Company. Expansion of the farmed land has been a continuing process. Purchased by James Fullmer in late 1970s.

Property consists of two major farms plus state and BLM grazing leases, as follows:

Deeded land (acres):			
Farmable land			
Salome Farm	420		
Nord Ranch HQ	40		
Lone Mtn. Farm	*2,157*		
Net farmland	2,617		
Ditches, roads, etc.	134		
Total farmland		2,751	
Desert land		*1,210*	
Total deeded land			3,961
State leased land			10,078
BLM leased land			*128,466*
Total deeded land			142,505

The BLM lease includes 4,753 acres provisionally taken for right-of-way and easements for the CAP canal. The deeded land consists of two separate parcels. The Salome farm consists of 364 acres. Balance of deeded land (3,597 acres), includes Lone Mountain Farm and Nord Ranch.

Water Rights and Resources: Hydrologic study estimated an annualized flow of 5,455 acre-feet of surface water in Centennial Wash. A certified surface water right of 4,500 acre-feet per year exists. Centennial Wash is dammed by Narrows Dam, 25 foot earthen dam located at north end of Lone Mountain Farm. Can hold 2,600 acre-feet.

Current groundwater pumpage in McMullen Valley is about 11,500 acre-feet per year, resulting in annual declines of about 4.4 feet. Only about 280 feet of saturated aquifer left, so with constant pumping, only a 64 year supply. Pumping 7,400 acre-feet per year makes it a 100 year supply.

Current annual pumping in the north end of the Harquahala Plains Basin is 4,900 acre-feet. Decline is about 0.5 feet per year. At current pumping rate, more than 100 year supply.

Total 100 year groundwater reserve estimated to be 1,210,000 acre-feet, for 12,100 acre-feet per year.

Transferable Water (acre-feet/year):

Surface water, Centennial Wash			
Certified water right	4,500		
additional annual flow	*955*		
total dependable flow		5,455	
Groundwater, 100 years supply			
McMullen Valley	7,363		
Harquahala, current pumping	4,898		
Harquahala, 100 yr. excess	*12,098*		
total groundwater			*24,359*
Total			29,814

Prices and Costs: Currently for sale, listed at $9.6 million. Purchased in late 1970s.

Current Land Use: Irrigated agriculture.

G P FARMS

Owner: American Continental Corporation

Location: Within the Phoenix Active Management Area, west of Phoenix, near the town of Buckeye. GP Farms is adjacent to the 20,000 acre Estrella Ranch, which is also owned by American Continental.

Description of Property: 2,489 deeded acres, plus 40 acres of agricultural land leased from the state.

Water rights and resources: 2,239.3 acres have grandfathered irrigation rights convertible to 6,493 ac-ft. in Type I nonirrigation groundwater rights. Water level averages 300 feet and well yields average 1,800 gpm.

Water quality: variable

Prices and Costs: Purchased in 1985 for $7,802,010. Assuming no value for the land itself, the 1986 constant dollar value for the water rights is about $1,300 per acre-foot.

Current Land Use: 500 acres are still under cultivation.

Additional Comments: GP Farms will be a primary water source for real estate development on the Estrella Ranch. Water from the property will also be used to serve developments on GP Farms itself.

HARQUAHALA VALLEY IRRIGATION DISTRICT

Owner: Landowners in Harquahala Valley Irrigation District

Location: 60 miles west of Phoenix, near Interstate 10 and the CAP canal.

Description of Property: The Central Arizona Water Conservation District (CAWCD), the U.S. Government, the Cities of Glendale, Peoria, possibly Tempe and Chandler, and other cities are currently negotiating to buy 27,000 deeded acres.

CAP eligible acres within HVID	24,000
Acres outside HVID	3,000

Water Rights and Resources: 93,000 acre-feet of groundwater per year. Also as part of the negotiations, the federal government would receive 24,000 acre-feet of CAP water from HVID converted to M & I priority use.

Water Quality: Early tests indicate water is sufficiently good to put into CAP canal.

Prices and Costs: Approximately $67.5 million based on a cost of $2,500 per acre. Costs per proposed participants are as follows:

United States will forgive debt of HVID lands related to CAP distribution system; will credit $18 million to CAWCD against its repayment obligation to the U.S.

CAWCD $35.2 million

Glendale $9.6 million

Peoria $9.6 million

Other Cities total of $9.6 million

(Numbers, as reported, do not add up to $67.5 million).

Current Land Use: Irrigation.

Additional Comments: Under the proposal, the CAWCD would obtain 51,000 acre-feet per year as a backup supply during low flows in the Colorado River. The Fort McDowell Indian Community would receive 24,000 acre-feet per year of Colorado River water arising from a settlement with the U.S. Government. Glendale, Peoria, and the other cities combined would each get 14,000 acre-feet per year.

HIDDEN VALLEY FARMS

Owner: American Continental Corporation

Location: Within the Phoenix Active Management Area, west of Phoenix, near the town of Buckeye. Hidden Valley Farms is adjacent to the 20,000 acre Estrella Ranch, which is also owned by American Continental.

Description of Property: approximately 6,069 acres.

Water Rights and Resources: Grandfathered groundwater irrigation rights convertible to 15,341 acre-feet in Type I nonirrigation ground-water rights. Water levels are between 250 and 350 feet. Well yields vary, but up to 2,500 gpm is possible. The water level is generally rising due to reductions in farming.

Water quality: Varies across basin.

Prices and Costs: Purchased in 1986 for $18,300,000. Assuming no value for the land, equal to $1,190 per acre-foot.

Current Land Use: There is no irrigation activity currently.

Additional Comments: Hidden Valley Farms will be a primary water source for real estate development on the Estrella Ranch. Water from the property will also be used to serve developments on Hidden Valley Farms itself.

LINCOLN RANCH

Owner: Lincoln Ranch Partners
Phoenix, Arizona

Location: Along the Bill Williams River in La Paz County, upstream from the Planet Ranch. The Bill Williams River is tributary to the Colorado River. These lands are not located within an Active Management Area.

Description of Property: 1,040 deeded acres, of which about 800 are developed for irrigation.

Water Rights and Resources: A total transferable and sustained yield of about 11,500 acre-feet of water per year, apportioned as follows:

Surface Water: 7,500 acre-feet of surface water rights in the Bill Williams River, of which about 6,300 acre feet are estimated to be transferable out of the basin;

Groundwater: 385,000 acre-feet of groundwater in storage, of which an estimated 5,200 acre feet may be withdrawn and transported off the land each year without overdrafting the aquifer (this number is considered high by some experts. Overdraft could impact surface water flows at Planet Ranch);

Approximately 98 percent of all the surface water rights in the Bill Williams River are controlled by Lincoln Ranch and the Planet Ranch (owned by the city of Scottsdale). Two other small ranches own the remaining surface water rights.

Prices and Costs: Deeded land purchased for $5 million in 1984 by Vector Interests for Lincoln Ranch Limited Partnership. Vector is a partner (with a two percent interest) in Lincoln Ranch Limited Partnership, along with six other partners. The seller, Roy Ross, retained all the state and federal grazing leases associated with the ranch.

Current Land Use: Roy Ross leases the land and continues to run the ranch, raising cattle and growing diverse crops: bermuda grass, alfalfa, cotton, sudan grass, fruits, vegetables, pasture.

Additional Comments: Lincoln Ranch Partners hope to trade or sell the ranch or its water rights to a municipal government, such as the city of Phoenix.

Several alternatives are under consideration for transporting water from the Bill Williams River into central Arizona.

The simplest and least expensive transportation scheme would be to allow the waters in the Bill Williams to flow into the Colorado, and then work out an exchange agreement whereby the water could be delivered via the Central Arizona Project from its intake at Lake Havasu on the Colorado River. Although this alternative is the most cost effective, it is the least practical legally and institutionally. Waters diverted from the Bill Williams River are subject only to Arizona state law. Once the water mingles with the Colorado River, however, administration of its use and transfer comes under the jurisdiction of the complex collection of agreements, decrees, rules and

regulations comprising the "Law of the [Colorado] River." In order to avoid legal complications which would likely preclude any transfer of the water, both the Lincoln and Planet Ranches plan to remove their water from the Bill Williams River prior to its confluence with the Colorado and transport it overland to points within Arizona. Three alternatives are under consideration:

1) Build a pipeline directly from the Bill Williams River to the Phoenix area;

2) Build a pipeline from the Bill Williams River to the McMullen Valley, where it would connect with the water transportation system that will be developed in that area by the city of Phoenix;

3) Build a pipeline from the Bill Williams River to the CAP aqueduct;

The main problem is that there is too little water available to justify building a system to transport the water as a single project. Discussions continue between Lincoln Ranch Limited Partnership and the City of Scottsdale over joint investment and operation of a water transportation system involving Lincoln Ranch and Planet Ranch. Possible to sever surface water rights and take water directly from Alamo into Butler Valley, then into the CAP aqueduct. Could generate power on down side of mountains into Butler Valley to offset lift. Same is true for Planet Ranch.

MCMULLEN VALLEY FARMLAND

Owner: City of Phoenix

Location: La Paz County, near the town of Wenden. Not located within an Active Management Area.

Description of Property: Approximately 14,000 acres of deeded land and 2,000 acres of state leased land.

Water Rights and Resources: Estimated annual exportable yield of 30,000 acre feet of groundwater. The land is in the part of the basin where bedrock is closest to the surface, limiting storage. Groundwater in the Wenden area has a static level of 550 feet; Aguila area has a static level of 423 feet. Result is high pumping costs. The fee land is wide-spread and mixed with state land. Possible conflict of use due to towns in the area.

Prices and Costs: $30.5 million; lands acquired in December, 1986 from 24 different landowners.

Current Land Use: Approximately 13,000 acres are under a 2-year lease to the Colorado River Indian Tribe. Some additional acreage planted in pecan and pistachio orchards is rented to four other lessees. In 1987, a total of almost 5,000 acres were cultivated on the leased lands, with 3,725 acres in cotton and about 1,200 acres in orchards. Future plans are to continue cultivating some portion of the lands using up to 10,000 acre- feet of water per year. This quantity would be in addition to the 30,000 acre-feet of water planned for export each year.

Additional Comments: It is expected that the water exports to Phoenix will begin around the year 2000. A 20-mile pipeline will be constructed to transport the water to the CAP canal.

MOHAVE VALLEY IRRIGATION DISTRICT

and

LANDOWNERS ON THE COLORADO RIVER

Owner: Eight landowners in the Mohave Valley Irrigation District.
Also, five other individual landowners on the Colorado River.

Location: MVID is on the Colorado River south of Bullhead City near Mohave Indian Reservation in Mohave County.
The other landowners are located on the Colorado River from Yuma to Ehrenberg in Yuma and La Paz counties.

Description of Property: U.S. Government is currently negotiating to buy at least 1700 acres from within MVID and a minimum of 1300 acres from individual landowners.

Water Rights and Resources: MVID has 3,400 acre-feet of pre-1968 Colorado River water.
A total of 3,700 acre-feet of Colorado River water is available from the individual landowners.

Prices and Costs: Phoenix area cities have indicated that they will pay $1200/acre-foot for pre-1968 priority water. One appraisal in the Mohave Valley Irrigation District valued the land and the associated water at $8700 per acre. However, the Bureau of Reclamation is not interested in buying the land in MVID and may try to buy the water only.

Current Land Use: Mostly irrigation.

Additional Comments: As with Cibola Valley Irrigation District, the water is being obtained by the U.S. as compensation to the Phoenix area for the loss of water from Plan 6. The Colorado River Board in California has expressed concern over any negative impacts of taking of Colorado River water. Also, in Mohave County, the Board of Supervisors has issued a statement opposing water transfers. The U.S. Government must look at the various associated impacts before purchase. Currently, the U.S. is searching for more individuals willing to sell their land and water to bring the total amount of water available from Cibola, Mohave, and individual landowners to 25,000 acre-feet per year.

PINAL COUNTY FARMLAND

Owner: City of Mesa

Location: Pinal County, south of the town of Coolidge. All lands are located within the Pinal Active Management Area and lie within either the Hohokam or the Central Arizona irrigation districts.

Description of Property: 13 parcels of land totalling 11,607 deeded farmland acres. All parcels are located in Pinal Active Management Area and lie within either the Hohokam or Central ARizona Irrigation Districts.

Water Rights and Resources: Grandfathered irrigation groundwater rights convertible to a total of 29,352 acre-feet in Type I nonirrigation groundwater rights. Land also has a CAP allocation, which has been viewed as a possible source of water for development on the land. However, reclamation law limits ownership of land receiving reclamation water to 960 acres per person or corporation. This problem has not been resolved.

Water quality: Generally good. Less TDS than Colorado River.

Prices and Costs: Total expenditure for the 13 individual parcels acquired in 1985 was $29,072,775. Down payment was $17 million; total outlay, including fees, money in escrow, etc. is approx. $37 million. Source was bonds sold by a municipal development corporation originally set up to finance construction of downtown parking garage. Bonds being paid off partially through $300 increase in water development fee for new construction, partially through pledged share of state excise tax revenues.

Current Land Use: Under lease arrangements with the original owners, the land continues to be farmed, but with a significantly reduced rate of irrigation. IN response to a price incentive in the lease agreement, the farmers have reduced their water use by 80 percent by concentrating cultivation on one-third of the land previously farmed and reducing the rate of irrigation per acre. Some fields have been converted from water-intensive crops such as cotton to other lower water using crops such as barley. In 1987, a total of 3,938 acres were cultivated: 2,240 acres of cotton; 1,518 acres of assorted grains; and 180 acres of alfalfa were grown. Mesa expects to retire all the land from irrigation and to begin to transport the water off the land for municipal use by the year 2001.

Additional Comments: Alternative means of using the water rights on the Pinal County farmland include direct exportation and an exportation-exchange agreement. Under the direct exportation scenario, Mesa would transport the water via pipeline directly from the farmlands to the municipal water system. A less expensive alternative would be to pump the groundwater from the farmland into the CAP aqueduct, where it would then be available for delivery to a downstream user, such as the city of Tucson. In exchange, Mesa would divert CAP water earmarked for Tucson from its own turnout in the aqueduct. This arrangement has the advantage of not requiring any excess CAP aqueduct capacity. Mesa and Tucson have entered into an understanding in principal over such an exchange. Still not clear if water can be removed from an irrigation district. San Carlos is not a Bur. Rec. project, it is BIA.

PLANET RANCH

Owner: City of Scottsdale

Location: Along the Bill Williams River in La Paz County. The Bill Williams River is a tributary of the Colorado River. The lands are not within any Active Management Area.

Description of Property: 8,400 acres of land, of which about 2,200 currently are under cultivation, mostly in alfalfa.

Water Rights and Resources: Surface water rights in the Bill Williams River of 13,500 acre-feet. Approximately 98 percent of all the surface water rights in the Bill Williams River are controlled by the Planet Ranch and the Lincoln Ranch. The Lincoln Ranch, located upstream from Scottsdale's property, was acquired by a group of Phoenix investors for its water rights. Two other small ranches along the Bill Williams River own the remaining surface water rights.

Water quality: N/A

Prices and Costs: The ranch was purchased by Scottsdale from Arizona Ranch and Metals Company in 1984 for $11.6 million. Shortly thereafter Scottsdale invested $3.9 million in improving the property. The city lost approximately $1.3 million in the first three years of operation, and now is just beginning to break even. It expects to continue breaking even on the ranch operation until the land is retired from irrigation and the water exported to Scottsdale for municipal use.

Current Land Use: 1,400 acres were under cultivation prior to acquisition by Scottsdale. The city has developed about 800 more acres and plans to develop an additional 200 acres, bringing the total of irrigated lands to 2,400 acres. The "use it or lose it" doctrine of surface water appropriation is causing Scottsdale to grow alfalfa, a high water-use crop, in an effort to perfect and maintain its surface water rights at the Planet Ranch. Sandy soil conditions and Scottsdale's inexperience with running an agricultural business reportedly are principal causes of operating deficits approaching $400,000 per year.

Additional Comments: Several alternatives are under consideration for transporting water from the Bill Williams River into central Arizona. The simplest and least expensive transportation scheme would be to allow the waters in the Bill Williams to flow into the Colorado, and then work out an exchange agreement whereby the water could be delivered via the Central Arizona Project from its intake at Lake Havasu on the Colorado River. Although this alternative is the most cost effective, it is the least practical legally and institutionally. Waters diverted from the Bill Williams River are subject only to Arizona state law. Once the water mingles with the Colorado River, however, administration of its use and transfer comes under the jurisdiction of the complex collection of agreements, decrees, rules and regulations comprising the "Law of the [Colorado] River." In order to avoid legal complications which would likely preclude any transfer of the water, the Planet Ranch plans to remove its water from the Bill Williams River prior to its confluence with the Colorado and transport it overland to points within Arizona. Cost estimates for developing a water transportation system range from $12 million to $16 million. Scottsdale has engaged in discussions with owners of the Lincoln to jointly construct and operate a water transportation system. Scottsdale has also filed with ADWR for unappropriated surface flow rights in the Bill Williams River.

RANEGRAS PLAIN

Owner: Agricom Management, led by Joe Adams (The Adams Group) and Ron Ober (RA Homes) has assembled the package (approx. 75 different deals).

Location: In La Paz County about 30 miles southeast of the town of Parker not far from the California-Arizona border. Property bounded north by town of Bouse, south by Highway 60, and east by the Granite Reef Aqueduct.

Description of Property: Approximately 35,000 acres, including the Arizona Public Service (APS) Ranch. Balance of land is mostly raw desert and abandoned farmland.

From October 1987 through December 1987, Agricom purchased 31 tracts of desert land, from 30 to 640 acres in size. Price range was $332 to $750 per acre. Total acreage was 4,774.34, at a total price of $2,459,231, or an average price of $515 per acre.

During the first two months of 1988, 14 purchases were recorded. Tract size ranged from 39 acres to 878 acres. Prices ranged from $328 to $1,100 per acre. The total acreage acquired was 2,533, at a total price of $1,650,964, for an average price of $652 per acre.

Raw desert totals are: 7,307.4 acres raw desert at $562.47/acre for total cost of $4,110,195

Total Agricom purchases:

APS Ranch (in escrow)	12,550 acres
Raw desert, purchased	7,300
Raw desert, in escrow	15,650
Total	35,000 acres

Water Rights and Resources: All groundwater in basin, if they succeed in acquiring the entire area.

Water quality: High probability of fluoride, high TDS, and hexavalent chromium.

Prices and Costs: Rumor of $500/acre for most of the raw desert and abandoned farmland in escrow, with some parcels going for $900 - $1,200. Total of about 75 parcels, ranging from 20 to 880 acres. To date, only about 6 parcels have gotten out of escrow. Price for APS Ranch currently unknown. Estimated total cost of $20 million, which may or may not include APS Ranch.

Current Land Use: See APS Ranch. Balance of land mostly vacant. Announced intention to continue agriculture, with possible light industrial uses in near future.

ENDNOTES TO CHAPTER 1

1. The current legal framework for water transfers in Arizona and the issues confronting the legislature are described in Woodard & Checchio, *The Legal Framework for Water Transfers in Arizona*, 31 **Ariz. L. Rev.** 721 (Dec. 1989).

2. The Central Arizona Project is a massive federal reclamation project costing in excess of $4 billion featuring a 335-mile long aqueduct that, when complete in the mid-1990s, will have the capacity to move up to 2.1 million acre-feet of water per year from the Colorado River to urban areas and farms in central Arizona.

3. An acre-foot of water is the quantity of water needed to cover one acre of land to a depth of one foot, or 325,851 gallons. This is sufficient water to meet the domestic needs of five to 10 persons for one year, or to irrigate roughly one-quarter acre of a "typical" crop.

4. It does not appear likely that the effluent will be delivered to the reservation due to the cost of constructing a non-potable pipeline. Instead, it may be exchanged for other water delivered to the Nation.

5. For a discussion of the pre-1980 groundwater law, see Goodman, *Current Groundwater Law in Arizona*, **Ariz. St. L. J.** 205 (1978); and Wheeler, *The Right to Use Groundwater in Arizona after Chino Valley II and Cherry v. Steiner*, 25 **Ariz. L. Rev.** 473 (1983).

6. This is not necessarily the case. *See* **B. Colby Saliba & D. Bush, Water Markets in Theory and Practice: Market Transfers, Water Values and Public Policy** 91 (1987).

7. Of three Indian water rights settlement bills passed by Congress in October 1988, only the Salt River Pima-Maricopa Indian Community Water Rights Settlement Act of 1988 (H.R.4102) retained an off-reservation water leasing provision. In the cases of the San Luis Rey Indian Water Settlement Act (S.795) and the Colorado Ute Indian Water Settlement Act (H.R.2642 and S.1415), off-reservation leasing provisions were removed prior to passage. In addition to the Salt River Pima-Maricopa Settlement, congressional approval was granted under SAWARSA in 1982 for the Tohono O'odham Nation to sell a portion of their water entitlement to Tucson area users subject to approval by the Secretary of the Interior.

8. Phoenix paid $30 million for land in McMullen Valley, while estimated infrastructure costs to move the water to the CAP aqueduct range up to $50 million; if the aqueduct cannot be used, a parallel delivery system could cost an additional $200 million. Transport options considered by Scottsdale have costs that exceed the $11.6 million price of the land. CAWCD's proposed water farm purchase costing $69 million has estimated capital costs of $40 million for a wellfield and pipeline to move the water to the CAP aqueduct.

9. For detailed information on water farm transactions occurring in Arizona, see Woodard, Checchio, Thacker & Colby, *The Water Transfer Process in Arizona: Analysis of Impacts and Legislative Options*, Division of Economic and Business Research, University of Arizona, April 1988, 170 pages.

10. La Paz County has borne the brunt of the water farming impacts. Results of an economic analysis of these impacts are presented in A. Charney and G. Woodard, *Water Farming Study Estimates: Economic Losses in La Paz County*, **Arizona's Economy**, (Sept. 1989).

11. For a comparison of economic impacts on several Arizona counties, see Checchio & Nunn, *Water Transfers: Calculating an Index of Economic Impacts*, **Water Resources Bulletin** (1990 forthcoming).

12. One example of voluntarily negotiated compensation is Mesa's payment of over $100,000 to Pinal County in lieu of taxes in 1986. Phoenix also has made voluntary in-lieu of tax payments; however, the amount of the payment currently is in dispute.

CHAPTER 2

WATER TRANSFERS IN CALIFORNIA: 1981-1989

Brian E. Gray

Professor of Law

University of California
Hastings College of the Law

CHAPTER 2

TABLE OF CONTENTS

TABLES

ACKNOWLEDGMENTS

Many individuals contributed to this report. I would like to thank Bob Potter, Deputy Director of the California Department of Water Resources, and Walt Pettit, Chief of the Water Rights Division of the State Water Resources Control Board for their comments on previous drafts of the report and for their advice throughout the project. I am especially grateful to Dave Cornelius, Glenn Mork, Rick Miner, and Bert Parkinson, all of the State Water Resources Control Board, for their help.

Several law students provided research for several portions of the report. Jeff Van Horne, Boalt Hall class of 1990, and Michelle Lentzner, Hastings class of 1991, spent many hours at the State Water Resources Contol Board compiling the data for Sections 3 and 4C of the report. Dave Williams and Scot Yarnell, Hastings class of 1989, generated a wealth of new information about transfers among Central Valley Project contractors, much of which appears in Section 4. Drew Bendon, Kimberly McMorrow, and Jeff Schwarz, also Hastings class of 1989, contributed to Section 5.

I thank Dr. Henry Vaux, Director of the University of California Water Resources Center, who was kind enough to sponsor this research. Finally, I would like to extend a special round of thanks to Dr. Larry MacDonnell, Director of the University of Colorado's Natural Resources Law Center, who initiated and led the study of water transfers in six western states, of which this report is a part. Without his organizational skills, advice, good cheer, and abiding patience this report would not have been possible.

Introduction

Throughout the 1980s, the California Legislature enacted a series of statutes that encourage and facilitate the voluntary transfer of water and water rights. These statutes were the product of the Legislature's conclusion that reallocation of California's water resources through private transactions, rather than by administrative fiat, represents a partial solution to the state's chronic (and increasing) inability to supply competing urban, industrial, agricultural, instream, environmental, and other uses with sufficient water to meet their reasonable demands. Paradoxically, for all of the Legislature's efforts, there have been far fewer state-administered transfers of water in California than in any of the other five states reviewed in this study. Indeed, the lion's share of transfers occurred without reference to the water transfer laws enacted during the decade.

This chapter summarizes the water transfer activity that occurred in California from 1981 through 1989. The time-frame of the California study varies from that of the other state reports for three reasons.[1] First, apart from the transfers that occurred in response to the 1976-1977 drought, no transfer applications were filed with the State Water Resources Control Board between 1975 and 1982. Rather than omit the vast majority of transfers that the Board has authorized during the 1980s, we have chosen to extend the period of the California study through 1989. Second, information on the other major category of transfers--transfers and exchanges between federal contractors of water supplied by the Central Valley Project--was available only for the years 1981 through 1988.[2] Accordingly, we decided to focus on the period for which data are available, rather than rely on incomplete information for the years 1975 through 1980. Third, the major statutes that promote the voluntary transfer of water were enacted in the early 1980s. By extending this study through 1989, we were able to include more of the transfers that are governed by these new laws.

With only minor exceptions, all of the transfers of water that have occurred within the last decade have involved two types of water rights: (1) appropriative rights to surface water established by permit or license issued by the State Water Resources Control Board, and (2) contract rights to water appropriated by the United States Bureau of Reclamation, the California Department of Water Resources, or a local water agency. There were no transfers of water rights in California during the 1980s. Rather, each of the transfers analyzed in this study was simply a transfer of water; the water right or contract right remained with the transferor throughout the term of the transfer agreement.

Section 1 provides a brief introduction to the California law of water transfers. It focuses on the efforts of the Legislature to promote the voluntary reallocation of water by enacting a series of comprehensive, and sometimes duplicate, statutes governing the transfer of water appropriated pursuant to permits and licenses issued by the State Water Resources Control Board. Following this review of the applicable law, Section 2 describes all of the transfer applications filed with the Board from 1981 through 1989. This empirical survey shows that, notwithstanding the Legislature's aspirations, relatively few applications have been submitted to and approved by the Board. All of the Board authorized transfers were short-term and for a specific purpose. Section 3 analyzes the extensive transfers that have occurred during the 1980s within the Central Valley Project, which is owned and operated by the United States Bureau of Reclamation.

Valley Project, which is owned and operated by the United States Bureau of Reclamation. It also offers a partial explanation for the relative paucity of state-authorized transfers. Because the service area of the CVP is so large--extending throughout the Central Valley and portions of the San Francisco Bay Area--virtually all transfers of water between CVP contractors may be accomplished without changing the point of diversion, place of use, or purpose of use of the water appropriated by the Bureau. Consequently, these transfers are neither subject to the Board's jurisdiction nor reported in the records maintained by the Board.

Section 4 continues with a discussion of transfers between water agencies in Southern California. These transfers involve Colorado River water supplied by the Bureau of Reclamation's Boulder Canyon Project and represent the only long-term transfers that took place in California during the 1980s. Because the Boulder Canyon Project Act generally preempts California water law, these transfers also were exempt from the Board's change in water right jurisdiction. Finally, Section 5 concludes with the principal findings and recommendations of the study.

The focus of this report is on those water transfers that either were subject to the jurisdiction of the State Water Resources Control Board or were conducted under the general supervision of another agency such as the Department of Water Resources or the Bureau of Reclamation. Although the report omits the transfers that took place within local water agencies,[3] the transfers analyzed in the following pages comprise the lion's share of the activity that occurred during the study period. As such, it provides a basis for comparison with the companion reports on state-administered transfers in Arizona, Colorado, New Mexico, Utah, and Wyoming.

This report is descriptive rather than prescriptive. It begins with the premise that California law encourages the voluntary reallocation of water and concludes with the recognition that transfers have occurred and will continue to serve as one means of responding to regional disparities between supply and demand. In general, the report does not comment on the wisdom of particular transfers. Nor does it evaluate the general efficacy of California's transfer laws or consider the desirability of transfers as part of a broader strategy to improve the efficiency of use and allocation of the state's water resources. These normative questions will be the subject of a follow-up article, which will take a closer look at a variety of the individual transfers discussed in this report.

Section 1: A Summary of California Water Transfer Law

The transfers discussed in this report have involved two types of water rights: (1) appropriative rights established by permit or license issued by the State Water Resources Control Board, and (2) contract rights to water supplies developed by the United States Bureau of Reclamation, the California Department of Water Resources, or a local water agency. There were no transfers of water rights in California during the period of this study. Rather, each of the transfers described below in Sections 2 through 4 was simply a transfer of water; the water right or contract right remained with the transferor throughout the term of the transfer agreement. Accordingly, this summary of California water transfer law will focus on the laws that govern the transfer of water held by appropriative right or by contract.[4]

Introduction

Before the revolution in California water transfer law that occurred in the 1980s, the principal rule governing water transfers was that any change in the point of diversion, place of use, or purpose of use associated with the transfer not injure another lawful user of water. This rule is both part of the common law[5] and has been codified in sections 1701 and 1702 of the Water Code.[6] The transfer statutes enacted during the past decade incorporate this "no injury" rule and add a variety of other provisions that are designed to promote the voluntary transfer of water while also protecting the environment and economy of the area from which the water is transferred.

The modern statutory law of water transfers may be divided into four categories: (1) policy declarations and directives; (2) authorization for the transfer of reclaimed conserved, and surplus water; (3) rules governing experimental, "urgent," and other short-term transfers; and (4) recognition of long-term transfers of water or water rights.

Policies and Directives

The Legislature's first foray into the field of water transfers was to announce its finding "that the growing water needs of the state require the use of water in an efficient manner and that the efficient use of water requires certainty in the definition of property rights to the use of water and transferability of such rights."[7] In furtherance of this finding, the Legislature then declared that it is "the established policy of this state to facilitate the voluntary transfer of water and water rights where consistent with the public interest in the place of export and the place of import."[8]

The 1980 legislation that established these policies did not provide specific directives to implement them, however. Accordingly, in 1982, the Legislature ordered the Department of Water Resources, the Board, and "all other appropriate state agencies to encourage voluntary transfers of water and water rights."[9] Because the 1982 legislation focused on the transfer of conserved and surplus water,[10] the Legislature also authorized the state agencies to provide financial assistance "to identify and implement water conservation measures which will make additional water available for transfer."[11]

In 1986, the Legislature reiterated its policy of encouraging transfers as a means of promoting efficient water use and supplying new demands. This legislation declared that (1) "voluntary water transfers between water users can result in a more efficient use of water, benefiting both the buyer and the seller"; (2) "transfers of surplus water on an intermittent basis can help alleviate water shortages, save capital outlay development costs, and conserve water and energy"; and (3) the public interest requires water conservation and "the coordinated assistance of state agencies for voluntary water transfers to allow more intensive use of developed water resources in a manner that fully protects the interests of other entities which have rights to, or rely on, the water covered by a proposed transfer."[12]

The 1986 legislation also contained a variety of specific directives that were designed to increase the level of state involvement in the negotiation and implementation of water transfers. For example, section 480 of the Water Code provides that DWR "shall establish an ongoing program to facilitate the voluntary exchange or transfer of water and implement the various state laws that pertain to water transfers."[13] Consistent with the Legislature's purpose to offer water transfers as a substitute for the development of new sources of supply, this section authorizes the

Department "to facilitate these transactions only if the water to be transferred is already developed and being diverted from a stream for beneficial use or has been conserved."[14] Section 481 requires DWR to maintain "a list of entities seeking to enter into water supply transfers, leases, exchanges, or other similar arrangements," as well as a list of "the physical facilities which may be available to carry out water supply transfers."[15] In accordance with this directive, DWR has complied a draft "Catalog of Water Transfer Proposals," which lists thirty-one transfers that range from completed transactions to mere ideas.[16] The Department also has prepared a draft water transfer guide, which outlines the law applicable to water transfers, describes DWR's role in the process, reviews the authority of the Board and other agencies, and summarizes the various potential effects of a transfer on the environment and other water users.[17]

Along with these directives to DWR in its administrative capacity, the 1986 legislation also requires the Department to facilitate water transfers when acting in its role as manager of the State Water Project. Declaring that the transfer of water from the Central Valley Project would "offer potential benefits to California's hard-pressed farmers and to California's water-dependent urban areas," the Legislature ordered DWR to negotiate with the Bureau of Reclamation "to contract for interim rights to stored water from the [CVP] for use in the State Water Resources Development System by state water supply contractors."[18] It also directed the Department to "pursue discussions" with the Bureau to permit federal contractors to transfer water "to any public entity which supplies water for domestic use, irrigation use, or environmental protection . . . during times of shortage."[19]

Finally, the Legislature has required DWR and all other agencies that operate water conveyance facilities to make available to "bona fide transferors" unused aqueduct capacity for the transfer of water to transferees along the conveyance system.[20] This obligation is subject to the requirement that the transferor pay "fair compensation" for use of the aqueduct.[21] As described below, DWR has relied on these statutes to permit the Bureau of Reclamation to "wheel" CVP water through the California Aqueduct to federal contractors and National Wildlife Refuges in Santa Clara County the San Joaquin Valley.

Transfers of Reclaimed, Conserved, and Surplus Water

The first comprehensive set of water transfer rules was enacted in 1982. This legislation, now codified in sections 380 through 387 and 1010 through 1011 of the Water Code, has two distinguishing characteristics. First, it is premised on the assumption that most of the water offered for transfer will be water that either is surplus to the needs of the transferor or is reclaimed or conserved by the transferor for the purpose of transferring it to another user. Second, the 1982 legislation attempted to decentralize the process of water transfers by empowering local agencies to sell water and to serve as brokers between individual users within their jurisdiction and potential purchasers of the water.

Consistent with these purposes, section 380 recognizes that the "various regions of the state differ widely in the availability of water supplies and in the need for water to meet beneficial uses"[22] and that "[d]ecisions regarding operations to meet water needs depend in part upon regional differences."[23] It then declares that "[m]any water management decisions can best be made at a local level, to the end that local and regional operational flexibility will maximize efficient statewide use of water supplies."[24] The Legislature also stated that

the policy of encouraging local agencies to transfer water based on local and regional economic considerations is "in furtherance of" the reasonable and beneficial use doctrine of Article X, Section 2 of the California Constitution and section 109 of the Water Code.[25]

To clear away any uncertainty over the power of local water agencies to transfer water outside their jurisdictional boundaries, section 382 declares that "[n]otwithstanding any other provision of law, every local or regional public agency authorized by law to serve water to the inhabitants of the agency may sell, lease, exchange, or otherwise transfer water that is surplus to the needs of the agency's water users for use outside the agency."[26] Section 381 supplements this declaration by directing that the authority of local and regional agencies "pursuant to this chapter shall control over any other provision of law which contains more stringent limitations on the authority of a particular public agency to serve water for use outside the agency, to the extent those other laws are inconsistent with the authority granted therein."[27] This pronouncement of the supremacy of the new water transfer law is important, because there are provisions in the Irrigation District Law, as well as in local water supply contracts that prohibit or restrict the transfer of water.[28] According to section 381, these limitations are invalid to the extent that they may be applied to prohibit a transfer that satisfies the other requirements of sections 380 through 386.[29]

The reference in section 382 to water that is "surplus to the needs of the agency's water users"[30] raises two questions. First, what constitutes "surplus water" and who determines whether it exists? Second, according to Article X, Section 2 of the California Constitution, an appropriator has rights only to the amount of water that it can put to a reasonable and beneficial use.[31] How, then, may a user transfer water that by definition is surplus to its needs? The first question is answered in section 383; the second is addressed by sections 1010, 1011, and 1244, which are discussed below.

Section 383 defines "surplus water" in three different ways. In keeping with the goal of the legislation to decentralize the water transfer process, each of these definitions defers to the local water agency's determination that surplus water is available for transfer. The first two subsections address the transfer of "water to which the right is held by the agency."[32] Section 383(a) authorizes the agency to transfer water "which the agency finds will be in excess of the needs of water users within the agency for the duration of the transfer."[33] Section 383(b) approves the transfer of conserved water. It defines as surplus water "of which any water user agrees with the agency on mutually satisfactory terms, to forego use for the duration of the transfer."[34] The third subsection authorizes an individual water user within an agency, rather than the agency itself, to negotiate a transfer of water that is surplus to the user's needs. Section 383(c) provides that "the water user and the agency [may] agree, upon mutually satisfactory terms, that the water user will forego use for the period of time specified in the agreement" with the transferee and directs that the agency "shall act as agent for the water user to effect the transfer."[35] Although the purpose of this subsection is to allow an individual user within a water agency to conserve water and to transfer the surplus, the approval of the agreement is subject to the consent of the agency. According to section 383, the agency, rather than its member water users, is the paramount actor.

In addition to the existence of surplus water, two other requirements must be met before water may be transferred pursuant to sections 380 through 387. First, just as the

transferor agency must approve the agreement, so too must the water agency with jurisdiction over the area to which the water will be transferred. Section 385 stipulates that "[n]o water may be transferred pursuant to this chapter for use within the boundaries of a local or regional public agency that furnishes the same water service to the transferee without the prior consent of that agency."[36] Second, all transfers must comply with the other provisions of the Water Code that govern water transfers. According to section 384,

> Prior to serving water to any person for use outside the agency, the agency shall comply with all provisions of the general laws of the state relating to the transfer of water or water rights, including, but not limited to, procedural and substantive requirements governing any change in point of diversion, place of use, or purpose of use due to such transfer.[37]

Moreover, section 386 declares that

> the Board may approve any change associated with a transfer pursuant to this chapter only if it finds that the change may be made without injuring any legal user of water and without unreasonably affecting fish, wildlife, or other instream beneficial uses and does not unreasonably affect the overall economy of the area from which the water is being transferred.[38]

As this directive makes clear, notwithstanding the primacy of local agencies under the 1982 legislation, the ultimate decision whether to approve a transfer that involves a change in the transferor's water right remains with the Board.

The concern that "water that is surplus to the needs" of the transferor agency's users might be subject to forfeiture under Article X, Section 2 of the Constitution is addressed in sections 1010, 1011, and 1244 of the Code. These sections, originally enacted in 1979, allow a water user to reduce its demand for water by conserving or by substituting reclaimed wastewater without losing the rights to the water voluntarily foregone.[39] Their purpose is to encourage conservation and reclamation by removing the risk that the user's ability to make due with less could be construed as an admission that the user did not reasonably need, and therefore has no rights to, the foregone water. The 1982 water transfer legislation extended this protection to water made available for transfer as a result of conservation or reclamation.

Section 1010(b) provides that "[w]ater, or the right to the use of water, the use of which has ceased or been reduced as the result of the use of reclaimed or polluted water . . . may be sold, leased, exchanged, or otherwise transferred pursuant to any provision of law relating to the transfer of water or water rights."[40] Section 1011(b) creates identical rights to transfer water or water rights "the use of which has ceased or been as a result of water conservation efforts."[41] Although these provisions expressly authorize the transfer of reclaimed and conserved water, standing alone they would not alleviate the risk that the offer of such water for sale or lease could be used as evidence that the transferor does not need--and therefore has no rights to--the proffered water. Sections 1010(b) and 1011(b) must be read, however, in conjunction with section 1244, which the Legislature enacted in 1980. Section 1244 addresses the risk of forfeiture

by declaring that "[t]he sale, lease, exchange, or transfer of water or water rights, in itself, shall not constitute evidence of waste or unreasonable use."[42]

These sections state the Legislature's policy to allow for the voluntary reclaimed, conservation, and transfer of water that arguably does not belong to the transferor because it is in excess of the transferor's reasonable needs. They represent a legislative decision that it is better to encourage the reallocation of water to more valuable uses by voluntary arrangement than to rely exclusively on the powers of the Board, DWR, and the courts to monitor existing uses for compliance with the constitutional requirement of reasonable use.[43] Notwithstanding their clear statement of purpose, however, sections 1010, 1011, and 1244 do not completely eradicate the risk that an offer of water for sale could result in a determination of waste or unreasonable use. They do not provide, for example, that a water user in jeopardy of losing its rights can avoid forfeiture by negotiating a transfer.[44] These sections do, however, afford potential transferors a reasonable assurance that, by offering water for sale, entering into negotiations, or conducting studies of potential conservation yields within their service areas, they will not lose their water rights. Neither the transfer nor the negotiations leading up to the transfer may be used as evidence that the transferor's water rights or contract entitlements exceed its actual reasonable needs.

These provisions are controversial both because they may not work and because they may work too well. Potential transferors are legitimately concerned that transfer negotiations will bring unwanted scrutiny of their existing uses and that section 1244 will not deter the Board from conducting an investigation of waste and unreasonable use pursuant to section 275 of the Water Code. Other water users are equally concerned that, taken together, sections 1010, 1011, and 1244 reward waste by allowing transferors to profit from the sale or lease of "surplus" water. This controversy is examined in Section 5, which reviews the Imperial Irrigation District-Metropolitan Water District transfer of conserved water.

Short-Term Transfers

In addition to authorizing the transfer of conserved and surplus water, the Legislature also has established more general rules to govern the transfer of water on a short-term basis. Originally, it created three categories of short-term transfers: (1) Temporary Urgency Changes, applicable during water supply emergencies; (2) Temporary Changes, which may last for up to one year; and (3) Trial Transfers, which authorized transfers for experimental purposes. Although the Legislature repealed the Trial Transfer provisions in 1988,[45] they are described here because three of the transfer applications submitted to the Board during the years studied in this report involved this category of short-term transfers.

Temporary urgency changes

The Temporary Urgency Change provisions of the Code were enacted to allow the Board to approve transfers of water and other changes in existing water rights in response to conditions that do not allow the petitioner to apply for a temporary transfer of water. According to section 1435, a permittee or licensee that has "an urgent need to change a point of diversion, place of use, or purpose of use . . . may petition for . . . a conditional, temporary change order without complying with other procedures or provisions of this division."[46] It defines "urgent need" as the existence of circumstances from which the Board may determine that a temporary change in the

water right "is necessary to further the constitutional policy that the water resources of the state be put to beneficial use to the fullest extent to which they are capable and that waste of water be prevented."[47]

Before the Board may grant a Temporary Urgency Change it must make four findings:

> (1) The permittee or licensee has an urgent need to make the proposed change.
>
> (2) The proposed change may be made without injury to any other legal user of water.
>
> (3) The proposed change may be made without unreasonable effect upon fish, wildlife, or other instream beneficial uses.
>
> (4) The proposed change is in the public interest.[48]

Once the Board approves a Temporary Urgency Change, it must supervise the diversion and uses authorized by the change order to ensure the protection of consumptive and instream beneficial uses potentially affected by the change in water right.[49]

Section 1440 stipulates that a Temporary Urgency Change order "shall not result in creation of a vested right, even of a temporary nature, but shall be subject at all times to modification or revocation in the discretion of the board."[50] A Temporary Urgency Change may last for no more than 180 days, although it may be renewed by the Board.[51]

Trial transfers

The original 1980 water transfer legislation created two categories of short-term transfers: Temporary Changes and Trial Transfers.[52] The Legislature substantially revised the Temporary Change provisions in 1988 and eliminated the Trial Transfer category.[53] As mentioned above, because three of the transfer applications submitted to the Board during the 1980s were for Trial Transfers,[54] this procedure will be described briefly.

The purpose of the Trial Transfer provisions was to allow the Board to approve transfers for a limited period of time to assess the efficacy of the transfer and to evaluate its effects on downstream water users and instream uses. If all worked well, a Trial Transfer could serve as a prelude to a long-term transfer agreement. According to the statute, the Board could approve a Trial Transfer following notice and a public hearing if it concluded that (1) the transfer was unlikely to cause "substantial injury to any legal user of water"; (2) the transfer "would not unreasonably affect fish, wildlife, or other instream beneficial uses"; and (3) "the precise effect of the transfer on other legal users or instream beneficial uses is difficult to determine in advance of such a transfer."[55] Following the Trial Transfer period, which could not exceed one year,[56] the parties could petition the Board to convert the Trial Transfer into a long-term transfer.[57] The Board was authorized to grant the petition if, based on the evidence developed during the Trial Transfer, it concluded that a long-term transfer "would not result in substantial injury to any legal user of water and would not unreasonably affect fish, wildlife, or other instream beneficial uses."[58]

Temporary changes

The final, and most frequently used, provisions governing short-term transfers are sections 1725 through 1732, entitled Temporary Changes. Section 1728 defines a

Temporary Change as "any change of point of diversion, place of use, or purpose of use involving a transfer or exchange of water or water rights for a period of one year or less."[59] A permittee or licensee may engage in a Temporary Change if it meets two criteria. First, the transfer must involve only the amount of water that the transferor would have "consumptively used or stored" during the period of the transfer.[60] The statute defines "consumptive use" as "the amount of water which has been consumed through use by evapotranspiration, has percolated underground, or has been otherwise removed from use in the downstream water supply as a result of direct diversion."[61] Second, consistent with the other provisions governing water transfers, the change must not "injure any legal user of the water" or "unreasonably affect fish, wildlife, or other instream beneficial uses."[62]

Originally, an appropriator that wanted to engage in a Temporary Change did not need the Board's approval. Rather, the appropriator simply was required to notify the Board of its proposal. If the Board did not object to the proposal within thirty days, the Temporary Change went into effect.[63] The 1988 amendments altered this procedure, requiring Board authorization of all Temporary Changes. According to section 1726, the potential transferor must notify the Board of the proposed Temporary Change.[64] The notice must contain "information indicating the amount of water proposed for transfer, the parties involved in the transfer, and any other information the board by rule may prescribe."[65] Following receipt of this notice, the Board may approve the change without conducting a public hearing if it concludes both of the following:

> (1) The proposed temporary change would not injure any legal user of water, during any potential hydrological condition, through resulting significant changes in water quantity, water quality, timing of diversion or use, consumptive use of the water, reduction in return flows, or reduction in the availability of water within the watershed of the transferor.
>
> (2) The proposed temporary change would not unreasonably affect fish, wildlife, or other instream beneficial uses.[66]

If the Board approves the Temporary Change, it must notify the transferor and those legal users of water described above.[67] If it cannot make the requisite findings within sixty days of its receipt of the notice of proposed temporary change, the Board must conduct a public hearing on the matter.[68]

The 1988 legislation that amended the Temporary Change provisions also addressed an omission in the previous transfer laws that may have inhibited some appropriators from offering their water for transfer. Although reversion of full rights to the transferor probably was implicit in the earlier legislation, there was some concern that the law did not specifically state that, upon conclusion of the term of a transfer agreement, the transferor would have full rights to the water. Accordingly, section 1731 now states that following the "expiration of a temporary change period, all rights shall automatically revert to the original holder of the right without any action by the board."[69]

There are two main advantages to characterizing a short-term transfer as a Temporary Change. First, the administrative process is expedited because the Board may approve the change without a hearing, based solely on the written record submitted by the

petitioner. Second, the statute exempts Temporary Changes from the environmental review procedures of the California Environmental Quality Act.[70] As several of the case studies discussed below in Section 4 indicate, however, these advantages may be unavailable where the Temporary Change involves large quantities of water or where the proposed transfer significantly alters stream flows. In such cases, downstream users and representatives of instream flow interests are almost certain to object and thereby cause the Board to convene a public hearing and require the transferor to conduct hydrologic and environmental studies to justify the proposal.

Long-Term Transfers

The final set of rules governing water transfers, Water Code sections 1735 through 1738, governs the creation of long-term transfer agreements. Section 1735 defines a Long-Term Transfer as one "for any period in excess of one year and states that the Board "may consider a petition for a long-term transfer of water or water rights involving a change of point of diversion, place of use, or purpose of use."[71] Section 1736 then authorizes the Board, "after providing notice and opportunity for a hearing, [to] approve such a petition for long-term transfer where the change would not result in substantial injury to any legal user of water and would not unreasonably affect fish, wildlife, or other instream beneficial uses."[72] The statute does not place any limits on the duration of a Long-Term Transfer. As with the Temporary Change laws, however, it does provide that "[f]ollowing the expiration of the long-term transfer period, all rights shall automatically revert to the original holder of the right without any action by the board."[73]

Although the Long-Term Transfer provisions overlap with sections 380 through 386 discussed above, the Legislature did not explain how or whether the new law should be integrated with the old.

Transfer of Water Based on Contract Rights

As described below in Sections 3 and 4, most of the surface water appropriated in California is not used by the appropriator but is sold to irrigation districts, water agencies, farmers, industry, and domestic consumers. Many water users therefore do not hold water rights. Rather, their rights are based on water supply contracts that they have entered into with some other agency. The existence of these contractual entitlements to water raises two important questions. First, can a contractor transfer water even though it does not hold the appropriative right? Second, are such transfers subject to the jurisdiction of the Board according to the laws discussed above?

Although the water transfer statutes refer to transfers of water or water rights by the holder of the rights,[74] these laws apply equally to those who receive their water pursuant to contract. First, as described above, section 383 authorizes users within an irrigation or water district to transfer water supplied to them by the district that is surplus to their needs. In many such cases, the district would hold the water right and the transferor would be a contractor of water from the district. Thus, implicit in the surplus and conserved water transfer provisions is authorization for the transfer of water obtained by contract. Second, sections 1435, 1725, and 1735 apply whenever an appropriator changes the point of diversion, place of use, or purpose of use from that specified in its permit or license. If the appropriator sold water to a contractor and the contractor engaged in a transfer that necessitated a change in the water right, the appropriator would have to petition the Board for approval of the transfer. The

contractor-transferor therefore would be subject indirectly to the transfer provisions discussed above.

While transfers of water obtained under contract right generally fall within the jurisdiction of the Board, because of the character of the water rights held by the largest purveyors of water in the state--the Bureau of Reclamation and the Department of Water Resources--many such transfers escape the scrutiny of the Board. The permits for the Central Valley Project authorize the Bureau to divert water from the Trinity, Sacramento, American, Stanislaus, and San Joaquin Rivers, and from the Delta.[75] They define the place of use for this water as the entire service area of the CVP, which includes virtually the entire Central Valley as well as portions of the Bay Area.[76] The permits allow the Bureau to use the water for a multiplicity of purposes, including irrigation, municipal and industrial supply, hydroelectric power generation, flood control, recreation, and support of instream uses.[77] Consequently, a federal contractor may transfer water to another federal contractor without changing the point of diversion, place of use, or purpose of use of the water right held by the Bureau and therefore without invoking the transfer and change in use provisions of the Water Code. As described in Section 3, numerous transfers of substantial amounts of water occur within the CVP system each year that are not subject to the jurisdiction of the Board.

The same legal rules apply to the State Water Project. The permits for the SWP authorize the Department of Water Resources to divert water from the Feather River and from the Delta for distribution to users in the Bay Area, the San Joaquin Valley, and Southern California.[78] As with the CVP, the SWP permits allow the water to be used for multiple purposes.[79] Unlike the federal project, however, there have been few transfers between state contractors of water supplied by the SWP.[80]

Finally, all of the water taken from the Colorado River and delivered to users in Southern California is distributed by the Secretary of the Interior under the exclusive authority of federal law.[81] Thus, when a contractor for Colorado River water enters into a transfer agreement with another user, the parties need not obtain the approval of the Board even if the transfer is accompanied by a change in the point of diversion, place of use, or purpose of use. The jurisdiction of the Board over such transfers is preempted by federal law. Several prominent and on-going transfers of Colorado River water from agricultural users in the Imperial and Coachella Valleys to the Metropolitan Water District are analyzed in the case studies section of this report.[82]

Section 2: Transfers Subject to the Jurisdiction of the State Water Resources Control Board

As described above, the State Water Resources Control Board has jurisdiction over all transfers of water and water rights that involve a change in the point of diversion, place of use, or purpose of use set forth in the appropriator's permit or license. This section of the report analyzes all of the petitions to transfer water from an existing user to a new user filed with the Board from between 1981 through 1989. It includes all such transfers that required the Board to change an existing permit or license. The report does not consider petitions to change a permit or license where the water is used by the same party both before and after the change. This portion of the report also omits transfers that may be accomplished without changing the terms of a water rights permit, because they are not subject to the Board's jurisdiction. Two important categories of

such transfers--those that occur between contractors of the Central Valley Project and transfers involving Colorado River Water in Southern California--are the subjects of Sections 3 and 4.

Between 1981 and 1989, the Board received twenty-four petitions to transfer water. None of these applications involved the transfer of a water right; rather, they all requested approval of a short-term transfer of water. Fourteen of the petitions were for Temporary Changes pursuant to sections 1725 through 1732 of the Water Code. Six involved Temporary Urgency Changes authorized by sections 1435 through 1442 of the Code. Three of the petitions were for Trial Transfers under Water Code sections 1735 through 1739, which the Legislature repealed in 1988. The final application was for a long-term exchange of water between the Arvin-Edison Water Storage District and the Metropolitan Water District, which the Bureau of Reclamation filed on behalf of the parties as a long-term transfer pursuant to section 1735 of the Water Code.

The Board approved 19 of the petitions and denied two; two petitions were withdrawn. The long-term transfer petition is currently pending before the Board.

Table 1 describes the 19 transfers authorized by the Board by type. Three of the transfer applications that were denied or withdrawn were from an irrigation use to another irrigation use; the other involved a proposal to trade lower quality M & I water for higher quality irrigation water.

Although there was a tremendous range in the quantity of water transferred (from 18 acre-feet to 125,000 acre-feet), virtually all of the approved transfers share the characteristic of being limited to a few months. For the most part, the transfers authorized by the Board during the study period were for specific and very short-term purposes such as augmenting supply during one irrigation season, conducting water quality studies, maintaining instream flows during times of low natural flow, and providing contingency supplies during the 1987-1989 drought. Indeed, all of the largest authorized transfers--i.e., those exceeding 5,000 acre-feet--were for emergency drought supply, protection of fish and wildlife, or maintenance of Delta outflow as required by the Board's Salinity Control Plan and Water Rights Decision 1485.[83]

It also is interesting to note that over half of the nineteen transfers approved by the Board involved the same transferor: the Yuba County Water Agency. During the eight years covered by the study, YCWA entered into contracts to sell 561,516 acre-feet of water. Indeed, during the 1987-1989 drought, the Agency was the principal source of temporary supply for water agencies in the Bay Area, which either experienced actual shortfalls in their regular sources of supply or anticipated shortages if the drought had continued into 1990. YCWA became the largest transferor of water during the 1980s because the capacity of its storage facilities on the Yuba River, New Bullards Bar Reservoir, substantially exceeded the demands for water within the Agency's service area. Thus, YCWA was able to take advantage of the surplus transfer provisions of the Water Code, sections 380-387, discussed previously.[84]

The transfers approved by the Board during the 1980s demonstrate that California's water transfer legislation works well in times of drought when it is necessary to reallocate water on a short-term basis to ensure that no region of the state suffers inordinate hardship. The categorical exemption of Temporary Changes from the environmental review requirements of the California Environmental Quality Act[85] and the Board's practice of filing notices of exemption for

Temporary Urgency Changes enable the Board to expedite its review of drought-related transfer petitions.

The transfer laws also function effectively for small, short-term transfers. Whether the California statutes are adequate to the task of inducing and facilitating long-term transfers of substantial amounts of water remains to be seen. As described in Section 4, one long-term transfer and two long-term exchanges have occurred in Southern California. Although these transactions were not subject to the Board's change in water right jurisdiction, the thirty year transfer from the Imperial Irrigation District to the Metropolitan Water District was based in part on the conserved water transfer provisions of the California Water Code, particularly sections 1011 and 1244. This transfer has established that the reallocation of existing supplies is a viable means of responding to new demands for water on a long-term, if not permanent, basis. The first long-term transfer petition that has come before the Board was filed in September 1989 and will not be considered until mid-1990. The Board's review of this petition--a proposal for a thirty year exchange of over 100,000 acre-feet per year between the Arvin-Edison Water Storage District and the Metropolitan Water District[86]--will provide much-needed information about the efficacy of the transfer statutes for long-term transfers.

Table 2 provides a summary of the twenty-four petitions to transfer water submitted to the Board from 1981 through 1989.

TABLE 1
Types of Transfers Approved By the State Water Resources Control Board: 1981-1989

Municipal & Industrial to M & I	6
Surplus Supply to Irrigation	5
Consumptive to Environmental	3
Surplus Supply to M & I	2
Hydroelectric to M & I	1
Irrigation to Hydroelectric	1
Recreation to Irrigation	1

TABLE 2
Transfer Applications Submitted to the State Water Resources Control Board: 1981-1989

(1)

Transferor:	Yuba County Water Agency
Transferees:	John Kalfsbeek, Gunnersfield Enterprises, Inc., and Newhall Land & Farming Co.
Type:	Temporary Change (1725)
Date:	Filed 5-27-82

Request:	5000 Ac-ft
Period:	7-1-82 to 8-31-82
Pre-transfer source:	New Bullards Bar Reservoir
Post-transfer source:	Direct flow, Sacramento River and Colusa Basin Drain
Pre-transfer use:	Irrigation
Post-transfer use:	Irrigation
Protests:	5
Disposition:	Approved for 5000 Ac-ft

Comments: The purpose of the transfer was to replace water diverted directly from the Sacramento River by Newhall Land & Farming and water diverted by Kalfsbeek and Gunnersfield Enterprises from the Colusa Basin Drain, which would have returned to the Sacramento River. Thus, the water released into the Yuba River by Yuba County Water Agency would flow into the Feather River and on into the Sacramento River. The contract price was $3.50 per acre-foot.

(2)

Transferor:	Yuba County Water Agency
Transferees:	John Kalfsbeek, Newhall Land & Farming
Type:	Temporary Change (1725)
Date:	Filed 5-29-84
Request:	2266 Ac-ft
Period:	7-1-84 to 8-31-84
Pre-transfer source:	New Bullards Bar Reservoir
Post-transfer source:	Direct flow, Sacramento River and Colusa Basin Drain
Pre-transfer use:	Irrigation
Post-transfer use:	Irrigation
Protests:	0 protests, 4 comments
Disposition:	Approved for 2266 Ac-ft

Comments: This transfer was virtually identical to Transfer No. 1. The water released by the Yuba County Water Agency into the Yuba River replaced water diverted directly from the Sacramento River by Newhall Land & Farming and water diverted by Kalfsbeek from the Colusa Basin Drain, which would have returned to the Sacramento River. The contract price was $3.50 per acre-foot.

(3)

Transferor:	Yuba County Water Agency
Transferee:	Wilbur Jensen, Mabel Jensen, Josephine Grimmer, and Newhall Land & Farming Co.
Type:	Temporary Change (1725)
Date:	Filed 6-19-85
Request:	750 Ac-ft
Period:	7-1-85 to 8-31-85
Pre-transfer source:	New Bullards Bar Reservoir, Yuba River
Post-transfer source:	Direct flow, Sacramento River and Colusa Basin Drain
Pre-transfer use:	Irrigation
Post-transfer use:	Irrigation
Protests:	4 protests, 2 comments
Disposition:	Approved for 750 Ac-ft

Comments: As with Transfer Nos. 1 and 2, the purpose of this transfer was to replace water diverted directly from the Sacramento River by Newhall Land & Farming and water diverted by the other transferees from the Colusa Basin Drain, which would have returned to the Sacramento River.

(4)

Transferor:	East Bay Municipal Utility District
Transferee:	Contra Costa Water District
Type:	Temporary Change (1725)
Date:	Filed 9-20-85
Request:	15,000 Ac-ft initial 5,000 Ac-ft revised
Period:	9-25-85 to 12-31-85
Pre-transfer source:	Camanche Reservoir, Mokelumne River
Post-transfer source:	Direct flow, Contra Costa Canal
Pre-transfer use:	Municipal & Industrial
Post-transfer use:	Municipal & Industrial
Protests:	1
Disposition:	Approved for 5,000 Ac-ft

Comments: The purpose of the transfer was to provide the Contra Costa Water District with higher quality water from East Bay MUD's water supply system on the Mokelumne River. CCWD blended this water with its own supplies that it obtains from the Delta. The transfer application stated that the request was "prompted by the anticipated salinity intrusion into the Delta [during the] late summer and fall and Contra Costa Water District's desire to reduce the sodium and chloride levels for delivery to its customers."

(5)

Transferor:	W. Barry Hill (Sonoma Co.)
Transferee:	Skylark Nursery (Sonoma Co.)
Type:	Trial Transfer (1735)
Date:	Filed 11-12-85
Request:	18 Ac-ft
Period:	11-15-85 to 11-1-86
Pre-transfer source:	Reservoir, unnamed tributary: Santa Rosa River
Post-transfer source:	Direct flow
Pre-transfer use:	Irrigation, stockwatering, and recreation
Post-transfer use:	Irrigation
Protests:	0
Disposition:	Approved for 18 Ac-ft

Comments: Because of low water supply in the Santa Rosa Creek basin, the transferee needed water on a short-term basis for irrigating its nursery. The transferor, which was a licensee of the Board, stated that it was not presently using its entitlement.

(6)

Transferor:	East Bay Municipal Utility District
Transferee:	Contra Costa Water District
Type:	Temporary Change (1725)
Date:	Filed 1-2-86
Request:	5000 Ac-ft
Period:	1-1-86 to 4-30-86
Pre-transfer source:	Camanche Reservoir, Mokelumne River
Post-transfer source:	Direct flow, Contra Costa Canal
Pre-transfer use:	Municipal & Industrial
Post-transfer use:	Municipal & Industrial
Protests:	0
Disposition:	Approved for 5000 Ac-ft

Comments: This was an extension of Transfer No. 4, described above.

(7)

Transferor:	Yuba County Water Agency
Transferee:	Newhall Land & Farming Co.
Type:	Temporary Change (1725)
Date:	Filed 6-30-86
Request:	400 Ac-ft
Period:	7-1-86 to 9-30-86
Pre-transfer source:	New Bullards Bar Reservoir
Post-transfer source:	Direct flow (Sacramento River)
Pre-transfer use:	Irrigation
Post-transfer use:	Irrigation
Protests:	1
Disposition:	Denied (Fishscreens needed)

Comments: The purpose of this transfer application was to replace water diverted from the Sacramento River by the transferee. The Board rejected the application because the transferee had not installed fishscreens at its pumps.

(8)

Transferor:	United States Bureau of Reclamation
Transferee:	Dudley Ridge Water District
Type:	Trial Transfer (1735)
Date:	Filed 1-12-87
Request:	80,000 Ac-ft
Period:	3-1-87 to 2-29-88
Pre-transfer source:	Central Valley Project, Tracy Pumping Plant and Delta-Mendota Canal
Post-transfer source:	State Water Project, Banks Pumping Plant and California Aqueduct
Pre-transfer use:	Irrigation
Post-transfer use:	Irrigation
Protests:	13
Disposition:	Petition Withdrawn (EIR required)

Comments: The purpose of this transfer application was to add the Dudley Ridge Water District as a temporary contractor of the Central Valley Project for 2,000 acre-feet. Because the District is a state contractor, the Bureau proposed to use the State Water Project facilities to wheel the water to the transferee. The Bureau also requested permission to use the state facilities to wheel 78,000 acre-feet of federal project water to the Semi-Tropic Water Storage District, the Kern Delta Water District, and the Buena Vista Water Storage District, each of which are existing federal contractors. The Bureau withdrew the application after the Board concluded that an Environmental Impact Report was required.

(9)

Transferor:	Yuba County Water Agency
Transferee:	California Department of Water Resources
Type:	Temporary Change (1725)
Date:	Filed 7-21-87
Request:	83,100 Ac-ft at 935 cfs
Period:	7-17-87 to 9-30-87
Pre-transfer source:	New Bullards Bar Reservoir, Yuba River
Post-transfer source:	Delta (replaces releases from Lake Oroville)
Pre-transfer use:	Irrigation, Municipal & Industrial
Post-transfer use:	Multi-purpose supply and Delta outflow
Protests:	8 comments

Disposition: Approved for 83,000 Ac-ft

Comments: The purpose of this transfer was to allow the Department of Water Resources to withhold water impounded in Lake Oroville for release later in the year, which it otherwise would be required to release to maintain water quality in the Delta according to State Water Resources Control Board Decision 1485. The water released by Yuba County Water Agency into the Yuba River would flow into the Feather River below Oroville Reservior and on into the Sacramento River and the Delta.

(10)

Transferor:	East Bay Municipal Utility District
Transferee:	Contra Costa Water District
Type:	Temporary Change (1725)
Date:	Filed 10-23-87
Request:	44 Ac-ft
Period:	11-1-87 to 12-31-87
Pre-transfer source:	Camanche Reservoir, Mokelumne River
Post-transfer source:	Direct Flow (EBMUD aqueduct to CCWD)
Pre-transfer use:	Municipal & Industrial
Post-transfer use:	Municipal & Industrial
Protests:	0
Disposition:	Approved for 44 Ac-ft

Comments: The purpose of this transfer was to supply a joint water quality monitoring study conducted at the Contra Costa Water District's prototype water treatment plant.

(11)

Transferor:	Boy Scouts of America, San Francisco
Transferee:	City of Willits
Type:	Temporary Urgency Change (1435)
Date:	Filed 11-18-87
Request:	75 Ac-ft
Period:	11-20-87 to 5-19-88
Pre-transfer source:	Scout Reservoir, Finney Valley Creek
Post-transfer source:	Direct Flow, Finney Valley Creek
Pre-transfer use:	Recreational
Post-transfer use:	Municipal & Industrial
Protests:	0
Disposition:	Approved for 75 Ac-ft

Comments: The purpose of this transfer was to provide drought relief to the City of Willits.

(12)

Transferor:	Yuba County Water Agency
Transferee:	California Department of Water Resources
Type:	Trial Transfer (1735)
Date:	Filed 4-18-88
Request:	185,000 Ac-ft
Period:	7-1-88 to 9-30-88
Pre-transfer source:	New Bullards Bar Reservoir, Yuba River
Post-transfer source:	Delta (replaces releases from Lake Oroville)
Pre-transfer use:	Irrigation; Municipal & Industrial
Post-transfer use:	Multi-purpose supply and Delta outflow
Protests:	1

Disposition: Approved for 110,000 Ac-ft

Comments: This transfer was second year repeat of Transfer No. 9 discussed above.

(13)

Transferor:	United States Bureau of Reclamation
Transferee:	East Bay Municipal Utility District
Type:	Temporary Urgency Change (1435)
Date:	Filed 5-10-88
Request:	75,000 Ac-ft
Period:	7-1-88 to 6-30-89
Pre-transfer source:	Central Valley Project, Folsom Reservoir, American River
Post-transfer source:	Bixler Pumping Plant, Delta
Pre-transfer use:	Municipal & Industrial
Post-transfer use:	Irrigation
Protests:	11
Disposition:	Denied for environmental and public health reasons.

Comments: East Bay MUD is a contractor with the Bureau of Reclamation for water impounded at Folsom Reservoir on the American River. EBMUD proposed to take its American River entitlement from the Delta, pump that water east to its own Camanche Reservoir, and release it into the Mokelumne River for downstream irrigation users. It also proposed to increase its exports from the Mokelumne River and offered the Delta water as a substitute for the reduced Mokelumne River water supplies. The proposal was met with massive opposition by the effected downstream users.

(14)

Transferor:	Ashley Payne
Transferee:	Heidrick Farms, lessee of lands owned by Woodland Farms
Type:	Temporary Change (1725)
Date:	Filed 5-17-88
Request:	1450 Ac-ft at 12.2 cfs
Period:	6-15-88 to 8-30-88
Pre-transfer source:	Direct flow, Yolo Bypass
Post-transfer source:	Direct flow, Yolo Bypass
Pre-transfer use:	Irrigation
Post-transfer use:	Irrigation
Protests:	0 protests, 2 comments
Disposition:	Approved for 1450 Ac-ft at 12.2 cfs

Comments: The purpose of the transfer was to supply water to both portions of a parcel of land that was in the process of being divided.

(15)

Transferor:	Yuba County Water Agency
Transferee:	California Department of Water Resources
Type:	Temporary Urgency Change (1435)
Date:	Filed 8-18-88
Request:	12,000 Ac-ft
Period:	8-18-88 to 9-15-88
Pre-transfer source:	New Bullards Bar Reservoir
Post-transfer source:	Delta (replaces releases from Lake Oroville)
Pre-transfer use:	Irrigation; Municipal & Industrial
Post-transfer use:	Multi-purpose supply and Delta outflow

Protests:	1
Disposition:	Approved for 12,000 Ac-ft

Comments: This transfer was a third year repeat of Transfer No. 9 discussed above.

(16)

Transferors:	John R. McArthur, William J. Mitchell, and Ernest J. Britten
Transferee:	Malacha Hydro, Ltd. (Muck Valley Project)
Type:	Temporary Change (1725)
Date:	Filed 7-7-88
Request:	500 Ac-ft
Period:	11-1-88 to 12-31-88
Pre-transfer source:	Iverson Reservoir, unnamed stream near the East Fork of Juniper Creek
Post-transfer source:	Direct flow on unnamed stream
Pre-transfer use:	Irrigation, Stockwatering, and recreation
Post-transfer use:	Hydroelectric project test
Protests:	0 protests, 2 comments
Disposition:	Approved for 500 Ac-ft

Comments: The purpose of this transfer was to test the Muck Valley Powerhouse. Permanent operation of the project would be based on a new permit.

(17)

Transferor:	Yuba County Water Agency
Transferee:	East Bay Municipal Utility District
Type:	Temporary Change (1725)
Date:	Filed 2-02-89
Request:	66,000 Ac-ft approved
Period:	3-01-89 to 2-28-90
Pre-Transfer Source:	New Bullards Bar Reservoir, Yuba River
Post-Transfer Source:	Bixler Pumping Plant, Delta
Pre-Transfer Use:	Irrigation; Municipal & Industrial
Post-Transfer Use:	Municipal & Industrial
Protests:	1
Disposition:	Approved for 60,000 Ac-ft at 90 cfs

Comments: The purpose of this transfer was to secure a contingency supply for East Bay MUD during the 1987-1989 drought. Thus, East Bay MUD obtained an option from Yuba County to purchase 66,000 acre-feet at a price of $45.00 per acre-foot. Because East Bay MUD would have to divert the water from the Delta, it would be of substantially lower quality than the water East Bay MUD appropriates from the Mokelumne River, its normal source of supply. Following heavy rain and snowfall during March 1989, which alleviated the critical shortages produced by the drought, East Bay MUD decided not to exercise its option.

(18)

Transferor:	Yuba County Water Agency
Transferee:	City of Napa (representing itself, American Canyon County Water District, Calistoga, and St. Helena.
Type:	Temporary Change (1725)
Date:	Filed 2-27-89
Request:	7,000 Ac-ft.
Period:	4-01-89 to 9-30-89
Pre-Transfer Source:	New Bullards Bar Reservoir, Yuba River
Post-Transfer Source:	State Water Project, North Bay Aqueduct

Pre-Transfer Use:	Irrigation; Municipal & Industrial
Post-Transfer Use:	Municipal & Industrial
Protests:	Department of Fish and Game
Disposition:	Approved for 7,000 Ac-ft at 21 cfs

Comments: The purpose of this transfer was to supply water to the transferees' customers during the 1987-1989 drought. The contract price was $45.00 per acre-foot.

(19)

Transferor:	Pacific Gas & Electric Co.
Transferee:	El Dorado Irrigation District
Type:	Temporary Urgency Change (1435)
Date:	Filed 2-27-89
Request:	600 Ac-ft
Pre-Transfer Source:	Reservoir, American River
Post-Transfer Source:	Sly Park Reservoir, Consumnes River
Pre-Transfer Use:	Hydroelectric Power Generation
Post-Transfer Use:	Municipal & Industrial
Protests:	0
Disposition:	Approved for 600 Ac-ft

Comments: The purpose of this transfer was to secure a supplemental supply during the late stages of the 1988-1989 drought.

(20)

Transferor:	Yuba County Water Agency
Transferee:	California Department of Water Resources
Type:	Temporary Change (1725)
Date:	Filed 3-28-89
Request:	200,000 Ac-ft
Period:	5-01-89 to 9-30-89
Pre-Transfer Source:	New Bullards Bar Reservoir, Yuba River
Post-Transfer Source:	State Water Project, Banks Pumping Plant and California Aqueduct and South Bay Aqueduct
Pre-Transfer Use:	Municipal & Industrial, Irrigation
Post-Transfer Use:	Municipal & Industrial, Irrigation, Delta outflow
Protests:	1
Disposition:	Approved for 200,000 Ac-ft at 1,307 cfs from 7-1-89 to 9-15-89 and at 309 cfs from 9-16-89 to 9-30-89

Comments: The Department of Water Resources originally engaged in this transfer for the purpose of providing emergency drought supply to three municipal water suppliers in the Bay Area--Santa Clara Valley Water District, the San Francisco Water Department, and the Marin Municipal Water District. After DWR committed itself to purchase the water from the Yuba County Water Agency for $45 per acre-foot, the drought lessened for San Francisco and Marin and those agencies informed DWR that they did not need the water. Accordingly DWR will deliver 90,000 acre-feet (less carriage losses) to SCVWD and the remaining 110,000 acre-feet (less carriage losses) to State Water Project contractors in the Tulare Basin. The contract price for SCVWD is $45 per acre-foot. The contract price for the Tulare Basin recipients is $30 per acre-foot ($11 per acre-foot for the water and $19 per acre-foot for transportation costs and carriage losses).

(21)

Transferors:	William C. Payne and W. Ashley Payne
Transferee:	California Valley Land Company

Type:	Temporary Change (1725)
Date:	Filed 5-1-89
Request:	1,450 Ac-ft
Period:	6-15-89 to 8-30-89
Pre-Transfer Source:	Direct flow, Yolo Bypass
Post-Transfer Source:	State Water Project, Banks Pumping Plant and California Aqueduct
Pre-Transfer Use:	Irrigation
Post-Transfer Use:	Irrigation
Disposition:	Petition withdrawn

Comments: The application was withdrawn after DWR announced that there would be no surplus capacity in the Banks Pumping Plant.

(22)

Transferor:	Yuba County Water Agency
Transferees:	Department of Fish and Game; Grasslands Water District
Type:	Temporary Urgency Change (1435)
Date:	Filed 8-8-89
Request:	30,000 Ac-ft
Period:	8-23-89 to 11-30-89
Pre-Transfer Source:	New Bullards Bar Reservoir, Yuba River
Post-Transfer Source:	State Water Project, Banks Pumping Plant and California Aqueduct
Pre-Transfer Use:	Irrigation; Municipal & Industrial
Post-Transfer Use:	Fish and Wildlife
Disposition:	Approved for 30,000 Ac-ft

Comments: This transfer is the sequel to Transfer No. 17 discussed above. After deciding not to use the water it purchased from the Yuba County Water Agency as a contingency drought supply, East Bay MUD resold approximately half of its contract entitlement to the Department of Fish and Game and the Grasslands Water District. The Department of Water Resources agreed to divert the water from the Delta in October for delivery to Grasslands where it will be used to saturate wetlands for the benefit of waterfowl and various shooting clubs. In the Spring of 1990, the water will be released from the Grasslands Water District into the San Joaquin River to aid the migration of salmon smoalt to the sea. Grasslands will pay East Bay MUD $5.00 per acre foot and will pay an additional $8.75 per acre-foot to DWR for the cost of using the State Water Project to transport the water. To account for carriage losses and Delta outflow requirements, Yuba County will release 39,000 acre-feet, which will allow 30,000 acre-feet to be delivered to Grasslands.

(23)

Transferor:	Kern County Water Agency
Transferee:	Westlands Water District
Type:	Temporary Urgency Change (1435)
Date:	Filed 8-1-89
Request:	50,000 Ac-ft
Period:	9-21-89 to 12-31-89
Pre-Transfer Source:	State Water Project, Banks Pumping Plant and California Aqueduct
Post-Transfer Source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-Transfer Use:	Irrigation
Post-Transfer Use:	Irrigation
Disposition:	Approved for 50,000 Ac-ft

Comments: As a result of the 1987-1989 drought and the projected 50 percent reduction in supply from the SWP, many farmers in the Kern County area were unable to receive financing for the planting of row crops in 1989. Because of the greater than normal rain and snowfall during March 1989, however, DWR

was able to provide to KCWA its full entitlement. This left KCWA with a temporary surplus. Initially, KCWA planned to use the surplus for aquifer recharge and storage for later years. Following a request by Westlands, which was facing critical shortages as a result of the drought, KCWA agreed instead to transfer 50,000 acre-feet in the form of a temporary transfer and future exchange. Thus, Westlands agreed to pay $20 per acre-foot for the water in 1989 plus transportation costs of approximately $12 per acre-foot. In addition, Westlands will reimburse KCWA for the water itself over a ten year period. Westlands plans to transfer water back to KCWA during wet years when it can acquire sufficient additional supplies from the Bureau of Reclamation at a projected cost to Westlands of $17 per acre-foot. If Westlands makes the exchange deliveries during dry years, however, KCWA will pay a rebate of between $5 and $15 per acre-foot. This is one of the few transfers of water between state and federal contractors and represents the first transfer of SWP water from a state contractor to a non-state contractor. Thus, to accomplish the transfer, it was necessary for the Board temporarily to change the place of use of DWR's water rights for the SWP to include Westlands.

(24)

Transferor:	Arvin-Edison Water Storage District
Transferee:	Metropolitan Water District
Type:	Long-Term Transfer (1735)
Date:	Filed 9-27-89
Request:	Variable: up to 135,000 acre-feet per year from MWD to Arvin-Edison; up to 128,300 acre-feet per year from Arvin-Edison to MWD
Period:	1995 through 2035
Pre-Transfer Source:	Central Valley Project, Friant Dam and Friant-Kern Canal
Post-Transfer Source:	State Water Project, Banks Pumping Plant and California Aqueduct
Pre-Transfer Use:	Irrigation
Post-Transfer Use:	Municipal and Industrial
Disposition:	EIR in Preparation; Petition Pending

Comments: Pursuant to this exchange proposal, during relatively wet years DWR would deliver to Arvin-Edison up to 135,000 acre-feet per year of MWD's entitlement from the SWP. Arvin-Edison would use this water either for irrigation or for aquifer recharge. In exchange, during dry years MWD would be entitled to receive up to 128,300 acre-feet per year of Arvin-Edison's entitlement from the CVP. In dry years, Arvin-Edison would substitute groundwater for the CVP supplies transferred to MWD. Deliveries to Arvin-Edison would be through the California Aqueduct and Cross-Valley Canal. Deliveries to MWD would be through the California Aqueduct. To accomplish this exchange, it would be necessary to change the Bureau's permits for the CVP to add the Banks Pumping Plant at Clifton Court Forebay as a point of diversion and to include the MWD service area as a place of use. Arvin-Edison and the Bureau are preparing a joint EIR-EIS. The Board will not schedule a hearing until the environmental analysis is completed.

This is the first petition for a long-term transfer that has been submitted to the Board. If approved, it also would be one of the few transfers between a CVP contractor and a SWP contractor.

Section 3: Transfers Within the Central Valley Project System

In contrast to the small number of transfers approved by the State Water Resources Control Board, recipients of water supplied by the Central Valley Project engaged in over 1,200 transfers during the period of this study. Between 1981 and 1988, CVP contractors transferred over 3 million acre-feet. These transactions ranged in size from a few acre-feet to over 100,000 acre-feet. The primary purpose of the transfers was to accommodate fluctuations in water needs during the year due to changes in cropping patterns and weather.

The most common method of reallocating CVP water was by *ad hoc* agreement between individual contractors.

In addition, two associations of CVP contractors formed water pools, which provide a more regular and formal means of transferring water among contractors along the Sacramento River and the adjacent Tehama-Colusa Canal. As with the transfers discussed in Section 2, none of the transfers of federal project water involved a transfer of a water right or a contract right. Rather, all of the transfers within the CVP system were of water only and lasted for no more than a few months.

Transfers by Ad Hoc Agreements

The transfers between CVP contractors are routine and occur on an informal basis. Because they do not require a change in the Bureau of Reclamations's water rights permits for the CVP, the transfers are neither subject to the Board's jurisdiction nor reported to the Board. Although the parties submit their transfer proposals to the Bureau and request its approval, the Bureau generally does not evaluate the proposals. Rather, the Bureau routinely approves *ad hoc* transfers between its contractors as a means of reallocating CVP water to remedy short-term disparities between supply and demand.

Transfer policies and practices

The Bureau does not have a written policy governing transfers within the CVP system, although some field offices have promulgated guidelines.[87] According to its staff, the Bureau has no authority to act as a water broker and does not negotiate transfers between contractors.[88] Rather, the transfers are initiated and arranged by the transferring parties. The CVP user associations serve as unofficial brokers on behalf of their member contractors. Because of their knowledge of cropping patterns, familiarity with member contract allotments and "word of mouth," these associations are able to refer "deficit" and "surplus" contractors to one another.

The terms of transfers are negotiated by the parties. The parties establish the quantity of water, the month of delivery, and the price to be paid. Once these terms are settled, the parties ask the local Bureau field office to deliver the water to the transferee instead of to the transferor. The Bureau normally takes from three to four weeks to respond to such requests. Generally, transfers to users within the same service area receive preferential approval, apparently to offset any deficit conditions which may exist in that region. It is rare for the Bureau to deny a transfer request.

Limitations on the transfer of water between CVP contractors

The Bureau imposes six restrictions on transfers between CVP contractors. First, the transferor must have excess water available under its allotment from the Bureau. The Bureau normally does not challenge the transferor's declaration that it has a temporary surplus that is available for transfer.

Second, agreements to transfer water may be only for the current water delivery year and all deliveries must be completed within that period.[89] This limitation seems to be mainly a convenience for Bureau billing purposes. At the end of the delivery year, the annual billing cycle terminates and total revenue is calculated.

Third, the transferee must have a contract with the Bureau for a use of water authorized by the transferor's contract. For example, the Bureau will approve a transfer from an irrigation contractor to a domestic supplier only if the transferor's contract permits water to be used for municipal and industrial purposes. Since the vast majority

of Bureau contracts are with irrigation districts for the purpose of agricultural use only, CVP contractors generally are not able to transfer water to a municipal and industrial user.[90] While such transfers are rare, they have occurred where the transferor district's contract with the Bureau authorizes the district to supply water to both irrigation and municipal and industrial users.[91]

Fourth, the transferee's use must not violate federal reclamation law. The Bureau insists, for example, that transferees who are irrigation users comply with the acreage limitations of the Reclamation Reform Act.[92]

Fifth, the Bureau reviews the price that may be charged under a transfer agreement. A transferor may not make a profit on the transfer of water; however, it may charge reasonable service fee to recoup all costs associated with the transaction.[93] The service fee is negotiated by the parties and is not subject to close scrutiny by the Bureau.[94] Where a transferor and transferee pay different water rates,[95] the transferee is charged the higher of the two rates.

Sixth, the Bureau does not permit transfers between field divisions, except for Tracy and Fresno. This policy effectively prevents transfers between CVP contractors across the Sacramento-San Joaquin Delta.

Transfers among CVP contractors: 1981-1988

The CVP is divided into five field divisions.[96] In turn, each field division is divided into a number of service areas. The Bureau refers to transfers between contractors within the same service area as "transfers." Transactions between contractors in different service areas are designated as "exchanges." During the eight years covered by this study, all transfers and most exchanges took place within the same field division. The only exchanges between contractors in different field divisions were from users in the Tracy Field Division to users in the Fresno Field Division.

The survey of transfers within the CVP system covered the years 1981 through 1988. During this period, more than 3 million acre-feet of water was transferred or exchanged between federal contractors. These transactions ranged from only a few acre-feet to several thousand acre-feet. The contractor that transferred or exchanged the most water was the Arvin-Edison Water Storage District. Arvin-Edison transferred or exchanged over a million acre-feet during the study period.[97] The service area that transferred or exchanged the most water was Friant-Kern Canal in the Fresno field division.

Table 3 summarizes the aggregate transfers that occurred within the CVP system during the years 1981-1988. Table 4 shows the transfers of CVP water, recorded by Field Division, for the same years.

Transfers and Exchanges by Pooling Agreements

In addition to the transfers among individual CVP contractors, two groups of contractors have created permanent pooling arrangements. Both involve contractors in the Sacramento River Valley.[98] The Sacramento River Water Contractors Association ("SRWCA") entered into a pooling agreement in 1974.[99] The Tehama-Colusa Canal Authority ("TCCA") began pooling in 1981.[100] The purpose of both pools is to establish an on-going water bank into which members can contribute water when they have a surplus and from which they may obtain water when they have a deficit.

Rules and procedures

The pooling agreements provide that participating contractors may transfer water only through the pools. Thus, a contractor with excess water is prohibited from transferring that water to CVP contractors that are not members of the association. Rather, the contractor may transfer water only into its pool account. Similarly, as long as there is sufficient water in the pool, association members may not obtain water from another transfer source.

In most other respects, the rules and procedures that govern the pools are similar to those applicable to the individual *ad hoc* transfer agreements discussed above. Participating contractors must contract and pay in advance for a specific water allotment for the delivery year.[101] Any contractor that has excess water may deposit that water into the pool. A Contractor that withdraws water from the pools must pay the higher of either its own contract rate or the rates of those contractors that have made deposits into the pools. Neither the depositors nor the user-association may profit from the transaction, although a reasonable service fee is permitted. The deposits and withdrawals from the pools are reported to the Bureau.

Role of the water contractors associations

The Sacramento River Water Contractors Association and the Tehama-Colusa Canal Authority are responsible for managing the pools. Although the transfers into and out of the pools are formally subject to review by the Bureau, for all practical purposes the transfers are administered by the associations. Bureau approval for the individual transactions is not required.

TABLE 3

Aggregate Transfers Within the Central Valley Project System: 1981-1988
(acre-feet)

Year	Exchanges* In	Exchanges Out	Transfers** In	Transfers Out
1981	25275	25275	30049	30049
1982	102173	102173	569858	569858
1983	61293	61293	323646	323646
1984	31269	31269	414675	414675
1985	32442	32442	292266	292266
1986	73875	73875	340581	340581
1987	28764	28764	219642	219642
1988	46173	46173	239864	232450
1981-88	401264	401264	2430490	2430490

* Exchanges involve another service area
** Transfers occur within the same service area

TABLE 4
Transfers Within the Central Valley Project System by Field Division: 1981-1988
(acre-feet)

Field Division	*Year*	*EI*	*EO*	*TI*	*TO*
Folsom	1981	–	–	–	–
	1982	57	57	–	–
	1983	122	122	–	–
	1984	1782	1782	–	–
	1985	318	318	–	–
	1986	784	784	–	–
	1987	154	154	–	–
	1988	–	–	–	–
	1981-88 Period	3217	3217		
Field Division	*Year*	*EI*	*EO*	*TI*	*TO*
Tracy	1981	110	500	7069	7069
	1982	5741	5568	12316	12316
	1983	359	2960	45	45
	1984	589	4800	7800	7800
	1985	10255	13928	8875	8875
	1986	3543	28686	15602	15602
	1987	823	6600	15386	15386
	1988	3726	5242	11963	11963
	1981-88 Period	25416	68284	79056	79056
Fresno	1981	24165	23775	13014	13014
	1982	88517	88690	507760	507760
	1983	60812	58211	269631	269631
	1984	26398	22187	367349	367349
	1985	17244	13571	235539	235539
	1986	68340	43197	265008	265008
	1987	24737	18906	149653	149653
	1988	40097	38581	167366	167366
	1981-88 Period	350310	307172	1975260	1975260
Field Division	*Year*	*EI*	*EO*	*TI*	*TO*
Shasta	1981	–	–	83	83
	1982	–	–	830	830
	1983	–	–	715	715
	1984	–	–	921	921
	1985	–	–	1251	1251
	1986	–	–	1693	1693
	1987	–	–	1220	1220
	1988	–	–	1120	1120
	1981-88 Period	–	–	7833	7833
Willows	1981	1000	1000	9883	9883
	1982	7858	7858	48952	48952
	1983	–	–	53255	53255
	1984	2500	2500	38605	38605
	1985	4625	4625	46601	46601
	1986	5535	5535	58278	58278
	1987	3050	3050	53383	53383
	1988	7156	2350	59414	66827
	1981-88 Period	26918	26918	368341	375754

Operation of the pools

SRWCA conducts one pool per delivery year. All deposits and withdrawals must be submitted to the association by April 15. In most years, deposits exceed withdrawals and the excess may be resold by the Bureau to non-SRWCA contractors. TCCA conducts three pools per year in April, June, and August. Very little water is deposited in April, as most contractors do not know what their irrigation needs will be by that date. While deposits and withdrawals increase in June, most water is pooled in August once the contractors have determined whether they are operating at a deficit or excess for the delivery year. The difference in practice between SRWCA and TCCA lies in the fact that SRWCA normally has ample supplies while TCCA normally operates at a deficit. Even after pooling, many TCCA contractors had a deficit. Although the SRWCA pool operated at a chronic surplus, and the TCCA pool at a deficit, there were no exchanges between pools during the 1981-1988 study period.[102]

Table 5 summarizes the deposits into and withdrawals from the SRWCA pool during the year through 1988.

As these data indicate, only a small fraction of the water used by SRWCA contractors is obtained through the pool. For the period 1983-1988, the pool provided only about .3 percent of the total water supplied to these users. Moreover, deposits into the pool exceeded withdrawals by a factor of ten. As discussed above, the excess water was returned to the Bureau for redistribution to other contractors, including users served by the TCCA pool.

Table 6 describes the use of the Tehama-Colusa pool from 1981 through 1988. "Transfers In" and "Transfers Out" indicate the deposits into and withdrawals from the pool by members of the TCCA. "Exchanges In" and "Exchanges Out" signify the water transferred into and out of the pool by either the Bureau or by non-TCCA contractors.

Summary

The Sacramento and Tehama-Colusa pools are prime examples of the benefits of water banking. They serve as established sources of supplemental supply and offer their members a dependable means of responding to short-term allocational disparities. Both SRWCA and TCCA regard the pooling agreements as highly beneficial for their members and are not aware of any public or private objection to the pools.

Wheeling of CVP Water Through the California Aqueduct

In addition to the transfers discussed above, the Bureau itself transferred water within its existing service area by wheeling water through the California Aqueduct, which is owned and operated by the California Department of Water Resources. Historically, the CVP supplies have exceeded the Bureau's contract obligations. Similarly, the capacity of the California Aqueduct has exceeded the amount of water available under DWR's permits. Consequently, as part of the Coordinated Operating Agreement signed in 1986, DWR agreed to make available to the Bureau excess capacity in the aqueduct to allow the Bureau more efficiently to transfer water from the Delta to users in the San Joaquin Valley.

Article 10 (a) of the Coordinated Operating Agreement authorizes the Bureau to "wheel" water through the California Aqueduct. To use the aqueduct in this manner, the Bureau must divert water from the Delta through the state's pumping plant located at Clifton Court Forebay, which is one mile west of the federal pumping plant

TABLE 5
Sacramento River Water Contractor Association
Pool Deposits and Withdrawals: 1983-1988

(acre-feet)

Year	*From Pool*	*To Pool*	*Total Water Used*
1988	2,710	46,370	937,909
1987	291	43,120	937,909
1986	530	41,980	916,809
1985	1,073	35,250	916,809
1984	8,535	29,070	916,809
1983	3,845	51,350	916,809

TABLE 6
Tehama-Colusa Pool Transfers: 1981-1988
(acre-feet)

Pool Transfers	*Year*	*EI*	*EO*	*TI*	*TO*
Tehama-Colusa	1981	1000	--	1053	91
	1982	4440	3418	125	1147
	1983	--	--	--	--
	1984	2500	--	--	2500
	1985	3000	1625	--	1375
	1986	9500	2035	4263	11705
	1987	7350	--	3000	10350
	1988	7156	--	2500	9656
	1981-88 Period	34946	7078	10941	36825

for the Delta-Mendota Canal located at Tracy. Because this represents a change in the point of diversion under its water rights permits, the Bureau's use of the California Aqueduct is subject to the approval of the State Water Resources Control Board.

From 1985 through 1989, the Bureau submitted ten applications for a Temporary Urgency Change in its permits to change the point of diversion to Clifton Court Forebay.[103] The Board approved all ten changes, which allowed the Bureau to wheel water through the California Aqueduct for use in the San Joaquin Valley at times when the CVP facilities were operating at full capacity. With one exception, the purpose of each of the changes approved by the Board was environmental--to support salmon spawning and migration, to provide greater instream flows in the Delta, or to supply water to national wildlife refuges in the San Joaquin Valley. Table 7 summarizes the ten Temporary Urgency Changes.[104]

TABLE 7

Temporary Urgency Changes in the CVP Point of Diversion from Tracy to Clifton Court Forebay: 1985-1989

(1)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 8-30-85
Request:	12,800 Ac-ft
Period:	9-19-85 to 10-15-85
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-Transfer use:	Municipal & Industrial
Post-Transfer use:	Municipal & Industrial
Protests:	0
Disposition:	Approved for 12,800 Ac-ft

Comments: The purpose of this change was to use California Aqueduct to convey CVP water to San Luis Reservoir for later distribution to the Santa Clara Valley Water District, an existing CVP contractor.

(2)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 7-27-87
Request:	10,000 Ac-ft
Period:	9-1-87 to 4-30-88
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-Transfer use:	Storage for multi-purpose
Post-Transfer use:	Supply of migratory waterfowl habitat
Protests:	0
Disposition:	Approved for 10,000 Ac-ft

Comments: The purpose of this change was to allow the Bureau to use the California Aqueduct to convey CVP water to San Luis Reservoir. This enabled the Bureau to supply the Kern National Wildlife Refuge from September through December, while delivering available interim water to the San Luis Reservoir.

(3)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 9-14-87
Request:	80,000 Ac-ft
Period:	12-1-87 to 2-28-88
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal and San Luis Reservoir
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir

Pre-Transfer use:	Storage for multi-purpose
Post-Transfer use:	Delta outflow (salmon migration)
Protests:	0
Disposition:	Approved for 10,000 Ac-ft

Comments: The Bureau engaged in this Temporary Urgency Change at the request of the California Department of Fish and Game. The purpose was to use the California Aqueduct to convey CVP water to San Luis Reservoir. This would enable the Bureau to reduce its diversions at Tracy Pumping Plant to facilitate outmigration of yearling salmon from DFG's Merced River Spawning Channel.

(4)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 3-09-88
Request:	100,000 Ac-ft
Period:	3-14-88 to 4-10-88
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Storage for multi-purpose
Post-transfer use:	Delta outflow (salmon migration)
Protests:	0
Disposition:	Approved for 100,000 Ac-ft Water Right Order 88-2

Comments: This change also was made at the request of the California Department of Fish and Game. The purpose was to allow the Bureau to reduce its diversions at the Tracy Pumping Plant to create hydraulic conditions in the Delta that would allow DFG to study the effects of the Delta Cross Channel on migrating Chinook Salmon. The Bureau would compensate for its reduced diversions by wheeling an equivalent amount of water through the California Aqueduct for storage in San Luis Reservoir.

(5)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 6-30-88
Request:	85,500 Ac-ft
Period:	7-01-88 to 2-28-89
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Multi-purpose
Post-transfer use:	Waterfowl management, salmon spawning, and Delta water quality
Protests:	0
Disposition:	Approved for 85,500 Ac-ft Water Right Order 88-18

Comments: There were three separate purposes for this change. First, from September through December 1988, the Bureau supplied 7,500 acre-feet to the Kern National Wildlife Refuge. These deliveries were made at the request of the U.S. Department of Fish and Wildlife to provide an additional drought supply for migratory waterfowl. Second, during July and August 1988, the Bureau reduced its diversions at the Tracy Pumping Plant by 48,000 acre-feet to maintain water levels and water quality in the southern Delta. Third, the Bureau lost up to 30,000 acre- feet by adjusting the releases from Shasta Dam and Keswick Dam to maintain water temperatures adequate to support salmon eggs and juvenile salmon in the upper Sacramento River. The change enabled the Bureau to compensate for these adjustments in releases and diversions by

wheeling 85,500 acre-feet of CVP water through the California Aqueduct for storage in the San Luis Reservoir and for delivery to the Kern National Wildlife Refuge.

(6)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 9-30-88
Request:	126,500 Ac-ft
Period:	10-1-88 to 3-31-89
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Multi-purpose
Post-transfer use:	Waterfowl management, salmon spawning
Protests:	2
Disposition:	Approved for 126,500 Ac-ft Water Right Order 8-23

Comments: This change was a request for modification of Temporary Urgency Change 5 described above. It had two purposes. First, the U.S. Department of Fish and Wildlife requested additional water for the Kern National Wildlife Refuge and for waterfowl management areas within the Semitropic Water Storage District. The Bureau delivered 1,500 acre-feet through the California Aqueduct for these purposes. Second, as in Temporary Urgency Change E, the Bureau altered its releases from Shasta Dam and Keswick Dam to maintain water temperatures adequate to support salmon eggs and juvenile salmon in the upper Sacramento River. It determined, however, that the 30,000 acre-feet that it was allowed to wheel through CVP facilities to compensate for water lost as a result of this reoperation was insufficient. Accordingly, this change allowed the Bureau to wheel 125,000 acre-feet of CVP water through the California Aqueduct for storage in the San Luis Reservoir.

(7)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 10-17-88 Amended 10-7-88
Request:	45,000 Ac-ft
Period:	10-7-88 to 3-31-89
Pre-Transfer source:	Central Valley Project, New Melones Reservoir (Stanislaus River) and Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Multi-purpose
Post-transfer use:	Waterfowl habitat and salmon migration
Protests:	1
Disposition:	Approved for 45,000 Ac-ft Water Right Order 88-24

Comments: At the request of the California Department of Fish and Game, the Bureau released 45,000 acre-feet from New Melones Reservoir on the Stanislaus River to support salmon migration from the lower San Joaquin River to the Delta. The Bureau then rediverted this water through the SWP facilities at Clifton Forebay and wheeled it through the California Aqueduct. It delivered 25,000 acre-feet to the Grasslands Water District for maintenance of waterfowl habitat and 20,000 acre-feet to San Luis Reservoir to replace an equal amount of water released through the Volta Wasteway to the San Joaquin river in April 1989.

(8)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 12-21-88
Request:	10,000 Ac-ft
Period:	1-01-89 to 3-31-89
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Multi-purpose
Post-transfer use:	Water quality
Protests:	0
Disposition:	Approved for 10,000 Ac-ft Water Right Order 89-1

Comments: The purpose of this change was to allow the Bureau to divert water at Clifton Court Forebay to substitute for reduced diversions at the Tracy Pumping Plant. The Bureau was required to curtail its diversions at Tracy to comply with water quality standards at Rock Slough (the intake for the Contra Costa Canal) pursuant to Decision 1485. The water diverted through the SWP facilities would be wheeled through the California Aqueduct for direct delivery to CVP customers or for storage in San Luis Reservoir.

(9)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 4-28-89
Request:	30,000 Ac-ft
Period:	5-10-89 to 8-20-89
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Multi-purpose
Post-transfer use:	Fish survival studies
Protests:	0
Disposition:	Approved for 30,000 Ac-ft

Comments: During the first 10 days in May 1989, the Bureau agreed to reduce its diversions from the Tracy Pumping Plant to enable the California Department of Fish and Game and the U.S. Department of Fish and Wildlife to conduct studies of the survival of migratory salmon in the Sacramento and San Joaquin rivers and in the Delta. This reduction was coordinated with the releases and reservoir reoperations described above in Temporary Urgency Changes E & F. The Bureau would compensate for the curtailment in diversions by diverting water at Clifton Court Forebay from late May through mid-August and wheeling the water through the California Aqueduct to San Luis Reservoir.

(10)

Applicant:	United States Bureau of Reclamation
Type:	Temporary Urgency Change (1435)
Date:	Filed 8-3-89
Request:	8,200 Ac-ft
Period:	9-15-89 to 12-31-89
Pre-Transfer source:	Central Valley Project, Tracy Pumping Plant to Delta-Mendota Canal
Post-Transfer source:	State Water Project, Banks Pumping Plant to California Aqueduct and San Luis Reservoir
Pre-transfer use:	Multi-purpose

Post-transfer use: Supply of migratory waterfowl habitat
Protests: 0
Disposition: Approved for 8,200 Ac-ft

Comments: The Bureau filed this petition at the request of the U.S. Fish and Wildlife Service. The purpose of the change was to supply CVP water to the Kern National Wildlife Refuge. The refuge normally acquires its water from the Friant-Kern Canal or from local water agencies. Because the Delta-Mendota Canal would be operating at full capacity and because supplies were not available from local agencies, it was necessary to use the California Aqueduct to wheel CVP water to the refuge.

Section 4: Transfers of Colorado River Water in Southern California

The only long-term transfers of water that occurred in California during the decade covered by this study both involve water supplied by the Bureau of Reclamation's Boulder Canyon Project on the Colorado River. The first such transfer--an exchange between water agencies in the Coachella Valley and the Metropolitan Water District--also represents the only transfer to date of water supplied by the State Water Project.[105] The second transfer--between the Imperial Irrigation District and the Metropolitan Water District--is the best example yet of the interplay between California's water rights and water transfer laws.

The Coachella Valley Water District/Desert Water Agency and Metropolitan Water District Exchanges

The exchange agreements between the Coachella Valley Water District and the Metropolitan Water District and between the Desert Water Agency and MWD were motivated by three purposes. First, Coachella and Desert have water supply contracts with the State Water Project, but there is no canal through which to transport SWP water to them. By exchanging their SWP entitlement with MWD for a portion of MWD's entitlement from the Colorado River, these agencies could make use of their SWP contracts. Second, both Coachella and Desert pump groundwater and have been concerned about long-term overdraft. A supplemental source of surface water would help to reduce overdraft and could be used periodically to recharge the aquifer. Third, SWP water is lower in salinity than is water taken from the Colorado River. Thus, by exchanging some of its federal supplies for Coachella's and Desert's SWP entitlement, MWD could enhance its water quality.

The parties entered into the original exchange agreements in 1967 and amended them in 1983 to extend the term until 2035. These agreements authorize MWD to receive the other agencies' SWP entitlement in exchange for an equivalent amount of MWD's Colorado River entitlement. Both agreements declare that they are for an exchange of water only; the parties retain their original contracts with the Department of Water Resources and the Bureau of Reclamation. Thus, Coachella and Desert pay DWR for the water taken by MWD, and MWD pays the Bureau for the exchange water delivered to the other agencies. The Coachella-MWD exchange is for 61,000 acre-feet per year. The amount of water transferred in the Desert-MWD exchange is variable and rises with Desert's SWP entitlement. It began at 8,000 acre-feet per year and reaches a plateau of 38,100 acre-feet per year from 1990 through 2035.

In 1984, the parties signed a supplemental agreement that allows MWD to make advance deliveries to Coachella and Desert up to 600,000 acre-feet. These

advance deliveries are stored in the Upper Coachella Valley Groundwater Basin for later use by the other agencies. The stored water serves as a water bank. Thus, whenever MWD determines that it needs to take its full Colorado River entitlement to supply its own users, MWD may suspend deliveries to Coachella and Desert. During these periods, Coachella and Desert receive their exchange water from advance deliveries stored in the water bank. The supplemental agreement provides that MWD may continue to take Coachella's and Desert's entitlements from the SWP without delivering exchange water for so long as MWD has a positive account in the water bank.

The transfer of SWP water from Coachella and Desert to MWD was not subject to the jurisdiction of the State Water Resources Control Board, because the water rights permits of the Department of Water Resources define the place of use for the SWP as including both the Coachella-Desert Service areas and the MWD services area. Thus, as with the transfers of CVP water described in Section 3, this part of the exchanges could be accomplished without changing either the place of use or the purpose of use of the State Water Project.

The associated transfer of Colorado River water from MWD to Coachella and Desert also fell outside the Board's jurisdiction, but for a different reason. Because this water is distributed by the Secretary of the Interior under the exclusive authority of federal law, the Board's change in water right jurisdiction is preempted. The exchange contracts were subject, however, to the approval of the Department of the Interior.

The exchanges began in 1973 and have been interrupted only once, by the 1976-1977 drought. They are successful examples of how water transfers, conjunctive use of alternative supplies, and water banking can expand the efficiency and supply capacity of systems that, considered in isolation, are at their physical limits.

The Imperial Irrigation District and Metropolitan Water District Transfer

The most prominent water transfer that occurred in California during the period covered by this study was the 1988 agreement for the transfer of conserved water from the Imperial Irrigation District to MWD. According to this agreement, IID will transfer 100,000 acre-feet per year to MWD for 35 years, and MWD will contribute $92 million for delivery and irrigation system improvements and other conservation measures in the Imperial Valley. As with the Coachella and Desert exchanges analyzed above, this transfer was not subject to the approval of the State Water Resources Control Board, because it involved federally supplied Colorado River water. Unlike those exchanges, however, the Board played a significant role in the IID-MWD transfer. An important inducement to this transfer was the Board's finding that IID's use of unlined canals, failure to construct regulating reservoirs, and methods of irrigation result in waste and therefore constitute an unreasonable use of water in violation of Article X, Section 2 of the California Constitution.

Findings of waste and unreasonable use and preliminary contract negotiations

The IID-MWD transfer originated with the petition filed in 1980 by John Elmore, a farmer whose lands adjoin the Salton Sea, which asked the Department of Water Resources to investigate alleged waste and unreasonable use of water within IID. Elmore claimed that the District's lack of regulating reservoirs and excessive deliveries of water to farmers produced unreasonable

amounts of return flow, or "tailwater," which ran off the farmers' land into the Salton Sea and flooded Elmore's land. DWR concluded that IID's practices were unreasonable and referred the matter to the Board. The Board conducted hearings pursuant to section 275 of the Water Code.[106] In its Water Rights Decision 1600, the Board ruled that IID's failure to implement "practical measures available to reduce the present losses of water within the District . . . is unreasonable and constitutes a misuse of water under article X, section 2 of the California Constitution."[107]

IID challenged Decision 1600 on the ground that the Board does not have statutory authority, following its own administrative adjudication, to declare an existing use of water unreasonable. Rather, IID argued, the Board must file suit to enforce the mandate of Article X, Section 2, in which litigation IID would have the right to a trial *de novo*. The court of appeal rejected this contention and held that the Board has "all-encompassing adjudicatory authority" under both section 275 and the California Constitution to enforce the reasonable use doctrine.[108]

While this lawsuit was pending, IID began to consider various measures to conserve water. Prompted in part by an Environmental Defense Fund study, which proposed that MWD finance water conservation capital improvements within IID in exchange for the conserved water,[109] IID commenced negotiations with MWD in 1984. MWD previously had expressed an interest in obtaining water from IID primarily because it had no other long-term sources of additional water supply. The electorate's rejection of the Peripheral Canal in 1982 had limited the supply capacity of the State Water Project, and the imminent completion of the Central Arizona Project would soon reduce MWD's entitlement from the Colorado River.

By mid-1985, the parties had drafted a memorandum of understanding in which MWD would pay $10 million per year into IID's water conservation fund in exchange for 100,000 acre-feet per year of conserved water. In October 1985, however, the IID board of directors rejected the memorandum and voted to require an environmental impact report on the proposal. By mid-1986, contract negotiations had broken off completely, with the parties at loggerheads over the price of MWD's conservation investments, the term of the transfer agreement, and the characterization of the transfer itself. IID contended that the transfer was a sale of water. In contrast, MWD argued that it was simply investing in capital improvements, which would free-up conserved water to which it would be entitled according to the terms of the Seven Party Agreement.[110] Negotiations resumed in late 1987 and continued into 1988. Although the parties were able to narrow their disagreements, they remained divided over both price and the characterization of the agreement.[111]

In September 1988, the State Water Resources Control Board broke the deadlock by issuing its long-awaited follow-up order to Decision 1600. The Board directed IID to conserve 20,000 acre-feet per year by January 1, 1991 and 100,000 acre-feet per year by January 1, 1994.[112] Three months later IID agreed to transfer 100,000 acre-feet per year to MWD.

The agreement

The agreement between IID and MWD establishes a water conservation program that includes lining existing canals, construction of reservoirs and interceptors, installation of gates and automation equipment, and implementation of water supply monitoring, which are designed cumulatively to conserve 100,000 acre-feet per year for transfer to MWD. The program is administered by a

Program Coordinating Committee composed of three members: one representative appointed by each of the parties and a third, jointly appointed member. The agreement requires IID to have all the projects of the conservation program operable within five years. The term of the agreement is thirty-five years.

MWD's principal duty under the agreement is to fund the conservation program, including construction and annual operating and maintenance costs. The agreement also provides that MWD will reimburse IID for indirect expenses associated with the program, such as lost hydroelectric power revenue, mitigation of adverse effects on agriculture from increased salinity, environmental mitigation, and public information expenses. The parties estimated that the capital costs will be approximately $92 million and that the annual costs will exceed $3 million. They fixed MWD's liability for indirect costs at $23 million.

IID's primary obligations are to implement the conservation program and to make available to the Secretary of the Interior the water conserved by the program. The agreement also establishes a timetable for the implementation of the conservation program and a schedule of water to be conserved. This schedule is set forth in Table 8.

As shown in the table, the target deadline for full implementation of the conservation measures is January 1, 1995. Each project will be reviewed yearly for the five years following the effective date of the agreement by consultants who will report their findings to the PCC. If, based on the review of all available information for a particular project, the consultants recommend an adjustment in the estimates of the amount of water being conserved, the PCC will adjust those estimates to reflect the actual amount of water being conserved by each project. After the first five yearly reviews, each project will be reviewed once every five years during the balance of the term of the Agreement. If it is determined by the PCC, a court, or an arbitrator that more than 100,000 acre-feet per year is being conserved, the excess water will go to MWD. The rationale for allowing MWD to receive conserved water in excess of 100,000 acre-

TABLE 8
Water Conservation Schedule
IID-MWD Transfer Agreement

Effective Date	New Water Conserved & Available for Use by MWD (acre-feet per year)	Cumulative Water Conserved and Available to MWD (acre-feet per year)
1-1-90	38,610	38,610
1-1-91	14,745	53,335
1-1-92	10,490	63,845
1-1-93	22,940	86,785
1-1-94	13,215	100,000
1-1-95 and each year thereafter until modified	—	100,000

feet per year is that MWD's funding of the conservation program is by project and therefore it should receive the water conserved by each project rather than a specified annual amount. If the amount of water conserved is less than 100,000 acre-feet per year, however, IID must undertake additional conservation measures to be funded by MWD.

Once IID conserves 100,000 acre-feet, MWD's right to receive conserved water is not cumulative. If MWD fails to use all the water conserved by the program during any calendar year, it will not be entitled to more than 100,000 acre-feet during the next calendar year. MWD may "bank" the conserved water received from IID, however, in Lake Mead or in any other reservoir in which it obtains water banking rights. Finally, in times of shortage--defined as any year in which the Secretary of the Interior cannot deliver 3.85 million acre-feet to the first three priorities of the Seven Party Agreement--IID may choose not to provide conserved water to MWD.

The parties also reserved a number of existing rights and contentions. First, except for the transfer of water made available by the conservation program, the agreement does not affect the parties' respective rights to water from the Colorado River.

Second, the parties agreed that, except for legal proceedings to enforce the contract, they would not base any legal contention on the existence and execution of the agreement. The purpose of this provision is similar to Water Code section 1244 discussed above. It was designed to prevent MWD from using the conservation and transfer agreement to bolster its claim that IID is wasting water. Indeed, the agreement declares that, subject to MWD's right to use the water conserved by the program, neither the execution nor the performance of the agreement shall "result in any forfeiture, diminution or impairment of any rights of IID in the conserved water."

Third, the agreement states that the water conserved and transferred to MWD retains its third priority status under the Seven Party Agreement. MWD then made two seemingly contradictory declarations. On the one hand, it promised not to assert that the agreement and conservation program have the effect of changing the status of the conserved water from IID's third priority to its own fourth or fifth priorities. On the other, MWD reserved its claim to water "not put to beneficial consumptive use by the holders of the first three priorities of the Seven Party Agreement as set forth in both IID's and MWD's water delivery contracts with the Secretary [of the Interior]." The purpose of these provisions was to preserve MWD's contention that IID is wasting water and that the Secretary should reallocate all water in excess of IID's reasonable and beneficial uses to MWD under the Seven Party Agreement. At the same time, IID preserved its denial of that claim and sought to ensure that MWD could not use the execution of the conservation and transfer agreement as an admission by IID of waste and unreasonable use.

Subsequent developments

Because the agreement provides for the reallocation of 100,000 acre-feet per year of water supplied by the Boulder Canyon Project, the parties submitted the contract to the Department of the Interior. In a letter dated January 17, 1989, the regional director of the Bureau of Reclamation informed IID and MWD that it was "prepared to facilitate" implementation of the agreement. The letter noted, however, that the Coachella Valley Water District and the Palo Verde Irrigation District "have expressed concerns regarding the potential impacts on their existing entitlements to water from the Colorado

River" and encouraged IID and MWD to obtain the other agencies' consent to the agreement.

Two weeks later, Coachella filed suit against IID, MWD, and the Bureau, seeking to enjoin implementation of the transfer. Coachella claimed that the transfer violates the Seven Party Agreement, which it contends restricts the use of third-priority water to the Imperial and Coachella Valleys. At the time of this writing, it appears that the Coachella litigation will be settled.

Summary of the IID-MWD transfer

The IID-MWD transfer was largely the product of one of the rare applications of California's waste and unreasonable use laws. It is doubtful that IID would have seriously considered investment in the conservation measures necessary to make water available to transfer had Elmore not filed his complaint and had the Board not followed-up by investigating IID for waste under section 275 of the Water Code. Following the Board's 1984 and 1988 orders, IID was confronted with the choice of finding a means of financing the necessary water conservation or forfeiting its rights to 100,000 acre-feet per year. Self-interest dictated that it preserve its water rights by signing the conservation/transfer agreement with MWD.

In agreeing to transfer water to MWD, IID took advantage of the conserved water provisions of the Water Code, including sections 1011 and 1244, discussed above in Section 2C. Indeed, to facilitate the transfer, the Legislature enacted special legislation in 1984 designed to minimize the risk to IID's water rights. Section 1012 of the Water Code provides that "any water conservation effort . . . which results in reduced use of Colorado River water within the Imperial Irrigation District" shall not cause a "forfeiture, diminution, or impairment of the right to use the water conserved . . . except as set forth in the agreements between the parties and the United States."[113] This provision appears to preclude the state or any other party from bringing a forfeiture action against IID with respect to the 100,000 acre-feet per year it conserves pursuant to the agreement. As such, section 1012 is considerably stronger than sections 1011 and 1244, which authorize the transfer of conserved water and declare only that the transfer "*in itself*, shall not constitute evidence of waste or unreasonable use."[114]

For its part, MWD was motivated to pursue the conserved water transfer option for two reasons. First, in the early 1980s, MWD was facing projected increases in demand coupled with rather severe supply constraints. The population in MWD's service area increased by ten percent between 1980 and 1985 and is expected to rise an additional thirty five percent from 1985 and 2010.[115] With the defeat of the Peripheral Canal in 1982, it appeared that additional supplies from the State Water Project would not be available to serve this population, at least in the near future. Moreover, when the Central Arizona Project reaches full capacity, MWD stands to lose up to 662,000 acre-feet per year of its Colorado River supply. These factors combined to induce MWD to begin exploring means of reallocating the existing entitlements to water from the Colorado River.

Second, while MWD initially pursued the option of forcing a reallocation of the Colorado River supplies through the laws of waste and unreasonable use, it ultimately chose the transfer option to minimize the expense and uncertainty associated with proceedings to divest IID of a portion of its entitlement. To obtain a reallocation by administrative fiat rather than voluntary transfer, MWD would have had to convince both the State Water Resources Control

Board and the Bureau of Reclamation that IID was wasting water and that the appropriate remedy for such unreasonable use under the Seven Party Agreement would be to reallocate such water to MWD. In view of the administrative hearings and judicial review required, this strategy was not only legally risky, it also would have taken well over a decade to accomplish. MWD's decision to pay over $100 million for water that it could have obtained "for free" thus reflects a rational business judgment that the transfer option was less risky, and ultimately less expensive, than the alternative strategy.

Although the IID-MWD transfer sprung from a unique confluence of factors, it nonetheless stands as a model for future transfers. The transfer shows how vigorous enforcement of the state's laws against waste and unreasonable use can be a catalyst for the reallocation of water from inefficient uses to relatively higher-valued uses. It also demonstrates that water conserved from already developed supplies can serve new demands as effectively as can the development of new supplies. Perhaps most importantly, the IID-MWD transfer may be the deal that breaks the institutional log jam by convincing the water industry that long-term, large-scale transfers are both possible and (under some circumstances) the most attractive water supply option.

Section 5: Findings and Conclusions

Principal Findings

1. There were fewer state-authorized transfers in California than in the other five states represented in this study. Between 1981 and 1989, twenty-four petitions to transfer water were submitted to the State Water Resources Control Board. The Board approved nineteen ofthe petitions and denied two. Two petitions were withdrawn, and one is pending.

2. The total number of transfers during the 1980s, including those that were not subject to the Board's jurisdiction, was much larger than expected.

   a. In addition to the nineteen approved by the SWRCB, there were more than 1,200 transfers between contractors of the Bureau of Reclamation of water supplied by the Central Valley Project between 1981 and 1988.

   b. Three long-term transfers occurred in Southern California between users of water supplied by the Boulder Canyon Project on the Colorado River.

   c. Numerous routine transfers also took place between users within the Kings and Kern County Water Agencies.

3. There was a tremendous range in the amount of water transferred. The transactions ranged in size from a few acre- feet to over 100,000 acre-feet.

4. Virtually all of the transfers were for a term of less than one year.

   a. Each of the nineteen transfers approved by the SWRCB was for a specific, short-term purposes such as augmenting supply during one irrigation season, conducting water quality studies, maintaining instream flows during times of low natural flow, and providing contingency supplies during the 1987-1989 drought.

b. The transfers of CVP water were routine and for the purpose of distributing water among the federal contractors as needed during each irrigation season.

5. In contrast to the CVP system, there were only two transfers between State Water Project contractors of water supplied by the SWP.

a. Pursuant to these agreements, the Coachella Valley Water District and the Desert Water Agency have exchanged their SWP entitlement for an equal quantity of the Metropolitan Water District's entitlement from the Colorado River.

b. The Coachella exchange involves 61,000 acre-feet per year; the Desert exchange will reach 38,100 acre-feet per year from 1990 through 2035.

c. The purposes of the exchanges were: (1) to allow Coachella and Desert to make use of their SWP entitlements; (2) to enhance the quality of water that MWD supplies to municipal and industrial users by substituting the higher quality SWP water for a portion of MWD's Colorado River supplies; and (3) to allow Coachella and Desert to use the substitute Colorado River supplies to recharge the aquifer from which they pump groundwater.

d. The exchange contracts are long-term (50 years).

6. Most of the transfers were not subject to the jurisdiction of the SWRCB, either because they did not involve a change in the type of use, place of use, or point of diversion or because the water transferred is not within the Board's jurisdiction.

a. The multi-purpose type of use and extensive place of use terms of the water rights permits for the CVP and the SWP allow water to be transferred among federal contractors and among state contractors without triggering the Board's jurisdiction.

b. The largest transfer that occurred within California--the 35-year, 100,000 acre-feet per year transfer of conserved water from the Imperial Irrigation District to the Metropolitan Water District--was exempt from the SWRCB's transfer jurisdiction because it involved Colorado River water allocated according to federal law.

7. There were no transfers of water rights during the study period.

Conclusions

1. Of the six states reviewed in this study, California has the strongest statutory directives to promote water transfers.

2. Ironically, most of the transfers that occurred during the 1980s were not based on these statutes.

3. This pattern is likely to continue for several reasons.

a. The large service areas of the CVP, the SWP, and other regional agencies allow many water contractors to transfer water without changing the terms of the water right pursuant to which the water is appropriated. In these cases, the SWRCB has no jurisdiction over the transfers.

c. These sources account for 42 percent of the surface water consumed in the state.

4. These transfers should not be brought under the Board's jurisdiction because the state should not regulate existing water markets that facilitate transfers in which water rights are not changed and third parties are not adversely affected.

5. Notwithstanding their limited use and applicability, the California water transfer statutes enacted during the 1980s played an important role in the state-wide response to the 1987-1990 drought by facilitating a number of short-term transfers to areas that faced critical shortages.

6. The modern California statutes will make a significant contribution to the future management of the state's water resources for three reasons.

a. By authorizing the transfer of conserved and surplus water, the statutes will help to minimize the risk that an offer of water for sale or lease could result in an investigation of waste or unreasonable use and a decree divesting the transferor of a portion of its water rights.

b. As the IID-MWD transfer demonstrates, the threat of such an investigation and decree could help to induce transfers as a means of both avoiding forfeiture and financing water conservation improvements.

c. The water transfer statutes have contributed to a growing appreciation in the water industry that transfers are a viable means of supplying new demands and of reallocating water from less valued uses to greater valued consumptive and instream uses.

7. The essential elements of an efficient, fair, and forceful transfer law are already in place in the California Water Code. The law should be reorganized to resolve inconsistencies and to establish a cohesive system for the transfer of water on both short-term and long-term bases. The substance of the transfer statutes otherwise should not be significantly altered.

ENDNOTES TO CHAPTER 2

1. The other reports survey water transfers that occurred between 1975 and 1985.

2. The Bureau of Reclamation annually collects data on such transfers, but routinely deletes the data from its central computer after a year or so. Apparently by oversight, the Bureau had retained its files on all transfers within the CVP system for the years 1981 through 1988.

3. We did not, for example, survey all irrigation districts and other local water agencies to determine the number of transfers that occurred among their individual members. As part of the project work, however, we did ask all contractors of the State Water Project whether their members had transferred or exchanged water during the period covered by this study. Only two--the Kern County Water Agency and the Kings County Water Agency--reported transfers among their individual members. Both agencies have on-going, but informal programs to reallocate water among their members as needed during each irrigation system.

4. This survey of California's water transfer laws is taken, in slightly revised form, from Gray, *A Primer on California Water Transfer Law*, 31 **Ariz. L. Rev.** 745, 767-80 (1989).

5. *See* Scott v. Fruit Growers Supply Co., 202 Cal. 47, 52-53, 258 P. 1095, 1097 (1927); Butte T.M. Co. v. Morgan, 19 Cal. 609, 615 (1862).

6. Cal. Water Code §§ 1701 & 1702 (West 1971). These "change in water right" sections of the Code are applicable only to appropriative rights based on a permit or license issued by the Board. They do not apply to pre-1914 appropriative rights, which were established before the creation of the California Water Commission on December 19, 1914 and therefore are not subject to the direct regulatory authority of the Board acting as successor to the Commission. Pre-1914 rights are governed, however, by the common law "no-injury" rule and by Water Code section 1706 which provides that persons "entitled to the use of water by virtue of an appropriation other than under the Water Commission Act or this code"--*i.e.*, pre-1914 appropriators--"may change the point of diversion, place of use, or purpose of use if others are not injured by such change, and may extend the ditch, flume, pipe, or aqueduct by which the diversion is made to places beyond that where the first use was made." *Id.* § 1706.

7. *Id.* § 109(a) (West Supp. 1990).

8. *Id.*

9. *Id.* § 109(b).

10. *See* discussion *infra* on transfers of conserved and surplus water.

11. Cal. Water Code § 109(b) (West Supp. 1990).

12. *Id.* § 475.

13. *Id.* § 480.

14. *Id.*

15. *Id.* § 481.

16. California Department of Water Resources, A Catalog of Water Transfer Proposals (Sept. 1986) (draft).

17. California Department of Water Resources, A Guide to Water Transfers in California (June 1989) (draft); *see* Cal. Water Code § 482 (West Supp. 1990).

18. Cal. Water Code § 10008 (West Supp. 1990).

19. *Id.* § 10009.

20. *Id.* § 1810. The statute defines "bona fide transferor" as simply a person or public agency "with a contract for sale of water which may be conditioned upon the acquisition of conveyance facility capacity to convey the water that is the subject of the contract." *Id.* § 1811(a). "Unused capacity" means "space that is available within the operational limits of the conveyance system and which the owner is not using during the period for which the transfer is proposed and which space is sufficient to convey the quantity of water proposed to be transferred." *Id.* § 1811(e). The statute also stipulates that it shall apply only to 70 percent of the unused capacity. *Id.* § 1814.

21. The obligation to provide unused aqueduct capacity also is subject to a variety of other qualifications. For example, a contractor of the operator of the conveyance facility has a right to use unused capacity before it leased to a bona fide transferor that is not an existing contractor. *Id.* § 1810(a). In the event of an emergency (defined as a "sudden occurrence such as a storm, flood, fire, or an unexpected equipment outage impairing the ability of [the contractor] to make water deliveries," *id.* § 1811(b)), a contractor also may preempt a lease of unused capacity to a transferor that is not an existing contractor. *Id.* § 1810(c). The transfer of water through the conveyance facility may not diminish the quality of the water normally carried by the aqueduct, unless the transferor provides for treatment of the water. *Id.* § 1810(b). And, the transfer must be accomplished "without injuring any legal user of water and without unreasonably affecting fish, wildlife, or other instream beneficial uses and without unreasonably affecting the overall economy or the environment of the county from which the water is being transferred." *Id.* § 1810(d).

22. *Id.* § 380(a).

23. *Id.* § 380(b).

24. *Id.* § 380(c).

25. *Id.* § 380(d).

26. *Id.* § 382.

27. *Id.* § 381.

28. *See* Assembly Office of Research, Water Trading: Free Market Benefits for Exporters and Importers 40-45 (1985).

29. *Id.* at 41-42.

30. Cal. Water Code § 382 (West Supp. 1990).

31. Article X, Section 2 provides in relevant part that "[t]he right to water . . . is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water." Cal. Const., art. X, § 2.

32. Cal. Water Code § 383(a) & (b) (West Supp. 1990).

33. *Id.* § 383(a). The original version of the legislation limited the duration of transfers to seven years. Cal. Stats. 1982, ch. 867, p. 3221, § 2. The Legislature eliminated this time constraint in 1986. Cal. Stats. 1986, ch. 364, § 1. In muddled terms, section 387 now provides: "Any agreement for the transfer of water under the provisions of this chapter shall be for a period not to exceed seven years unless a longer period is mutually agreed upon by the agency and the transferee." Cal. Water Code § 387 (West Supp. 1990).

34. *Id.* § 383(b).

35. *Id.* § 383(c).

36. *Id.* § 385.

37. *Id.* § 384.

38. *Id.* § 386.

39. Section 1010(a) provides in relevant part: "Cessation of or reduction in the use of water under any existing right . . . as the result of the use of reclaimed water or water polluted by waste to a degree which unreasonably affects such water for other beneficial uses, shall be and is deemed equivalent to, and for the purpose of maintaining any right shall be construed to constitute, a reasonable and beneficial use of water to the extent and in the amount that such reclaimed or polluted water is being used not exceeding, however, the amount of the reduction." *Id.* § 1010(a).

Section 1011(a) states that "[w]hen any person entitled to the use of water under any appropriative right fails to use all of any part of the water because of water conservation efforts, any cessation or reduction in the use of such appropriated water shall be deemed equivalent to a reasonable beneficial use of the water to the extent of such cessation or reduction in use." *Id.* § 1011(a).

40. *Id.* § 1010(b).

41. *Id.* § 1011(b).

42. *Id.* § 1244.

43. Section 275 of the Water Code provides that "the department and the board shall take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state." *Id.* § 275. The courts have concurrent authority to enforce the reasonable use requirement of Article X, Section 2. Environmental Defense Fund v. East Bay Municipal Utility District, 26 Cal. 3d 183, 200, 605 P.2d 1, 9-10, 161 Cal. Rptr. 466, 474-75 (1980).

44. As discussed below in Section 5, the Legislature enacted special legislation in 1984 to facilitate the transfer of conserved water from the Imperial Irrigation District to the Metropolitan Water District, which declares categorically that the water conserved and transferred shall not be forfeited. Cal. Water Code § 1012 (West Supp. 1990). This legislation is considerably more protective of the transferor's water rights than are the statutes discussed in the text.

45. 1988 Cal. Stat., ch. 1145, § 2.

46. Cal. Water Code § 1435(a) (West Supp. 1990).

47. *Id.* § 1435(c).

48. *Id.* § 1435(b).

49. *Id.* § 1439.

50. *Id.* § 1440.

51. *Id.* §§ 1440 & 1441.

52. 1980 Cal. Stat. ch. 933, § 12.

53. 1988 Cal. Stat. ch. 1145, §§ 2 & 3.

54. *See infra* Section 2.

55. 1980 Cal. Stat. ch. 933, § 12 (former Water Code § 1735).

56. *Id.*

57. *Id.* (former Water Code § 1737).

58. *Id.* (former Water Code § 1738).

59. Cal. Water Code § 1728 (West Supp. 1990).

60. *Id.* § 1725.

61. *Id.*

62. *Id.* § 1725 (West Supp. 1990).

63. *See* 1980 Cal. Stat., ch. 933, § 12 (former Water Code §§ 1726-1728).

64. Cal. Water Code § 1726 (West Supp. 1990).

65. *Id.*

66. *Id.* § 1727(a).

67. *Id.* § 1727(b).

68. *Id.* § 1727(c).

69. *Id.* § 1731.

70. *Id.* § 1729 (exempting temporary changes from the requirements of Division 13 (commencing with Section 21000) of the Public Resources Code).

71. *Id.* § 1735.

72. *Id.* § 1736.

73. *Id.* § 1737.

74. For example, section 383 authorizes the transfer of "[w]ater, the right to which is held . . . pursuant to an appropriation made under the Water Commission Act or Division 2 (commencing with Section 1000)." *Id.* § 383. The Temporary Urgency Change provisions refer to a "permittee or licensee who has an urgent need to change a point of diversion, place of use, or purpose of use." *Id.* § 1435(a). Similarly,

the Temporary Change sections provide that a "permittee or licensee may temporarily change" its water rights. *Id.* § 1725. Section 1735, the Long-Term Transfer law, simply states that "the board may consider a petition for a long-term transfer of water or water rights." *Id.* § 1735.

75. United States v. State Water Resources Control Board, 182 Cal. App. 3d 82, 98-99, 227 Cal. Rptr. 161, 166-67 (1st Dist. 1986).

76. *Id.*

77. **W. Kahrl, The California Water Atlas** 47-50 (1979).

78. United States v. State Water Resources Control Board, 182 Cal. App. 3d 82, 99, 227 Cal. Rptr. 161, 167 (1st Dist. 1986).

79. **W. Kahrl**, *supra* note 77, at 50-56.

80. *See infra* Section 4.

81. Arizona v. California, 373 U.S. 546, 575-90 (1963); *see* Department of Water Resources, California Water: Looking to the Future 26-28 (1988) (Bull. 160-88).

82. *See infra* Section 4.

83. State Water Resources Control Board, Water Quality Control Plan: Sacramento-San Joaquin Delta and Suisun Marsh (1978); State Water Resources Control Board, Water Right Decision 1485: Sacramento-San Joaquin Delta and Suisun Marsh (1978).

84. *See supra* text accompanying notes 22-44.

85. *See supra* text accompanying notes 59-70.

86. This exchange is described below in Table 2.

87. In December 1988, the Department of the Interior published a short paper titled "Principles Governing Voluntary Water Transactions that Involve or Affect Facilities Owned or Operated By the Department of the Interior." The document states that the Department "will become involved in facilitating a proposed voluntary water transaction only when it can be accomplished without diminution of service" to existing federal contractors and when "there are no adverse third-party consequences, or when third-party consequences will be heard or adjudicated in appropriate State forums, or when such consequences will be mitigated to the satisfaction of the affected parties." Department of the Interior, *Principles Governing Voluntary Water Transactions that Involve or Affect Facilities Owned or Operated By the Department of the Interior* 2 (Dec. 1988); *see also infra* notes 88 and 93.

88. The Bureau's unwritten policy is confirmed by the 1988 "Principles Governing Voluntary Water Transactions," which states that the Department "will not suggest a specific transaction except when it is part of an Indian water rights settlement, a solution to a water rights controversy, or when it may provide a dependable water supply the provision of which otherwise would involve the expenditure of Federal funds." *Id.* Rather, the Department's role "will be to facilitate transactions that are in accordance with applicable State and Federal law and proposed by others." *Id.*

89. The water delivery year runs from March 1 through February 28.

90. This limitation has apparently not posed a significant problem for the Bureau in the past. However, it may become more problematic in the event of water shortages. For example, the Santa Clara Valley Water District County is a federal contractor in the San Luis Delta-Mendota service area and a member of the San Luis Delta-Mendota Water Users Association. It is the only M&I user in that service area. If

Santa Clara were able to receive transfers of federal water from agricultural users, water rationing during drought years might be avoided.

91. For example, the Lindsey-Strathmore Irrigation District has transferred water to the City of Lindsey. Conversely, the City of Fresno frequently sells surplus water to agricultural users in the Fresno Field Division of the CVP.

92. *See* 43 U.S.C. §§ 390cc and 390ee.

93. The recent water transfer policy document promulgated by the Department of Interior suggests that the policy of not allowing profits may be changed. It provides that "the financial terms negotiated between the [transferring] entities do not concern DOI." Department of the Interior, *supra* note 87, at 9. The Department also stated that "if the Federal Government is not made worse off financially by the transaction . . . it may be in the public interest to allow federally developed water to be employed. The fact that it was developed by virtue of a subsidized Federal project . . . should not . . . be a barrier." *Id.* at 8.

94. Bureau staff reported that they do not require transferors to report their transaction costs and acknowledged that, as a consequence, they are not able to determine whether a given service fee is reasonable or not, except by "eye-balling."

95. Water rates are set by the Bureau and depend on a variety of factors, including the type of water, type of use, date the contract was entered into, size of the farm, and the type of delivery system by which the water is supplied.

96. The five field divisions in the CVP system are: (1) Folsom, (2) Tracy, (3) Fresno, (4) Shasta, and (5) Willows.

97. Over the 1981-1988 period, Arvin-Edison transferred out 623,387 acre-feet, exchanged out 188,156 acre-feet, transferred in 59,160 acre-feet, and exchanged in 345,213 acre-feet. While it was the only contractor to transfer or exchange over a million acre-feet, there were several contractors that transferred well over 100,000 acre-feet during the same period.

98. In addition, the Friant Water Users Association is reportedly considering instituting a pooling agreement.

99. SRWCA represents thirty-two major users from over 100 contractors along the Sacramento River. While most contractors are water districts, some are individual irrigators under exchange contracts.

100. TCCA represents the contractors along the Tehama-Colusa Canal, all of which are water districts.

101. Sacramento River contractors purchase CVP water only for the months of July, August and September. During the rest of the year, contractors rely on their riparian and/or pre-1914 appropriative rights.

102. TCCA contractors were able to purchase additional supplies from the Bureau. Because both the TCCA and the SRWCA obtain their water from the Sacramento River, it is reasonable to conclude that the additional supplies sold to TCCA contractors includes unused SRWCA water.

103. A eleventh petition for Temporary Urgency Change, in which the Bureau sought to supply water through the California Aqueduct to the Dudley Ridge Water District pursuant to a temporary CVP contract was analyzed previously in Section 3.

104. These Temporary Urgency Changes were not transfers of water because the right to use the water always remained with the Bureau of Reclamation. We have nonetheless included them in the report

because they were authorized by the Board and show how the CVP and SWP facilities may be used conjunctively to obtain maximum beneficial use of the waters available to the two projects.

105. Two other SWP contractors have filed an Environmental Impact Report on a proposed transfer of project water. The Castaic Lake Water Agency has purchased 8,500 acres of land within in the Devil's Den Water District, which is located within Kings and Kern Counties. Castaic proposes to retire this land and transfer the conserved water through the California Aqueduct to its service area. Devil's Den has a contract entitlement to 12,700 acre-feet per year of SWP water. The parties do not expect to begin the transfer until 1997.

106. This section empowers DWR and the Board to "take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state." Cal. Water Code § 275 (West Supp. 1990).

107. California State Water Resources Control Board, Decision 1600: Imperial Irrigation District Alleged Waste and Unreasonable Use of Water 66 (1984). The Board directed IID to monitor the tailwater discharge of all fields receiving water deliveries, to repair defective tailwater structures, to submit a "detailed and comprehensive water conservation plan," and to develop a plan for construction of regulatory reservoirs by February 1, 1985. *Id.* at 67-69. It did not order the District, however, to conserve a specific amount of water.

108. Imperial Irrigation District v. State Water Resources Control Board, 1160, 1169-70, 231 Cal. Rptr. 283, 288-89 (4th Dist. 1986). The court of appeal remanded to the superior court for a determination whether the Board's Decision 1600 was supported by substantial evidence. On remand, the superior court affirmed the Board's findings and conclusions in all respects. Imperial Irrigation District v. State Water Resources Control Board, No. 58706 (S.D. Co. Supr. Ct. filed Apr. 13, 1988).

109. **R. Stavins & Z. Willey, Trading Conservation Investments for Water** (1983).

110. The Seven Party Agreement defines how the Secretary of the Interior distributes water from the Boulder Canyon Project to its California contractors. The first three priorities are: (1) Palo Verde Irrigation District; (2) Yuma Project (California portion); (3) Imperial Irrigation District, Coachella Valley Water District, and the mesa lands of the Palo Verde Irrigation District. The Metropolitan Water District holds the fourth and fifth priorities. The first three priorities are entitled to 3.85 million acre-feet per year. The fourth priority gives MWD rights to 550,000 acre-feet per year. Under its fifth priority MWD is entitled to an additional 662,000 acre-feet per year, but only until the Central Arizona Project reaches full capacity. *See* Department of Water Resources, California Water: Looking to the Future 28 (1987) (Bull. 160-87).

111. For a more thorough review of the contract negotiations, see McMorrow & Schwarz, *The Imperial Irrigation District-Metropolitan Water District Water Transfer: A Case Study, in* **M. Reisner & S. Bates, Oasis: Reform or Revolution For Western Water** 149 (1990).

112. California State Water Resources Control Board, Order 88-20: Order to Submit Plan and Implementation Schedule For Water Conservation Measures 44-45 (1988).

113. Cal. Water Code § 1012 (West Supp. 1990).

114. *Id.* § 1244 (emphasis added). The Legislature also enacted a special bill in 1987 to relieve IID of all liability "for any effects to the Salton Sea or its bordering area resulting from the conservation measures." *Id.* § 1013.

115. *See* Department of Water Resources, *supra* note 110, at 6.

CHAPTER 4

TRANSFERS OF WATER USE IN NEW MEXICO

F. Lee Brown, Charles DuMars, Michelle Minnis,
Sue Anderson Smasal, David Kennedy and Julie A. Urban

Natural Resources Center

The University of New Mexico

CHAPTER 4

TABLE OF CONTENTS

TABLES AND FIGURES

Tables

Figures

Introduction

Section 1: Basic Concepts in New Mexico Water Law

New Mexico applies the prior appropriation doctrine to both groundwater and surface water. In addition to appropriative water rights, there are federal reserved water rights, held in Indian reservations and other federal lands.[1] Because these federally created water rights have been held nontransferable, they will not be considered in the discussion below.

Public Ownership

The New Mexico legislature has declared that "all natural water flowing in streams and watercourses, whether such be perennial or torrential, within the limits of the state of New Mexico, belong to the public."[2] The state governs these resources as trustee for its citizens.[3]

An individual may acquire a real property right to divert water, consistent with procedures under state law, up to the amount that can be put to a beneficial use.[4] Because water rights are property rights in New Mexico, they are transferable by deed from one person to another.[5] They can be forfeited if not put to beneficial use.[6]

Protection of instream flow in designated stretches of a watercourse is now common in most prior appropriation states, but has not been permitted in New Mexico. New Mexico has not authorized instream flows as beneficial uses of water.[7] Arguments based on ecological, recreational, and other grounds have been advanced in repeated efforts to secure legislative approval of instream rights, but no such efforts have been successful. These efforts have been defeated for several reasons, among them general concern that acceptance of this new use might severely limit transfer options. For example, instream flow opponents sometimes object, on principle, to the fact that transferring a surface right to instream use would protect a given stream stretch and that, consequently, surface rights downstream of the protected stretch could not be transferred to locations upstream of that stretch.[8] The constitution of New Mexico does not expressly foreclose instream flow rights.[9] It is conceivable, therefore, that a right to transfer water to instream use could be upheld under the constitution, where the transfer would provide economic benefit for a private party or recreational benefit for the state.[10]

Priority

New Mexico water law is based on "prior appropriation," a doctrine variously expressed in the several western states that have adopted it. In New Mexico the essence of prior appropriation is contained in two principles:

a. the first user (appropriator) in time has the better right to take and use water; and
b. that right continues as against subsequent users as long as the appropriator puts the water to beneficial use.[11]

Determining water rights by priority in time is a strict departure from the riparian approach followed in the eastern states.[12]

To establish a right to appropriate surface water anywhere in the state one must obtain a permit from the state engineer.[13] The same procedure is followed in establishing a right to appropriate groundwater, except where the groundwater is outside a declared basin. Declared basins are "water[s] of underground streams,

channels, artesian basins, reservoirs or lakes, having reasonably ascertainable boundaries."[14] Outside a declared basin one can establish a right to appropriate groundwater simply by diverting water from the aquifer to beneficial use.[15]

Surface water rights that were established in an area prior to the state engineer's assertion of jurisdiction are also valid. New Mexico surface water came under jurisdiction of the state engineer in 1907. Thus, anyone who diverted surface water and put it to beneficial use before 1907 holds a valid water right regardless of whether the state engineer has since issued a corresponding permit.[16] Similarly, anyone who has pumped groundwater in a basin prior to state engineer jurisdiction has the right to continue his pumping.[17]

Beneficial Use

Under the New Mexico Constitution, "beneficial shall be the basis, the measure, and the limit of the right to use water."[18] The legislature has not statutorily defined what constitutes a "beneficial use" or assigned priorities as between particular uses. To date, however, as indicated above, the courts have recognized as beneficial uses only uses involving diversion of water from its source.[19]

Definition of Water Rights

A water right is defined not only by its priority date but by type of use, place of use, quantity, and point of diversion. A right's point of diversion, type, quantity, and place of use define the rightholder's choices in exercising the right.[20]

Use

Rights are designated as being for agricultural, municipal, industrial, or some other category of use. Some uses are exempt from traditional forfeiture rules.[21] Holders of municipal water rights, for example, are allowed forty years from the date of application to put water to beneficial use.[22] All other rights are limited to a maximum of four years of non-use subject to extensions of time.[23]

Quantity

The units of water utilized are described in definite ways. The right may be expressed in terms of land irrigated, or "acre feet per year," or as a rate of flow such as "cubic feet per second."[24] Water permits usually specify a total diversionary amount rather that the amount to be consumed by use. Because the total diversionary amount includes return flow, however, the relevant amount when the water is to be transferred to a new place or use is the consumptive use.[25]

The maximum quantity of water allocated to any given right is determined by the reasonable demands of the user and the desire "to prevent waste."[26] For agricultural rights, demand may be presumed to be the amount necessary to irrigate crops in the area as calculated by the Blaney-Criddle formula or some similar method adjusted for altitude, temperature, precipitation, and other relevant variables.[27] For municipal or industrial rights, the amount allowed per capita is determined by the reasonable water demands of these uses.[28]

Although the entire quantity of water associated with a right is generally designated for use within each calendar year, the time of year when a right must be used is not specified unless there is reason to do so. Surface rights are sometimes permitted on a seasonal basis when seasonal allocation makes more water available to others on the stream.[29]

Point of Diversion

The diversion point is the place where the appropriator constructs works for removing water from the stream or ground. The point of diversion and the source of water are extremely important in defining the scope of the right. Hydrologic differences in underground aquifers illustrate this point. Rights to groundwater differ, depending on whether the water is in a stream-related aquifer, one recharged by surface streams, or a non-stream-related aquifer, one that is for practical purposes closed or nonrenewable.[30] New Mexico law conditions the extraction of water from a stream-related aquifer on the appropriator's retirement of surface rights on the stream sufficient to protect downstream users.[31] This requirement, known as the coordinated management rule, means that groundwater in storage can be taken only if a balance can be maintained between surface flow and groundwater pumping. Rights in non-stream-related aquifers, on the other hand, are absolute, but defined in time by the amount of water that can be pumped from the aquifer and the rate at which the water is withdrawn.[32]

Rights to surface water are also subject to restriction. Surface rights are divided into direct flow rights and storage rights. The point of diversion of a storage right is at the dams or outlet. The point of diversion of a diversionary flow right is on the stream at the irrigated land. Generally, direct flow rights are not convertible into storage rights unless the storage serves an accepted beneficial use. If storage is wasteful it will be ruled illegal.[33]

Place of Use

The place of use is the place, and only the place, where the water has been used historically, or for a permitted right, the place designated on the permit.[34]

Administration of Water Rights

Both the state engineer and the state judiciary have administrative roles with respect to water rights. The state engineer has at least three main administrative functions: maintaining records of all permitted water uses and uses declared antecedent to state engineer jurisdiction; granting permits for new uses; and supervising transfers of existing water rights with respect to point of diversion, place of use, and purpose of use. A water right can be sold without the state engineer's permission so long as the right's use, diversion point, and place of use remain unchanged. The state engineer does not directly supervise the use of water, except where metering is required, but he does bring legal actions to prevent waste,[35] and, if water rights have been forfeited for non-use, he may bring an action to enjoin further use of the right.[36] Statutory law also provides that the state engineer will assert responsibility to promote the adjudication of rights.[37]

In administering water rights the state engineer is constrained by hydrology as well as by law. For example, although he does not give permits for a term of years, hydrologic factors sometimes require decisions having the same result. Extraction of water from mined basins is essentially a taking of nonrenewable resources. Since the resource is finite, a state engineer decision to permit diversions from these aquifers at a rate that exceeds recharge is a determination that all rights in the area will someday be terminated for lack of water supply. Accordingly, as indicated above, permits for water from these aquifers are permits for the number of years that make up the basin's useful life.[38]

Judicial administration of water rights occurs only with respect to quantifying them through a general stream adjudication.

Very rarely a court will also issue an injunction against impairment of another's right. These actions involve all persons with water rights on a particular stream. The result of such adjudications is a judicial decree that establishes a point of diversion, priority date, place of use, purpose of use, and quantity for every water right owner on the stream.[39]

Transfer of Water Rights

General Considerations

The legal right to transfer a water right is generally the same whether the water is ground or surface, tributary or nontributary. The coordinated management obligation to maintain an equilibrium between ground and surface water in stream-related aquifers however may require additional conditions on ground water withdrawal that affect surface rights.[40] Water can be conveyed for use from basin to basin.[41] Under these systems, the transferor must be certain that within-basin consumptive use after the transfer would not be greater than before the transfer. Simply put, an out-of-basin transfer cannot make the basin worse off than it was before.[42]

A water right priority date remains the same even though it is transferred. Imported water, on the other hand, does not carry a priority date in the basin of use, but is subject to state rules of forfeiture and beneficial use. New Mexico's water rights leasing statute allows temporary transfers,[43] but those transfers and transfers on a permanent basis always go through the Office of the State Engineer.[44] According to the Office of State Engineer, the leasing statute is seldom used. Where a transfer is within irrigation or conservancy districts, and is on lands served by the district works, the state engineer does not get involved[45] so long as downstream users are not affected.

Transfer Procedures

Persons seeking to transfer a water right must file a formal application with the Office of the State Engineer. The application indicates the point of diversion, the place of use, the quantity of the right, and, where they exist, the file number and license number of the right. After filing an application, the applicant publishes a notice of intent to change the right's use or place of use in a newspaper of general circulation where the right is located.[46]

Anyone objecting to a proposed transfer can file a formal protest with the state engineer. Protests must be based on a claim that the transfer will impair existing rights, will be contrary to the conservation of water, or will be detrimental to the public welfare. The standing rules for objecting on "public welfare" grounds are more specific than for protests based on impairment. The protestant must be specifically and substantially affected. Where no protest is filed and the state engineer finds the transfer compatible with state law, the transfer application will be approved. Where there is a protest, the state engineer holds a formal, due process hearing on the issues set out in the protest and decides the case.[47] If either party is dissatisfied with the state engineer's decision, he may appeal *de novo* to the district court. Although such appeals are *de novo*,[48] case/law suggests that courts should defer to the state engineer's expertise.[49]

In transfer hearings the applicant bears the burden of proving nonimpairment, conservation of water, and consistency with the public welfare.[50] Technically, the applicant also must prove the use and amount of the transferred right. Practically, however, where the right has been adjudicated, the protestant bears the burden of disproving the right's use and amount. This is the case because adjudication of rights in a transfer

proceeding is not allowed and an existing adjudication decree or declaration is accepted as *prima facie* evidence of the size and validity of the right.[51] Generally, in water right cases the burden of proof is by preponderance of the evidence. If the action filed is a forfeiture or abandonment claim, however, the standard of clear and convincing evidence applies.[52] The requirement that a transfer be consistent with the public welfare is a major issue in New Mexico to which will be discussed more fully in the fifth section below. First, however, the Census of Transfers and the Transaction Cost survey will be described and discussed.

Section 2: Census of Transfers

Applications to Change Place or Purpose of Use

In keeping with the objectives of the project as a whole, the New Mexico segment of the study relied heavily on the development and use of an instrument for recording information on all identified transfers during the 1975-1987 time period. In New Mexico, as outlined in the previous section, the principal means of moving water from one place and/or use to another is accomplished through the sale or lease of the water right itself.

All parties proposing changes in place or purpose of use of a water right, to both surface and groundwater, must file application with the State Engineer Office (SEO). These applications then follow administratively specified procedures in which they are scrutinized for conformity with the transfer restrictions also described in the previous section.[53] All transfer applications are contained within water rights files within one of four principal offices (or their branches) of the SEO in Santa Fe, Albuquerque, Roswell, or Deming. By statute the originals are in Santa Fe. Tables NM-1 and NM-2 report the number of applications to change the place or purpose of use of surface or groundwater rights respectively during the period of study.

TABLE NM-1

Applications to Change the Place or Purpose of Surface Water Use

Year	Number
1974-76	38
1976-78	58
1978-79	38
1979-80	64
1980-81	44
1981-82	53
1982-83	76
1983-84	60
1984-85	42
1985-86	49
1986-87	33
Total	555

Source: Annual Reports of the State Engineer Office.[54]

Before discussing the procedures that were employed in gathering information on these transfer applications, two caveats are in order. First, a substantial number of these applications, particularly in the Roswell District but also in Deming, involved nothing more than a shift in the location of the groundwater well as farmers adopted center pivot irrigation techniques during this period. The consequence of this factor is that the 2543 applications are not indicative of the numbers of applications which involved a change in purpose of use or a significant shift in the place of use. This factor will be partially accounted for below.

TABLE NM-2

Applications to Change the Place or Purpose of Use of Groundwater

Year	Albuquerque District[55]	Roswell District	Deming District	Total
1974-76	66	232	201	499
1976-78	110	142	266	518
1978-79[56]	74	61	71	206
1979-80	47	67	49	163
1980-81	29	105	57	191
1981-82	6	121	69	196
1982-83	26	74	55	155
1983-84	48	83	41	172
1984-85	43	79	35	157
1985-86	23	90	54	167
1986-87	12	59	48	119
Totals	484	1113	946	2543

Source: Annual Reports of the State Engineer Office.

On the other hand, there has developed a recent practice, particularly in the middle Rio Grande around Albuquerque, in which water rights are purchased from an irrigator and then leased back to him for a period of years into the future. In this way a municipality such as the City of Albuquerque, for example, obtains control over the water right even though it has no need of it for the present. When the lease expires after a number of years, then presumably the municipality will have need of the right. In the meantime, however, no record of this transaction may enter the files of the SEO since the water remains in its current use, and no change in place or purpose of use is contemplated until some time into the future.[57]

The net result of this lease-back arrangement for counting purposes in this report is some underestimation of the effective authority over the water right represented by ownership. In other words, the census survey recorded actual applications to change the place or purpose of use, and those numbers should not be considered as a measure of the degree of change in effective control over water. It is certain that more water rights have effectively moved into municipal or industrial ownership than the SEO records will reveal.

Recording Procedures

With the assistance of SEO personnel, research assistants from the projects spent many weeks conducting a manual search of all water rights files in the various offices of the State Engineer. Appendix NM-A to this chapter is the form that was used to record information about the transfer applications discovered and documented. The 1309 applications thus recorded are termed the New Mexico Census of Water Rights Transfers.

Several aspects of the recording instrument deserve explanation and mention. First, there is a category of changes in water rights which the SEO terms Dedications and New Appropriations. Briefly, a party who wishes to put in a new groundwater well in an aquifer that is hydrologically connected to an already fully appropriated stream system may purchase an existing surface right to the stream and "dedicate" it to the State Engineer in a legally binding manner.

By thereby giving the State Engineer authority to require retirement and effectively extinguish the surface right, the party acquires the right to make a new appropriation from the stream related aquifer, a dispensation that would not otherwise be permitted due to the inevitable effect of groundwater pumping on the fully appropriated stream. The State Engineer will exercise this retirement authority when, according to SEO calculations, the new groundwater pumping begins reducing the flow of the river system. For purposes of the Census this combination of Dedication and New Appropriation was treated like a transfer even though administratively the two functions of Dedication and New Appropriation are distinct.

The informational categories on the form are basically 1) the administrative description of the right involved in the transfer, 2) the legal description of the location of the right, 3) the quantum of the right in diversion, consumptive use, or storage units, 4) the type of water user, 5) the use for which the right is exercised, 6) a chronological history of the transfer, and 7) a listing of the parties involved in the transfer to the extent that the records so provide. Items 2) through 5) record information both before and after a proposed transfer. Originally, the priority date of the right was an additional informational element of the Census form. However, practically speaking, the file records are generally deficient in this regard as many, if not most, New Mexico streams have not been finally adjudicated in court with the consequence that priority dates are commonly only best guesses or assertions by the owner of the right, though declarations by owner are prima facia evidence in an adjudication case.

Completeness and Accuracy of Data

The benchmark numbers for comparing the completeness of the Census are provided in Tables NM-1 and NM-2 above taken from the annual reports of the SEO.[58] The total number of both surface and groundwater applications reported in those two tables is 3098. During the early years covered by the survey, however, the SEO prepared biennial reports. Consequently, the 1974-76 numbers in the two tables include applications from 1974 as well as 1975 and 1976 even though 1974 was outside the survey period. If the 1974-76 numbers are reduced by a fourth (135),[59] then for comparison purposes the number of applications reported by the SEO during the survey period is reduced to 2963.

The difference between this figure and the 1309 applications which appear in the Census database described below is 1654. Roundly 835 applications were seen by the census-takers but not recorded because they appeared to involve nothing more than a change in point of diversion. Another 89 applications which were recorded were nevertheless eliminated from the database for the same reasons. And approximately another 100 applications were recorded and tabulated on the same Census form. These computations leave approximately 630 (slightly over twenty per cent of the original 3098 SEO figure) unreported.

There are various possible explanations for this discrepancy. Some files containing applications were undoubtedly in use when the census-takers were at a particular SEO

office and were missed despite precautions. The numbers reported in the SEO reports themselves may contain some error. Certain SEO offices cooperated by providing actual lists of files which contained change applications, and conceivably some pertinent files were inadvertently left off of those lists. All in all, it appears that the data drawn from the Census records would tend to underestimate the extent of transfer activity rather than the reverse. Although some doublecounting may have occurred, it would have been unlikely due to the procedures employed and certainly isn't supported by the evidence.

No systematic methods were employed to determine the accuracy with which the information from individual applications was recorded onto the Census forms themselves. The census-takers were sensitive to the need for accuracy, and potential discrepancies that were identified during a review of all forms before coding were compared against the original application and corrected if necessary. Coded entries into the database were also proofed. In summary, the data set appears to be reasonably free of errors, but some undercounting may have occurred.

Database for Census Information

The data generated in the Census process are voluminous. All of the information other than the names and addresses of participants from the last page of the Census form was transferred to an electronic database using Lotus 1-2-3 for ease of entry. Many Lotus files were created in the process, and the large volume of information thus produced was not easily managed nor necessary for most descriptive and analytical tasks. Consequently, a reduced database was constructed using a BASIC program.

Two features of this reduced database warrant mention in the text of this report. First, the SEO office classifies each water right geographically into one of numerous surface and groundwater basins. For purposes of this study these basins were aggregated into eight surface and surface-related groundwater units and into four enclosed groundwater basins. Table NM-3 lists these 12 geographic units and their constituent members, and Figure NM-1 presents a color-coded depiction of the twelve aggregate "basins."

Historically, water rights in New Mexico and other western states have been measured in a variety of ways such as cubic feet per second, acres of land to be irrigated, or acre-feet of diversion which generally relate to their agricultural origin. Increasingly, however, as rights are transferred into municipal or industrial uses, their measure is also being tranformed into acre-feet of consumptive use, which in many ways is a more accurate and concise measure of the quantum of water entitled by the right.

File records in New Mexico still contain a mixture of these measures. With ample time and expertise each of those rights still measured in units other than consumptive acre-feet could be converted into a consumptive use measure, at least in principle. For purposes of this study, however, less time consuming methods of standardization were required. In addition to the above complication, many files containing transfers did not have separate entries for both the water right quantum *before* and *after* completion of the transfer even though those values were potentially different.

To remedy these problems and standardize the water quantum information, two assumptions were made. 1) If data were reported only for the "move-from" location or

TABLE NM-3

Aggregate Surface-Related and Groundwater Basins Used in This Report

Aggregate Basin	Constituent Basins
1. Bluewater	Rights in the Bluewater basin.
2. Canadian	Rights in the Canadian basin.
3. Gila/San Francisco	Rights in the Gila, the San Francisco, their tributaries, and all Gila/San Francisco groundwater rights.
4. Pecos River Valley	Surface and surface related rights in the Pecos, the Rio Hondo, the Penasco, the Canal, the Roswell Aquifer (artesian and shallow), Carlsbad, the Upper Pecos, and Ft. Sumner.
5. Lower Rio Grande	Rights in the Rio Grande below Elephant Butte Lake and Lower Rio Grande groundwater rights.
6. Middle Rio Grande	Surface and surface related rights in the Rio Grande in and above Elephant Butte Lake and below Otowi Bridge and in tributaries to the Rio Grande which enter within the above boundaries.
7. Upper Rio Grande	Surface and surface related rights in the Rio Grande above Otowi Bridge and in tributaries which enter the Rio Grande above the bridge.
8. San Juan	Surface and surface related rights in the San Juan, the Animas, and their tributaries in the northwest portion of the state.
9. Central Groundwater	Estancia and Sandia groundwater basins.
10. Southeast Groundwater	Lea County, Portales, and Capitan.
11. Southwest Groundwater	Mimbres, Playas Valley, Lordsburg Valley, Nutt-Hockett, and Animas (southwest).
12. South Central Groundwater	Tularosa.

the "move-to" location, it was assumed that there was no change in the quantity of right being transferred. 2) If data were reported only in diversion units, it was assumed that consumptive use was the same fraction of diversion as the average of all consumptive use to diversion ratios for all transferred rights of that type (agriculture, industry, or municipality) which did report both consumptive use and diversion values. The pertinent coefficients used in converting diversion quantities into consumptive use are Agriculture (.534), Municipal (.459), and Industrial (.663). By use of this procedure all

transferred rights were converted into consumptive use measures for description and analysis.

Section 3: Summary Statistics

Number of Applications

Table NM-4 reports the total number of all change applications recorded by the census-takers which represented more than a nominal change in point of diversion, e.g. a move to center-pivot sprinkler irrigation.

Several aspects of this application data deserve mention. First, there is a general pattern of increased transfer activity, as measured by number of applications, from the early seventies which peaks around 1979 to 1983 and then declines for the remainder of the period of record. This pattern is most clear in the total reported for the entire state, but it is also apparent in the data for the Pecos, the Gila/San Francisco, the Middle Rio Grande, the Southeast Groundwater, and the San Juan basins.

Each of these basins has its own specific socioeconomic character and its own water supply situation which provide the most likely determinants of the amount of transfer activity. For example, the Middle Rio Grande area contains the City of Albuquerque which has a standing offer to buy water rights in response to historical and projected growth in population. The San Juan and Southeast Groundwater basins are the locus for substantial oil and natural gas production and reserves and have experienced booms and busts after the 1973 oil embargo and subsequent energy price increases and declines.

The Gila/San Francisco is the location for copper mining and processing. It is also under added legal restrictions that do not apply to the rest of New Mexico. Namely, as a result of a decision by the U.S. Supreme Court[60] water rights must be purchased for domestic use outside the home even though the quantum may be very small. In most of the state, households are entitled to three acre-feet of diversion per annum without necessity of purchase even in fully appropriated basins. This singularity of the Gila/San Francisco accounts for much of the volume of application numbers in this basin.

Despite the differences among the various basins, as a general statement, they have all experienced the slower demographic and economic growth in the eighties relative to the seventies that has been characteristic of New Mexico as a whole.[61] It is likely that this slower growth has been a major factor in the declining numbers of transfer applications since the peak years of the late seventies and the early eighties.

It is difficult to draw many comparative conclusions across basins from the number of change applications. Geographically, some of the twelve basins (e.g. Bluewater and the Central Groundwater basins) are quite small relative to others (the three Rio Grande basin areas, for example). And, again, the socioeconomic and water supply characteristics of the twelve basins are substantially different. However, it is useful to point out reasons why some of the basins experience low numbers of applications.

The Lower Rio Grande, for example, may still contain substantial quantities of unappropriated groundwater which have not yet been put to beneficial use though there has been substantial litigation over these supplies. In the presence of appropriable supplies, less change of existing uses should be expected. The Upper Rio Grande, in contrast, is fully appropriated, but a combination of socioeconomic factors reduces the amount of transfer activity in that basin.

FIGURE NM-1

MAP OF NEW MEXICO DEPICTING
AGGREGATE SURFACE AND GROUNDWATER BASINS

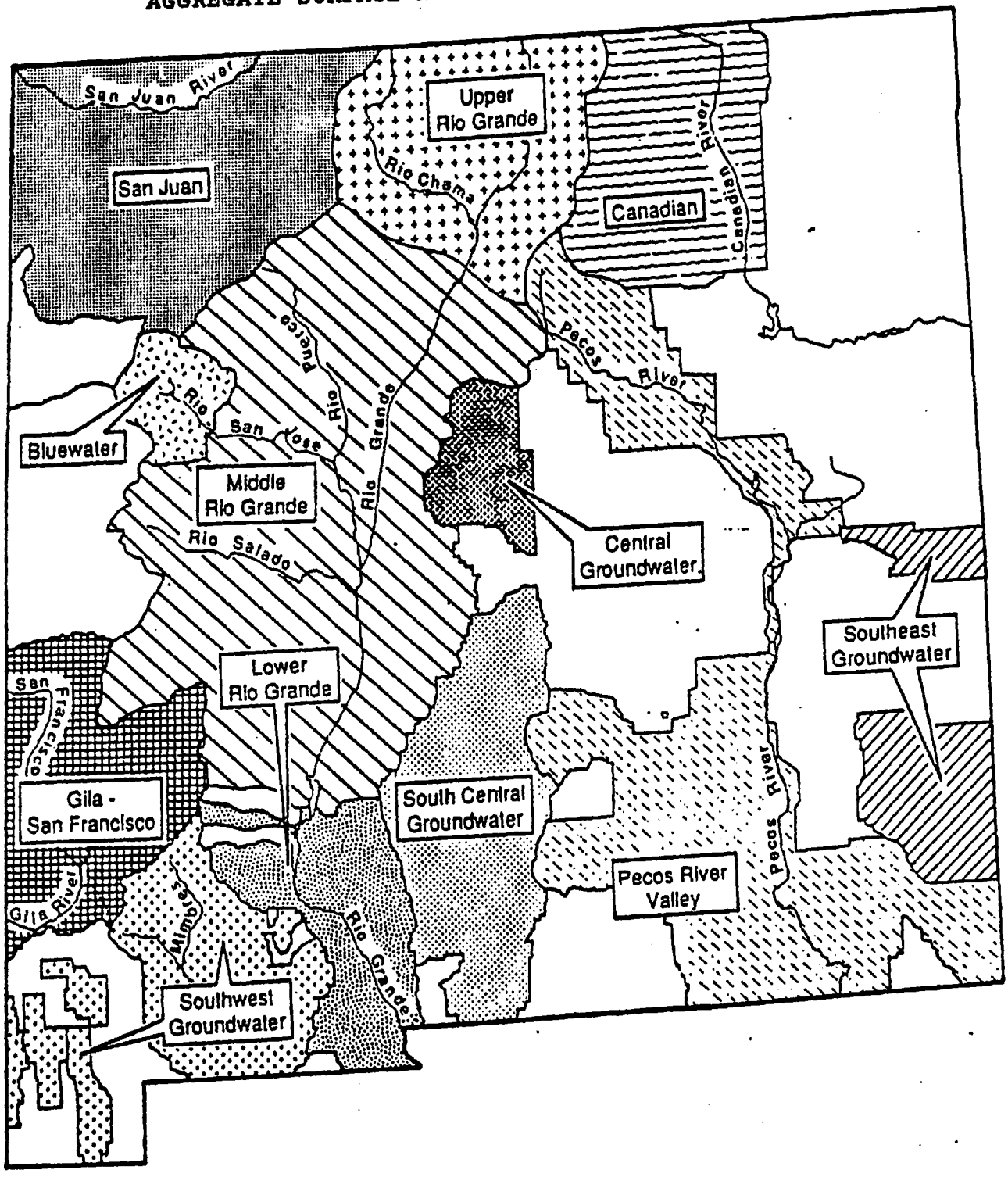


TABLE NM-4
Number of Applications to Change Place or Purpose of Use
(by year and basin)

Year 19:	75	76	77	78	79	80	81	82	83	84	85	86	8	Total
Basin														
Bluewater	00	02	02	00	01	02	02	04	17	05	01	00	00	36
Canadian	02	03	07	05	05	01	04	01	01	00	02	01	00	32
Gila & SF	15	05	13	25	43	23	46	17	16	26	23	18	14	284
Pecos	20	18	09	07	17	11	21	28	13	32	19	23	21	239
Lower RG	00	00	00	00	01	01	00	00	04	00	02	05	02	15
Middle RG	06	20	08	16	21	16	17	12	12	11	09	13	07	168
Upper RG	06	07	06	05	05	09	15	14	04	10	06	04	07	98
San Juan	00	02	05	05	29	06	07	27	41	06	06	11	01	146
C Ground W		06	08	04	03	03	01	05	00	03	02	04	05	04 48
SE Ground W		16	05	09	08	13	26	25	13	15	08	07	05	01 151
SW Ground W		05	05	04	07	09	09	06	09	07	03	12	08	04 88
SC Ground W		00	00	01	00	00	00	00	01	00	00	02	00	00 04
Total	76	75	68	81	147	105	148	126	133	103	93	93	61309	
% of total	06	06	05	06	11	08	11	10	10	08	07	07	05100	

Namely, this region relative to the Lower Rio Grande experiences slower growth, and the cultural attitudes of many of its traditional Hispanic and Indian communities oppose the transfer of water from its historical association with agriculture.[62]

Consumptive Use Measures

Ultimately, however, the simple numbers of applications alone do not reveal as much about the nature and extent of transfer activity as when they are placed in the volumetric context of water associated with those applications. For this information consider first Table NM-5.

The pattern that was revealed in the application numbers in which the time series rose to a peak in the late seventies and early eighties is not repeated in the volumetric series.[63] Instead, the annual totals for the state fluctuate from year to year around an annual average that is slightly more than nine thousand acre-feet per year. Individual basins exhibit even more variation. Bluewater, for example, ranges from a low of zero to a high of 3769 acre-feet. Even the more active basins such as the Middle Rio Grande vary from a high of 10,486 acre-feet in 1986 to a low of 73 acre-feet in the following year.

Essentially, this characteristic reflects the lumpiness of the water right holdings themselves. Water rights are not held in homogeneous blocks for the convenience of transfer processes. Instead, they have emerged from their principally agricultural origin according to the configuration of land ownership itself. Then, too, the process by which rights are offered for sale, in response to a standing offer, for example, may be erratic in nature. Larger blocks may take varying degrees of time to negotiate and arrange, while small lots may arrive on the market almost unexpectedly. Any temporal patterns in this data, then, tend to be hidden by this erratic size of the individual transfers.

Comparison of totals across basins, however, does reveal the relative size of those basins in terms of the volume for which application to change has been made. The Gila/San Francisco basin which exhibited the largest number of transfer applications over the period of record is seen to be much smaller in volume, again reflecting the large number of small transfers for single home domestic uses.

Overall, the largest volume of water rights for which a change application has been made during the study period occurred in the Middle Rio Grande in which the City of Albuquerque is a dominant buyer. The next most active basins volumetrically are the Pecos and the Southeast Groundwater areas. To put these volumes into perspective, it is useful to compare them against a volumetric measure of the established quantity of water rights in each basin. Unfortunately, in the absence of adjudication decrees for most basins, such numbers are not available.

The best proxy that does exist is the estimated annual consumptive use of water prepared by the New Mexico State Engineer Office every five years.[64] The use of these numbers as a base must be qualified, however, in several ways. First, the depletion (consumptive use) quantities reported by the SEO are estimated by counties and by river basins, but the river basins do not correspond in each case to the aggregations which have been employed in this study. Only the Rio Grande (as a whole), the San Juan, the Gila/San Francisco, and the Pecos seem roughly comparable, and even in these cases, the match may not be exact.

Second, the depletions reported are unlikely to be precisely synonymous with long-term sustainable consumptive use due to some mining of groundwater in each basin.

TABLE NM-5
Total Consumptive Use Associated with Applications to Change the Place or Purpose of Use
(in acre-feet of rights by basin and year)

Year 19:	75	76	77	78	79	80	81	82	83	84	85	86	87	Total
Basin														
Bluewater	00	33	1193	00	89	377	15	1518	3769	1527	23	00	00	8543
Canadian	222	99	487	53	68	231	86	238	320	00	01	151	00	1956
Gila & SF	725	18	243	62	926	722	225	980	261	241	158	74	29	4665
Pecos	1368	1794	373	275	982	443	702	1230	940	1201	795	8693	3714	22510
Lower RG	00	00	00	00	99	92	00	00	181	00	34	79	15	501
Middle RG	100	9912	232	888	5879	520	278	292	170	4977	235	10486	73	34041
Upper RG	20	2301	55	31	16	2491	1593	323	127	454	56	35	25	7527
San Juan	00	05	154	53	349	175	30	648	928	89	195	527	04	3157
C Ground W	386	508	310	364	767	02	60	00	255	89	201	82	114	3138
SE Ground	6160	310	479	3789	1296	2711	4479	389	1329	200	426	380	124	22072
SW Ground	4514	746	429	138	279	649	190	127	1351	350	195	371	65	9404
SC Ground W	00	00	1328	00	00	00	00	24	00	00	17	00	00	1369
Total	13495	15728	5284	5653	10750	8412	7658	5769	9631	9127	2337	20878	4163	118884
% of total	11	13	04	05	09	07	06	05	08	08	02	18	04	100

TABLE NM-6

Comparison of Transferred Rights with Basin Depletions (in acre-feet of consumptive use per year)

Basin	Trans. Rights	Depletions	Trans. Rights as Percent of Depletions
Rio Grande	42,069[85]	883,300	4.8%
San Juan	3,157	299,500	1.1%
Pecos	22,510	414,300	5.4%
Gila/San Fran.	4,665	48,400	9.6%

Consequently, for this reason the depletion numbers are not perfect proxies for the total quantity of consumptive use rights in a given basin; they are only the best comparative numbers available. With those caveats in mind, Table NM-6 compares the total quantity of rights for which application to transfer has been made in the above four basins with the estimated annual depletions in the same basin.

In this light, the Gila/San Francisco acquires prominence once again in that it has experienced the largest quantity of change applications as a percentage of the total depletion of the river basin system in New Mexico. One other caveat stated in the previous section should be repeated here. Namely, it is likely that legal control over additional water rights has already passed to municipalities such as the City of Albuquerque and other parties, but those transfers of control are not reflected in these numbers because the rights continue to be beneficially used in agriculture until needed by the new owner and prospective user. In this respect, it is likely that the Rio Grande percentage (and possibly the others as well) would be significantly higher than reported in Table NM-6 if these additional rights were included in the basin totals.

As one final measure of applications in consumptive use terms, consider Table NM-7.

A number of interesting observations can be made from this data. First, although the volumetric fluctuations by basin and year first seen in Table NM-5 are still evident, the average sized application for the state as a whole is 91 acre-feet of consumptive use, and the averages for ten of the thirteen years in the study period are less than the overall average. Small applications of less than one hundred acre-feet are the norm, as will be demonstrated even more clearly in tables below.

Second, individual basins again vary substantially from the low of sixteen acre-feet in the Gila/San Francisco previously explained to the 342 acre-feet for the Southcentral Groundwater basin (due exclusively to one large application in 1977). The Middle Rio Grande also exhibits significantly larger sized applications on average than occur in most basins, though even in this basin nine of the thirteen years exhibit averages of less than one hundred acre-feet. The averages in eight of those nine are less than thirty-five acre-feet. Finally, seven of the eleven basins have averages over the entire period that are less than a hundred acre-feet.

Size of Transfers

The size distribution can seen even more clearly in Tables NM-8 and NM-9. These tables report approved applications (actual transfers) rather than simply those changes for which applications have been submitted. As such, they omit eighty applications, containing 12,029 acre-feet of consumptive use, which were either withdrawn, denied, or still pending in 1987.

Fully 87 percent of the 1229 approved transfers contained consumptive use quantities less than or equal to a hundred acre-feet in magnitude. Yet, 84 percent of the total approved volume of 106,855 consumptive acre-feet were contained in applications greater than a hundred acre-feet in magnitude. The bulk of the transfer numbers are of small size, while the bulk of the volume is contained in larger sized transfers.

Relevant here, though not reported in the two tables above, is the fact that the average sized transfer for those containing more than a hundred acre-feet of consumptive use was 547 acre-feet. Also, the overall average transfer measured 87 acre-feet, not much different from the average 91 acre-feet per application reported above.

Protests

Tables NM-10, NM-11, and NM-12 contain information about the applications which were protested. As noted in Table NM-10, only 59 applications over the entire thirteen year study period were protested. This number is less than five per cent of the total applications or, stated otherwise, only one of every twenty-two applications were protested.

Considered broadly over time and basins, there does not appear to be any significant pattern to the protests. For the most part, they are scattered fairly evenly. In a few basins, notably the Southeast Groundwater in 1975, the Southwest Groundwater in 1979, and Bluewater in 1983, there were single years in which protests were clumped together to some degree. Subsequently, in these basins there were very few additional protests. In other words, the problems seemed to have been resolved.

There is also a persistent pattern of a small number of protests in the Middle Rio Grande from 1978 through 1983 which may reflect objections of the Middle Rio Grande Conservancy District to proposed transfers which moved rights from inside the District boundaries to outside. Beyond those relatively isolated situations,there is very little to consider by way of numbers of protests. In fact, the rarity of protest is the most remarkable feature of Table NM-10.

A total of 12,881 acre-feet of consumptive use applications have been protested which is approximately eleven per cent of the total volume contained in the applications. In other words, larger applications appear to have some slightly higher frequency of protest (one of every nine acre-feet for which application is made is protested). This circumstance is also reflected in the average of 218 acre-feet contained in protested applications, as compared with the 91 acre-feet average of all applications.

Two basins (Bluewater and the Canadian) seem to have a higher frequency of protest than other basins whether measured by numbers or volume. And, the Southeast Groundwater basin has a substantially higher frequency of protests when the measure is volume. However, the number of cases in the first two basins is small and has not continued beyond an initial period of activity, and the Southeast Groundwater protests, once again, were almost exclusively in a single year.

TABLE NM-7
Average Consumptive Use of Change Applications
(in acre-feet of consumptive use by basin and year)

Year 19:	75	76	77	78	79	80	81	82	83	84	85	86	87	Total
Basin														
Bluewater	00	17	597	00	89	188	07	380	222	305	23	00	00	237
Canadian	111	33	70	11	14	231	21	238	320	00	01	151	00	61
Gila & SF	48	04	19	02	22	31	05	58	16	09	07	04	02	16
Pecos	68	100	41	39	58	40	33	44	72	38	42	378	177	94
Lower RG	00	00	00	00	99	92	00	00	45	00	17	16	08	33
Middle RG	17	496	29	55	280	32	16	24	14	452	26	807	10	203
Upper RG	03	329	09	06	03	277	106	23	32	45	09	09	04	77
San Juan	00	02	31	11	12	29	04	24	23	15	33	48	04	22
C Ground W	64	64	78	121	256	02	12	00	85	44	50	16	29	65
SE Ground	385	62	53	474	100	104	179	30	89	25	61	76	124	146
SW Ground	903	149	107	20	31	72	32	14	193	117	16	46	16	107
SC Ground	00	001328		00	00	00	00	24	00	00	08	00	00	342
All	178	210	78	70	73	80	52	46	72	89	25	224	68	91

TABLE NM-8
Numbers of Transfers
by Different Size Categories
(in numbers per size category by basin)

Months	0-3	4-10	11-25	26-50	51-100	>100	Total
Basin							
Bluewater	00	04	05	05	03	11	28
Canadian	07	01	04	07	04	06	29
Gila & SF	200	30	21	09	13	06	279
Pecos	36	42	50	23	25	47	223
Lower RG	00	02	07	02	04	00	15
Middle RG	22	48	34	19	15	15	153
Upper RG	37	23	10	06	03	11	90
San Juan	39	30	29	31	06	05	140
C Ground W	14	00	03	04	04	07	32
SE Ground W	06	34	33	17	15	44	149
SW Ground W	19	25	21	07	03	12	87
SC Ground W	00	01	02	00	00	01	04
Total	380	240	219	130	95	165	1229
% of total	31	20	18	11	08	13	100

TABLE NM-9
Volume of Transfers by Different Size Categories
(in acre-feet transferred by size category by basin)

Months	0-3	4-10	11-25	26-50	51-100	>100	Total
Basin							
Bluewater	00	25	82	175	231	6262	6775
Canadian	09	03	49	248	280	1357	1946
Gila & SF	247	174	321	324	973	2566	4605
Pecos	58	241	808	817	1736	18265	21925
Lower RG	00	13	115	66	307	00	501
Middle RG	30	253	565	611	928	22742	25129
Upper RG	52	133	184	221	176	6716	7482
San Juan	50	164	494	1105	403	782	2997
C Ground W	23	00	51	147	280	2300	2800
SE Ground W	12	209	535	612	978	19586	21932
SW Ground W	30	160	341	283	216	8364	9394
SC Ground W	00	03	37	00	00	1328	1369
Total	511	1379	3581	4607	6509	90268	106855
% of total	00	01	03	04	06	84	100

TABLE NM-10
Number of Protested Applications
(by year and basin)

Year 19:	75	76	77	78	79	80	81	82	83	84	85	86	87	Total
Basin														
Bluewater	00	00	00	00	00	00	00	00	04	01	00	00	00	05
Canadian	02	01	03	00	02	00	00	00	00	00	00	00	00	08
Gila & SF	00	00	00	00	00	01	00	00	00	00	00	00	00	01
Pecos	00	00	00	01	01	00	01	01	00	03	02	02	01	12
Lower RG	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Middle RG	00	01	00	02	01	01	02	01	02	00	01	01	00	12
Upper RG	00	00	00	01	00	00	00	00	01	01	00	00	00	03
San Juan	00	00	00	00	00	00	00	00	00	00	01	00	00	01
C Ground W	00	00	00	00	00	00	00	00	00	01	00	00	00	01
SE Ground W	09	00	00	00	01	00	00	00	00	00	00	00	00	10
SW Ground W	00	00	00	00	04	00	00	00	01	00	00	00	00	05
SC Ground W	00	00	00	00	00	00	00	00	00	00	01	00	00	01
Total	11	02	03	04	09	02	03	02	08	06	05	03	01	59
% of total	19	03	05	07	15	03	05	03	14	10	08	05	02	100

TABLE NM-11
Consumptive Use Contained in Protested Applications
(by year and basin)

Year 19:	75	76	77	78	79	80	81	82	83	84	85	86	87	Total
Basin														
Bluewater	00	00	00	00	00	00	00	00	582	1449	00	00	00	2031
Canadian	222	85	138	00	11	00	00	00	00	00	00	00	00	456
Gila & SF	00	00	00	00	00	38	00	00	00	00	00	00	00	38
Pecos	00	00	00	14	01	00	15	77	00	118	48	1086	479	1838
Lower RG	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Middle RG	00	25	00	66	44	04	58	71	04	00	60	15	00	347
Upper RG	00	00	00	05	00	00	00	00	61	03	00	00	00	69
San Juan	00	00	00	00	00	00	00	00	00	00	50	00	00	50
C Ground W	00	00	00	00	00	00	00	00	00	88	00	00	00	88
SE Ground	6000	00	00	00	600	00	00	00	00	00	00	00	00	6600
SW Ground W	00	00	00	00	113	00	00	00	1249	00	00	00	00	1362
SC Ground W	00	00	00	00	00	00	00	00	00	00	03	00	00	03
Total	6221	110	138	85	769	42	73	148	1896	1658	161	1101	479	12881
% of total	48	01	01	01	06	00	01	01	15	13	01	09	04	100

TABLE NM-12
Average Consumptive Use Per Protested Applications
(by year and basin)

Year 19:	75	76	77	78	79	80	81	82	83	84	85	86	87	Total
Basin														
Bluewater	00	00	00	00	00	00	00	00	146	1449	00	00	00	406
Canadian	111	85	46	00	06	00	00	00	00	00	00	00	00	57
Gila & SF	00	00	00	00	00	38	00	00	00	00	00	00	00	38
Pecos	00	00	00	14	01	00	15	77	00	39	24	543	479	153
Lower RG	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Middle RG	00	25	00	33	44	04	29	71	02	00	60	15	00	29
Upper RG	00	00	00	05	00	00	00	00	61	03	00	00	00	23
San Juan	00	00	00	00	00	00	00	00	00	00	50	00	00	50
C Ground W	00	00	00	00	00	00	00	00	00	88	00	00	00	88
SE Ground W	667	00	00	00	600	00	00	00	00	00	00	00	00	660
SW Ground W	00	00	00	00	28	00	00	00	1249	00	00	00	00	272
SC Ground W	00	00	00	00	00	00	00	00	00	00	03	00	00	03
All	566	55	46	21	85	21	24	74	237	276	32	367	479	218

TABLE NM-13
Approval Times for Applications
(number of applications in monthly intervals)

Months	0-3	3-6	6-12	12-24	24-48	>48	Total
Basin							
Bluewater	09	11	04	04	00	00	28
Canadian	11	07	02	07	02	00	29
Gila & SF	172	72	25	06	01	00	276
Pecos	115	62	27	12	06	00	222
Lower RG	09	04	01	01	00	00	15
Middle RG	77	39	22	08	07	00	153
Upper RG	23	25	23	08	10	01	90
San Juan	35	39	36	17	05	08	140
C Ground W	19	08	03	01	00	01	32
SE Ground W	13	16	07	04	00	09	149
SW Ground W	74	07	04	00	01	01	87
SC Ground W	01	01	02	00	00	00	04
Total	658	291	156	68	32	20	1225
% of total	54	24	13	06	03	02	100

TABLE NM-14
Approval Times for Applications
(volume in applications in monthly intervals)

Months	0-3	3-6	6-12	12-24	24-48	>48	Total
Basin							
Bluewater	3033	2720	756	267	00	00	6775
Canadian	498	295	406	736	11	00	1946
Gila & SF	2876	599	746	343	38	00	4601
Pecos	8080	9278	1110	3343	112	00	21923
Lower RG	346	124	15	16	00	00	501
Middle RG	9210	14718	943	129	128	00	25129
Upper RG	3118	275	1907	274	1847	61	7482
San Juan	632	564	1371	206	123	101	2997
C Ground W	2398	261	91	49	00	02	2800
SE Ground	12768	2320	692	153	00	6000	21932
SW Ground	7857	103	113	00	1249	72	9394
SC Ground	1328	24	17	00	00	00	1369
Total	52142	31281	8166	5517	3508	6235	106848
% of total	49	29	08	05	03	06	100

TABLE NM-15
Approval Times for Applications
(average consumptive use per application in monthly intervals)

Months	0-3	3-6	6-12	12-24	24-48	>48	Total
Basin							
Bluewater	337	247	189	67	00	00	242
Canadian	45	42	203	105	05	00	67
Gila & SF	17	08	30	57	38	00	17
Pecos	70	150	41	279	19	00	99
Lower RG	38	31	15	16	00	00	33
Middle RG	120	377	43	16	18	00	164
Upper RG	136	11	83	34	185	61	83
San Juan	18	14	38	12	25	13	21
C Ground W	126	33	30	49	00	02	87
SE Ground W	113	145	99	38	00	667	147
SW Ground W	106	15	28	00	1249	72	108
SC Ground	1328	24	08	00	00	00	342
All	79	107	52	81	110	312	87

TABLE NM-16

Use to Use Direction of Change
(in acre-feet of consumptive use and per cent)

Sector to Sector	Volume	Per Cent of Total
Agriculture to Agriculture	31,285	26.3%
Agriculture to Agri. and Non-Agri.	3,045	2.6%
Agriculture to Non-Agriculture	34,941	29.4%
Non-Agriculture to Agriculture	4,625	3.9%
Non-Agriculture to Non-Agriculture	44,994	37.9%

cost data were mailed to the applicants. The database population was reduced to 730 applications to change the place or purpose of use before the sample was drawn. Those applications which only involved a shift within the agricultural sector alone or were from agricultural to domestic use were eliminated.[68] The remaining applications were then stratified into three time periods and individual hydrologic basins in order to insure a broad cross section of transfers within the sample.

Three time periods of 1975-79, 1980-83, and 1984-87 were employed containing 202, 318, and 210 files respectively. The number of basins ranged from eleven to thirteen depending on which basins had actually experienced transfer applications during the particular time period. A total of 303 randomly selected files were then chosen with the distribution indicated in Table NM-17; the larger number being the total number of applications in the respective basin during the time period and the number in parentheses being the sample size selected for that basin. Abbreviations used in Table NM-17 are Gila/San Francisco (GSF), Middle Rio Grande (MRG), Penasco (PN), Pecos River Valley (PRV), Southeast Groundwater (SEGW), San Juan (SJ), Southwest Groundwater (SWGW), Upper Rio Grande (URG), and the Lower Rio Grande (LRG). The first number reports the transfers recorded, while the second number (in parentheses) reports the size of the random sample selected from this basin and time period.

Following sampling, the sample applications were then separated into two categories by frequency of application. Those applicants having more than one application in the entire Census population of 1309 were approached in person in order to reduce the possibility that there would be confusion between or among their separate applications. All applicants in the random sample were then provided a copy of the transaction cost survey form either by mail or in person. Those receiving the form by mail were subsequently called on the phone approximately two weeks later. This survey form and sampling procedure had been finalized after a field test of a previous version in which exclusively mail responses were sought.

Of the 303 survey forms distributed in this manner, 121 (39.9 percent) usable responses were obtained at this writing, though not all contained transaction cost data. There are a total of 87 responses (again, at this writing) with usable transaction cost information that were obtained either through phoning or through personal interviews with applicants who had made more than one application. Thirty-four (34) of the 121 responses contained sales price information

TABLE NM-17

Distribution of Random Sample Among Basins and Time Periods

1975-79 1980-83	*1984-87*	
Bluewater 3 (2)	Bluewater 18 (6)	Bluewater 4 (2)
Canadian 7 (4)	Canadian 1 (1)	Canadian 3 (1)
Estancia 3 (2)	Estancia 2 (1)	Estancia 4 (2)
GSF 29 (14)	GSF 30 (9)	GSF 26 (12)
MRG 59 (29)	LRG 5 (2)	LRG 1 (1)
PN 1 (1)	MRG 63 (20)	MRG 57 (27)
PRV 45 (22)	PN 2 (1)	PN 3 (1)
SEGW 13 (6)	PRV 52 (16)	PRV 52 (25)
SJ 14 (7)	SEGW 34 (11)	SEGW 12 (6)
SWGW 15 (7)	SJ 50 (16)	SJ 15 (7)
URG 13 (6)	SWGW 25 (8)	SWGW 17 (8)
	Tularosa 1 (1)	URG 16 (8)
	URG 35 (11)	
TOTAL 202 (100)	TOTAL 318 (103)	TOTAL 210 (100)

out of 63 which involved sales. An additional 14 have lease price information.

It was clear from conversations with respondents that many did not have good records, if any, of their expenses, the price paid or received, or personal time invested in the transfer process. Many of the dollar numbers provided, then, cannot be considered as anything more than an informed estimate on the part of the respondent. Presumably, the longer the period since the application, the less accurate are the estimates provided. The fact that 60 percent of the sample did not respond is troubling, but there is little evidence of bias in the portion which did respond.

Results: Transaction Costs

To facilitate comparison, all transaction cost and price data were converted into constant (real) 1988 dollars through use of the Consumer Price Index (CPI). Bearing in mind this adjustment, Table NM-18 presents the real transaction cost, on average, per acre-foot of consumptive water right for the eight basins for which results can be disclosed.[69]

For some of these basins the range of values in the sample exhibits substantial variation, particularly if a protested application appeared in the sample. For example, in the Upper Rio Grande the transactions cost per consumptive acre-foot varied from a low of $17.78 to a high of $4997.26 within the set of six values. Given, however, that there are only 64 Upper Rio Grande transfers in the entire set of 730 from which the transfer sample was drawn, it is likely that a large variation (and large average value) would persist in the population of 64 as a whole as well as for this particular sample of six. The average value, of course, would be expected to change with additional sampling.

Based on the numbers reported in Table NM-18, there appears to be substantial

TABLE NM-18

Average Transactions Cost[70]
(in 1988 dollars per right to consumptive acre-foot)

Basin	Numbers of Responses	Average Transactions Cost
Southeast Groundwater	14	$ 1.66
Southwest Groundwater	5	4.92
Bluewater	11	2.25
Gila/San Francisco	12	151.16
Pecos River Valley	25	66.53
Middle Rio Grande	7	537.42
Upper Rio Grande	6	1383.58
San Juan	5	283.32
New Mexico	87[71]	290.52

variation in transactions cost from one basin to another. However, there does not appear to be any discernible pattern to these average cost figures except possibly that it is less costly to transfer rights in groundwater basins as contrasted with basins containing surface water. With the exception of the relatively low value for Bluewater, values for the two groundwater basins are substantially lower than all of the surface water basins.

The averages for the three periods are $18.75 (1975-79), $260.04 (1980-83), and $495.24 (1984-87). The estimated standard errors for these averages are, respectively $4.83, $44.89, and $332.56. If 99 percent confidence intervals are constructed for the first two periods, they become ($6.29, $31.21) and ($144.20, $375.86) respectively, which do not overlap. Thus, it is very highly probable that average transactions cost (in constant dollars) have increased substantially from the first period to the second. Because of the large estimated standard error for the third period, it is less certain that the higher average reported for that period would be sustained in repeated sampling, though it is certainly more probable than not.

On a consumptive acre-foot basis, therefore, average transaction costs have increased from an almost nominal figure in the early years of the study period to well over $400 per AFCU in recent years. Again, this increase is over and above inflationary adjustments as reflected in the CPI. The explanation for this pattern is unclear, particularly since the frequency of protest has not increased from one period to the next.[72] The upward trend warrants further study due to the importance of transaction costs in the transfer process as a whole.

Despite the increase in the average transaction cost of applications, the bulk of the changes still are processed inexpensively, whether measured by numbers of applications or the quantum of water contained within them, as can be seen in Table NM-19.

Alternatively, Table NM-20 depicts the average transaction cost by size category of acre-feet contained in the application. From these numbers it seems clear that there is an economy of scale in which the cost per unit of water transferred declines as the volume of water in the application increases.

TABLE NM-19

Distribution of Average Transaction Cost
(numbers of applications and volume by cost range)

Transaction Cost Ranges	Number of Appls.	Per Cent of Total	Volume in Range	Per Cent of Total	Average in Range
< $10	52	59.1%	17,696 a-f	95.2%	$ 1.88
$10-$50	14	15.9%	319 a-f	1.7%	23.60
$50-$100	6	6.8%	325 a-f	1.8%	68.42
$100-$250	6	8.0%	185 a-f	1.0%	194.06
$250-$1000	5	5.7%	35 a-f	.2%	596.61
> $1000	4	4.6%	22 a-f	.1%	4997.26

TABLE NM-20

Average Transactions Cost by Size of Application

Size Group	Number of Applications	Ave. Trans. Cost
0-5 acre-feet	15	$ 473.70
5-10 a-f	7	343.82
10-20 a-f	14	395.40
20-50 a-f	15	60.23
50-150 a-f	16	36.25
> 150 a-f	20	3.82

Results: Prices

As noted above, there is less information in the survey results about prices paid or received from the sale of water rights. In fact, only slightly more than half of the transfers were actually sales. Nevertheless, it is useful to summarize the price information obtained from the survey to add to the general body of water right price information.

Tables NM-21 and NM-22 report average price information by time period and by basin respectively. For the second and third time periods there are also sufficient data to report estimated standard errors for the averages provided. In those cases, 95 percent confidence intervals for the average price reported are ($1638, $2194) and ($2180, $4116) respectively. In other words, it is estimated that 95 percent of the samples selected would fall within these intervals in repeated sampling. Because there is only a small overlap in the two confidence intervals, it is almost certain that the real price of water rights has risen substantially between the two periods.

These few values for sales prices are not sufficient to provide much basis for generalization, though the regional differences and the temporal increases are consistent with similar results reported elsewhere. In most basins water rights have become valuable property rights, and the evidence confirms a continuing increase in their value in constant dollars over and above increases due to general inflation. Transfer of these rights

TABLE NM-21

Average Price of Water Rights Per Time Period[73]
(in 1988 dollars per consumptive acre-foot)

Period	Number of Sales	Average Price
1975-79	6	$ 1276
1980-83	13	1916
1984-87	15	3148

TABLE NM-22

Average Price of Water Rights by Basin[74]
(in 1988 dollars per consumptive acre-foot)

Basin	Number of Sales	Average Price
Southeast Groundwtr	2	$ 105
Southwest Groundwtr	1	3316
Gila/San Francisco	3	4108
Pecos River Valley	14	2358
Middle Rio Grande	8	1450
Upper Rio Grande	1	2354
San Juan	4	2361
New Mexico	34[75]	2167

from one use and/or place to another may be expected to attract increasing scrutiny, as is perhaps reflected in the increasing transactions cost associated with transfers. One policy issue associated with the transfer process is the nature and extent of public review to which these transfers should be subjected. This topic is examined in its New Mexico context in the following section.

Section 5: New Mexico and the Public Welfare

Introduction

New Mexico recently enacted legislation prohibiting the transfer of a water right from one use or place to another where the effect of the transfer would be "detrimental to the public welfare or contrary to the conservation of water."[76] New Mexico's statute, like similar statutes in other western states, simply adds public welfare and conservation impacts to other potential impacts that must be considered by the hearing officer or judge in ruling on a transfer application.[77] This section examines the concept of "public welfare" and the question of how it should be defined with respect to water use. Specifically, the discussion addresses the question of whether an appropriate determination of the public welfare can be made in the administrative or judicial arenas.

A Case in Point

The requirement that transfers be consistent with the public welfare became state law in 1985. Because few transfer

applications have been challenged on this ground, the full ramifications of the requirement are not known. The likelihood the ramifications will be prolix is perhaps best illustrated by the case of *Sleeper v. Ensenada Land and Water Association*.[78] This case directly pitted the economic values associated with a new ski development against the cultural values of a northern New Mexico community.

Events leading up to the Sleeper suit date to the late 1970s, when Tierra Grande Corporation began developing a subdivision in conjunction with a large ski resort development[79] near Ensenada, New Mexico, a small farming community in the north central part of the state. While building roads for the new subdivision Tierra Grande dug a gravel pit then, later, transformed the pit into a recreational lake by damming the Nutrias Creek.[80] The Nutrias, a tributary of the Rio Brazos, empties into the Ensenada irrigation ditch before it joins the Rio Brazos.[81] Fed mainly from snowmelt, the Nutrias runs heavily during the spring and is dry by late May or early June.[82] The Ensenada Land and Water Association uses the creek's waters, drawn off the Ensenada ditch, to fill irrigation reservoirs and "fertilize" the soil with its rich silt.[83] The Association members use the Rio Brazos water when the Nutrias runs dry.

Tierra Grande's actions in damming the creek violated laws regarding the building of dams and the diversion of water.[84] When the state engineer discovered the lake, he ordered Tierra Grande to breach the dam.[85] After complying with the order, Tierra Grande contracted with two local property owners to purchase their lands and appurtenant water rights.[86] The parties conditioned the purchase upon the state engineer's approval of the property owners' application for change of place and purpose of use and point of diversion of their surface water rights.[87]

The applicants requested a one-time diversion of 61.32 acre-feet of water from Nutrias Creek to create the lake, and, thereafter, annual diversions of 13.32 acre-feet to compensate for evaporative loss.[88] These diversions necessarily would result in the retirement of irrigated land,[89] because when water rights used to irrigate land are transferred to a nonagricultural use, the previously irrigated land must be retired from agriculture. To offset loss of water from the creek, the applicants proposed to temporarily retire 64.55 acres of irrigated land during the year lake was filled, then, in the next year, permanently retire 14.02 acres of irrigated land.[90]

In 1982 the applicants applied for transfer of the surface water rights. The Ensenada Association protested, alleging that the transfer would impair existing rights and would be contrary to the public interest. The hearing officer, relying upon hydrologic studies and his finding that the transfer would not impair existing rights, recommended that the state engineer approve the transfer application. When the state engineer accepted this recommendation, the Ensenada Association appealed his decision, and the state district court reversed in a *de novo* hearing.

At the district court hearing, the Ensenada Association argued that the transfer would be contrary to the public interest because it would result in the permanent loss of agricultural land and, inasmuch as ditch maintenance expenses after the transfer would be born by fewer people than before, would increase the financial obligations of individual association members.

The applicants contended that economic development resulting from the proposed resort project would be in the

public interest because it would stimulate the local economy. The resort would generate construction jobs, such as the building of second homes, in the Ensenada area. Eventually, the applicants claimed, the tourist industry associated with the project would provide more local jobs, shifting the populace from an agricultural subsistence economy to an economy based on tourism.[91]

An expert for the Ensenada Association countered that the development of tourism/recreational facilities would not improve the financial outlook of people currently residing in the area. The resort project would provide only menial jobs, such as those for waiters and maids. Overall, he said, most local residents would never realize any benefits from the resort economy.[92]

Presiding at the hearing, Judge Art Encinias addressed the conflict between economic and cultural values inherent in the dispute. Although Encinias used the term "public interest" rather than "public welfare," it is clear he considered the terms synonymous. "Northern New Mexicans possess a fierce pride over their history, traditions, and culture," he said, noting that the deeply rooted traditional ties of northern New Mexicans to the land and water are central to maintaining that culture.[93] He observed, further, that the living culture of the northern New Mexico region is recognized at the state and federal levels as possessing significant value that cannot be expressed in monetary terms. "[H]ere," he said, "it is simply assumed by the Applicants that greater economic benefits are more desirable than the preservation of a cultural identity."[94] In opposition to this view, Encinias mentioned that developments such as the resort community in question contribute step-by-step to the destruction of the local culture.[95] Reversing the state engineer, Encinias stated that "to transfer water rights, devoted for more than a century to agricultural purposes, in order to construct a playground for those who can pay is a poor trade, indeed."[96]

On appeal, the New Mexico Court of Appeals held that the statute in effect at the time of the application precluded the state engineer from considering broad public interest factors in the transfer of surface water rights. Because, in a strictly hydrological sense, the transfer did not harm existing rights, the court reversed.[97] While the people of the Ensenada ditch have had their day in court, the victories for them at the district court level and for their opposition at the appellate level have not instructed others as to the meaning of "public welfare."

Water Scarcity and Public Welfare

The conditions of water scarcity that gave rise to the prior appropriation system have been constant over time, but the demand for water has been expanding. In the last 70 years, New Mexico's population has more than tripled[98] and, where population once was dispersed widely in the state, it is now concentrated in urban areas.[99] Over the same period, the state's surface waters have been almost fully appropriated, and groundwater previously inaccessible due to inadequate drilling and pumping technology has become the major source of supply in several counties.[100] Furthermore, developments in hydrology now permit more precise measurement of underground reserves, better understanding of the relationship between underground and surface streams, and the possibility of reliably determining the state's water resource limits.

These demographic and technological changes have been accompanied by unprecedented, vastly increased demand for water in metropolitan, industrial, and recreational uses. Meanwhile, the

concentration of senior water rights in agricultural uses is criticized by many as economically inefficient.[101] The closer the state approaches full appropriation, the greater is the pressure to move water to higher economically valued uses and to operate the allocation system on the market model.

Population increases have also been accompanied by increased production and disposal of municipal and industrial wastes, thus, in turn, by problems of water pollution. Point sources of pollution can be tracked to some extent, but the technology for correcting the effects of pollution, where it exists, is prohibitively expensive. Lastly, over all these other changes hangs the spectre of global warming and its unknown consequences for the region. In short, the West is still experiencing population growth that is clarifying the finite nature of its water resources. Submitting proposed water rights transfers to the test that they not harm public welfare is an expression of growing uneasiness with growth based on a finite water future. What it says, in effect, is that some lawmakers, and, presumably, their constituents, are beginning to question the wisdom of allowing the marketplace exclusive control in determining who shall hold these rights and how they shall be used.

Ordinarily, mistrust of market effects does not extend to commerce in coal, copper, other minerals, and other energy fuels. Where these resources are concerned, society has developed ways of mitigating the undesirable social and environmental consequences of allowing free trade to run its course. Depletion costs have been accepted in exchange for cash. When a mine or demand for its ore plays out, for example, the mining company is obliged to restore damaged lands and severance tax revenues are used to establish new tax bases for affected communities.

Where water is the resource and short supply a factor, however, results of a strict market economy are sometimes regarded as intolerable. Like air, water is perceived as distinguishable from other natural resources because it is essential to all forms of life. Because water has this characteristic, society seems unprepared to deal with the reality that giving the market exclusive control in western water trade might displace from competition those who could not bear the going rates.[102] In extremely arid areas people with fewer financial resources would be without water and forced to move. And, in the long term, given the strength of demand and the relative paucity of supply, water reserves would be exhausted. This result would mean destruction of the region's economic base and its habitability as well. The area would lose its capacity to support life, and this concept, on "Spaceship Earth," does not appear to be palatable for the current body politic.[103]

Conflicting Values Included in the Concept "Public Welfare"

Even though members of society are concerned about the "public welfare," there is never unanimity as to its meaning. Visualizing various values in water as located upon a continuum can help, perhaps, to clarify this subject. At one end of the continuum would lie values that are widely and strongly held. Water resources protected by law might be placed here. Through the Endangered Species Act,[104] for example, Congress has preserved the water habitats of certain birds, fish, and other kinds of wildlife. Similarly, as noted above, the federal government has asserted water rights in national parks, Indian reservations, and other areas it has set aside for specific purposes.

At the other end of the continuum would lie values that are so abstract or impractical they are unlikely ever to command a large constituency. Here, then, might be

placed the sentiments of people who cherish the image of free running streams and, regardless of the impact, insist that no stream be impeded in its flow to the sea. Between these extremes there are a number of other publicly held values in water.[105] Examples of these are set out below.

Environmental, Recreational, and Scenic Values

Almost all western states have recognized public benefit in preserving water flow in some stretches of perennial streams and rivers.[106] Protection of a certain level of streamflow is justified on several grounds. It maintains bacterial activity that cleanses the stream, dilutes municipal and industrial discharge into the stream, carries potentially clogging sediment downstream, ensures survival of fish and other aquatic life, and sustains vegetation in the bed and on the banks of the stream. This vegetation, in turn, serves as habitat for wildlife and waterfowl and acts as a filter by trapping polluting substances carried in return flow irrigation water and other runoff.

Other values in retaining water in streams and rivers are shown in the popularity of sport fishing, swimming, boating, rafting, and other purely recreational activities. In addition, there is clearly some value held in the enjoyment of the scenic quality of rivers, and of watersheds generally.[107]

Economic Values

In addition to directly sustaining physical life, water has other properties that, directly and indirectly, sustain economic life. It is among the most fundamental of the "means of production." As a source of buoyancy and momentum, channeled water can carry heavy objects from place to place, and can carry away and dilute the effluent of factories and businesses. Quantities of captured water, converted to steam or hydroelectric power, can serve multiple energy needs and at great distances from rivers and reservoirs.

In the end, the availability of water determines the feasibility of nearly all commercial enterprises. Some of these--in the West most notably large-scale irrigated agriculture, mining, and oil exploration--require large amounts of water.[108] Other businesses that do not themselves use great quantities of water depend on businesses that do. Manufacturers of farm implements, wholesalers and retailers of seed and fertilizer, trucking companies, packagers, advertisers, grocers and their customers all rely on the products of farming. Similar dependency networks radiate from the logging camps, mines, quarries, and oilfields of resource producing western states. Thus water underpins not only the tax base of towns built around highly water-consumptive industries, but, ultimately, the tax bases of remote, less water-consumptive, cities.[109]

Historic and Cultural Values

For many people, water has significant cultural value apart from its importance as an economic commodity. In New Mexico, this value is evident in the traditions of historic communities. Among the many New Mexicans descended from aboriginal Indians and 16th century Spanish settlers there are some who make their living by subsistence farming and livestock grazing in the tribal Pueblos or rural villages built by their ancestors.[110] In these enclaves of traditional cultures, community values in water are manifest in physical structures--the hand dug ditches through which water can flow to all parts of the villages--and in social structures--the respected practices of using and maintaining the ditches. Field crops are irrigated and stockponds filled by water

diverted from nearby sources and carried through this network of ditches, or acequias.

Adherents to these traditional ways of life revere water as a sacred substance, the lifeblood of society. Reverence for the life-giving power of water extends to everything associated with water. The seasonal changes and corresponding changes in rainfall and river flow are observed by time-honored rituals, dances, and feasts. These events, along with the handicrafts, music, and other creative works the events inspire, are the basis of a substantial portion of the New Mexico's tourist trade, which is one of the state's primary industries.

Conservation Values

Where water is scarce, the tendency to prefer present over future uses is strong. And the duty to ensure usable water resources to future generations, while generally acknowledged in principle, often suffers in practice. Still, partly because the disastrous effects of improvident resource exploitation are now being felt world wide, value in long-term management of water and other resources is today expressed more earnestly than in the past.[111]

Factors Constraining Decision Makers Evaluating Public Welfare

If water occurred in only one form, as a solid, divisible substance, it could be parceled and allocated in chunks. As a resource, however, water is not readily severable from all of the institutions affected by decisions allocating it from one use to another. It is a changeable, mobile element in a natural system, the laws of which are imperfectly understood. Moreover, what *is* understood about hydrologic systems complicates rather than simplifies the task of allocating water with public welfare impacts in mind. We now know, for example, that certain groundwater aquifers are connected to surface streams, that certain others are not, and that the decontamination of a polluted water system, whether surface or underground, is extremely expensive. All of this information helps clarify the public welfare debate, but does not help resolve it.

Issues of Water Supply

Renewable water resources

As noted above, some underground aquifers are hydrologically connected to surface streams.[112] Water, in the form of rainfall and snowmelt, percolates down through the soil to fill these aquifers, and, moving laterally underground, eventually enters streambeds as recharge. Over time, because water pumped from such an aquifer is lost to the surface-stream recharge process, withdrawals from the aquifer will not only drain it but also deplete the associated streams. Thus, where underground aquifers and surface streams are effectively the same water source, administration of them must recognize that fact. The difficulty comes in deciding when to balance accounts.

The rate at which the pumping of groundwater affects associated streams varies with the composition of the geologic zones separating the well from the stream. Usually, however, the rate is slow. One can take stream-related groundwater today and postpone reckoning with the impact until far into the future. If one were to place a well directly into the river, the drawdown effect would be immediate and evident. But the impact on the river of wells fifteen miles away from the river might not be felt for a hundred years. Thus, although the impact eventually will be felt, until it is felt, water pumped from the well can be considered as withdrawal from storage rather than withdrawal from the river.

These temporal and spatial considerations are of great practical

importance to municipalities, for municipalities in New Mexico rarely depend on surface water alone. In virtually every western city, groundwater in storage hydrologically connected to surface supplies is a supplemental, if not the major, water source. Accordingly, cities attempting to coordinate economic growth and water withdrawals have found it expedient to place wells as far from the river as possible and use the often high-quality groundwater to support domestic and industrial needs. Here, water from the city's wells is thought of as if it were drawn from a source independent of the river when, in fact, it is an interest-free loan from the river. Once created, however, the debt to the river eventually must be paid.

The statutes of New Mexico allow municipalities to acquire water rights and refrain from fully using them for up to 40 years.[113] This law permits cities and towns to appropriate more water than they can use at present and, at the same time, build a hedge against increasing water prices in the future. For example, a city presently dependent on groundwater can buy agricultural rights in surface water at current market rates then lease the rights back to the individual farmers who sold them.[114] As long as the rights are used under lease by the farmers, the rights' type and place of use do not change, so no formal transfer must take place.[115] With the surface water rights in hand, the city can pump its wells secure in the knowledge that, when the time comes to repay the debt to the river built up by well pumping, the city can dry up the leased surface rights to offset the impact on the river.

The repayment issue becomes critical when and where a municipality has based its economic growth on a combination of surface and groundwater use greater than the actual supply. Consider a city of 500,000 people that needs 100,000 acre-feet a year to sustain it. For a time, the city can easily withdraw that amount from storage and the river. When the river ultimately can supply only 50,000 acre-feet a year, however, something will have to give. For purposes of public welfare analysis, then, decision makers must inquire into issues such as whether a city should be obliged to limit its growth on the basis of long-term supplies, or should be obliged to keep a certain amount of groundwater in reserve in case there is no snow melt and the upstream reservoirs are low.

Nonrenewable water resources

Where one is deciding the fate of a closed, or non-stream-related aquifer, the possible policy approaches are numerous. For example, on the basis of speculation about future needs, one could conclude that these are of greater social value than present needs, and disallow any use greater than natural recharge. In this case, annual appropriations from an aquifer that contained 15,000,000 acre feet of water but had a sustained yield of only 1,000 acre feet a year could be limited to 1,000 acre feet. At the other extreme, if policymakers believe that the economic value of the water in present uses was higher than any foreseeable future use, they could make a decision to extract the water at rates dictated by present needs, leaving none for future generations.

One compromise between these positions would be to allocate quantities greater than natural recharge but strategically so. That is, using the best available technology, one could calculate the quantity of water in the basin as well as the supply of collateral resources needed to sustain economic development in the area. On the basis of these measurements, mining of water would be allowed but at a rate that ensured a certain quantity of water would remain to support the area's economy.

Of course, in making these decisions policies would have to present opportunities and obligations for water conservation. And the rate of drawdown might have to be

regulated to prevent one user adversely affecting another by pumping too fast. Whatever the approach, a decision to mine and at a certain rate lies squarely within the concept of public welfare.[116]

Issues of Water Quality

In evaluating the public welfare issues above, another crucial question is reached: to what degree are changes in water quality part of the public welfare equation? This question is more complex than it might at first appear. One starting point, as occurs in some legislation, would be the proposition that there should never be any degradation of water quality in either renewable or non-renewable sources.[117]

"Efficiency" versus "waste"

This argument proceeds from the notion that every drop of water taken from a non-renewable source moves that source steadily toward extinction. Therefore, not one drop should be wasted or polluted. The difficulty in holding this position becomes apparent in the realization that pollution of water may not be "waste" of water. Indeed, in the process of polluting a water resource, a great deal of economic activity and employment may be generated for a large number of people.

If mining of a nonrenewable source is allowed, it is inconsistent to argue the same source should never be polluted because the economic activity creating pollution is necessary to sustain employment. Suppose that two individuals proposed to extract water from a nonrenewable aquifer. The first agreed he would farm and by doing so dry up the aquifer. This use would generate 100 jobs over 45 years. Suppose the latter agreed he would utilize the water for a non-consumptive industrial purpose, thereby consuming none of it, and reinject it into the ground after he was done. This use of the water would generate 4,500 jobs over 45 years. When reinjected into the aquifer, however, the water would be mildly toxic and, given current technology, unusable for other purposes. In which case is the public welfare best served? The debate over nondegradation versus measured rates of degradation continues on, and every word of the debate invokes public welfare issues.[118]

Surface water pollution also presents public welfare ironies. Many clamor for more "efficiency" in water use by farmers, and ask that less water be consumed by the farming process. From a water quality standpoint, the problem may at times be just the opposite. Some modern farms may be too efficient.[119]

Throughout the West, where massive irrigation projects have been built and where water has become sufficiently expensive, cost may already be an incentive to the farmers to conserve water. This condition often results in the farmers using drain tiles to enhance return flow from their fields after the crops have been irrigated.[120] Although this process uses less water, it often reduces the quality of the water returning to the river. The water is lower in quality because it leaches the naturally occurring salts, and, at times, other elements such as boron and selenium, out of the soil and into the river to be presented as a "gift" to the next downstream user. Thus, consumption of the minimum use of water by one user can lower water quality for the next user and so on, until fisheries at the end of the watershed are severely damaged.[121]

Terms such as "efficiency" and "waste" and "conservation" are proper to the evaluation of the "public welfare," but people rarely mean the same thing when they use them. Consider three very distinct meanings for the term "waste" of water. An expert in the technology of on-farm uses of water might insist that, in farming, water is wasted in only three ways: by transpiration through the leaves of plants, by evaporation from open ditches, and by sufficiently deep percolation so that it cannot be reused

economically or becomes blended with a nonusable aquifer. An economist, however, would suggest that even if one utilized the absolute minimum amount of water to grow crops, there would still be a waste of water if there were a more valuable use for the water outside of agriculture. Finally, consider a person who values rare birds. That person might strongly argue that water would be wasted in farming or industrial use when it could be used to save the last few members of an indigenous duck species once plentiful in the area. The answer to the question of waste thus depends on whether waste is measured with a laser plane for leveling fields, a calculator with a discount rate function, or an ornithological guide and a hope that one's children will have an opportunity to observe the variety of species that can be seen today.

Prevention versus cleanup

Water quality concerns include another significant factor that must be woven into the decision making process. This factor is the practical irreversibility of certain decisions. Weighing the costs of water pollution cleanup against the costs of prevention often results in substantial imbalance as illustrated than by the Exxon oil spill in Valdez, Alaska. The cost of an alcoholic treatment program, or a testing program, or a failsafe radar system may be relatively minor in comparison with the cost of repairing the damage done by the oil slick. The same is commonly true with respect to the introduction of petrochemicals into a groundwater aquifer. The cost of removing such substances is frequently prohibitive by most benefit-cost calculations. That cleanup occurs at all is probably due to the general horror at having befouled one of life's most basic resources, its water supply. It remains to be seen, however, whether that horror will sustain the cleanup when they become so high that they compete with the costs of other basic programs garbage collection or police service, for example. Because some pollution is virtually irreversible,[122] the public welfare is plainly implicated, not only for the individual actors in a water transaction, but for all the members of society who may have to live with the adverse consequences of the transaction.

Assuming the preceding discussion illustrates the difficult issues involved in the public welfare debate, other equally difficult questions also arise. Who should decide public welfare issues? How should those decisions be made? States may try to reinvent the wheel, as some states have done, or they may realize that others have worked long and hard at this question before. Indeed, such a planning analysis is commonplace throughout the world whenever new water development projects are proposed. Why should the analysis be any different when the issue is whether an existing water right should be transferred or whether a new appropriation should be permitted instead of whether a new water project should be constructed.

The Best Forum for Determining Public Welfare

If such an analysis is considered mandatory, other issues become relevant. When and where should the analysis take place? Who is best qualified to do it? Actual practice under the transfer statutes of most western states, New Mexico included, elides these issues, and, therefore, resolves them by default. This oversight deserves scrutiny, for it obscures the fact that transfer procedures combine two questions that are not necessarily related: 1) Should this water right be transferred from use A to use B?, and 2) Would such a transfer be consistent with the public welfare?

The first question is properly joined with the issue of whether the transfer of the water right infringes upon or decreases the value of a third party's property right in water by reducing the quantity of the third party's

water right.[123] This issue falls under the general heading of impairment. It is a question of hydrology and submits readily to technical expertise. By contrast, the public welfare question concerns a broad range of variables and, perhaps, might be clearer if stated differently: Would allowance of this transfer be inconsistent with society's goal of optimal utilization of precious and scarce water resources?[124]

The "impairment" question lends itself to an administrative or judicial forum because the ultimate facts are rarely in dispute and the legal issues are capable of clear statement and resolution. The adversary system of expert witnesses and cross examination is well suited to this task. The public welfare question is ill-suited to such a forum for the following reasons.

First, the issues are not clear-cut and capable of technical resolution. Second, expert testimony, if appropriate at all, would be largely subjective and value-loaded, and the decision making process would likely lead to a war of experts testifying on widely varied major premises. Third, resolution without error would be difficult because the traditional legal efficiency guidelines of relevancy and materiality would be useless, because virtually everything is relevant in a public welfare inquiry. Fourth, the inquiry would be so broad that the party with the most financial resources and staying power would prevail, solely because that party could amass more subjective testimony. Fifth, the typical decision makers in such a forum at least at the initial stage of the proceeding are commonly the state engineer and his staff. These persons, generally engineers or other technically trained persons, are unlikely to be prepared by professional training or by temperament to handle sweeping nontechnical issues.

Sixth, assuming the issues were brought to the appellate courts for judicial clarification, there would be little chance of consistency in outcomes because any legal holding would contain little more than a general legal rule, as broad as public welfare itself, and each case would turn on its facts. Seventh, inasmuch as clear legal rules would not be forthcoming from the courts and the decision maker would not necessarily be trained to address these policy questions, the possibility of arbitrary and inconsistent results would be extremely high. Without some predictability of result few people would be inclined to invest money in transferring a water right.[125]

If one agreed with this analysis and wished to remove public welfare consideration from the province of administrative or judicial decision makers and limit the administrative and judicial transfer issues to questions of technical water right impairment, where should the power to decide public welfare issues be vested? One possibility would require the individual seeking a transfer to prepare the equivalent of an environmental impact statement and make it part of the record of decision to be considered by the administrative decision maker. This alternative, obviously patterned on the National Environmental Policy Act (NEPA),[126] probably would not go far enough. It does not go far enough because it would provide no decision rule: it is one thing to display impacts and quite another to decide that one or another impact justifies scrubbing a project.

A second choice would be to regionalize water development planning, as New Mexico has done, and allow the participants in that planning process to make fundamental choices about public welfare values in water use. The basic characteristics of such a process would be involvement of citizens affected by water usage, defined procedural rules, and, following fair and adequate notice, a full public hearing on the issues.

Such a planning process would allow the public to have input into decisions regarding the use of regional water resources, subject of course to due process and to restrictions on unlawful takings of property without compensation.[127] The benefits of having a community rather than a judge define the public welfare values involved in water use include the following.

Once a regional water plan had been produced in this manner, it could serve as a guide, or, in some cases if subject to judicial review at adoption, a binding set of regulations for purposes of determining the public welfare impacts of proposed water rights transfers in the region.[128] Such a system would give clarity to transferors of water rights, would aid judicial decision makers in understanding how their communities view the public welfare values in water, and, having been developed outside the judicial arena, would be paid for by all concerned persons rather than particular litigants.[129]

Section 6: Conclusion

The preceding discussion is intended to demonstrate that with scarcity of water resources, both surface and ground, comes inevitable political and philosophical debate as to the best method for allocating these resources among constituents of a democratic society. The authors endorse the marketplace as a starting point for allocating property rights in water and, thus far, have not seen a substitute that appears superior. At the same time, it is also clear that the value of water as an economic engine for production does not completely reflect the value of water to a society.

When cultural, environmental, and intergenerational values in water are articulated by the citizens of a society, there must be a forum in which these arguments can be heard. However, when these essentially nonquantifiable values are placed into a quasi judicial water rights transfer process through talismanic phrases such as the "public welfare," society is not necessarily served. The advocates of these values may not be served because the adjudicative process is not equipped to give the values a fair hearing, and the transferring parties are not served because they must submit to the costs and uncertainties of repetitive litigation. An alternative method may be found in allowing the "public welfare" to be defined in a regional planning process open to all interested parties.

1. Person Completing Form _____
2. Date completed _____

CENSUS OF NEW MEXICO WATER RIGHTS TRANSFERS
CHANGE IN PLACE AND/OR PURPOSE OF USE & DEDICATIONS/NEW APPROPRIATIONS
(1975-1987)

3. FILE # _____
4. SEO OFFICE _____
5. TRANSFER TYPE: A B C D E F G H I J (circle one)

6. APPLICANT: _____
7. ADDRESS: _____

		MOVE FROM or DEDICATE:	MOVE TO or NEW APPROPRIATION
SOURCE	8. / 9.	_____	_____
LEGAL DESCRIPTION	10. / 11.	1/4 1/4 1/4	1/4 1/4 1/4
Section	12. / 13.	_____	_____
Township	14. / 15.	_____	_____
Range	16. / 17.	_____	_____

REQUESTED AMOUNT OF TRANSFER:

Diversion rights, af/y	18. / 19.	_____	_____
Consumptive Use, af/y	20. / 21.	_____	_____
Quantity stored, af	22. / 23.	_____	_____

PRIORITY DATE OF APPROPRIATION:

Claimed	24. / 25.	_____	_____
Adjudicated	26. / 27.	_____	_____
Permitted	28. / 29.	_____	_____

TYPE OF WATER USER:

a) Individual	30. / 31.	___	___
b) Water District	32. / 33.	___	___
c) Corporation	34. / 35.	___	___
d) Municipality	36. / 37.	___	___
e) Utility	38. / 39.	___	___
f) Other _____	40. / 41.	___	___

USE TYPES:	MOVE FROM (DED.)	MOVE TO (NEW AP.)	TYPE OF DIVERSION:	MOVE FROM (DED.)	MOVE TO (NEW AP.)
a) Irrigation	42. ___	43. ___	a) Ditch	44. ___	45. ___
b) Municipal	46. ___	47. ___	b) Well	48. ___	49. ___
c) Commercial	50. ___	51. ___	c) Reservoir	52. ___	53. ___
d) Industrial	54. ___	55. ___	d) Spring	56. ___	57. ___
e) Recreation	58. ___	59. ___	e) Seeps	60. ___	61. ___
f) Fishery	62. ___	63. ___	f) Mine	64. ___	65. ___
g) Fire	66. ___	67. ___	g) Pipeline	68. ___	69. ___
h) Domestic	70. ___	71. ___	h) Surface pump	72. ___	73. ___
i) Stock	74. ___	75. ___			
j) All	76. ___	77. ___			

78. SURFACE WATER SUBAREA: _____

HISTORY

79. Date the application was considered filed _____.

80. Was there a protest? yes ____ no ____.

81. Date of protest _____.

82. Was there a hearing? yes ____ no ____.

83. Date of hearing _____.

84. What was the ruling? approval ___ denial ___ pending ___ .

85. Date of the ruling? _____.

86. Was there an appeal to District Court? yes ____ no ____.

87. Has there been a decision on appeal? approval ___ denial ___ pending ___ .

88. Date of decision on appeal _____.

89. Was there a higher appeal? yes ____ no ____.

90. If so, to where? _____ .

91. Disposition of appeal? approval ___ denial ___ pending ___ .

92. Date of final disposition _____.

93. Were there hydrologic reports filed? yes ____ no ____.

94. If yes, by State Engineer's Office? yes ____ no ____.
95. By hydrologists hired by the parties? yes ____ no ____.

96. Is any price mentioned in files? yes ____ no ____.

97. If so, indicate dollar amount, quantity of water, and whether rights were to consumptive use or diversionary.

_____

98. Were rights moved into, out of, or within an irrigation or conservancy district? yes ____ no ____.

If yes, indicate the nature of the move below:

99. Place/purpose of use moved out of a district. yes ____ no ____.
100. Point of diversion moved out of a district. yes ____ no ____.
101. Place/purpose of use moved into a district. yes ____ no ____.
102. Point of diversion moved into a district. yes ____ no ____.
103. Place/purpose of use moved within a district. yes ____ no ____.
104. Point of diversion moved within a district. yes ____ no ____.
105. Other _____.

106. Name of Irrigation or Conservancy District _____
107. Address of District office, if in file: _____
_____
_____

PARTICIPANTS

(If additional space is needed, use back of sheet)

		BUYER	SELLER
PRIMARY PARTIES (Give names of representatives, if corporation or municipality)	NAME(S)		
	ADDRESSES:		
	PHONE:		
ATTORNEY FOR APPLICANT (Give names of representatives, if corporation or municipality)	NAME(S)		
	ADDRESSES:		
	PHONE:		
PROTESTANT(S)	NAME(S)		
	ADDRESSES:		
	PHONE:		
ATTORNEY FOR PROTESTANT	NAME(S)		
	ADDRESSES:		
	PHONE:		
HEARING EXAMINER	NAME(S)		
	ADDRESSES:		
	PHONE:		
SEO EXPERTS	NAME(S)		
	ADDRESSES:		
	PHONE:		
OTHER EXPERT WITNESSES	NAME(S)		
	ADDRESSES:		
	PHONE:		

NATURAL RESOURCES CENTER
An interdisciplinary component of The University of New Mexico School of Law

Dear Friend:

We are writing to ask for your help. The Natural Resources Center and the Department of Economics at the University of New Mexico are conducting a pair of studies of water administration in New Mexico. We hope to get a better understanding of what it costs a water-right owner to change the place or purpose of the water use, as well as what changes in water uses are occuring, and what water rights are worth. The results of these studies may assist the State in matching its administration system to the needs of New Mexicans.

The only source for this information is people like yourself, who have been involved in changes in water use. With the cooperation of the State Engineer's Office, we have made a complete census of applications to change the place or purpose of use of water rights in New Mexico since 1975. As you know, the State Engineer's records do not include cost information, so we are asking people who have made applications to help us with cost data. Included with this letter is a questionaire which gives the date, quantity, and file number of your application, and asks what what you spent on the application, the amount of your time involved, and what was paid for the water right. This information is the missing element in understanding how the water system is working, and your cooperation is the only way to fill this gap.

We are sensitive to the fact that cost information is private. The information we collect will be used in statistical analysis, and will be kept confidential; it won't be associated with your name or with the file number of your water right. However, the results should be extremely useful to New Mexico and to people making changes in their water uses in the future.

It would be helpful if you would look over the questionaire and check your records for the information requested. If another person handled the application, you may prefer to pass the questionaire on to them. Someone from our office will call you next week to arrange a time to take your responses over the phone. They will be able to answer any questions you have about the study. If you have any questions right now, please call the Natural Resources Center in Albuquerque at 277-6424.

We hope to make the data from this census available to the public through the Bureau of Business and Economic Research by next summer. Thank you very much for your cooperation. Your help will be an important contribution to New Mexico's ability to make good, informed water decisions.

Sincerely yours,

F. Lee Brown,
Co-Director,
Natural Resources Center

Susan Christopher Nunn,
Assistant Professor,
Department of Economics

Department of Economics, The University of New Mexico, Albuquerque, NM 87131, 505 277-6424

Census of Applications to Change Place and/or Purpose of Water Use

Applicant: _____ Quantity_____ Date of application _____ File No._____

1. Is the above information correct? If not, please correct:

Applicant: _____ Quantity_____ Date of application _____ File No._____

2. What was your role in the transfer? ____ applicant ____ protestant ____ other (explain) _____

Answer questions 3-7 only if the application involved a sale, and you were associated with either the buyer or the seller.

3. Did this transfer involve a sale of water rights? ☐ yes ☐ no

4. With which party to the sale were you associated? ☐ buyer ☐ seller ☐ other (explain) _____

5. Could you estimate the total dollar value paid for these rights?
$_____ to the seller

6. Was there a commission paid to a realator or broker, and if so, how much? $ _____

7. Was there any additional compensation for the right other than price? ☐ yes ☐ no
If so please explain: _____

8. Could you estimate your total expenditures in the following catagories, associated with this application excluding purchase price or sales commission?

Filing and publication fees _$_____ Hydrologists or Engineers $_____
Title Search _$_____ Other (Please Explain) $_____
Attorneys _$_____ _____

9. Could you estimate the amount of uncompensated time in days or hours expended by you and your associates on this application. _____ days _____hours

10. On a scale of 1 to 5, with 5 the highest, would you indicate the intensity with which this application was protested? (Circle appropiate number.)

1	2	3	4	5
Routine, Uncontested		Moderately Protested		Strongly Protested

11. If protested, what were the reasons for protest, in order of importance?

1. _____
2. _____
3. _____

12. Was the original application modified or conditioned? ☐ yes ☐ no
If yes, how? _____

Thank you for your help!

ENDNOTES TO CHAPTER 4

1. United States v. Rio Grande Dam and Irrigation Co., 174 U.S. 690 (1899), Winters v. United States, 207 U.S. 564 (1908), United States v. New Mexico, 438 U.S. 696 (1978). For a good discussion of federal reserve water rights see **C. Meyers, A. Tarlock, J. Corbridge and D. Getches, Water Resource Management** 771-805 (3rd ed. 1987).

2. N.M. Stat. Ann. § 72-1-1 (Repl. 1985).

3. *Id.*

4. DuMars, *infra* note 11 at 1047.

5. *Id.*

6. N.M. Stat. Ann. § 72-12-8 (Repl. 1985) § 72-5-28 (Repl. 1985).

7. State *ex rel.* Reynolds v. Miranda, 83 N.M. 442 (1972) and cases cited therein.

8. **T. Anderson, Water Rights: Scare Resource Allocation, Bureaucracy, and the Environment** (1983) at 249-282.

9. N.M. Const. Art. XVI § 3 (1974).

10. *See* State of Idaho, Department of Parks v. Idaho Department of Water Administration, 96 Idaho 440, 530 P.2d 224 (1924).

11. DuMars, *New Mexico Water Law; An Overview and Discussion of Current Issues*, 22 **Nat. Res. L. J.** 1045 (1982).

12. *Id.* at 1046. Under the riparian doctrine, owners of land bordering a river or other body of water enjoy instream rights, or rights to a continuous flow of water through their property, and privileges in use of the water not accorded owners of nearby non riparian land, however longstanding the latter's residence on that land. A good discussion of the riparian water law doctrine can be found in **J. Sax and A. Abrams, Legal Control of Water Resources** (1986) pp. 154-227 and in **J. Mather, Water Resources: Distribution, Use, and Management** 277-83 (1984).

13. DuMars, *supra* note 11 at 1047.

14. N.M. Stat. Ann. § 72-12-12 (Repl. 1985). When the state engineer finds that an underground reservoir fits the statutory definition, he simultaneously declares the basin as such and brings it within his jurisdiction.

15. N.M. Stat. Ann. §72-12-2 (Repl. 1985).

16. N.M. Const. art. XVI § 1 (1978) and N.M. Stat. Ann. §§ 72-1-2 and 72-1-3 (Repl. 1985).

17. N.M. Stat. Ann. § 72-12-4 (Repl. 1985); State *ex rel.* Reynolds v. Mendenhall, 68 N.M. 467, 362 P.2d; DuMars, *supra* note 11 at 1047. For a good discussion of this issue *see* State *ex rel.* Bliss v. Dority, 55 N.M. 12, 225 P.2d 1007 (1950) *appeal dismissed*, 341 U.S. 924 (1951).

18. N.M. Const. art. XIV § 3 (1978).

19. State *ex rel.* Reynolds v. Miranda, 83 N.M. 443, 493 P.2d 409 (1972). For a good discussion of the instream flow issue *see* State of Idaho, Department of Parks v. Idaho Department of Water Administration, 96 Idaho 440, 530, 530 P.2d 924 (1974).

20. For example, the water allocation statute for agricultural use is N.M. Stat. Ann. § 72-5-18 (Repl. 1985). The state engineer also exercises authority to require efficient use of water.

21. State *ex rel.* Reynolds v. Rio Rancho Estates, Inc., 95 N.M. 559, 624 P.2d 501 (1981).

22. N.M. Stat. Ann. § 72-1-9 (Repl. 1985).

23. N.M. Stat. Ann. § 72-12-8 (Repl. 1985).

24. N.M. Stat. Ann. §72-5-19 (Repl. 1985) ("The standard measurement of the flow of water shall be the cubic foot per second of time; the standard measurement of the volume of water shall be the acre-foot, being the amount of water upon an acre covered one foot deep, equivalent to forty-three thousand five hundred and sixty cubic feet.").

25. City of Albuquerque v. Reynolds, 71 N.M. 428, 379 P.2d 73 (1962). For a discussion of the problem of consumptive use calculation in water right transfers *see* Dunning, *The Physical Solution in Water Law* 57 **U. of Colo. L. Rev.** 445 (1986).

26. N.M. Stat. Ann. § 72-5-18 (Repl. 1985) ("The amount shall be based upon beneficial use and in accordance with good agricultural practices and the amount allowed shall not exceed that amount. The State Engineer shall permit the amount allowed to be diverted at a rate consistent with good agricultural practice and which will result in the most effective use of available water in order to prevent waste.").

27. State *ex rel.* Reynolds v. Mears, 525 P.2d 870 (N.M. 1974).

28. City of Roswell v. Berry, 80 N.M. 110, 452 P.2d 179 (1969).

29. *See supra* note 26.

30. A non renewable aquifer is one that is not connected to a surface stream and that has been formed over thousands of years by rainfall gradually filling the alluvium with water. Once the water is taken out, for all practical purposes the aquifer will not be replenished.

31. City of Albuquerque v. Reynolds, 71 N.M. 428, 379 P.2d 73 (1963). Conjunctive management issues are discussed in **Meyers** *et al. supra* note 4 at 608-23.

32. Mathers v. Texaco, 77 N.M. 239, 421 P.2d 771 (1967). *See also* Bagley, *Water Rights and Public Policies Relating to Groundwater Mining in the Southwestern States*, 4 **J. Law and Econ.** 144 (1961).

33. For a good discussion of direct flow versus storage rights, see Denver v. Northern Colorado Water Conservancy District, 130 Colo. 375, 276 P.2d. 992 (1954). State engineer jurisdiction over stored imported waters is discussed in Jicarilla Apache Tribe v. United States, 601 F.2d 1116 (10th Cir. 1978) *cert. denied*, 444 U.S. 995 (1979).

34. *See supra* note 26.

35. N.M. Stat. Ann. § 72-8-4 (Repl. 1985) (waste of water a misdemeanor).

36. N.M. Stat. Ann. § 72-5-39 (Repl. 1985) (State Engineer can get injunction against unauthorized use including forfeited rights).

37. The New Mexico statutes setting out the procedures for the adjudication are located at N.M. Stat. Ann. §§72-4-1 to 72-4-20 (Repl. 1985).

38. Mathers v. Texaco, Inc., 77 N.M. 239, 421 P.2d 771 (1966).

39. N.M. Stat. Ann. § 72-4-19 (Repl. 1985) § 72-5-22 (Repl. 1985).

40. City of Albuquerque v. Reynolds, 71 N.M. 428, 379 P.2d 73 (1963).

41. N.M. Stat. Ann. §72-5-26 (Repl. 1985). However, if an individual proposes to pump water out of state, the "Commerce Clause" of the U.S. Constitution and interstate compacts are often implicated.

42. *Id.*

43. N.M. Stat. Ann. § 72-6-3.

44. *Id.*

45. N.M. Stat. Ann. § 72-5-39 (Repl. 1985). *See also*, Ellis & DuMars, *Two-Tiered Market in Western Water*, 57 **Neb. L. Rev.** 333 (1978).

46. N.M. Stat. Ann. §§ 72-5-4, 72-5-5, and 72-5-51. (Repl. 1985).

47. N.M. Stat. Ann. § 72-12-3 (Repl. 1985).

48. N.M. Const. Art. XVI, § 5 (1978).

49. Stokes v. Morgan, 101 N.M. 195, 680 P.2d 335 (1978).

50. N.M. Stat. Ann. § 72-12-7A (Repl. 1985).

51. W.S. Ranch v. Kaiser Steel Corp., 79 N.M. 65, 439 P.2d 714 (1968).

52. State *ex rel.* Reynolds v. South Springs Co., 80 N.M. 144, 452 P.2d 478 (1969).

53. For a description of the administrative procedures for transferring a right in New Mexico see Colby, Rait, Sargent & McGinnis, *Water Transfers and Transactions Costs: Case Studies in Colorado, New Mexico, Utah, and Nevada,* Department of Agricultural Economics, University of Arizona (July, 1988).

54. All records concerning surface water rights are kept in the Santa Fe office.

55. For convenience applications covering groundwater in the San Juan and Canadian basins are included in the Albuquerque totals, though administered through Santa Fe. Only eight such applications were recorded during the period of record.

56. In fiscal year 1978-79, the SEO changed from a biannual report to an annual basis.

57. There is a change of ownership form that is also administered by the SEO, but these records are much too numerous to have been surveyed during the course of this research.

58. Steve Reynolds, State Engineer, raises the possibility that the number of applications stated in the annual reports of the State Engineer's Office may themselves contain inaccuracies. However, there was no other data source available for checking the completeness of the Census survey.

59. The reports are prepared are on a fiscal year basis. Therefore, the 1974-76 report covers the last half of 1974, all of 1975, and the first half of 1976. Of the four half-years, only the last half of 1974 (presumptively one-fourth of the applications) is outside the survey period.

60. Arizona v. California, 373 U.S. 546 (1963).

61. Based on data reported in Tables 1-1 and 1-2 in Volume 1, the population growth rate for New Mexico fell from a compound annual rate of 2.51% in the seventies to 1.83% in the eighties. Employment grwoth rates fell precipitously from a seventies' rate of 4.2% to only 2.3% in the eighties.

62. **F. Brown & H. Ingram, Water and Poverty in the Southwest: Conflict, Opportunity and Challenge** (1987).

63. Recall as a caveat that the volumetric numbers reported here are constructed estimates based on average coefficients rather than recorded, official values taken from each application. Even with this qualification, however, the series should adequately reflect relative magnitudes from year to year and basin to basin.

64. Wilson, *Water Use in New Mexico in 1985,* New Mexico State Engineer Office Technical Report 46, November, 1986.

65. This number is the sum of the total volume of transferred rights for the Upper, Middle, and Lower Rio Grande basins in Table NM-5.

66. Four applications totaling seven acre-feet did not have sufficient information to determine the number of months to approval. Consequently, the total number of approved applications in Table NM-13 is only 1225 compared with 1229 in Table NM-8.

67. It is not uncommon for industrial or mining companies to use separate, seemingly unrelated subsidiaries to purchase water rights from farmers. One benefit of this practice is that rights can be accumulated more slowly over time with less impact upon price. However, the same practice complicates the task of determining just what Use sector may have actual control over the rights.

68. This decision was for the purpose of focusing on the transfers of greatest interest in the study, namely the movement of rights out of agriculture into municipal and industrial uses. By this decision, a large number of agriculture to domestic applications in the Gila/San Francisco were eliminated which presumably had very small transactions costs because they were routinely and quickly processed.

Also, as subsequent information about the transfer process has been obtained, it has been discovered that at least some, and possibly many, of the agriculture to agriculture transfers are a first step procedure *some* applicants employ to establish a more secure quantum and record for their rights before proceeding to the second step of applying for a change from agricultural to non-agricultural uses.

69. One response was obtained for the Lower Rio Grande and one for the Estancia. Due to promised confidentiality of the information, these individual responses will not be disclosed separately. They are included, however, in other aggregate statistics reported in this section.

70. The average values reported in this table are weighted by the size of the various strata in the stratified random sample. They are not simple means for the respective basins.

71. The column does not add to 87 reported for the state as a whole. *See supra* note 69.

72. *See* Tables NM-4 and NM-10.

73. These averages are weighted by the size of the respective strata in which the observations occur.

74. Also weighted averages.

75. The column labeled number of sales does not sum to 34 for reasons of confidentiality. However, all 34 reported prices are used in the calculation of the weighted sales price for the state as a whole.

76. N.M. Stat. Ann. § 72-12-7 (Repl. 1985).

77. For a discussion of other comparable statutes, *see* **F. Trelease & G. Gould, Cases and Materials on Water Law** (4th ed. 1986) at 194-214.

78. No. RA 84-53(C), slip. op. (N.M. Dist. Ct. Apr. 16, 1985) (hereinafter known as Sleeper I), *rev'd*, 107 N.M. 494, 760 P.2d (Ct. App. 1988) (hereinafter known as Sleeper II), *cert. quashed*, 107 N.M. 413, 759 P.2d 200 (1988).

79. *Id.* Sleeper I, slip op. at 2. This case is complex. This description of the facts is taken from an excellent student comment by Ms. Shannon A. Parden. The comment is to be published in the Natural Resources Journal under the title *The Milagro Beanfield Revisited in Ensenada Land and Water Association v. Sleeper: Public Welfare Defies Transfer of Water Rights.*

80. *Id.*

81. *Id.*

82. *Id.*

83. *Id.*

84. *Id.*

85. *Id.*

86. *Id.*

87. *Id.* at 2-3.

88. Sleeper II, 107 N.M. at 496, 760 P.2d at 789.

89. Sleeper I, slip op. at 3.

90. Sleeper II, 107 N.M. at 496, 760 P.2d at 789.

91. Sleeper I, slip op. at 5-6.

92. *Id.*

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

97. Sleeper II, 107 N.M. at 496, 500, 760 P.2d at 791-792, 793.

98. **New Mexico in Maps** (J. Williams 2d ed.)(1986) at 150-57.

99. *Id.*

100. Letter from Steve Reynolds, State Engineer, to Charles DuMars, Chairman, Governor's Water Law Study Committee, March 12, 1984, on file in office of Natural Resources Journal, University of New Mexico School of Law.

101. *See* **J. Sax and A. Abrams, Legal Control of Water Resources** (1986) at 796.

102. Numerous authors have written on this topic. *See, e.g.*, Grant, *Public Interest Review of Water Allocation and Transfer in the West: Recognition of Public Values*, 19 **Ariz. St. L. J.** 681 (1987). Getches, *The Value of Water in the West*, 8 **The Pub. Land L. Rev.** 1 (1987). Josephson, *An Analysis of the Potential Conflict Between the Prior Appropriation and Public Trust Doctrines in Montana Water Law*, 8 **The Pub. Land L. Rev.** 81 (1984). Littleworth, *The Public Trust vs. The Public Interest*, 19(4) **Pac. L. J.** 1201 (1988). Trager, *Emerging Forums for Groundwater Dispute Resolution in California: A Glimpse at the Second Generation of Groundwater Issues and How Agencies Work Towards Problem Resolution*, 21(1) **Pac. L. J.** 31 (1988). Ingram, Schneider, Nunn, Oggins, Urban & Checchio, *Measuring the Public Welfare Value of Water* (monograph), The Water and Public Welfare Project, Udall Center for Studies in Public Policy (University of Arizona) and the Natural Resources Center (University of New Mexico) 1988. Kneese and Brown, *The Southwest Under Stress: National Resource Development Issues in a Regional Setting* (Washington, D.C.: Resources for the Future, Inc., 1981). United National Department of Technical Co-operation for Development, *Assessment of Multiple Objective Water Resources Projects: Approaches for Developing Countries* (New York: United Nations, 1988).

103. For a directly contrary view see **T. Anderson, Water Rights: Scarce Resource Allocation, Bureaucracy, and the Environment** (1983).

104. 16 U.S.C. § 1531-1543.

105. *See, e.g.*, Shokal v. Dunn, 109 Idaho 330, 707 P.2d 441 (1985), National Audubon Society v. Superior Court, 658 P.2d 709, 189 Cal. Rptr. 346 (1983), *cert. denied sub non*, L.A. Dept. of Water and Power v. National Audubon, 464 U.S. 977 (1983) (often referred to as the "Mono Lake" case), and **F. Brown & H. Ingram, Water and Poverty in the Southwest: Conflict, Opportunity and Challenge** (1987).

106. Tarlock, *Appropriation for Instream Flow Maintenance: A Progress Report on New Public Western Water Rights*, 1978 **Utah Law Rev.** 211 (1978). *See supra* note 37, and case cited therein.

107. **W. Stegner, The Sound of Mountain Water** (1980) at 41-43.

108. *See* discussion of irrigation and industrial water demand in Ellis & DuMars, *Two-Tiered Market in Western Water*, 57 **Neb. L. Rev.** 333 (1978); **T. Anderson, Water Rights: Scarce Resource Allocation, Bureaucracy and the Environment** 223-48 (1983); and Zamora, Kneese, & Erickson, *Pricing Urban Water: Theory and Practice in Three Southwestern Cities*, 1 **S. W. Rev. of Mgmt. & Econ.** 89 (1981).

109. **F. Brown & H. Ingram, Water and Poverty in the Southwest: Conflict, Opportunity and Challenge** (1987).

110. *Id. See also* Upper Rio Grande Working Group, *The Course of Upper Rio Grande Waters; A Declaration of Concerns* (1985) and *Upper Rio Grande Waters: Strategies* (proceedings from a conference on traditional water use, October 5-6, 1987); Both publications are available from the Southwest Hispanic Research Institute, the Natural Resources Center, and the Native American Studies Center at the University of New Mexico, Albuquerque.

111. In *Policies for Water Law: Property Rights, Economic Forces, and Public Regulation* 5 **Nat. Res. L. J.** 1 (1965), the late Dean Frank Trelease concluded that:

> No system of water rights should result in a rigidity that will hamper future generations, nor impose upon those generations a water use pattern suitable only for a bygone age. A water use law should be flexible enough so that today's lack of omniscience or prescience will not prevent the correction of mistakes. It must grow with the times. The water rights it creates must be flexible enough to enable shifts from use to use. While it may be permissible to assume that the use to which water is first put is the most desirable and economic at the time, it is fallacious to presume that such a use would be best for all time. While we may wish to encourage water resource development today for its immediate benefits, getting the best use possible under present conditions, in years to come we may find that new or different uses promise greater benefits. (p. 30)

See also **J. Wright, The Coming Water Famine** (1966), and **E. Engelbert, Water Scarcity: Impacts on Western Agriculture** (1984).

112. City of Albuquerque v. Reynolds, 71 N.M. 428, 379 P.2d 73 (1962).

113. N.M. Stat. Ann. § 72-1-9 (Repl. 1985).

114. City of Albuquerque v. Reynolds, 71 N.M. 428, 379 P.2d 73 (1962).

115. For a discussion of how the City of Albuquerque has been required to retire surface rights, *see id.*

116. The issue of groundwater mining is discussed in T. Anderson, *supra* note 108 at 223-49 and in **C. Meyers, A. Tarlock, J. Corbridge & D. Getches, Water Resource Management** 626-76 (3rd ed. 1987). *See* also Mathers v. Texaco, 77 N.M. 239, 421 P. 2nd 771 (1967).

117. *See generally*, Tripp & Jaffee, *Preventing Groundwater Pollution: Toward a Coordinated Strategy to Protect Critical Recharge Zones*, 3 **Harv. Envtl. L. Rev.** 1 (1979). *See also* the 1986 Safe Drinking Water Act amendments, 42 U.S.C.A. §§300f-300j.

118. Water quality issues, of course, will arise under both federal and state law. *See* White, *The Emerging Relationship Between Environmental Regulations and Colorado Water Law*, 53 **U. Colo. L. Rev.** 597 (1982).

119. *See generally, Evaluation of Unlined Ditch and Reservoir Seepage Losses in Westlands Water District*, document prepared for San Joaquin Valley Drainage Program, U.S. Bureau of Reclamation contract No. 7-CS-20-05230 (Boyle Engineering Corporation, 1988). **T. Anderson** (*supra* note 108 at 283-322) suggests the possibility of allocation rights to pollute an aquifer as commodities in themselves.

120. *See generally*, Swain et al., Bureau of Reclamation, *Technical Report: Formulating and Evaluating Drainage Management Plans for the San Joaquin Valley* (1988).

121. *Id.*

122. Petrochemical and pesticide pollution in certain soil types is an example of this kind of pollution where clean up is not economically feasible. *See generally*, Office of Ground Water Protection, United States Environmental Protection Agency, *Pesticides in Ground Water: Background Document* (Wh-550G) (1986).

123. *See* Trelease, *New Water Legislation: Drafting for Development Efficient Allocation and Environmental Protection*, 12 **Land & Water L. Rev.** 385 (1977).

124. A good contrast of views can be found in Trelease, *The Model Water Code, The Wise Administrator and the Goddam Bureaucrat* 14 **Nat. Resources J.** 207 (1974) and Dunning, *Reflections on the Transfer of Water Rights* 4 **J. Contemp. L.** 109 (1977).

125. Ellis & DuMars, *supra* note 108.

126. 42 U.S.C. §§4331-4335.

127. *See, e.g.*, Orion Corporation v. Washington, 109 Wash. 2d 621, 747 P.2d 1062 (1987), *cert. denied*, 108 S. Ct. 1996 (1988) (regulation restricting right to fill tide lands was not a taking as they were subject to public trust).

128. The regional planning option is suggested under the theory that, in the case of any proposed transfer, those residing in the region where the transfer would occur would most likely be knowledgeable about, affected by, and concerned with water development in the area. Of course, there may be circumstances where the interests of the region would be overridden by the interests of the state as a whole. A procedure should be implemented to allow review of regional water plans on this basis and, where necessary, resolution of these conflicts.

129. The importance of integrating the planning process into the decision making process cannot be overstated. To fail to do so would be to create the worst of both worlds. If the interested parties were to engage in planning and have their plans brushed aside, they would be more likely to protest and further complicate the planning process. And, if there were no legal right to integrate the planning process into the decision, the decision maker might feel constrained to ignore the process out of the fear of appearing biased against the applicant. Thus, there must be some guidelines that indicate the weight to be given the plan in evaluating the propriety of a transfer. Armed with this information, the decision maker may still rule against the plan, but a reviewing court might well require clear and convincing evidence that the results of the planning proces did not in fact reflect the public welfare concerns of the community.

CHAPTER 5

REVIEW OF THE WATER RIGHTS TRANSFER PROCESS AND ACTIVITY IN UTAH

Chris C. Hogge
Paul G. Hansen
J. Paul Riley

Utah State Unviersity

Ray J. Davis

Brigham Young University

CHAPTER 5

TABLE OF CONTENTS

TABLES AND FIGURES

Tables

Tables Continued

Figures

Figures Continued

ACKNOWLEDGMENTS

The authors wish to express their appreciation to the many people who have contributed in significant ways towards the successful completion of this research. Significant help was provided in understanding the transfer process by Robert Morgan (State Engineer), Jerry Olds (Division of Water Rights), Lee Kapaloski (attorney), the Division of Water Rights staff, and special thanks are extended to Lloyd Austin, Jay M. Bagley, and Herbert H. Fullerton who reviewed the manuscript and made many useful suggestions.

Appreciation also is extended to the U.S. Geological Survey which provided significant funding for this study under the program. The Utah Water Research Laboratory (Dr. L. Douglas James, Director) also contributed significant funding to the project.

INTRODUCTION

As development continues and populations shift and grow throughout Utah, the need for reliable, legally-firm and transferable water and water rights becomes more critical. Considering the over-all aridity of the State, the scarcity of its finite water resources is apparent. An increasingly large portion of the State's surface and ground waters have been appropriated and possibilities for additional appropriations in several basins have been either restricted or closed to further development. Additional water storage and trans-basin diversions are costly and supporting federal funding less reliable. Also, there are increased costs associated with minimizing adverse environmental and social consequences of development. Technology, such as desalination and weather modification, also is subject to cost considerations and to scientific and environmental uncertainties. Moreover, conservation programs are only a partial answer to meet the need. This report emphasizes the outlining of Utah's legal basis for water rights and their transfer, administrative methods used, and through historical transfer analyses, identification of factors which motivate or inhibit the process. Following this discussion, possible options for improvement will be suggested.

Section 1: Legal and Administrative System

This section of the report, excepting the "Proposed determinationns" and" Basin closure" subsections, is based largely on material adapted from an article (Arizona Law Review 1989) prepared by Ray Jay Davis, Professor of Law at Brigham Young University in Provo, Utah and one of the coauthors of this report.

Acquisition of Appropriative Rights

Utah follows the doctrine of prior appropriation for acquisition of rights to use surface and underground waters. Such rights, however, may be obtained only through following the administrative permit process as outlined by law. By statute, regulation, judicial decision and practice, appropriative water rights are established, defined, categorized and administered.

Establishing Appropriative Rights

Immediately upon their arrival in Utah in 1847, the Mormon pioneers set about developing watercourses in the Great Basin for agricultural and domestic uses. They founded villages near streams where they emerged from the mountains, and they established outlying farms. This was contrary to the pattern of isolated farmsteads that characterized much of the earlier settlement in the country. Construction of ditches and canals was a community effort. Rights to use of water for irrigation were associated with use of the land. Ecclesiastical leaders selected persons to supervise equitable distribution and maximize efficient use of available water supplies.

Until the Treaty of Guadelup-Hidalgo ended the Mexican War, technically the area was governed by Mexican Law; but the Mormons, ignoring that fact, organized the "State of Deseret" as a structure of civil government. Deseret was not, however, recognized by Congress. As part of the Compromise of 1850, by congressional creation, a territorial government for Utah succeeded the self-created state. Section six of this organic act delegated legislative power to the territorial legislature and authorized it to deal with "all rightful subjects of

legislation". This, the legislature assumed, gave it the power to enact water resources legislation.

The first Utah Territory water statute granted counties "control of all timber, water privileges, or any watercourse or creek" and authorized them "to grant mill sites, and exercise such powers as in their judgment shall best preserve the timber and subserve the interests of the settlements in the distribution of water for irrigation or other purposes". Appropriations were effected by placing a notice of intent "in three of the most public places in the county at least ten days previous to the sitting of the court..." (Wilkinson 1927).

In 1880, a more detailed law superseded this early statute. Failure by the counties to enforce the earlier law, something which resulted in more water being claimed than ever was carried in streams, prompted enactment of the 1880 statute. In 1897, new water rights statutes were passed. Copied from other states' water rights laws, they formally adopted the doctrine of prior appropriation. The 1897 statutes were the first Utah statutes to require recording an appropriator's rights as the means of perfecting them. The laws did not limit the number of claims that could be filed to the same water, nor did they provide a method for determining whether the water actually was diverted and used.

Although the position of State Engineer as chief state water administrator was created by the 1897 statutes, not until significant changes were made in the laws in 1903 did the State Engineer gain any real authority. These changes embodied a compromise between the existing programs in Wyoming (solely administrative) and Colorado (solely judicial). There have been many changes in Utah water laws since 1903, but at that time the foundations for the modern water laws were established.

Currently and for the past fifty years, the permit system is the only method of obtaining an appropriated water right in Utah. Prior to 1903 for surface waters and 1935 for ground waters, rights could be obtained by use, notice and/or recording through water user claims. Several areas in the State are under adjudication orders *but* only a relative few have actually received a judicial decree. A judicial decree *spells* out the amount of water, date of appropriation and other relevant information regarding a water right in an adjudicated area. Until the code was amended in 1939, it was possible to obtain water rights by adverse possession. The amendment, however, foreclosed *the* possibility of acquiring a water right by adverse possession.

A permit to appropriate surface water may be obtained by any person or organization by complying with the permit-issuance process which the applicant initiates by filing a form finalized by the State Engineer. The application requires the name and address of the applicant, the nature of the proposed use for the water, the quantity of water in acre-feet or the flow of water in cubic feet per second, the period of the year in which it will be used, the name of the stream from which the water is to be diverted, the point of diversion, nature and place of use, and the nature of diverting works, and any other facts disclosing the purpose of the proposed appropriation. Storage in a reservoir is considered a diversion; the dam is the point of diversion.

The State Engineer's Office processes an application by endorsing the date of receipt, checking to determine if the application is complete, and then filing and recording it. Notice of application is published by the State Engineer for *three*

consecutive weeks in a newspaper published within the county, if there is one, otherwise in a newspaper having general circulation near the water source from which the appropriation is to be made. Following publication, there is a thirty days protest period in which, anyone who wants to protest the proposed use must file a written statement with the State Engineer.

Processing an application to appropriate water may require administrative fact finding. If there is unappropriated water in the proposed source, a permit may be granted to an applicant whose water development plan is physically and economically feasible and who has financial capacity to complete it. But a permit may be denied when the proposed use impairs existing rights or interferes with a more beneficial use of the water. Speculative, monopolistic or practices otherwise detrimental to the public welfare may be denied. It may be necessary, particularly in the event of a protest, to hold a hearing to get the facts.

Upon making his decision, the State Engineer endorses the application either approving or rejecting the application which may include certain conditions and sends a copy to the applicant. In the event of approval, the applicant can proceed with the physical steps needed to divert the water and place it to beneficial use. The initial time allowed for completion of construction work and putting the water to beneficial use is noted on the approval of the application. This time can be extended up to but not exceeding fifty years from the date of approval of the application through through filing an extension request and the showing of diligence or reasonable cause for postponement. If people protest the applicant's extention request or if the State Engineer deems it prudent, a hearing is held to determine whether there has been due diligence. Upon a finding of no diligence, the extension is not granted and the application lapses.

The water code requires the applicant to file proof of completion of the physical acts necessary for the appropriation including application of the water to beneficial use. If conditions of the water right proof are met, the applicant then receives a certificate of appropriation which is evidence of his right to use the water, subject to prior rights. The certificate states the quantity or flow of water, the purpose and time of use, and the place of use and diversion points. The date of the appropriation relates back to the time of the original application.

When the Utah water code was implemented, applicants who had been denied permits and unsuccessful protesters against grants of permits could seek judicial review through a de novo hearing in the district court in which the stream or water source or some part of it was located. The court, however, could consider only those issues which were or could have been raised at the administrative level.

Both informal and formal hearings are allowed in administrative procedures at the option of the State Engineer. To date, no formal hearing has ever been held in the State regarding water appropriation or transfers.

The recent adoption of the Utah Administrative Procedures Act which changed the review system, now provides for reconsideration by the agency as well as judicial review. The new administrative review law does not call for a de novo judicial proceeding in which evidence is taken. Under formal procedures, the reviewing court determines from the administrative record whether the agency made an error of law or

a finding of fact not based upon substantial evidence in the record.

Defining Appropriative Rights

The legislature declared that waters in Utah, whether on the surface or underground, are public property. Appropriative rights holders receive a right to the use of water, not ownership of the corpus of water. Although water rights are merely usufructuary, there are similarities between water rights and real property rights. The Utah supreme court has said that a right to use water is a right in real property. In *Hammond v. Johnson*, the court held that a suit to quiet title in water rights is similar to a suit to quiet title in real property. Also, reference in the Utah code to water rights transfer "by deed in substantially the same manner as real estate ..." (Utah Code 1989) suggests similarities between water and other property rights.

Usually water rights are permanent. There may, however, be instances of appropriations for limited periods of time although to date, none have occurred. Also an owner may lose water rights by forfeiture or abandonment. The Utah Code stipulates that, when an appropriator ceases to use the water for five consecutive years, the right ceases, unless, before that time expires, the appropriator files an application with the State Engineer for an extension of time in which to resume use of the water.

Water rights are limited by the condition that appropriations must be put to beneficial uses. Such uses must be reasonable in relation to the reasonable requirements of other appropriators. Beneficial uses listed in the Utah Code include irrigation, domestic or culinary, stock watering, power or mining development, manufacturing and recreation. By contrast, the Utah court has held flooding public lands solely to propagate wild fowl for sporting purposes is not a beneficial use. The code establishes no hierarchy of uses other than at times of scarcity and does not list all possible beneficial uses. Speculation and monopoly are conditions of use.

As previously stated, water rights also are defined in terms of quantity, diversion point, and time and place of use. The amount appropriated is described either by discharge measured by cubic feet per second or by volume measured by acre-feet. In surveyed territory, the point of diversion is designated by reference to survey corners or monuments, when either the diversion point or the point of return is located within six miles of such corners and monuments. In unsurveyed territory, the diversion point is designated with reference to a permanent prominent natural object. Sometimes the certificate of appropriation limits a water right to certain times or seasons. These restrictions are binding. Finally, the place of proposed use is stated in the application and listed on the certificate.

Categories of Appropriative Rights

Appropriative rights operate under a priority system. Priority is a significant aspect of a water right. Often the chief value of an appropriation is its relative priority, and thus interference with a person's right to divert under their priority is deprivation of a valuable property right. The first appropriator in time is the first in right. In times of shortage, water is delivered to senior rights holders in the order of their priority. There are decrees, however, that allow for proportional reductions in water received by rightholders in times of shortage depending on priority.

The preference concept is a unique aspect in the prior appropriation system. Utah law recognizes that, "in times of scarcity,

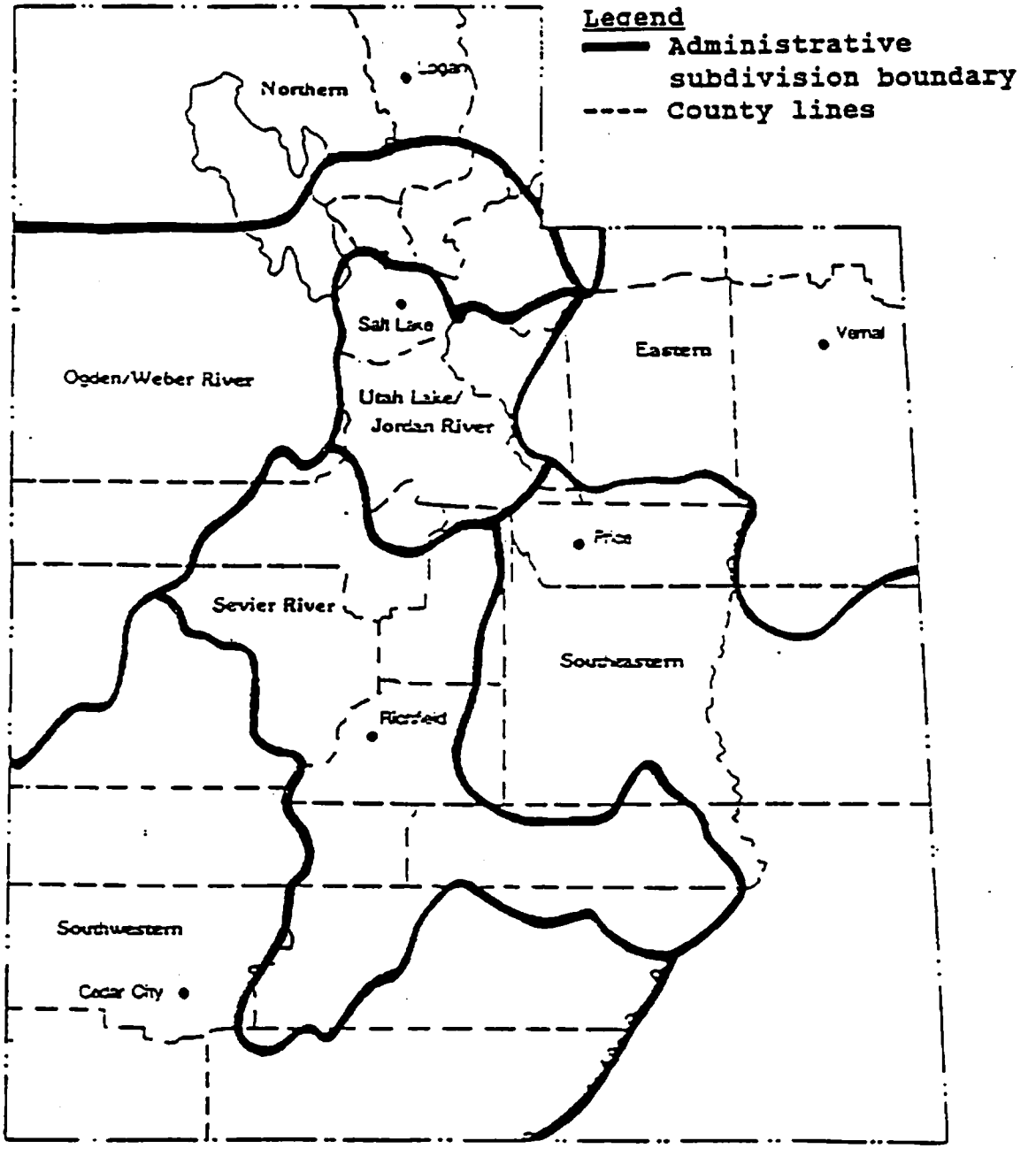


Figure 1. Map of the seven water right administrative subdivisions in Utah with the area name and location of area engineer offices.

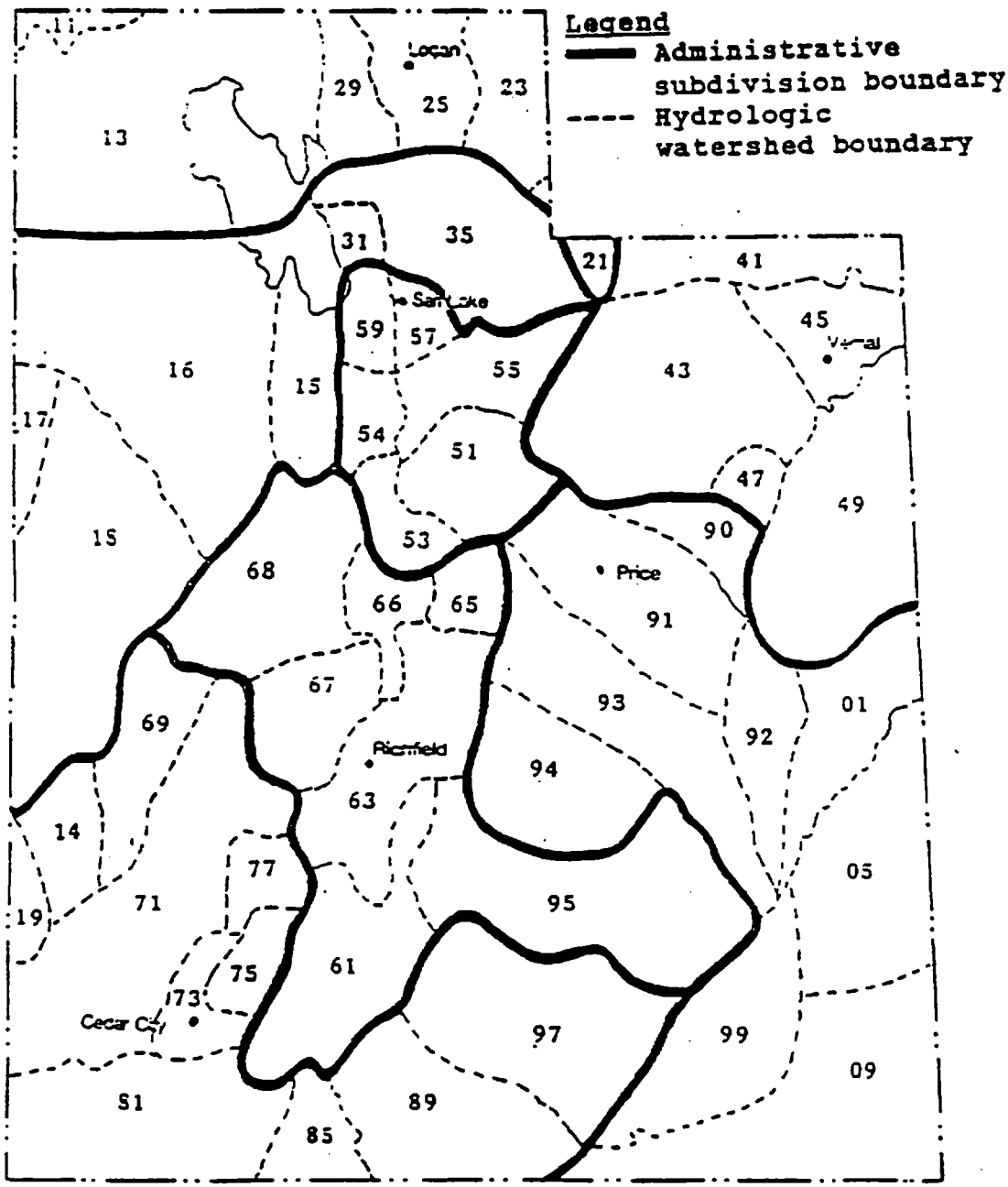


Figure 2. Map of the hydrologic watersheds within each of the seven administrative subdivisions in Utah and their identifying code number.

while priority of appropriation shall give the better right as between those using water for the same purpose, the use for domestic purposes, without unnecessary waste, shall have preference over uses for all other purposes, and use for agricultural purposes shall have preference over use for any other purposes except domestic use" (Utah Code 1953). Homesteaders, desert entrymen and purchasers from the state under certain circumstances have a preference over prior applicants to appropriate water for use on all or part of the same land.

Administration of Water Rights

The State Engineer's Office, now known as the Division of Water Rights, is an agency within the Utah Department of Natural Resources. The State Engineer is appointed by the Governor, and administers the Division of Water Rights. In addition to processing water permit applications, the Division has been delegated significant flood management authority, and participates in drainage basin water rights adjudication. The Division of Water Rights is organized into four operational sections--adjudication and distribution, appropriation, dam safety and investigations. To some extent, these operational divisions are intertwined, but the adjudication and appropriation sections are most directly involved in evaluation of appropriation and transfer applications. The State is divided into seven jurisdictional areas for administrative purposes--northern, eastern, Ogden/Weber River, Utah Lake/Jordan River, Sevier River, southwestern, and southeastern. Each of the seven regional areas are divided along watershed boundaries and are administered by area engineers. These areas are shown in Figure 1. The seven areas are further subdivided into fifty smaller watersheds and are referenced by area code numbers. Applications to the State Engineer are assigned a number which ties them into one of the fifty hydrologic areas. The watershed boundaries within each of the seven administrative areas are shown in Figure 2. This system facilitates the work of the Division of Water Rights and aids persons researching water rights in the state.

In addition to the legal and administrative structures, effectiveness of water rights administration in Utah turns upon other factors including the quality of preparation of applications and of protests, the extent to which participants obtain expert legal and technical assistance, and the willingness of the legislature to fund the operations of the State Engineer's Office at an adequate level. Inadequate preparation by applicants can delay the process by filing applications and protests which, because they are inadequate, are returned for more adequate compliance with statutory and administrative requirements. There also are administrative delays because legislative funding does not provide for enough technical and legal staff for the Division of Water Rights.

Changes of Appropriative Rights

Utah law recognizes water rights transfers that comply with legal requirements. As in the case of initial appropriations of water, the State Engineer administers the law. There are procedures and forms for various types of changes. The legal and institutional framework, however, imposes certain limits and restrictions upon which changes are possible in Utah.

Changing Water Rights

The Utah water code provides for water rights changes by stipulating: "Any person entitled to the use of water may change the place of diversion or use and may use the water for other purposes than those for which it was originally appropriated..."

(Utah Code 1989). Although the statute does not explicitly recognize the right to make changes by sale, lease, divisions of rights, exchanges or substitution of one water right for another, case law and administrative practice regard such transfers as part of the right held by a water rights owner and have procedures for such transfers (e.g. segregation applications).

An ownership transfer may take place because of a sales transaction. A water right may be transferred through execution of a deed similar to a change of ownership in fee of real property. It should be noted that a title company will not insure the validity of water rights. Such deeds, to be effective against third persons, must be recorded with the county recorder who transmits a copy to the State Engineer for filing. Subsequent purchasers and other persons are deemed to have notice of recorded deeds. As well as recognizing in the deed recording provision that purchases take place, the water code also authorizes the Division of Wildlife Resources to buy water rights.

In addition to permanent transfers through sales, there also are temporary transfers for specified periods of time.

The code provides for "segregation" or division of water rights upon request to the State Engineer and receipt of his approval. Such requests "may be rejected if the approval thereof would impair rights or would prove detrimental to the public welfare" (Utah Code 1953). The Division of Water Rights developed a form which is used to apply for division of water rights.

There is considerable activity in Utah in the exchange process as well as in "change" transfers. The State Engineer has authority to rule on exchange applications. The majority of exchanges in Utah have occurred within the Weber Basin Water Conservancy District boundaries where the District through the U.S. Bureau of Reclamation holds many large reservoir storage rights and their surface or subsurface tributaries. In an exchange, the actual water right does not change hands. The applicant contracts with the District essentially to change the point of diversion of a defined quantity of water and then through drilling a well or some other means is allowed to use that water. This water is then replaced through storage releases from a reservoir operated by the District in exchange for the expected depletion from the Districts' tributary waters. Conditions may be imposed upon such exchanges. Another type of exchange is largely driven by the need to upgrade water quality. This has occurred where an irrigation company holding high priority, high quality mountain stream rights, exchanged with a culinary water supplier who has lower quality water rights but yet is still suitable for irrigation purposes. The quantities exchanged may not be equal depending on the relative value of the water. In *State ex rel. Ellerbeck v. Salt Lake City*, the Utah Supreme Court allowed Salt Lake City to exchange relatively low quality irrigation water for better quality water from Big Cottonwood, Mill Creek, and Little Cottonwood Creeks. In *Genola Town v. Santaquin City*, the court also stated that water given in exchange need not be fit for all uses.

An application for an exchange may be lapsed by the State Engineer if the underlying water right used to facilitate the exchange has been lost,the exchange no longer can be carried out as stated in the application, or the applicant has not complied with conditions imposed in establishing the exchange.

An appropriator of water from a running stream is entitled to have it flow down the natural channel to his diversion point or, if diverted from the natural channel

by other appropriators for their convenience, to have it delivered to him at available points by other means paid for by subsequent appropriators. In Utah, changes in established means of diversion of prior appropriators by junior claimants also must be at their own expense. The substitute water should be delivered at a point where the prior appropriator can make full use of it, and the substitution must be without injury or damage to him.

A junior appropriator may use underground water as replacement for the impact of surface or groundwater withdrawals upon senior appropriators. Integration of surface and underground water use is a frequent goal of water rights transfers.

Types of Changes Permitted

Changes are allowed in quantities of water or flow of water including changes in ownership, alterations of the place of diversion, changes in the place of use, and shifts in the purpose for which the water is used. From 1975 to 1987 all of these types of changes took place and occurred in varying combinations, however, changes of ownership only were not included in the data base analyzed later in this report. Also there may be a change from carriage of water in a man-made canal to diversion of it into a natural stream. Upon application to the State Engineer, such a change may be made to prevent waste and facilitate distribution.

Utah law distinguishes between permanent and temporary changes. "Changes for an indefinite length of time with an intention to relinquish the original point of diversion, place, or purpose or use" are permanent changes. Temporary changes are those made for fixed periods of time "not exceeding one year" (Utah Code 1989).

Temporary changes in point of diversion, place of use and purpose of use for which water originally was appropriated must follow application requirements which are set forth in law. The State Engineer investigates all temporary change applications to determine if the proposed change would impair vested rights. The change would cause no impairment of vested rights. The State Engineer notifies all persons whose rights are affected. The State Engineer may require a deposit of money for investigation and notice before making an investigation or giving notice.

Copies of the permanent change and exchange application forms along with temporary change forms are included in Appendix A.

Permanent Change Procedures

A water rights holder initiates the change process by obtaining from and filing with the Division of Water Rights a change application. The application sets forth the name of the applicant, a description of the water right including the quantity of water, its source and point of diversion, the place, purpose and extent of the present and the proposed uses, the point to which the water will be diverted, and such other information as the State Engineer requires. The Division of Water Rights, upon request of the applicant, provides assistance in preparing the form.

The completed application is filed with the Division of Water Rights and the filing fee paid. Fees are based upon the quantity of water involved in the change application. Depending upon the flow rate or the acre-feet involved, fees range from a low of $30 (for up to 0.1 cfs or up to 20 acre-feet) to a high of $450 (for over 24 cfs or over 12,000 acre-feet). The fee does not cover the entire processing cost.

The application is reviewed by the division prior to giving public notice of the filing to ensure that the application is complete and in order. This generally includes verification of the validity of the water right. Thereafter the division follows the same procedures to process a change application as it does for an initial appropriation. Also the water code provides that "the rights and duties of the applicants with respect to applications for permanent changes of point of diversion, place, or purpose of use" are the same as those of applicants for initial appropriations with minor differences.

Accordingly, the State Engineer must advertise the application for a permanent transfer in a newspaper published in the county in which the water source is located. The advertisement may be in a paper having general circulation in the area near the water source if the county does not have a paper. Publication is for three consecutive weeks. A certified copy of the published advertisement is submitted which is then attached to the change application.

In instances of applications for temporary, rather than permanent, changes, the advertising process is not required. The State Engineer investigates the application, and if there is not impairment of existing rights, may issue an order authorizing the change. But, if the change impairs existing rights, notice of the application is given to all persons whose rights might be affected by the change. Any interested person may, within thirty days after notice is published, file a protest.

When the State Engineer receives protests, copies are sent to the applicant for response. In order to obtain additional information, the State Engineer may hold hearings on his own motion or upon request by a protestant. The hearings provide a forum for gathering additional information upon which the State Engineer may act. The statute allows either formal or informal hearings to be conducted. However, to this point in time no formal hearings involving change applications have been held. Generally, hearings are held twice a year in each county in the state, with additional hearings as are warranted by special circumstances.

Formal proceedings would be conducted before an administrative law judge acting as the hearing officer and would involve lawyers and water experts. The applicant's case would be presented first, witnesses for the applicant examined and then cross-examined by counsel for the protestors. The same process then would be followed for the case of the protestors. A record would be made which brings out evidence in support of or opposition to the transfer.

At the end of the hearing, the administrative law judge takes the results under advisement, and may seek further information prior to making a recommendation to the State Engineer. On appeal, the record of the hearing would be the basis for judicial review of a decision.

To this point all hearings involving change applications in Utah have been informal in nature. Because they are generally inexpensive and encourage openness in which the parties state their positions in dialogue form, informal hearings have been preferred by the State Engineer, the applicants and the protestors. These proceedings are conducted either by the State Engineer or an officer appointed by him. Information gathered through the hearing process is considered by the local area engineer of the Division of Water Rights. The area engineer submits a recommendation for approval or rejection of the change application to the appropriations engineer of

the Division for review. Finally, the recommendation is submitted to the State Engineer who generally issues a preliminary ruling referred to as a "memorandum decision."

The parties have twenty days in which to file a request for reconsideration of a memorandum decision by the State Engineer. He reviews such requests in a timely fashion and, if he decides that a rehearing is not warranted, he issues a final written decision. If, on the other hand, the State Engineer finds that additional information regarding the change should be considered, he grants reconsideration of the case.

After approval by the State Engineer of the application for a permanent change, the applicant makes the physical alterations necessary to effectuate the transfer. Actions undertaken without following the statutory process are criminal and do not create legal water rights. In notification of an application's approval, the State Engineer indicates the time within which construction and the physical change must take place. Sixty days before the date set for proof of permanent change, the applicant is given a form to describe the construction and provide other data regarding the change. If the change appears appropriately perfected, the division issues a certificate indicating the nature of the water right.

Judicial review of administrative decisions concerning changes is similar to that used for initial applications to appropriate water. The provisions of the Administrative Procedures Act are followed by the reviewing court looking for errors of law and factual decisions not supported by substantial evidence upon the whole record.

Restrictions on Changes

There are three situations in which changes of water use rights in Utah are restricted. First, there is the "no impairment rule." Second, there is a ban on municipal sales of waterworks, water rights or sources of water supply. And, third, there are limitations upon purchase of water rights by the Division of Wildlife Resources.

The principle restriction is that the State Engineer cannot approve an application if, among other things, the proposed use impairs existing rights. If there are conflicting rights, "changes may be approved as to part of the water involved or upon the condition that conflicting rights are acquired" (Utah Code 1989). That restriction seeks to protect the interests of third persons, usually other water rights holders, whose water rights would be adversely affected by the change. It is a necessary restriction upon rights transfers because, unlike most real property rights, water rights are correlative--the rights of any one water right holder exist in relationship to those of other water right holders on the same watercourse. For example, consider farmers who only partly consume irrigation water. Other users, probably junior to the senior agricultural users, rely upon their return flows. If the seniors sell to a consumptive user, such as the transferees in Millard and Emery Counties who operate power plants, junior water rights holders are affected and are able to negotiate payments or other means to protect their interests.

In addition to the "no impairment rule", a recent protested change application, resulting in court action and a subsequent judgement in favor of the protestant, could considerably increase the complexity of the transfer procedure. The court ruling, currently under appeal, requires that the

State Engineer also consider in change application public interest concerns, such as threat to life and/or property. Further background for this case is given in Case Study #2 discussed later in this report.

As for the second restriction, according to Article XI, Section 6 of the Utah Constitution, no "municipal corporation, shall ... sell ... any waterworks, water rights, or sources of water supply ..." it owns. However, exchanges of water rights or sources of water supply for other water rights or sources of water supply of "equal value" are not banned by the provision. Hence, in *Genola Town v. Santaquin City*, the Utah Supreme Court allowed a trade between two municipalities of culinary water for irrigation water. Moreover, section 6 does not bar water transfers by any other public entity. The restriction upon municipalities, however, is an unfortunate holdover from earlier fear of abuse of power by municipal officials, concern that the legislature might confiscate municipal water rights, and apprehension over possible ecclesiastical influence upon municipal decisions. Those considerations have waned with the passage of time.

Finally, as to the third limitation, some Utah case law casts doubt upon appropriations which do not involve diversions of the water. In order to protect fisheries and other wildlife dependent upon minimum stream flows, the legislature enacted an instream flow amendment to the Utah water code. Under the amendment, the Division of Wildlife Resources, a division within the Department of Natural Resources like the Division of Water Rights and the Division of Water Resources, may file change applications respecting (1) perfected water rights already owned by the division; (2) perfected water rights purchased by that division through funding provided for that purpose by the legislature, or acquired by lease, exchange or gift; or (3) appurtenant water rights acquired through buying real estate for other wildlife purposes.

Transfers to the Division of Wildlife Resources do not enlarge the original water right which is transferred to the division, nor may they impair any existing water right. The division must indicate in its change application the projected benefits to fisheries; it cannot obtain the water right merely for instream flow protection purposes. And, in order to acquire a long-term interest, prior legislative approval is required. Its power to act is so circumscribed that it has not as yet obtained water rights through the instream flow amendment process.

Other Water Entitlement Transfers

Many acquisitions and transfers of appropriative rights can be tracked by checking the records in the State Engineer's Office. Applications, hearings and certificates are matters of public record. There are, however, certain voluntary water entitlement transfers which do not follow the usual change processes. One type of transfer that takes place without administration by of the Division of Water Rights is the sale of land with appurtenant water rights. Another involves water company stock transactions.

Landownership-Based Water Entitlements

Water rights in Utah have a distinctive historic origin. During the late 1840s, Mormon ecclesiastical leaders directed water resources development and allocation. Communities built irrigation canals and ditches under direction from church leaders. Water use rights therefore became associated with utilization of land.

Today, although Utah is a prior appropriation state, water rights may or may not be appurtenant to land. Thus, water rights pass with conveyance of the benefitted

land unless they are expressly reserved. If appropriative rights are intended for the exclusive benefit of particular land and are therefore appurtenant to it, they pass with conveyance of title to that land, in absence of an express reservation severing them from the land. The land transaction is recorded at the county courthouse, and the recorder is to send notification of the recording for filing with the Division of Water Rights.

Stock Ownership-Based Water Entitlements

Land settlement in pioneer Utah was based upon rural villages in which farmers lived along with other townspeople. This made tight-knit church communities feasible, and gave rise to cooperative resources development. In such a setting, it was quite natural to build irrigation works on a community basis. There still are Utah communities with a "town ditch".

The community canals were forerunners of today's private water distribution organizations. The cooperative canal system continues to function in Utah whereas the public irrigation districts do not enjoy any real prominence. There is a Utah Code provision dealing with irrigation districts, but little use has been made of it. On the other hand, use is made of the provisions authorizing creation of metropolitan water districts and of water conservancy districts. Those provisions deal with such matters as real property assessments to pay operating costs, water rates that may be charged users, and, in the case of water conservancy districts, sale of water to municipalities, irrigation districts, or private persons or corporation. But, as noted, it is the private water organization that is of interest with respect to stock ownership-based water entitlements.

Private canal companies and ditch companies were among the earliest water appropriators in Utah. Some of them hold priority dates from pre-Civil War times. An example of an older right is that of the canal companies taking water from the Jordan River at Turner Dam near the boundary of Utah and Salt Lake Counties. They built their works between 1872 and 1883. With their senior priority to water in Utah Lake and the Jordan River, they have firm, and consequently valuable, water rights.

When a company is formed for the purpose of supplying water to its stockholders, in Utah it is normal for each share of stock to represent a proportionate share of the water in which the company has a right. Procurement of stock is necessary to confer the right to use the water. However, a water right cannot be acquired by the mere purchase of stock in an irrigation company; there also must be actual use of the water although another party may be allowed to use it. Districts are some of the most active participants in water stock transfer business. Water rights represented by shares of stock in a water company are personal property and may be sold and transferred independently of any land; and the water represented by such shares cannot be said to be appurtenant to the land on which it is used when looking at it from a deed point of view.

There is a relatively brisk trade in leasing and selling water company stocks. Water rights holders whose interests are represented by water company stock may ascertain in the spring of a year that they will not require all the water to which they hold entitlement through stock ownership. They place the stock with company employees or other persons acting as brokers. Other water users who do not have adequate water check with the company to determine if there is water to lease for the season. Supply and demand set the price for the transfer. In some cases, large water users purchase stock to meet their needs. This procedure has

allowed large water users such as electric power generating companies, resort towns and a university to meet part of their needs.

Trading in private water supplier stock is not reflected in the records of the State Engineer. Because the company holds the water right, transactions involving its stock are not changes in water rights as the terms "temporary transfer" and "permanent transfer" are used in the water rights transfer provisions of the Utah Code. Instead, they are stock transactions. Therefore, it is necessary to look for governing law to state legislation regulating issuance and transfer of stock. Mutual irrigation, canal, ditch, reservoir and water companies and water users' associations may issue stock "evidencing ... interests in water".

Such water companies must register their securities offerings under the Utah Uniform Securities Act. It does not exempt them from the registration requirement like it does agricultural co-operatives through reference to the statutory provision which deals with those entities.

According to the Utah stock fraud law, it is unlawful to fraudulently sell or buy any security, to make an untrue statement of a material fact or omit stating a material fact, or to engage in any act which would operate as a fraud or deceit. Damages can be recovered by the injured party. Water stock swindles can be policed by parties to transactions who are harmed by them.

Proposed Determinations

Proposed determinations are made to identify and define the water rights held in a given area. An area comes under an adjudication order, generally, as a result of water right disputes, upon the request of water users, and because uncertain water right and/or hydrologic conditions exist in the region (Sim 1988). At present, six areas are under adjudication in the State of Utah. Two areas, the Ogden and Weber River Basins and the Sevier River Basin, have been served with interlocutory decrees. Based upon information available from the adjudication section of the Division of Water Rights, the status of proposed determinations and adjudications in Utah is illustrated in Figure 3.

A problem with the proposed determinations lies in the length of time involved from the onset of the process until conclusion of the decree. It is not uncommon for an area to be under an adjudication order for several years, only to have the entire issue tied up in the court system for several more years. The fact that only two areas in the entire State have been decreed further illustrates the point. The vast number of changes that can occur in a single year, in terms of sales of property and water as well as transfers, can make the study outdated before it even makes it to the court for a decree (Boulton 1988). However, such a decree is viewed to be worthwhile and beneficial in that it identifies the water rights in a particular area and provides a starting point in resolving water claims. Additionally, it may well serve as an indicator of the availability of water for transfers as well as the political, environmental, and social climate of given regions (Hansen 1988).

Basin Closure

Basin policy and eventual closure of basins to additional appropriations of water is, of necessity, an aspect of the State Engineer's Office which must continually be under evaluation and change. The continual evolution of basin policy is heavily influenced by existing studies of water supplies in relation to water rights held, available field data where known interference exists, and by the validity of protests filed in a given area

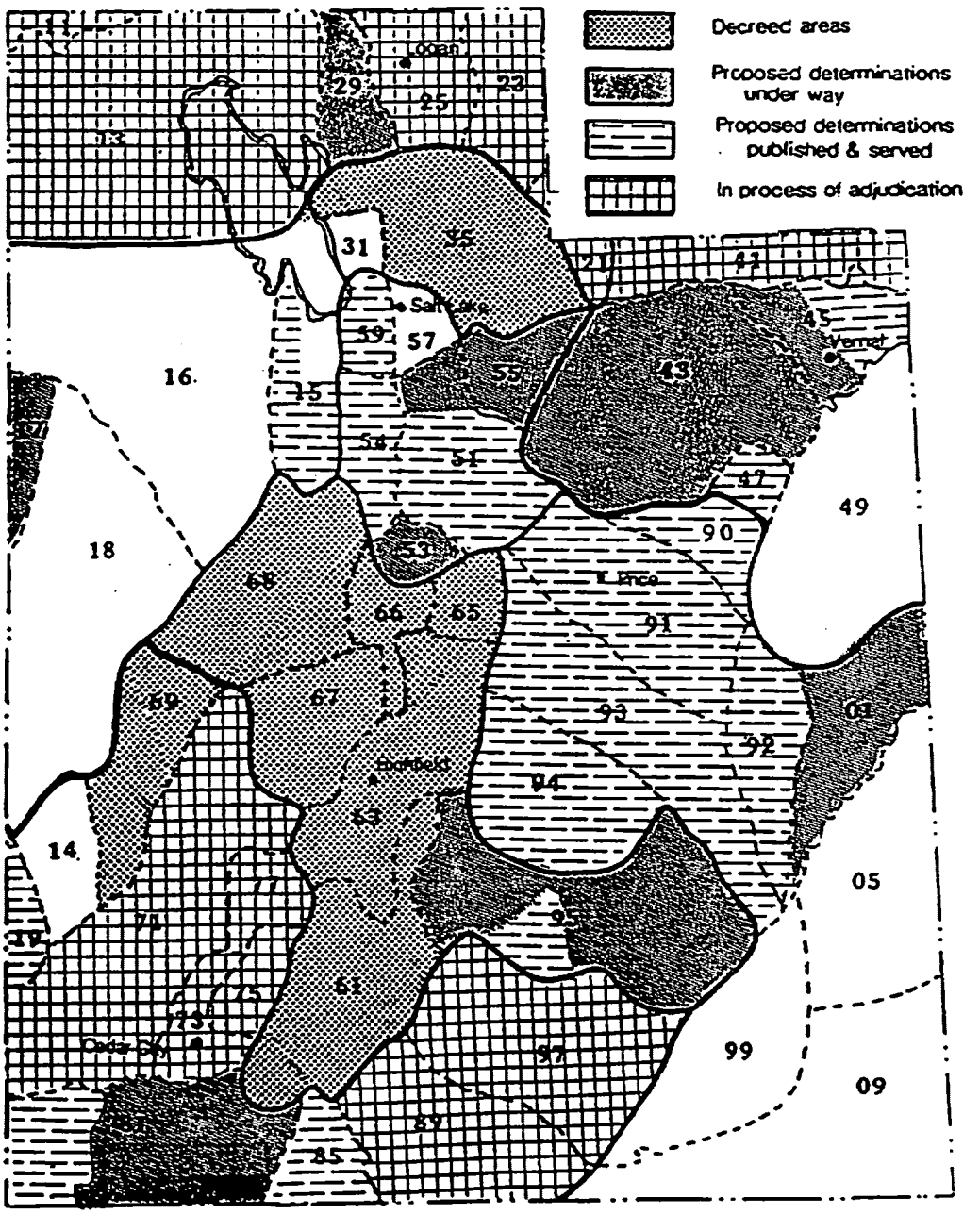


Figure 3. Status of proposed determinations and adjudications within the State of Utah, August 1988 (Hansen 1988).

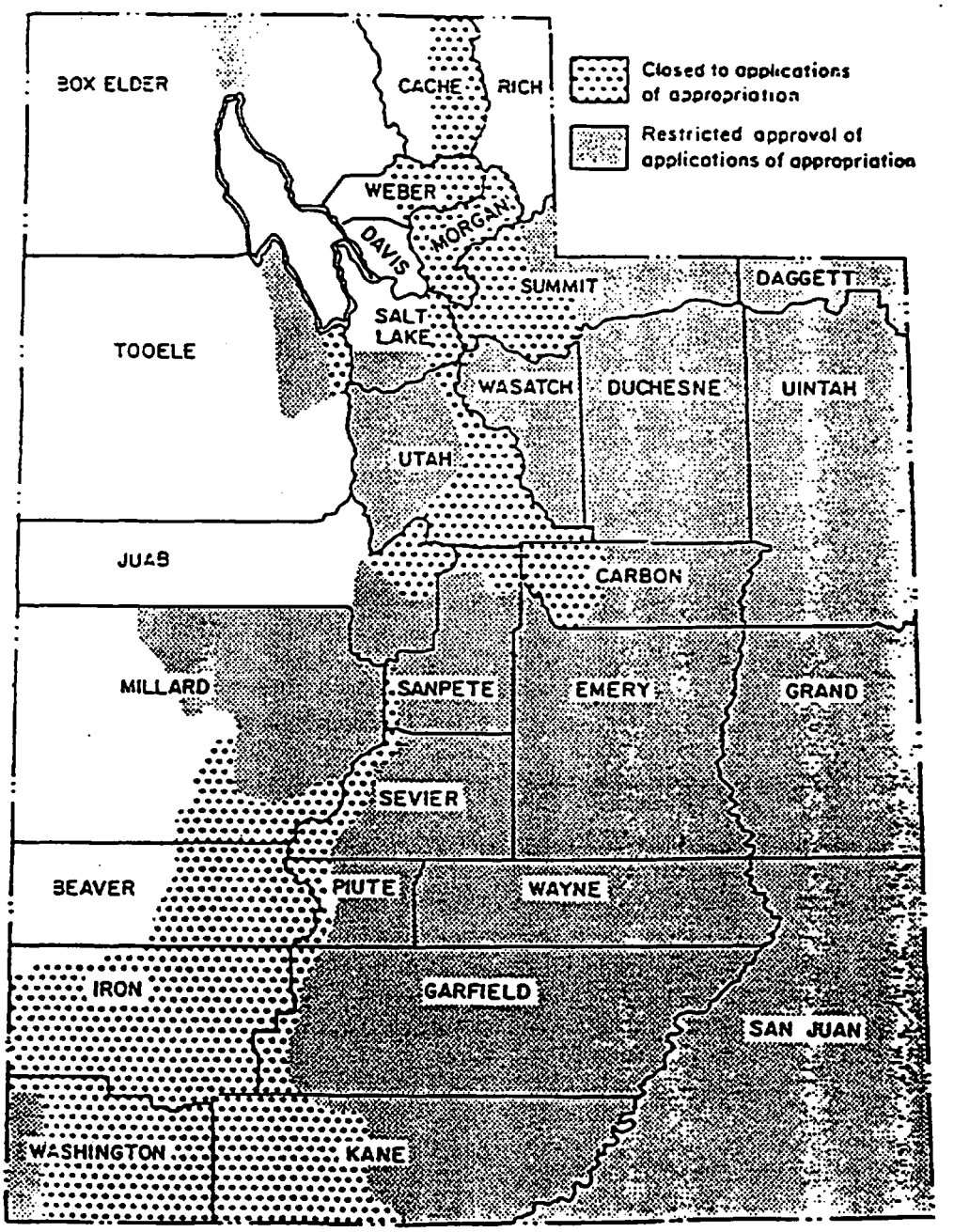


Figure 4: Areas in Utah closed to groundwater appropriation and areas with restrictions on appropriation (from Hoggan et al. 1982).

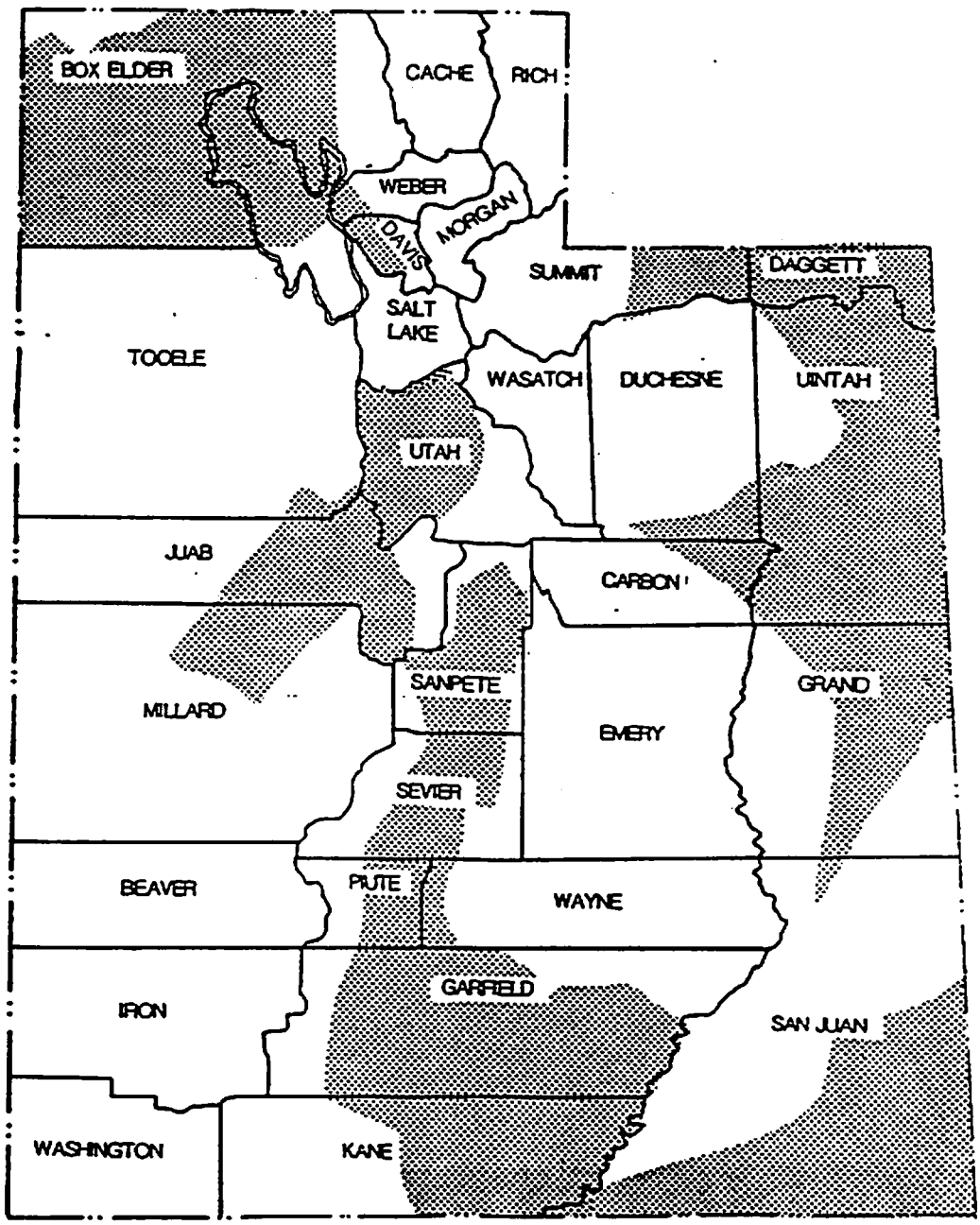


Figure 5. Areas in Utah which have undergone further limitation on groundwater appropriation since 1982.

(Jones 1988). A preliminary summary of State policies regarding the appropriation of water as of September 1987 is in Appendix B.

In a 1982 study performed by Daniel Hoggan et al. through the Utah Water Research Laboratory at Utah State University, the State Engineer's Office was evaluated with respect to the water commissioners which it employs to aid in the regulation of the State's waters. As a result of that study Figure 4 was generated which indicates the areas of the State which were closed or under restriction to the appropriation of water. Since 1982 many basins have undergone further restrictions on new appropriations of both surface and groundwaters. Figure 5 illustrates those areas which have undergone further restrictions on groundwater (Hansen 1988). Basin closures ultimately designate some form of transfer activity as the only means of acquiring water for new or changing developments in a given area.

Section 2: Water-Right Transfers - What, Who and How

It is important to begin this discussion by establishing a basic definition of what water-right transfers are, who is involved and how they occur. The following sections will discuss these factors. An excellent additional perspective of the voluntary water-transfer process from an economics standpoint was written by Herbert H. Fullerton (1989).

Transfer Definition

For the purposes of this research, water-right transfers are broadly defined as "transactions involving legally-binding alterations in the right to water usage." This definition is intended to include changes in the description of a right on the actual paper deed, those situations where binding contracts are written between two or more users and/or when shares of stock are exchanged within a water-right holding entity that affect the actual distribution and use of water. All of these transactions provide their transactors with certain legal rights to water use.

Water-right transfers can further be categorized into "formal" and "informal" transfers. Formal transfers are those requiring state engineer approval before becoming legally binding, and informal transfers are those that are not required to be approved or recorded by the state engineer. It is the formal transfer activity within Utah that was analyzed and is discussed later in this document.

Formal transfers are generally those transactions that alter the legal description of the water right or that by their nature are thought to have the potential of impairing existing rights and so are investigated by the state engineer prior to approval. These transfers occur through an application process with the Division of Water Rights in the form of "changes," "exchanges" or "temporary changes." Although exchanges do not involve an alteration in the underlying right, administrative practice requires them to be considered and approved by the state engineer.

Informal transfers are alternatively described as those transactions occurring where no change in the legal description of the underlying water right is made (with the exception of exchanges) but rather are a means of distributing shares or portions of water to a number of users within the legal bounds of a water distributing entity's rights. A change in ownership of a water right would also fall into this category. Informal transfer activity commonly occurs within mutual irrigation companies or water districts through the distribution and exchange of shares and/or lease agreements. These shares represent the

right to a portion of the water held by the company or district for use as described by the underlying water right. Since informal transfers are not regulated by the state engineer, records indicating this type of activity are not readily available.

The most common form of formal transfer is made through a change application where a permanent alteration in the nature of use, place of use and/or point of diversion is made. Exchange applications differ from change applications in that no legal alteration in the underlying water right is made and are similar to informal transfers. However, since implementation of the transaction has the potential of impairing surrounding water rights, state engineer approval is required (Olds 1989). This transaction is based upon a separate contract agreement drawn between two or more water users whose contract must remain in force in order for the exchange to be valid. Another difference between changes and exchanges is that many exchanges are applied for by a non-water-right-holding party, and exchanges are also not required to be certificated or "proven up." Additional discussion of the exchange concept is presented later in this document. Temporary changes are administered similarly to permanent changes but are limited to a one-year duration.

Although informal transfers do not require state engineer approval, they do, in most cases, require approval of the governing board of directors of the particular water company or district and are not a matter of public record.

Transferring Entities and Limitations

Understanding the types of transfers that can and do occur involves knowing the various types of water-right holders and how they differ. Who the right holder is influences how a transfer is initiated and through whose hands a proposed transfer must pass.

Right holders can be separated into three general groups. These include the independent water companies, such as mutual irrigation companies and user associations, private individuals or corporations, and public water districts.

The typical mutual irrigation company in Utah is a private, non-profit organization in which participating members are stockholders who use a common water source. The water rights exist in the name of the company, whose management and policy-making powers are in the hands of the board of directors elected by the stockholders. Private water companies of this nature exist throughout the western states but are most notably concentrated in Utah (Wahl and Osterhoudt 1985). Their development came largely through cooperative efforts of the early Mormon pioneers. Transfers outside of designated boundaries and use limits require formal application and subsequent approval of the state engineer.

Water rights can also be held by private individuals or corporations, with rights ranging from small domestic wells to control of a substantial portion of a particular area's water rights. Water-right transfers originating through these entities generally occur directly with the state engineer.

There are various public water districts, which are often formed to administer federally-funded water storage and distribution projects. The actual water rights in these instances are held by the federal government, at least until the debts incurred through the project's development have been repaid.

Water companies, associations and districts are overseen by boards of directors that generally are given the power to approve

or reject proposed transfers, whether they be formal or informal in nature. If the rights are held by the federal government, its approval must be given for formal transfers before the transfer is applied for with the state engineer.

A flow chart, shown in Figure 6, was developed to identify the more common modes of water-right transfer activity within the state and to put into perspective how the data analyzed for this research fit in with the overall water picture. This flow chart separates water-holding entities into three groups (private water companies, private individuals or corporations and public water districts), the types of transfers they may transact (formal or informal) and the governing body or bodies that approve or reject proposed transfers.

The water-right holding entities are treated separately to aid in identifying the options available to them in the transfer process and to more clearly identify the difference between formal and informal transfers.

Although informal transfer activity has not been quantified through this research, the number of organizations in operation that can transact such transfers is considerable in Utah. In a separate study made by the Utah State Historical Society in 1980, a listing of the independent water companies of Utah was compiled (Sorenson and Avery 1980). Summation of their results, along with more recent supplemental information received from the Division of Water Rights, resulted in a list of 939 independent water companies in existence in the state. The approximate numbers of these companies in each county are listed in Table 1. These numbers are approximate, but they give an indication of the potential occurrence of informal transfer activity.

When the number of conservancy, metropolitan and irrigation districts and municipal water organizations is combined with the numbers shown, the total number of water distributing organizations is over 1,000. The selling and exchange of shares within water companies is reported to be brisk in many parts of the state (Hansen 1988).

As part of this research, the statutes within the Utah Code Annotated (UCA) 73-7, 8 and 9 regarding the legally established water-right holding entities were reviewed (Utah Code Annotated 1989, pp.122-260). Table 2 was created to compare some of the limitations placed upon them.

Some of the most notable differences evident through this comparison are that private individuals, corporations and private irrigation companies have no power to tax, cannot acquire water rights through condemnation and must be able to prove beneficial use without qualifications. The other entities can levy taxes, acquire through condemnation and are given some leeway in proving beneficial use if there is reasonable cause, such as reserved supply for future public need, for nonuse. Another significant difference is that municipalities are restricted from divesting themselves of water rights or transferring them outside of their defined boundaries. A final difference is in the transfer approval process. Public water suppliers often act as administrators of water rights that are in the possession of the federal government. These rights may be held by federal agencies until development debts for system construction costs are repaid. This can result in an added tier of approving bodies. For example, a formal transfer application by a public water supplier may be required to be approved by its board of directors that then request approval by the U.S. Bureau of Reclamation, which then submits the transfer application to the state engineer for approval. In processing a

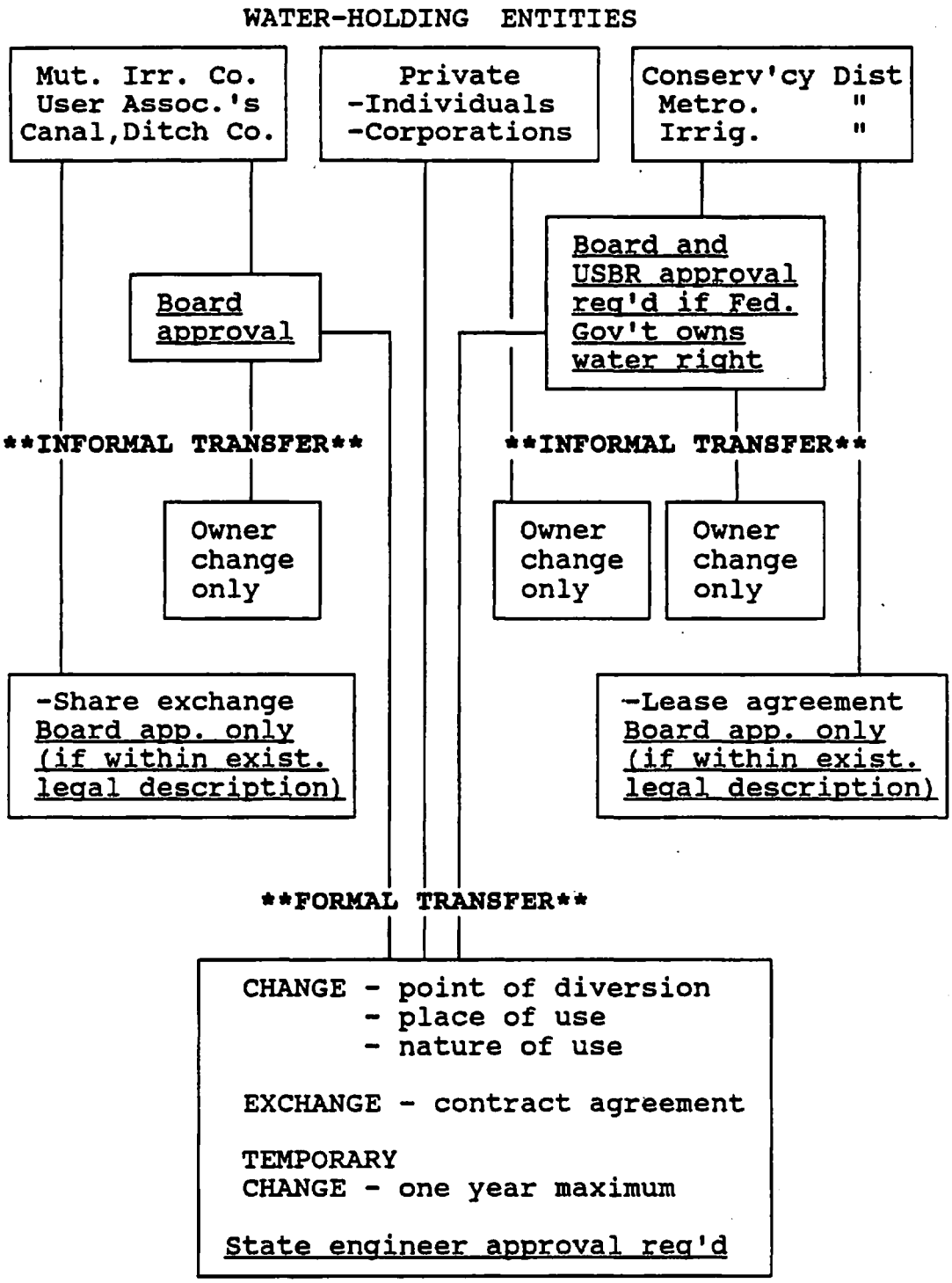


Figure 6. Water-right holding entities, their transfer governing body or bodies and the types of transfers that commonly occur.

TABLE 1.Independent water companies in Utah, organized by county

County	*Number*	*County*	*Number*
Beaver	26	Piute	12
Box Elder	42	Rich	30
Cache	107	Salt Lake	100
Carbon	26	San Juan	9
Daggett	3	Sanpete	64
Davis	23	Sevier	44
Duchesne	26	Summit	59
Emery	8	Tooele	14
Garfield	26	Uintah	21
Grand	4	Utah	57
Iron	17	Wasatch	15
Juab	7	Washington	63
Kane	7	Weber	60
Millard	24	Wayne	1
Morgan	44	TOTAL	939

transfer of water of federal funding origin,the time and cost involved may be prohibitive even before it reaches the state engineer.

Federally-held water storage rights are substantial in Utah where 96.8 percent of these rights are in the hands of the U.S. government (Wahl 1987). When the Reclamation Act of 1902 was initiated, its sole purpose was to develop water for irrigation. Little consideration was given to the possibility of changing (transferring) the nature of water usage. As the desire to transfer federally-developed waters to higher-valued uses has grown, several potential hindrances have been identified. Some of these obstacles are summarized below:

1. Legal uncertainties exist.

2. There is a lack of clarity regarding USBR administrative policy for handling transfer requests.

3. Contracts for USBR water can vary significantly from one to another. These may involve restrictions on land served, nature of water use, profits obtained through water transfers and the requirement that the transfer recipient be "qualified" (Wahl 1987).

Although in many cases there may not be specific legal or administrative obstacles to transfers, the legal uncertainty or lack of administrative clarity appear to be the biggest deterrents to facilitating transfers. Because many potential transfers have unique problems, the time and cost of seeing these transactions through may be prohibitive.

Formal Transfer Application Procedure

As an application to make a formal transfer of a water right progresses through board and/or USBR approval (if necessary), the applicant is required to complete a standard application form, whether it be for a "change," "exchange" or "temporary change." Copies of these forms are included in Appendix A.

Specific requirements of a transfer application have been recorded by others (Hansen 1988). To summarize the process,

Table 2. Comparison of statutory limitations placed on water-right holding entities or representatives.

	Priv	Mun	MD	CD	ID	MIC
Water-right holder?	yes	yes	yes*	yes*	yes*	yes
- Do individual users hold legal rights	yes	lease	lease	lease	lease	share
Transfer within bndry?	yes	yes	yes	yes	yes	yes
- approving body?	SE	B#	B#	B#	B#	B#
Transfer outside of boundary?	yes	no	yes	yes	yes	no
- approving body?	SE	N/A	+B/F/ SE	+B/F/ SE	+B/F/ SE	+B/F/ SE
Power to tax?	no	yes	yes	yes	yes	no
Must prove beneficial use?	yes	yes**	yes**	yes**	yes**	yes
Acquire water right by contract/purchase?	yes	yes	yes	yes	yes	yes
Acquire water right through condemnation?	no	yes	yes	yes	yes	no

Legend

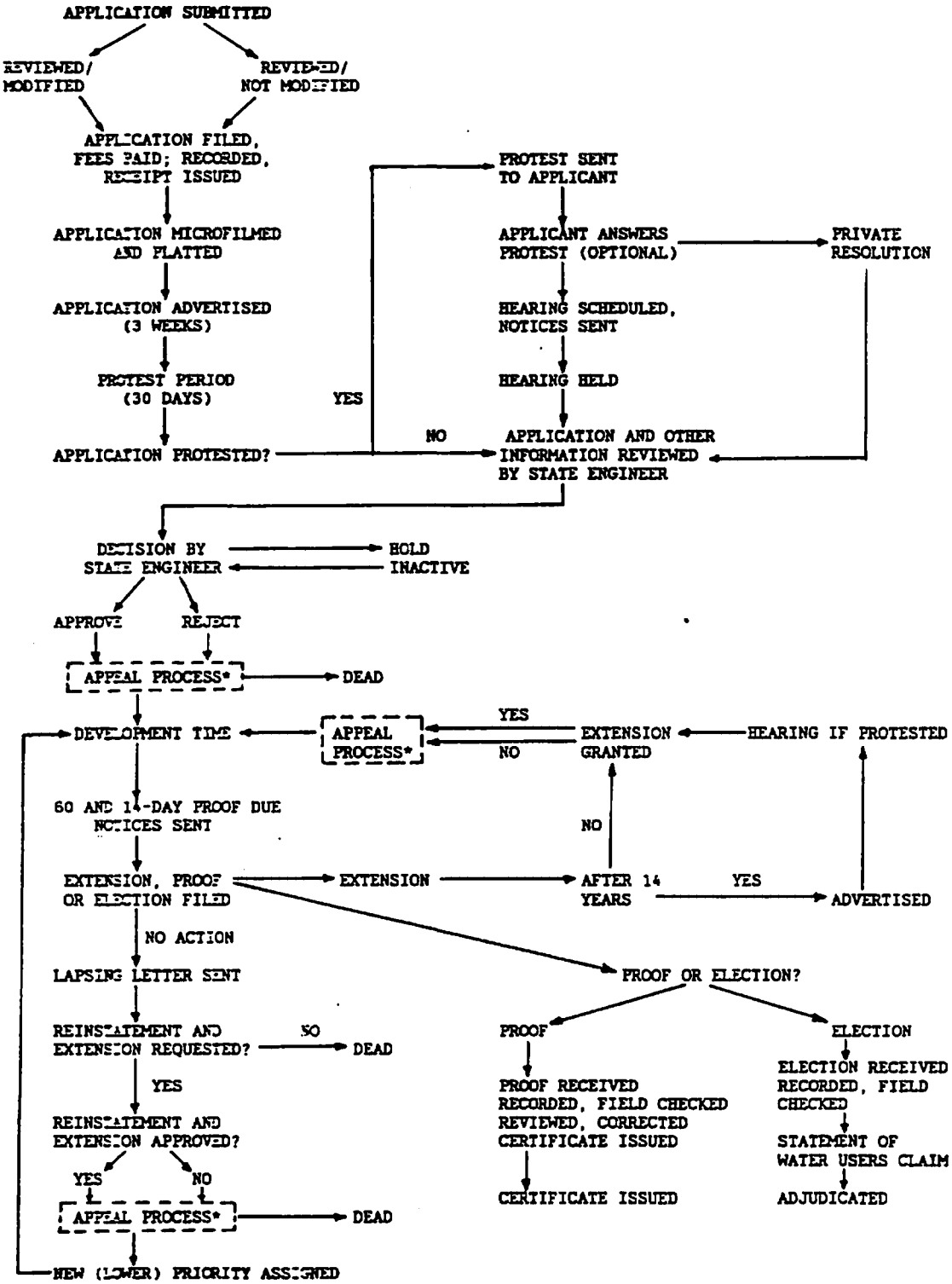
* Federal gov't may retain water rights until debts are paid if funding originated with Federal government.
\# State engineer approval req'd if change-in-right description requested.
\+ Federal gov't may require approval if it holds water right.
** If reasonable cause for nonuse (ex. future public need), then right may be held without use.

Priv = Private individual or corporation
Mun = municipality
MD = Metropolitan district
district
ID = Irrigation district
MIC = Mutual irrigation company or other, independent water company or association
SE = State engineer
B = Board of directors
F = Federal government
CD = Conservancy
N/A = Not applicable

a detailed flow chart has been developed to outline the step-by-step process and is shown in Figure 7.

This diagram was developed by staff of the Division of Water Rights and has been slightly modified for inclusion in this document. A part of this diagram involves the appeal process, which affects three different segments of the application process. This appeal process is outlined in Figure 8.

A difference between the change and exchange processes, as identified in UCA 73-



* See Figure 8

Figure 7. Detailed procedure for granting water rights and/or change applications.

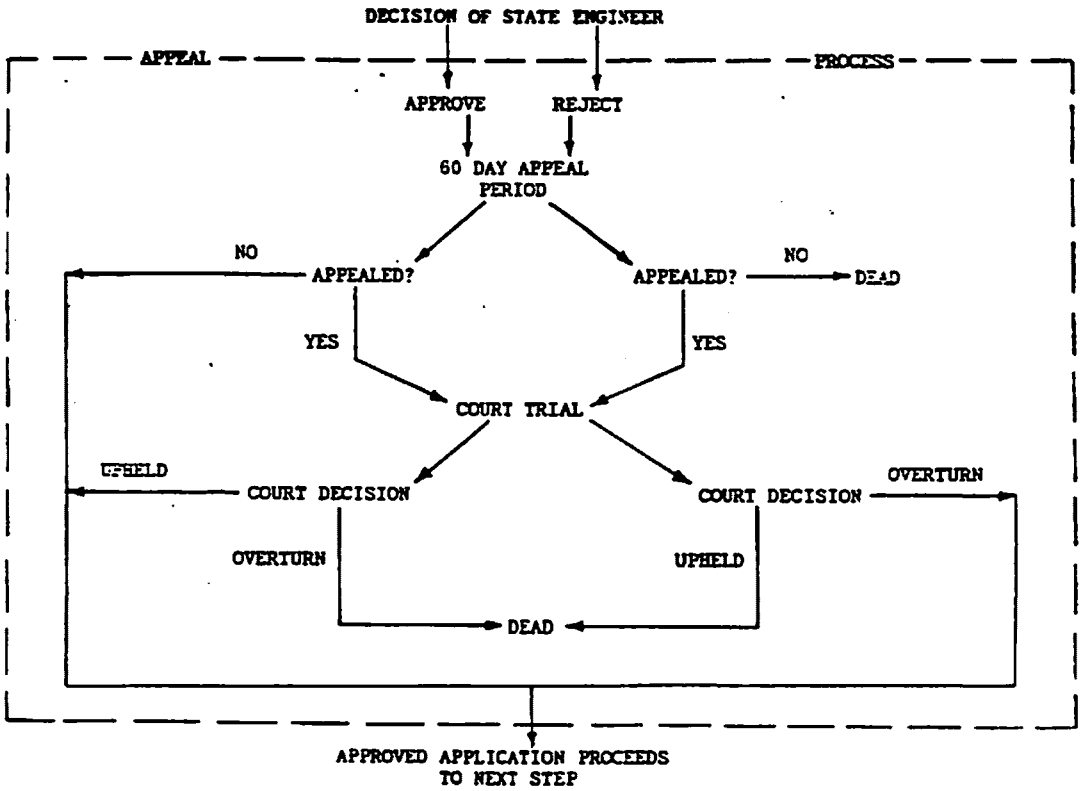


Figure 8. Detailed procedure of the appeal process involved in water-right appropriation and transfer procedures.

3-20, is that although the state engineer may require verification that diversion structures to complete the exchange have been constructed, the formal proof or election procedures are not required (Utah Code Annotated 1989, p.79). An additional variation is that the exchange application is often filed by a non-water-right holder. This can occur only after a contract between the holder of the underlying water right and the applicant has been agreed to by both parties.

Section 3: Analysis of Water-Right Transfer Record

Formal water-right transfer data for the state of Utah analyzed for this project include the period between 1975 and 1987 and were made available through the Division of Water Rights. Since 1985, all change and exchange applications have been entered on the computer data base maintained by the Division of Water Rights. Transfer records prior to 1985 were researched manually in early 1988 and combined with existing computer records to make up the project data base. This manual search excluded changes that had reached a certificated status prior to the time of retrieval (Olds 1989). The following analyses address the change and exchange application records, which require the consideration and approval of the state engineer.

Initial Assumptions

In discussing the change and exchange data, it is important to understand that these records do not contain all of the transfers of water in the state. Records of the transfer of water-right ownership or title only are not included. In addition, informal transfer activity, as previously defined, is not a part of this analysis. Data concerning this informal activity were found to be very difficult to acquire and so were not analyzed beyond recognizing that they are thought to be a significant segment of the overall transfer picture.

After retrieval of all available change records in early 1988, the data were reviewed to remove duplicated application files, temporary change applications, applications filed before and after the 1975-1987 study period and files that had no information important to this study. Temporary changes were not analyzed because long-term or permanent change trends were sought in this research. Beyond this initial screening of transfer records, it was assumed that the records made available are, as a whole, valid and accurate.

A full understanding of all the variables involved in the analyses presented in this report is a difficult task. In an effort to reduce the raw data to simplified and meaningful relationships, several assumptions were made. The assumptions made and definitions used are described within the text accompanying each relationship presented.

One item important to understanding the change application relationships developed is amendatory changes. An amendatory change is filed because of some variation in the point of diversion, place and/or nature of use described on an application to appropriate or a previously-approved change application. This type of change generally occurs at the time of certification or "proof," procedures that can occur from months to several years after approval of the original application. An amendatory change is given a new application number. This raises the probability of having two applications on record applying to only one actual change (Olds 1989).

Accurate identification of amendatory changes occurring prior to the implementation of the computer system in 1985 has been found to be very difficult. Ideally, this study would eliminate these duplications; however,

the time and effort required to do so was found to be prohibitive because a search of each record would be required.

For the period 1985-1987, 9.3 percent of the change applications were amendatory. This period coincides with the implementation of the computer system for water-right records. The data from this period are an accurate representation of the number of amendatory changes occurring each year (Olds 1989).

A search of the amendatory changes for the 1985-1987 period showed 30 percent involving changes in point of diversion only. Most of the relationships that follow exclude changes in point of diversion only because research emphasis was on analyzing trends with respect to type and place of use. Therefore, if this relationship were applied over the entire study period, the expected percentage of change applications being amendatory, excluding changes in point of diversion only, would be approximately 6 percent.

Present procedures for amendatory changes dictate that if a change is found to be less than 150 feet from the originally described point of diversion, no new change application is required. If the actual point of diversion is greater than 150 feet, then an amendatory application is required. Public advertisement of the amendatory change is mandatory if the point of diversion is greater than 660 feet from the original point of diversion (Olds 1989).

The relationships given in this report do not reflect a removal of amendatory changes from the data base. It is, therefore, probable that approximately 6 percent of the change applications are, in reality, duplicated. We believe these duplications to be essentially random with respect to time and area and not to significantly affect trends in the recorded relationships.

Change Applications

Change applications, as previously defined, involve a permanent alteration in the legal description of the water right relating to the point of diversion, place of use and/or nature of use.

Time and space distribution

The number of permanent change applications filed each year in Utah from 1975-1987 is given in Table 3. These numbers were determined through the sequential application numbering system used by the Division of Water Rights. Included in these totals are segregation change applications, which have a slightly different numbering system but also occurred within the study period.

TABLE 3. total change applications filed in Utah per year from 1975 to 1987

YEAR	TOTAL APPLICATIONS
1975	509
1976	519
1977	771
1978	569
1979	559
1980	495
1981	552
1982	483
1983	497
1984	331
1985	415
1986	398
1987	395
TOTAL	6493

Files that were checked out from the water-right fileroom by others or otherwise unavailable through computer files at the time of data retrieval in early 1988 were not

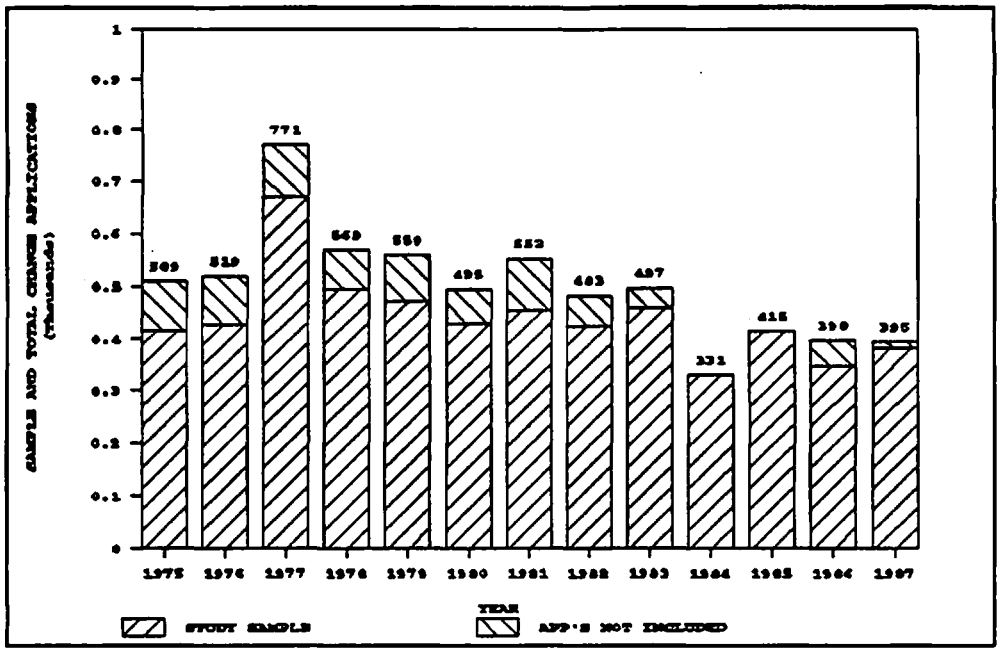


Figure 9. Total change applications filed in Utah per year between 1975 and 1987 relative to applications included in the study sample.

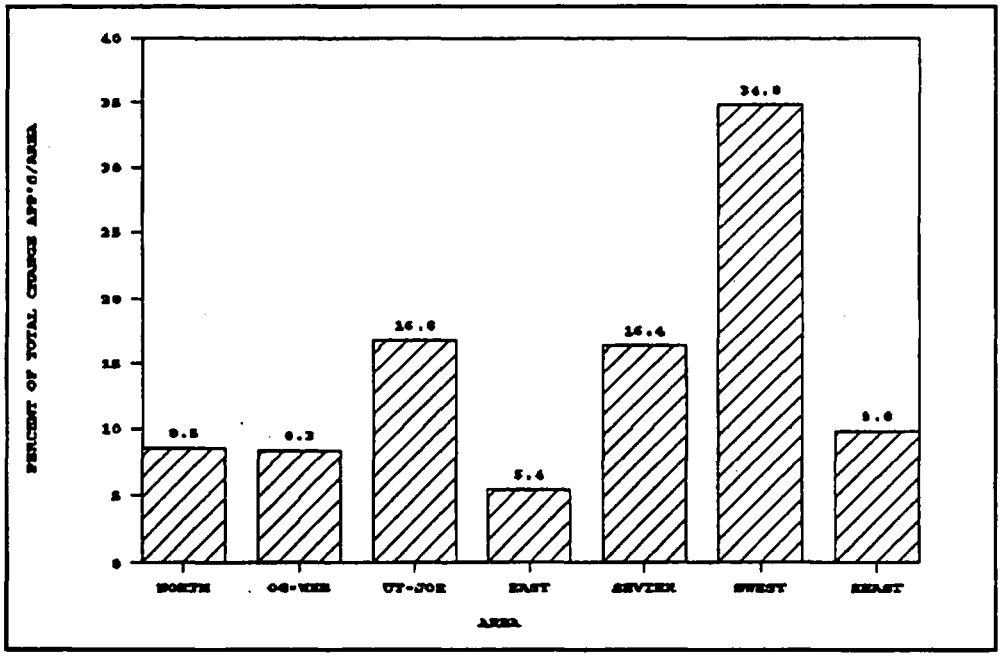


Figure 10. Study-sample percentage of total change applications filed in Utah per administrative subdivision for the period 1975 to 1987.

included in the project data base (Hansen 1989). For this reason, analyses for this project were developed from a subset of the total change applications within the study period. The study sample contains 88 percent of the totals given in Table 3.

Change applications retrieved into the study-sample data base are organized by administrative subdivision and year of application in Table 4.

Comparison of the yearly applications with the study-sample totals shows a relatively higher percentage of total yearlyapplications being retrieved into the data base after 1982, a fact directly attributed to the more readily accessible computer records. Those records not included in the study data base are believed to have occurred randomly across the state and are not believed to substantially influence relationships published in this report.

Three trends are observed in the tabulations of Tables 3 and 4. The first is the apparent correlation between the number of change applications and major climate shifts for the state. For example, in 1977 Utah experienced a very dry year, and a larger number of change applications were filed. For the study sample, six of the seven administrative subdivisions experienced their peaks or second highest number of change applications in 1977. The state total was 54 percent above the 13-year average. This correlates with a conclusion drawn by other researchers of water-right transfers in the western United States, which stated:

> One can conclude ... that the number of applications for water right transfers ... may be expected to increase as water supplies become fully utilized and users are forced to acquire water from new locations to serve their needsor during periods of drought or lower-than-average water supply. (Higginson and Barnett 1984, p.5)

In 1983 and 1984, Utah experienced wetter than normal water years, and in 1984 the lowest number of applications for the study period were filed, 34 percent below the 13-year average. This leads one to believe that fewer water-right changes occur during substantially wetter than normal periods. The second trend, observed in Table 4, is the extremely high number of applications filed in the southwestern area of the state. This area along with the Sevier River area, experienced a high number of change applications, perhaps largely because of the overall water scarcity in these areas, basin closure to new water-right applications and recent new developments due to rapid population growth. A high number of applications in the Utah Lake/Jordan River area are perhaps more directly related to the changing needs of this, the most densely populated area of the state. A third trend seen when looking at the state as a whole shows the total change applications filed gradually decreasing with time. These relationships are described more clearly in Figures 9 and 10, which show the total number of change applications per year relative to the study sample and the percentage of total per area, respectively.

Change type

The three major types of changes that can be made on a water right involve a change in the nature of use, place of use and point of diversion, respectively. Any one or all of these changes can take place in a given application. This research emphasizes changes in nature and place of use, and Table 5 was developed to show the relationship of the number of requested changes in nature and place of use relative to all other changes for each year.

TABLE 4. The total study sample change applications filed in Utah per administrative subdivision from 1975 to 1987

YEAR	ADMINISTRATIVE SUBDIVISION NORTH	OG-WEB RIVER	UT.LAKE-JORDAN RIVER	EAST	SEVIER RIVER	SOUTH-WEST	SOUTH-EAST	YEARLY TOTAL
1975	36	28	101	10	41	174	26	416
1976	35	34	81	24	33	180	40	427
1977	64	47	124	35	95	259	44	668
1978	50	24	91	40	53	167	69	494
1979	57	32	79	31	60	166	48	473
1980	42	43	61	28	57	130	70	431
1981	46	35	79	13	85	153	44	455
1982	34	41	60	17	86	141	46	425
1983	31	47	55	17	146	115	50	461
1984	9	34	50	17	73	111	40	334
1985	22	33	57	26	73	163	41	415
1986	22	28	53	29	62	128	25	347
1987	41	49	72	19	75	106	20	382
TOTAL	489	475	963	306	939	1993	563	5728
AVG/YR	37.6	36.5	74.1	23.5	72.2	153.3	43.3	440.6
percent TOT	8.5	8.3	16.8	5.3	16.4	34.8	9.8	

For the 1975-1987 period, the average percentage of all change applications to alter the nature of use is 52 percent. The trend is for these types of applications to increase, since the average for 1975-1981 was 47.7 percent while the 1982-1987 period averaged 57.1 percent. Similarly, all applications for change in place of use increased from 62.5 to 71.4 percent of all applications for the two time periods, respectively. This indicates a possible statewide trend toward more changes involving the nature and place of use.

Figure 11 shows the percent of change applications in the state occurring in each area, compared with the percent of all applications to change the nature and/or place of use in each area.

This comparison shows the three southernmost areas of the state with a relatively higher percent of applications that involve a change in nature and/or place of use, with the southwest area being the most obvious. This comparison could indicate a correlation of population growth rate with resulting need for changes in nature and place of use that this activity requires and the general scarcity of water in the drier regions of the state.

Status

Table 6 was compiled to identify the status of change applications filed for this study period. The status categories available through state records in Table 6 are identified as approved, rejected, lapsed and/or withdrawn and unapproved applications, respectively.

Table 6 was developed by eliminating all applications involving a change in point of diversion, which only accounts for approximately 22 percent of all filings. All

were included in the approved tabulations. For the state as a whole, 85.5 percent of these change applications were approved, 2.9 percent rejected, 2.1 percent lapsed or withdrawn and 8.4 percent as of mid-1988 unapproved. The remaining 1.1 percent of the applications were not categorized due to lack of sufficient data. This relationship is shown in Figure 12.

The results shown in Figure 12 give a very favorable representation of the approval rate for transfer applications involving a change in nature and/or place of use. In each of the seven administrative subdivisions in the state, approval and rejection rates were quite consistent. The areas experiencing a relatively lower percent of approvals and a correspondingly higher percentage of unapproved applications included the Ogden River/Weber River and the Utah Lake/Jordan River areas. These areas lie along the Wasatch Front, the most densely populated region of the state. The higher percentage of unapproved applications may be an accumulation of transfers yet to be decided upon due to their complex relationship with surrounding water rights.

Table 7 shows the status of the sampled change applications per year of application. Applications for a change in point of diversion only were excluded.

Approximately 60 percent of the unapproved applications were filed in 1987, which would account for the drastic drop in changes approved in 1987. These relationships can be seen in Figure 13 as a percentage of yearly study-sample change applications.

Time to decision

An analysis of the time elapsed between the filing date and the status date (i.e., the date that the state engineer handed down the decision regarding the application) was determined with respect to administrative subdivision for all approved applications and is shown in Table 8.

For the state as a whole, the peak number of approved changes (42.1 percent of total) were acted upon within a 3-6 month period, with approximately 83.2 percent being acted upon within 12 months, 15.7 percent taking more than 12 months and 1 percent unknown due to insufficient data. The most notable variation from this statewide trend was found in the Sevier River area where the peak number of change application approvals (36.9 percent) occurred in the 6-12month period, with only 59.4 percent occurring within 12 months and 39.8 percent requiring greater than 12 months to accomplish. The Sevier River area receives a larger percentage of protests for change applications filed than any other area of the state. This often requires a hearing that can add up to six months to the approval process.

Interestingly, even though the southwest area received a high number of applications, the time required for a decision on these filings was shorter than the state average. A distribution similar to Table 8, developed for all rejected change applications, is summarized in Table 9.

Figure 14 compares the time"to"decision distribution of approved and rejected applications within the study sample.

As would be expected, rejection decisions generally require more time than approvals. Only 50.5 percent of the rejections were acted upon within 12 months, 38.2 percent required more than 12 months and 11.3 percent were unknown due to insufficient data. Table 10 shows the time-to-decision distribution of approved change applications per year. Totals given in this table represent the status of transfer records available at the

TABLE 5. The number of change applications requesting changes in the type of use (nature, place and/or point of use) for each year from 1975 to 1987

YEAR	TYPE OF USE CATEGORIES NAT. (ONLY)	PLACE (ONLY)	NAT.& PLACE	NAT.+ POINT	PLACE+ POINT	OTHER	YEARLY TOTAL
1975	13	12	152	27	116	96	416
1976	22	13	134	45	126	87	427
1977	21	25	261	26	138	197	668
1978	28	9	155	46	129	127	494
1979	24	6	175	25	104	139	473
1980	25	11	155	35	87	118	431
1981	31	5	164	35	123	97	455
1982	24	5	182	30	89	95	425
1983	19	55	210	30	89	58	461
1984	12	15	148	21	85	50	331
1985	18	17	203	38	65	74	415
1986	15	14	187	18	43	70	347
1987	8	35	165	21	80	73	382
TOTAL	260	222	2291	397	1274	1281	5725

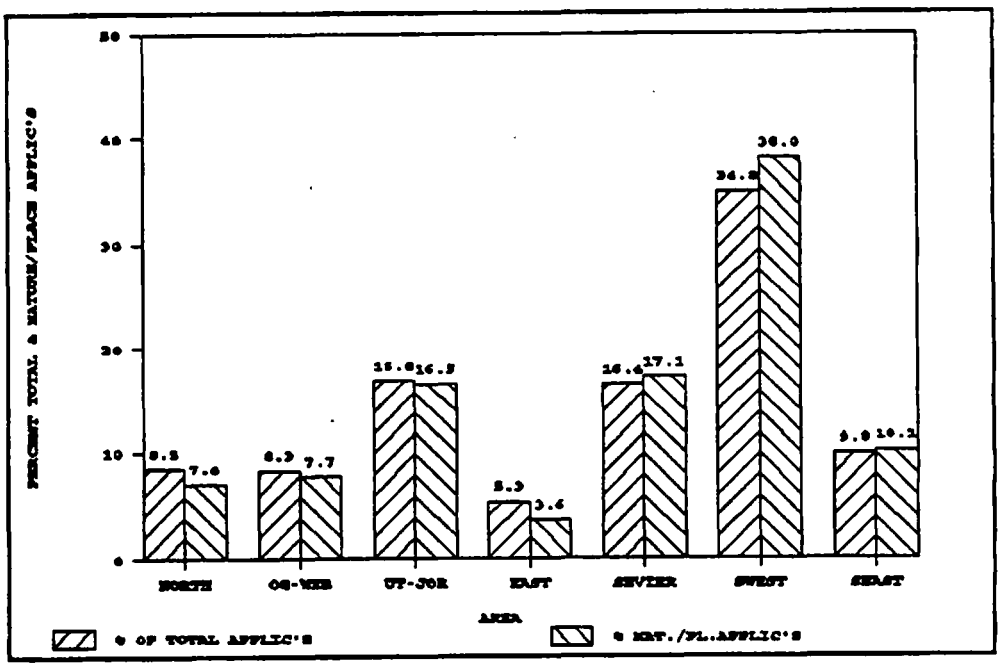


Figure 11. The percentage of all change applications filed in a given area, compared to the percent of all applications changing the nature and/or place of use per area (1975-1987).

TABLE 6. Status of change applications filed for the period 1975 to 1987 per administrative subdivision

AREA	INSUF. DATA	CHANGE APPLICATION STATUS* APP.	REJ.	LAP/WD	UNAP.	TOTAL
NORTHERN	6	267	8	10	23	314
OGDEN-WEBER RIVER	6	249	13	3	73	344
UTAH LAKE-JORDAN RIVER	18	568	16	20	112	734
EASTERN	3	144	2	3	9	161
SEVIER RIVER	4	614	24	25	96	763
SOUTHWEST	8	1544	60	29	52	1693
SOUTHEAST	4	428	6	4	10	452
TOTAL	49	3814	129	94	375	4461
% OF TOTAL	1.1	85.5	2.9	2.1	8.4	

* EXCLUDING APPLICATIONS FOR CHANGE IN POINT OF DIVERSION ONLY

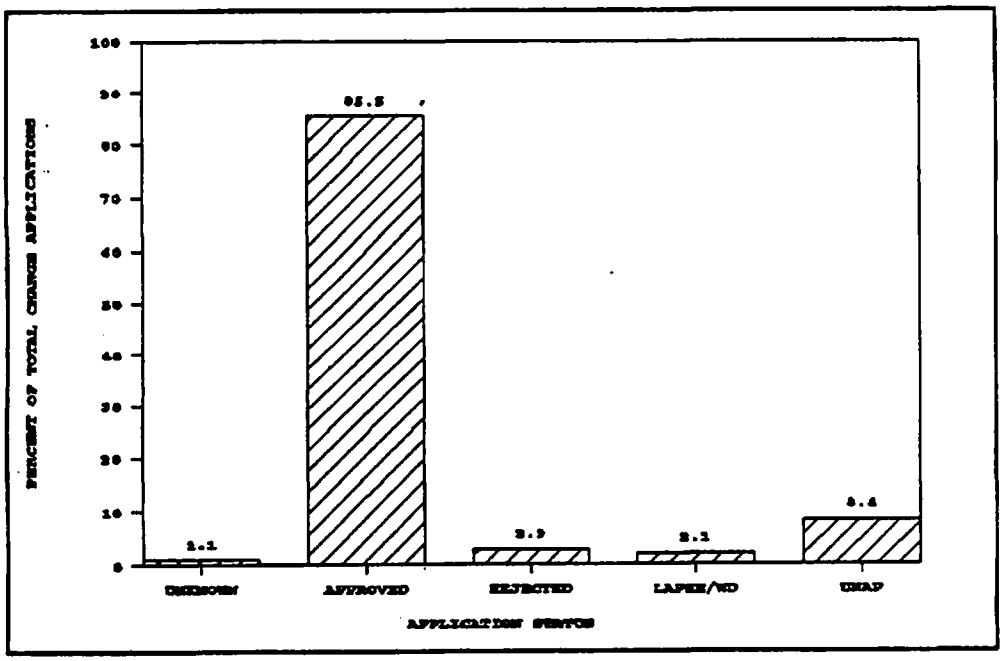


Figure 12. **Status of change applications filed between 1975 and 1987 (percentage of total). Changes in point of diversion only are excluded.**

TABLE 7. Status of study-sample change applications per year (1975-1987)

		CHANGE APPLICATION STATUS				
YEAR	INSUF. DATA	APP.	REJ.	LAP/WD	UNAP	TOTAL
1975	3	292	14	8	4	321
1976	12	285	20	5	10	332
1977	10	403	30	10	19	472
1978	2	335	17	9	5	368
1979	9	315	7	16	8	355
1980	1	284	4	15	9	313
1981	4	331	4	10	9	358
1982	2	309	10	9	7	337
1983	1	366	12	8	17	404
1984	2	241	2	3	34	282
1985	3	290	5	2	36	336
1986	0	244	3	0	28	275
1987	0	120	2	0	186	308
TOTAL	49	3815	130	95	372	4461
% OF TOT	1.1	85.5	2.9	2.1	8.4	

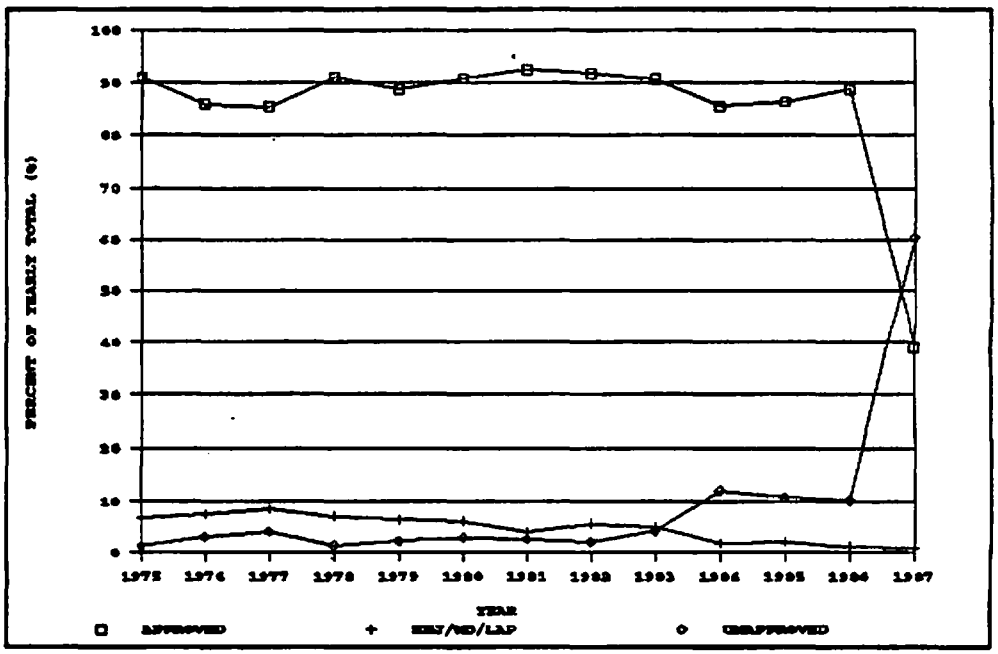


Figure 13. **Status of change applications filed each year as percentage of yearly total (1975-1987).**

TABLE 8. Time-to-decision distribution of all approved change applications for each administrative subdivision (1975-1987)

		TIME ELAPSED (MONTHS)						
AREA	INSUF. DATA	0-3	>3-6	>6-12	>12-24	>24-48	>48	AREA TOTAL
NORTHERN	1	4	115	116	24	5	0	265
OGDEN-WEBER RIV.	2	11	81	80	55	13	3	245
UTAH LAKE-JORDAN RIV.	6	50	228	192	57	29	6	568
EASTERN	4	2	57	58	22	2	2	147
SEVIER RIV.	6	13	111	223	191	58	11	613
SOUTHWEST	1	48	793	584	87	14	11	1548
SOUTHEAST	4	21	214	139	32	12	7	429
TOTAL	34	149	1599	1392	468	133	40	3815
% OF TOT.	0.9	3.9	41.9	36.5	12.3	3.5	1	

time of data retrieval in early 1988. These numbers would be expected to change slightly with time because previously undecided applications are acted upon. The study sample records show that 2.7 percent of the applications from 1975-1983 remain undecided while records for 1984, 1985, 1986 and 1987 show 12.1, 10.7, 10.2 and 60.0 percent, respectively, yet to be decided. To prevent extreme bias towards short decision periods, 1987 data were not included in the graphical representation shown in Figure 15. This figure represents the percentage of all approved change applications, excluding point of diversion only applications, filed within a given year, being decided within 6, 12, 24, and 48 months, respectively. A significantly decreasing trend in the precent of yearly approved applications decided within 6 and 12 months, respectively, was experienced between 1975 and 1983 slowdown may have been accentuated by major flooding and slide activity during the spring of 1983 that likely resulted in a slower application paperflow.

A trend similar to that shown in Figure 15 was not apparent for rejected change applications.

Protests

Since 1985, protest information is regularly entered on the computer system; prior to 1985, this information was not regularly maintained (Olds 1989). Protest information for 1985, 1986 and 1987 shows 13.2, 17.5 and 24.4 percent of all applications being protested. This three-year period shows a steadily increasing statewide protest rate. A large percentage of these protests occurred in the Sevier River area where protests are filed on a large percentage of all transfer applications by area irrigation companies. No other area of the state in known to experience this consistent protest activity (Olds 1989).

A more specific analysis of change applications in the Sevier River area from 1985-1987 revealed that 33 percent were protested. Subbasins 61, 63 and 66 were protested between 41 and 52 percent of the

TABLE 9. Time-to-decision distribution of all rejected change applications for each administrative subdivision (1975-1987)

AREA	INSUF. DATA	TIME ELAPSED (MONTHS) >0-3	>3-6	>6-12	>12-24	>24-48	>48	AREA TOTAL
NORTHERN	0	0	2	3	0	2	1	8
OGDEN-WEBER RIV.	1	0	2	3	2	2	3	13
UTAH LAKE-JORDAN RIV.	6	0	0	0	5	3	2	16
EASTERN	0	0	0	0	2	0	0	2
SEVIER RIV.	8	1	1	7	1	5	1	24
SOUTHWEST	3	1	28	16	9	2	2	61
SOUTHEAST	0	1	1	0	1	3	0	6
TOTAL	18	3	34	29	20	17	9	130
% OF TOT.	13.8	2.3	26.2	22.3	15.4	13.1	6.9	

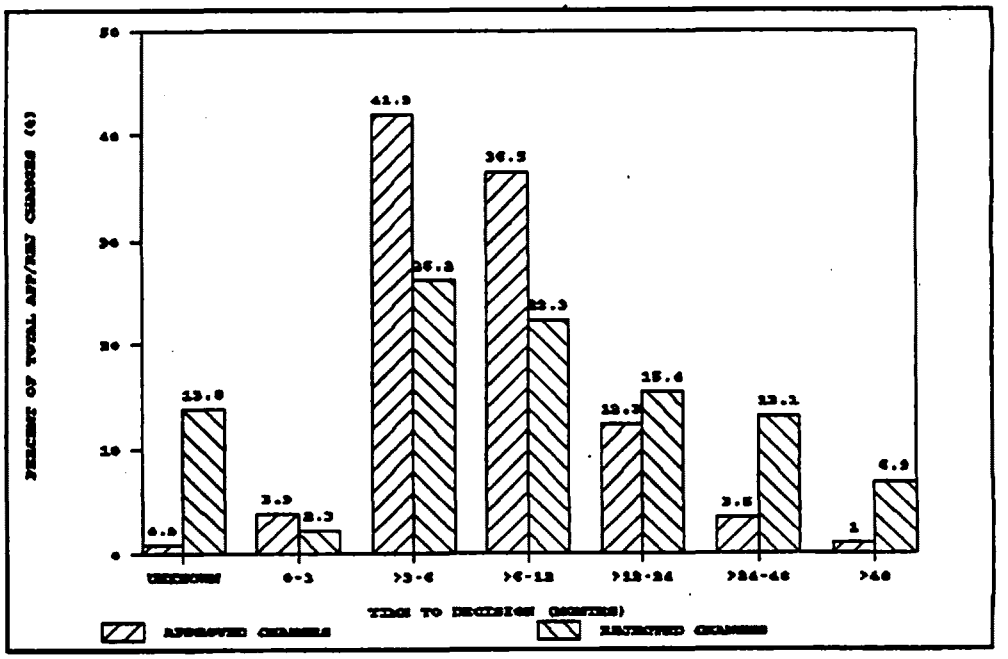


Figure 14. Comparison of time to decision for approved and rejected change applications as percentage of total (1975-1987).

TABLE 10. **Time-to-decision distribution of approved change applications per year of filing (1975-1987)**

TIME DISTRIBUTION (MONTHS) YEARLY

YEAR	>0-3	>3-6	>6-12	>12-24	>24-48	>48	TOTAL
1975	46	175	46	13	7	5	292
1976	29	179	42	20	9	2	281
1977	5	140	177	57	12	9	400
1978	1	119	146	53	9	2	330
1979	0	115	153	33	8	3	312
1980	3	127	123	20	7	3	283
1981	3	83	193	25	15	8	327
1982	1	96	123	53	28	3	304
1983	2	51	171	118	13	5	360
1984	9	127	69	19	14	0	238
1985	4	144	99	32	11	0	290
1986	38	143	38	25	0	0	244
1987	8	100	12	0	0	0	120
TOTAL	149	1599	1392	468	133	0	3781
% OF TOT	3.9	42.3	36.8	12.4	3.5	1.1	

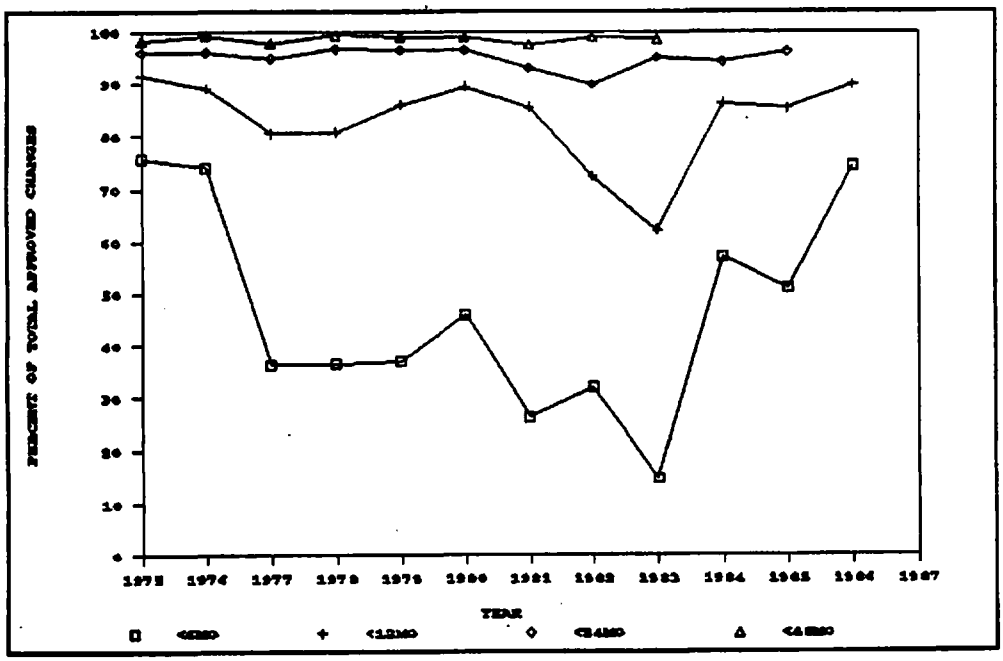


Figure 15. **The percentage of all approved changes decided upon within 6, 12, 24 and 48 months, respect-ively, per year of filing.**

TABLE 11. Quantities of water approved for change per year

YEAR	ACRE-FEET	SOLE CFS*
1975	55360.66	262.04
1976	52606.01	298.33
1977	38224.33	553.42
1978	27682.09	190.97
1979	69490.8	585.2
1980	15597.78	121.45
1981	39168.58	1099.01
1982	32856.6	2955.34
1983	63235.46	504.15
1984	34368.84	529.71
1985	39419.15	221.43
1986	14243.54	320.52
1987	6235.36	91.65
TOTAL	488489.2	7733.22

* Water right quantified in cfs only

TABLE 12. Quantities of water approved for change per administrative subdivision (1975-1987)

AREA	ACRE-FEET	SOLE CFS*
NORTHERN	7463.84	308.58
OGDEN-WEBER RIVER	24883.47	3191
UTAH LAKE-JORDAN RIVER	19413.82	222.87
EASTERN	119489.63	517.42
SEVIER RIVER	57343.54	681.01
SOUTHWEST	130786.71	648.18
SOUTHEAST	129108.22	2164.17
TOTAL	488489.23	7733.23

* Water right quantified in cfs only

TABLE 13. Distribution of water quantities transferred through approved changes per area (1975-1987)

AREA	<.5	.5-1	CFS >1-5	>5-20	>20-50	>50	AREA TOTAL
NORTHERN	144	20	42	18	1	1	226
OGDEN-WEBER RIV.	76	19	33	8	2	7	145
UTAH LAKE-JORDAN RIV.	289	31	47	3	1	0	371
EASTERN	53	6	10	1	4	1	75
SEVIER RIV.	260	18	34	9	1	2	324
SOUTHWEST	197	58	59	13	5	2	334
SOUTHEAST	93	9	21	4	2	6	135
TOTAL	1112	161	246	56	16	19	1610
% OF TOTAL	69	10	15.3	3.5	1	1.2	

TABLE 14. Distribution of water quantities transferred through approved changes for each area (1975-1987)

AREA	<10	10-100	ACRE-FEET >100-1K	>1K-5K	>5K-10K	>10K	AREA TOTAL
NORTHERN	28	7	2	4	0	0	41
OGDEN-WEBER RIV.	30	34	35	2	1	0	102
UTAH LAKE JORDAN RIV.	164	15	13	2	1	0	195
EASTERN	17	17	21	11	2	4	72
SEVIER RIV	220	31	31	3	0	1	286
SOUTHWEST	690	306	188	21	1	1	1207
SOUTHEAST	185	65	26	8	2	4	290
TOTAL	1334	475	316	51	7	10	2193
% OF TOT	60.8	21.7	14.4	2.3	0.3	0.5	

time. This analysis excluded change in point of diversion only applications.

Quantities

Water-right records in Utah list water-right quantities in acre-feet or cubic feet per second (cfs) or both; this creates a problem in consistently quantifying the actual water covered by the right. Table 11 shows the amount of water transferred for approved change applications, excluding changes in point of diversion only, for each year between 1975 and 1987. Cfs quantities are given in Table 11 only when acre-foot quantities are nonexistent in the water-right description. Table 12 indicates a relationship similar to Table 11 for quantities of water transferred organized by administrative subdivision. To minimize inconsistencies in quantification, the Division of Water Rights is attempting to quantify more of the water rights in acre-feet as new transfer applications are filed (Morgan 1989).

Tables 13 and 14 show the distribution of water quantities transferred through approved change applications within

through approved change applications within this study period, organized by administrative subdivision. Changes approved and quantified in cfs only are given in Table 13. Table 14 shows the distribution of water quantities in acre-feet.

In many instances, changes represented in Table 14 were quantified in both acre-feet and cfs. For Tables 13 and 14, the large majority of approved changes involved quanitites less than 0.5 cfs and less than 10 acre-feet, respectively. Point only transfers were not included in these relationships. This analysis is shown graphically in Figures 16 and 17.

Nature of use

An analysis of the patterns of the nature of use before and after approved change applications was also made. In many of the following relationships, one or all of four use categories are represented, including agricultural, municipal, industrial and single-family uses. State water-right records identify uses in various types of categories that require some interpretation to fall within the above categories. For the purposes of this study, assumptions were made in defining the four nature-of-use categories and are discussed in the following paragraphs.

If the irrigated acreage was greater than or equal to 5 acres and/or the total number of livestock served was greater than or equal to 10, then the application was considered to involve agriculture as at least one of its uses.

If an application indicated that the number of people served was greater than or equal to 20 and/or the number of families served was greater than or equal to 5 and/or a municipal use was given specifically, then at least one of the uses was considered to be municipal.

In order for an application to be identified as having an industrial use, some description of the use must have been given in the "mining," "power" or "other" use data retrieved from the Division of Water Rights.

Finally, if the irrigated acreage was less than 5, or the livestock served less than 10, or the number of people served less than 20, or the number of families served less than 5, then the application was defined to have a single- family use. These definitions were incorporated into a sorting Fortran program used in this analysis.

The "other" use column in the data base described less than 5 percent of the approved changes in nature and so was individually interpreted and categorized into either agricultural, municipal, industrial or single-family uses.

Special emphasis was placed on identifying the change in nature of water use from or to agricultural purposes in each administrative subdivision. Four scenarios of use transfer were defined that describe the qualitative use before and after the change, and the number of approved changes in each are tabulated in Table 15. The categories are agricultural to agricultural use, agricultural to non-agricultural use, agricultural to an apparently diminished agricultural use plus some other use, and changes in nature of use not originating with agriculture.

The first category in Table 15 more specifically includes agricultural use before and after the transfer but may include other uses that remain qualitatively unchanged. The second category implies a complete removal from agriculture. The third category includes agriculture before and after the change but indicates other uses that are different or in addition to prior uses. This relationship is shown graphically in Figure 18.

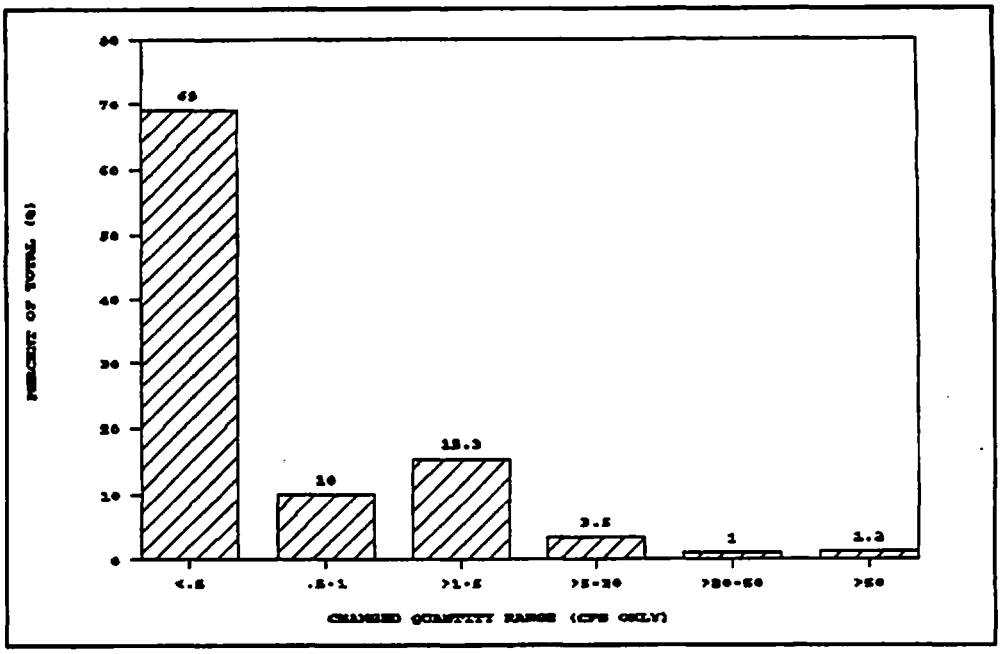


Figure 16. Distribution of approved applications falling within a specified flow range (1975-1987).

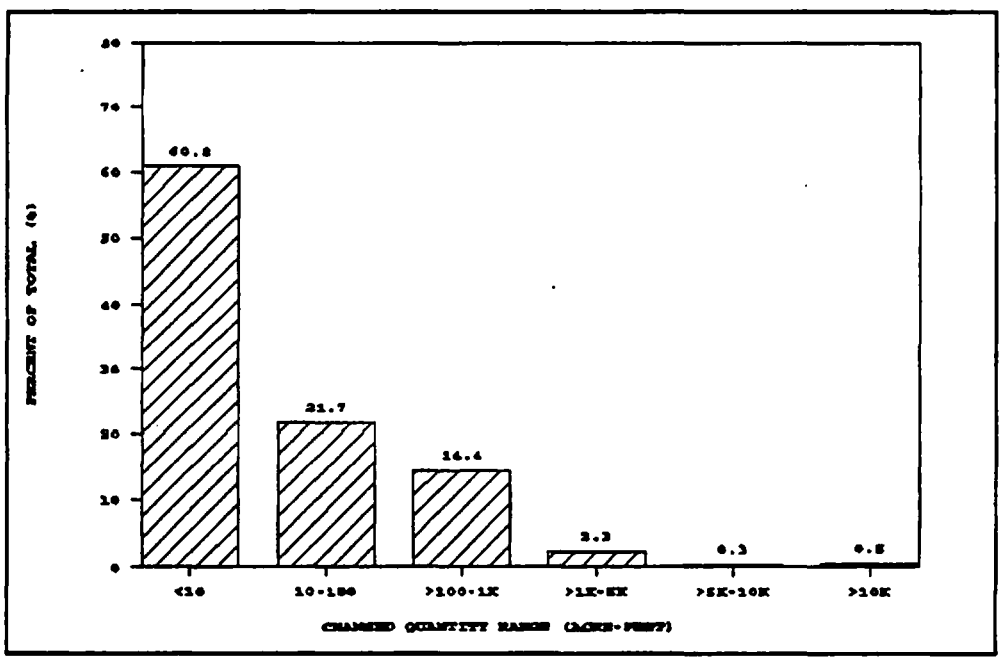


Figure 17. Distribution of approved change applications falling within a specified quantity range (1975-1987).

TABLE 15. **The number and type of use of approved changes before and after the change in nature of use where agriculture was involved, compared with non-agricultural uses for each area (1975-1987)**

	TYPE OF USE BEFORE/AFTER APPROVED CHANGE				
AREA	AG/AG	AG/NONAG	AG/AG+OTHER	OTHER	TOTAL
NORTHERN	79	51	17	22	169
OGDEN-WEBER RIVER	52	55	22	33	162
UTAH LAKE-JORDAN RIVER	51	71	22	207	351
EASTERN	15	18	10	26	69
SEVIER RIVER	62	136	15	143	356
SOUTHWEST	291	313	52	304	960
SOUTHEAST	49	34	30	202	315
TOTAL	599	678	168	937	2382
% OF TOTAL	25	28	7	39	

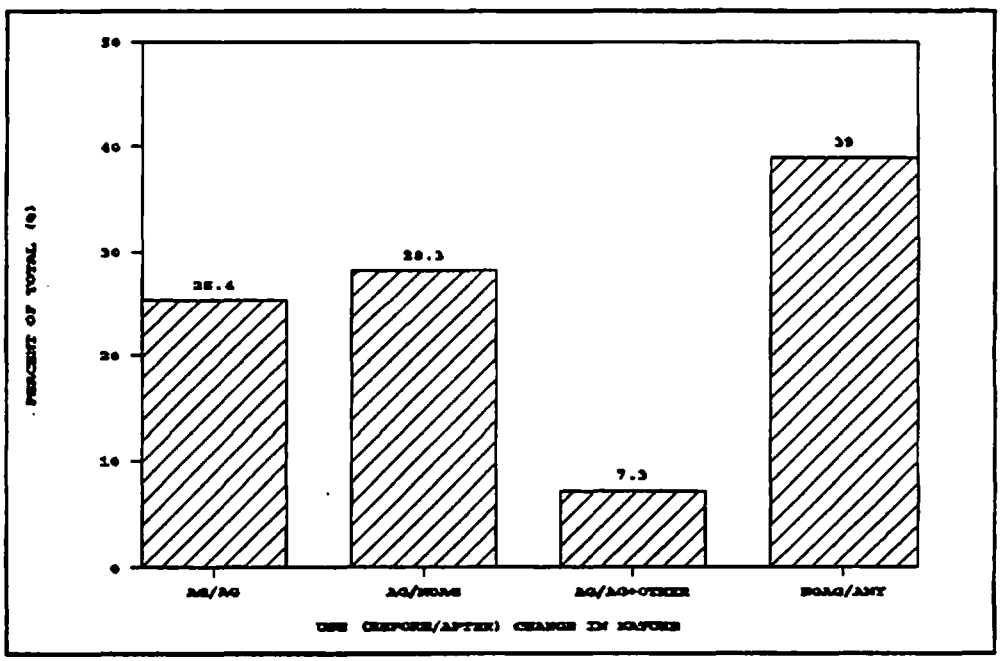


Figure 18. Comparison of approved changes in nature of use, with agricultural or non-agricultural uses before and after the transfer.

TABLE 16. Distribution of approved changes in nature of use with regards to new agricultural, municipal and industrial uses. The number of existing and proposed uses described for approved changes per year are also totaled (1975-1987)

YEAR	NEW USES NEW AGRI.	NEW MUN.	NEW IND.	NEW NATURE	TOTAL CHANGE IN 1	TOTAL CHANGE IN 2	NUMBER OF USES EXISTING 3	NUMBER OF USES PROPOSED 1	NUMBER OF USES PROPOSED 2	NUMBER OF USES PROPOSED 3	
1975	27	18	19	171	150	19	2	142	24	5	
1976	12	16	11	162	148	12	2	141	17	4	
1977	22	42	44	260	240	16	3	224	34	3	
1978	8	41	13	205	181	23	1	176	23	6	
1979	14	39	30	192	174	17	1	150	37	5	
1980	11	32	13	188	176	11	1	170	14	4	
1981	16	28	12	199	189	9	1	171	24	4	
1982	17	30	19	208	194	10	4	183	22	3	
1983	6	46	19	204	186	13	5	164	27	13	
1984	3	29	10	126	114	9	3	106	11	9	
1985	10	35	21	217	196	16	5	187	29	1	
1986	13	39	7	187	171	14	2	160	25	2	
1987	4	10	2	63	60	3	1	53	9	1	
TOTAL	163	405	220	2382	2179	172	31	2027	295	60	

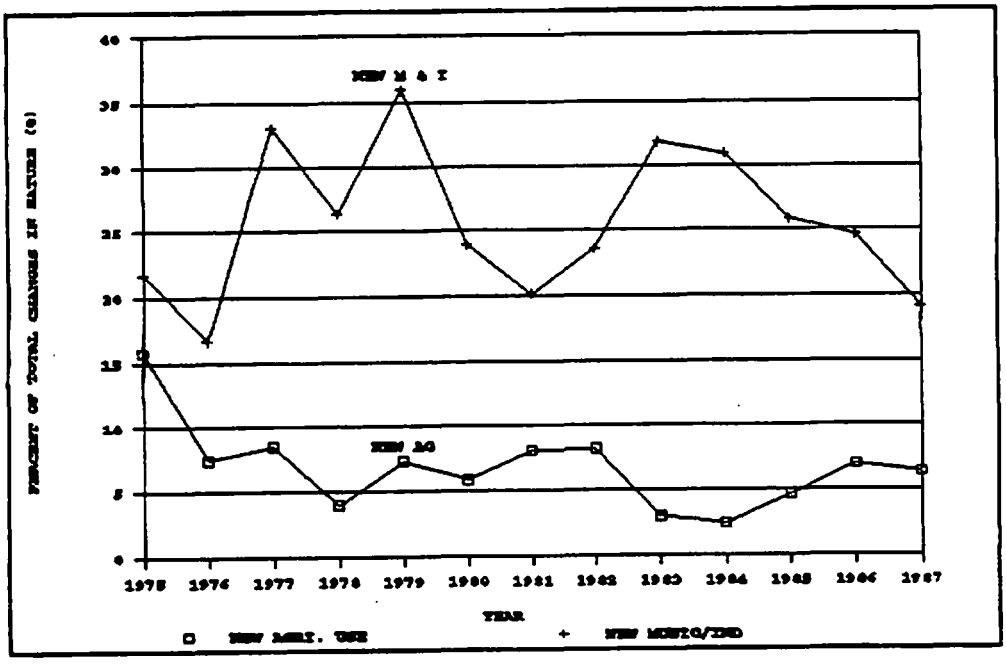


Figure 19. Comparison of new agricultural uses with new municipal and industrial uses as a percentage of the yearly total of approved changes in nature of use (1975-1987).

For the state as a whole, the percent of approved changes in nature of use originating with an agricultural use and ending in non-agricultural uses was 28.3 percent. The percent of changes in nature of use originating in an agricultural use and maintaining at least some agricultural use totaled 32.7 percent. It is believed that many of these changes actually decrease the amount of water used for agriculture. Those changes in nature of use not originating with agriculture represent 39 percent of the total.

Analysis of the new end use of transfers involving an approved change in nature of use, as well as the number of uses assigned to a water right before and after the change, is given for each year in Table 16.

The percentage of change-in-nature transfers moving to new municipal and industrial uses is compared with the percentage changing to new agricultural uses in Figure 19. From this relationship, new agricultural uses appear to be gradually declining while the combination of new municipal and industrial uses experienced above-average peaks in 1977, 1979, 1983 and 1984. The study period average shows that 6.8 percent of the total changes in nature of use involved new agricultural uses, while 26.2 percent involved new municipal or industrial uses. The peak number of new agricultural uses occurred in 1975, while the peak for both municipal and industrial use transfers occurred in 1977.

The tabulation of the number of uses before and after a change in nature, as shown in Table 16, indicates a general trend towards diversification. In other words, the number of uses per water right is increasing, which gives an indication of the increasing relative value of water as illustrated in Figure 20. Total changes in nature of use describing only one use decreased from 91.5 percent before application to 85.1 percent after, while the number of changes involving two and three uses increased from 7.2 and 1.3 percent before the transfer to 12.4 and 2.5 percent after, respectively.

In another analysis, the total number of agricultural, municipal, industrial and single-family uses before and after approved changes in nature of use were tabulated. The number of agricultural uses after the changes dropped 35.7 percent, while the municipal, industrial and single-family uses increased 130.5, 161.4 and 22.2 percent, respectively. This trend is a strong indicator of the growing municipal and industrial needs of the state. These relationships are shown graphically in Figure 21.

Water source

Analysis of the existing and proposed source of water from approved change applications by administrative subdivision and year of application was also conducted. Water sources were defined as groundwater and surface water, with four possible combinations of water-source changes being a groundwater source to a groundwater source (GW/GW), groundwater to surface water (GW/SW), surface water to surface water (SW/SW) and surface water to groundwater (SW/GW), respectively. Surface-water sources included streams, rivers, springs and reservoirs, while groundwater sources included wells. Changes in point of diversion only were excluded. The results of this analysis for each area are given in Table 17 and graphically for the entire state in Figure 22.

Viewing the entire state during the 1975 to 1987 study period, 75 percent of the changes involved a groundwater source before and after the change; 1 percent went from groundwater to surface water sources; 19

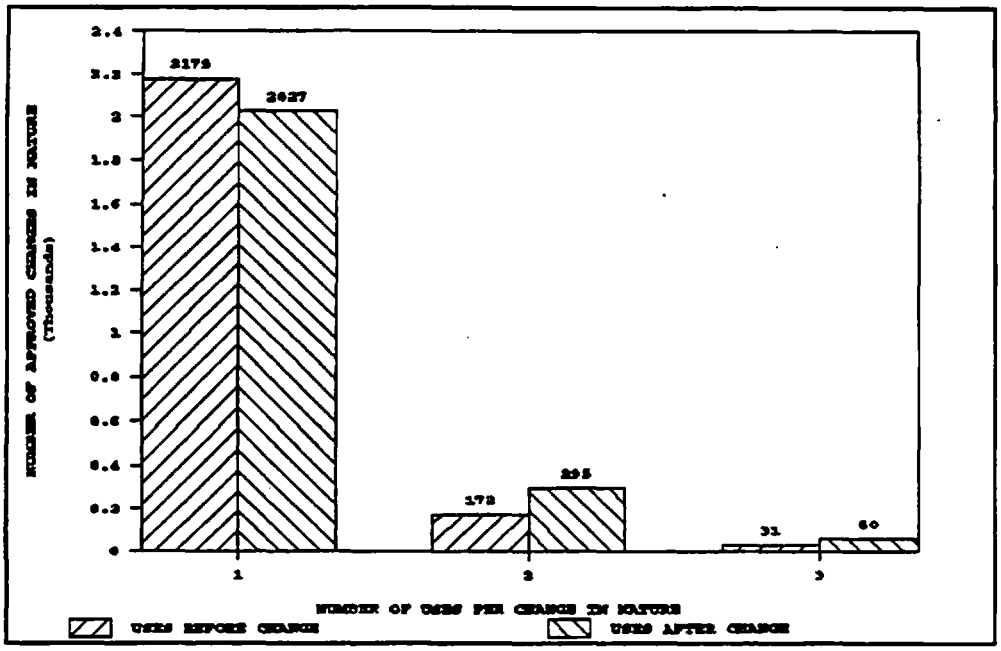


Figure 20. Comparison of the number of approved change-in-nature applications being used for 1, 2 or 3 uses before and after the transfer (1975-1987).

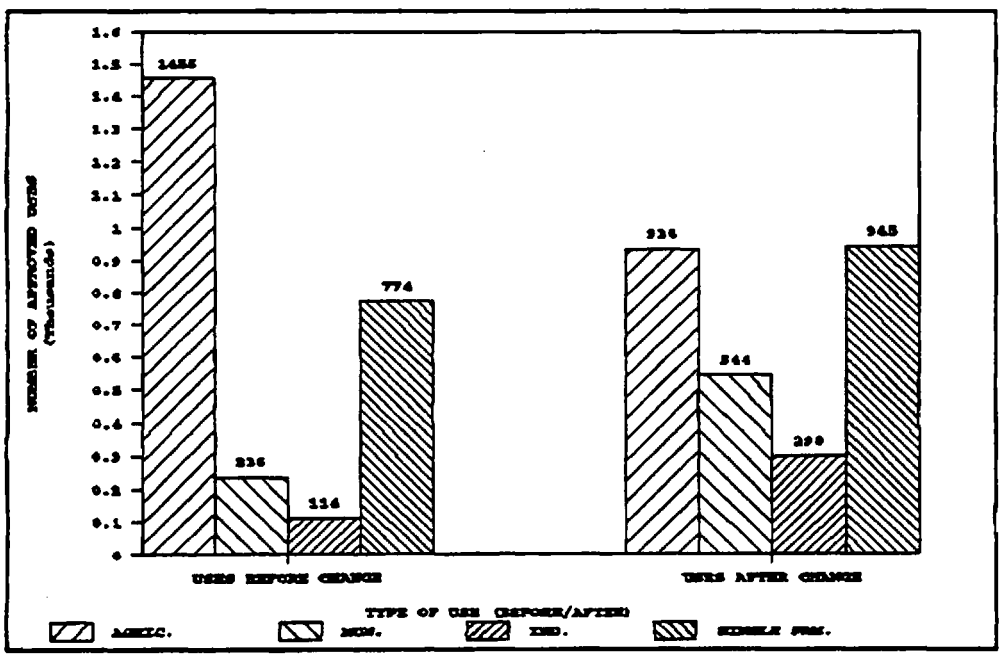


Figure 21. Comparison of the number of approved change-in-nature applications involving agricultural, municipal, industrial and/or single family use before and after transfer (1975-1987).

TABLE 17. Distribution of water source before and after the approved change for each area (1975-1987)

AREA	GW/GW	GW/SW	SW/SW	SW/GW	TOTAL
NORTHERN	136	2	102	22	262
OGDEN-WEBER RIVER	144	2	68	31	245
UTAH LAKE-JORDAN RIVER	466	7	46	34	553
EASTERN	51	1	77	14	143
SEVIER RIVER	338	4	163	86	591
SOUTHWEST	1290	17	127	24	1458
SOUTHEAST	302	2	103	3	410
TOTAL	2727	35	686	214	3662
% OF TOTAL	74	1	19	6	

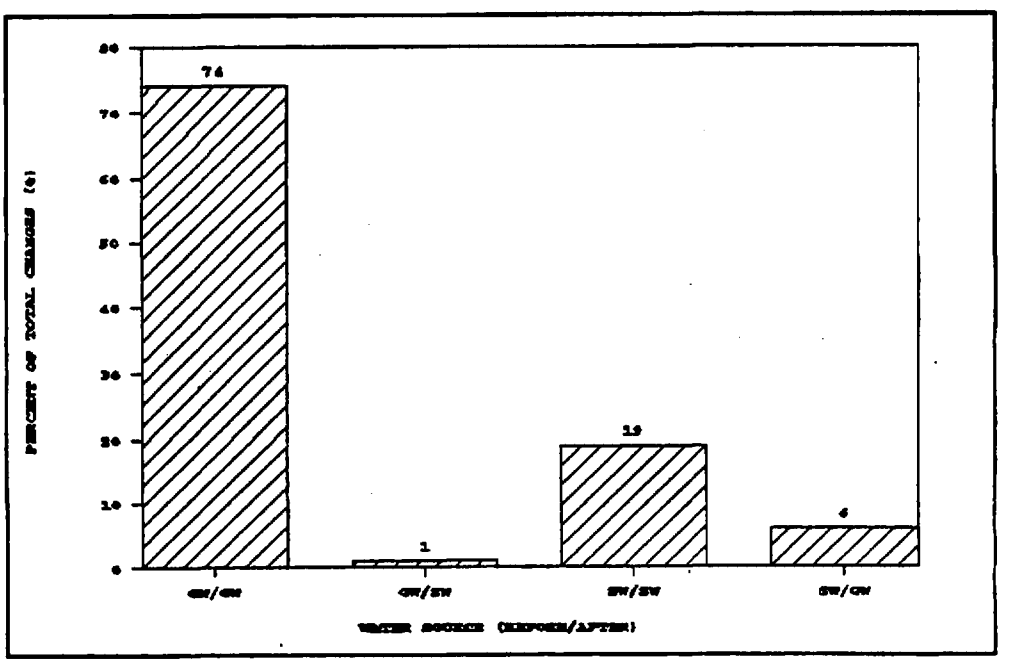


Figure 22. Distribution of water source before and after approved changes (1975-1987).

percent went from surface water to surface water sources; and 6 percent changed from surface water to groundwater. This indicates that 93 percent of all approved transfers involved the same existing and proposed types of sources. The high statewide percentage of GW/GW changes is strongly influenced by the southwest area, which had not only the highest number of change applications but also the highest percentage of GW/GW changes (88.5 percent) when compared with the other areas of the state. This gives an indication of the southwest area's dependence on groundwater.

Table 18 shows a relationship similar to Table 17 except that the existing and proposed water source is tabulated for each year during the study period. Trends in this table show that groundwater to groundwater transfers have generally decreased in percentage of approved changes since 1981, while surface water to surface water transfers and surface water to groundwater transfers have generally been above the period average since 1981. Very little trend was apparent in the groundwater to surface water transfers since there are so few in this data base. The biggest change occurred in 1983 when groundwater to groundwater transfers dropped 11.5 percent below the previous year, and surface water to surface water transfers increased 14.4 percent for the same period, which may be closely related to the wet climate in 1983. These relationships can be seen graphically in Figure 23.

The general dominance of the groundwater to groundwater transfers in the state engineer's records may be due to the absence of the suspected significant amount of informal transfer activity. A large portion of the state's surface waters are controlled by various irrigation companies, user associations and districts.

Quantification of this type of informal transfer activity has proved to be very difficult. If this informal activity were known and combined with change data, a relative increase in the surface-water activity might result.

Exchange Applications

Exchange applications differ from change applications in that no legal change in the underlying water right need be made, based upon a separate contract between water users, subject to state engineer approval.

Time and space distribution

The total number of exchanges filed per year from 1975 to 1987 is tabulated in Table 19.

Exchange records available at the time of data retrieval account for 94.4 percent of all applications filed during the study period. These files were incorporated into the study sample. The exchange applications in this sample are quantified per area and year in Table 20. All relation-ships developed hereafter are taken from the study sample.

Similar to the change application study sample, a relatively higher percentage of all exchange application data was retrieved from more recent years. Exchange records not included in the study sample are believed to have occurred randomly across the state. The total yearly exchange applications and corresponding filings within the study sample are shown in Figure 24, with the percent of total per area in Figure 25.

The most obvious relationship shown in Table 20 and Figure 25 is that, of the 1625 applications filed, 1330 (81.9 percent) occurred within the Ogden River-Weber River area. This is due in large part to the existing institutional organization in conjunction with growing development in this

TABLE 18. Distribution of water source before and after approved changes for each year (1975-1987)

YEAR	GW/GW	GW/SW	SW/SW	SW/GW	TOTAL
1975	246	2	34	9	291
1976	214	2	56	7	279
1977	310	3	63	22	398
1978	275	1	43	13	332
1979	243	5	41	18	307
1980	218	5	42	14	279
1981	259	3	43	15	320
1982	21	3	48	28	292
1983	199	1	100	24	324
1984	124	2	54	12	192
1985	200	4	68	14	286
1986	157	3	53	29	242
1987	69	1	41	9	120
TOTAL	2727	35	686	214	3662
% OF TOTAL	74.5	1	18.7	5.8	

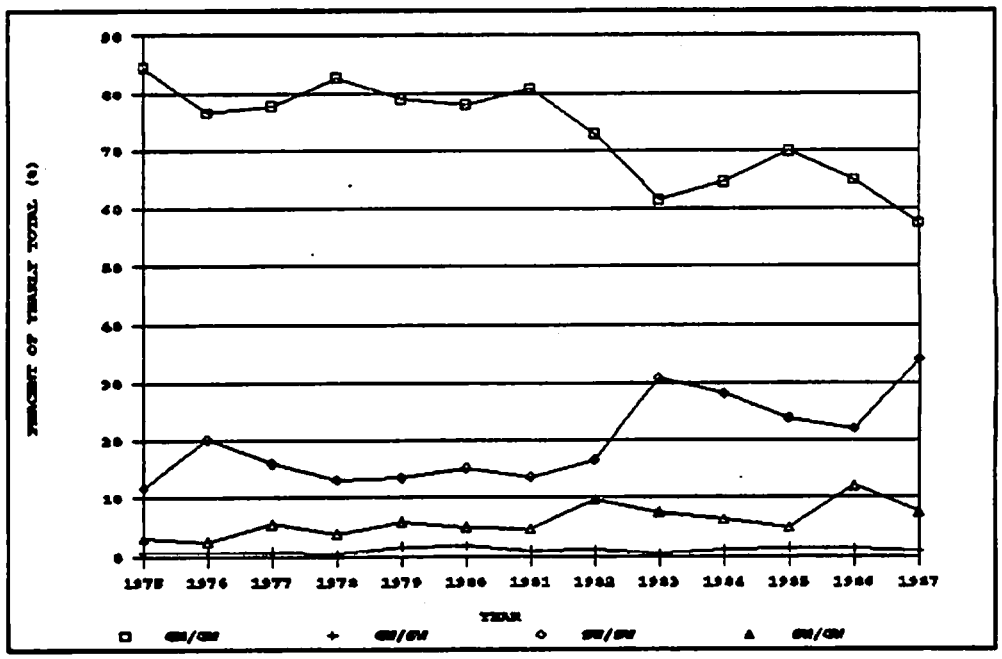


Figure 23. Comparison of the percentage of total approved-change applications falling within one of four categories of water source before and after approved transfers (1975-1987).

TABLE 19. Total exchange applications filed from 1975 to 1987

YEAR	EXCHANGE APPLIC'S
1975	99
1976	119
1977	145
1978	187
1979	235
1980	96
1981	289
1982	""128
1983	98
1984	88
1985	74
1986	74
1987	89
TOTAL	1721

TABLE 20. The total study-sample exchange applications filed in Utah per area and year (1975-1987)

	ADMINISTRATIVE SUBDIVISION							
YEAR	NORTH RIVER	OG-WEB -JORDAN	UT.LAKE RIVER	EAST RIVER	SEVIER WEST	SOUTH-EAST	SOUTH-TOTAL	YEARLY
1975	1	70	6	5	4	1	5	92
1976	1	86	9	0	5	0	6	107
1977	4	101	16	0	8	0	4	133
1978	5	151	5	1	2	1	6	171
1979	9	192	12	1	7	0	6	227
1980	2	77	4	0	2	0	7	92
1981	2	244	14	0	5	1	6	272
1982	2	99	6	1	3	1	8	120
1983	7	64	5	2	9	1	3	91
1984	2	59	10	0	12	0	3	86
1985	0	54	5	1	8	1	2	71
1986	0	60	6	0	1	0	7	74
1987	0	73	5	1	1	0	9	89
TOTAL	35	1330	103	12	67	6	72	1625
AVG/YR	2.7	102.3	7.9	0.9	5.2	0.5	5.5	125
% TOT	2.2	81.9	6.3	0.7	4.1	0.4	4.4	

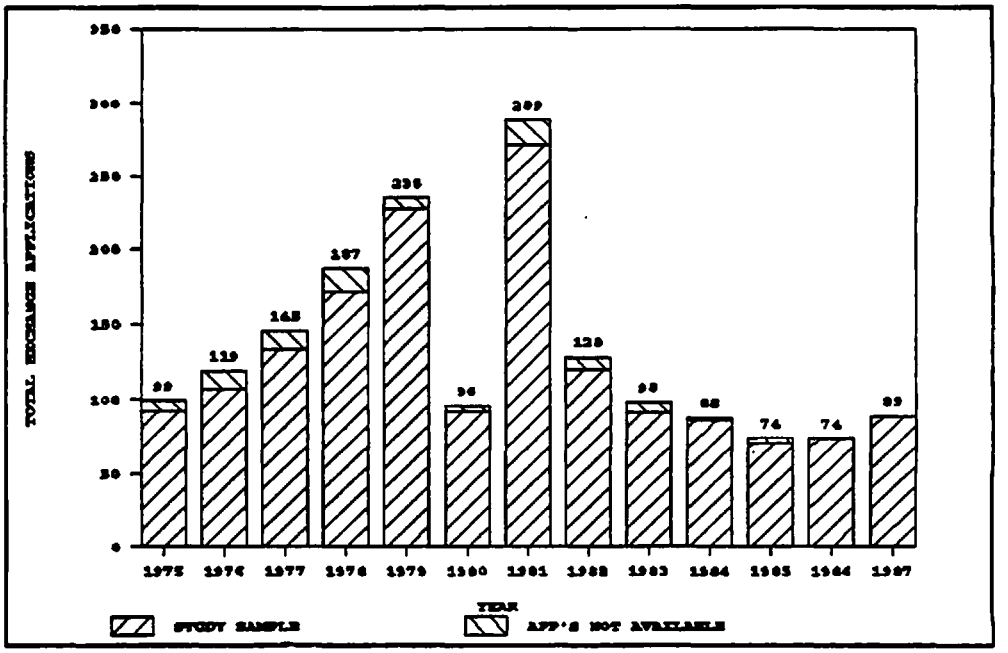


Figure 24. The total exchange applications included in study sample per year compared with the total applications filed (1975-1987).

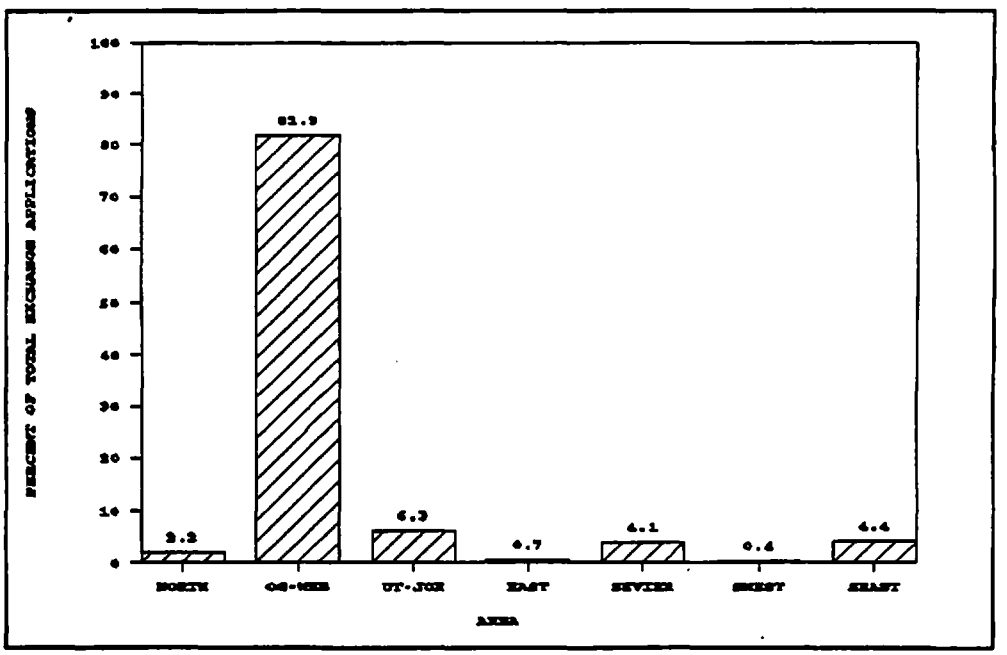


Figure 25. The percentage of total study-sample exchange applications per area (1975-1987).

mountainous region. Several large portions of water rights in this area are held by the Bureau of Reclamation which, through its Weber Basin Project, constructed several storage reservoirs. The Weber Basin Water Conservancy District was organized to administer this "project" water and,in essence, to sell it to repay construction costs from the Weber Basin Project.

An example of a typical exchange in this area is an individual, developer or community, which needs additional water, will develop a groundwater source since in many cases they are not within an existing culinary distribution system. The Bureau of Reclamation holds many of the rights to sources that are defined to be hydrologically connected to various reservoirs. Exchange applicants are, therefore, required to "replace" water drawn from their well by paying for an allotment of water to be released from a reservoir through an agreement with a conservancy district. Additional background information regarding the development and administration of this type of exchange procedure is discussed in more detail in Appendix B.

Other exchanges within the state are often driven by the need to upgrade water quality. These may involve a culinary water supplier exchanging water from a lower quality source with an irrigation company that has rights to a high-quality mountain stream. The quantities of water exchanged may not always be equal, depending on their relative value. This type of transaction can be viewed as benefitial to both parties.

The types of exchanges common to the Weber River Basin are generally identifiable by a surface water (storage or streams) source before and a groundwater (well) source after. Other exchanges on record almost exclusively involve a surface-water source before and after the exchange. The number of approved exchanges falling within these two descriptions is tabulated in Table 21. For the entire state, 86.4 percent of the exchanges involve a surface water to groundwater source transfer.

Status

The status of all exchange applications within the data-base study period and their status grouped as either approved, rejected or withdrawn and unapproved was also analyzed. These applications are organized by the year of filing and are summarized in Table 22. The approval percentage appears to decrease steadily after 1983, while those left unapproved increase steadily. This trend may be due largely to the incomplete status of the data base, which was retrieved in early 1988; since the time of data acquisition, many of the unapproved applications have been acted upon.

The average percentage of exchange applications approved during the study period was found to be 87.6 percent, while 3.7 percent were rejected or withdrawn and 8.7 percent as yet are unapproved, which is very similar to the change application approval rate. The yearly status of exchanges filed from 1975 to 1987 is shown in Figure 26. Table 23 shows the status of exchange applications for each area in the state for the 1975-1987 study period. This is shown graphically in Figure 27.

Time to decision

The time-to-decision distribution of approved exchange applications was developed by date of filing to identify yearly trends and is shown in Table 24. For the entire study period, the peak number of approvals occurred within three to six months.

A general slowing trend was experienced from 1975-1985, with the slowest

period occurring from 1983-1985. These trends are similar to the approved change relationships in Figure 15, except that recent improvement in decision time began in 1986 for exchanges rather than of 1984 as experienced by changes.

Figure 27 summarizes the percentage of exchanges approved within 6, 12, 24 and 48 months, respectively. Between 1975-1984, 6.6 percent of the filings remain undecided. For 1985, 1986 and 1987, 11.3, 13.5 and 29.2 percent of the applications, respectively, are yet to be decided upon. To prevent excessive bias towards shorter decision periods in recent yearly trends, 1987 filings were not included in Figure 27. This is due to the high percentage of unapproved applications in that year.

A relationship similar to that above for rejected exchange applications was not developed due to the small number of rejections. However, a comparison of overall time-to-decision distribution for approved and rejected exchange applications was made. This is shown in Figure 29. Nearly 43 percent of the rejected filings lacked sufficient data to be included in the distribution and are represented in the unknown category. It is apparent, however, that rejections require more time for decision.

TABLE 21. The number of approved exchanges per area from surface water to groundwater sources and surface water to surface water sources, respectively, for the period 1975 to 1987

AREA	SW/GW	SW/SW	TOTAL
NORTHERN	9	20	29
OG/WEB RIVER	1064	120	1184
UT/JORDAN	50	15	65
EASTERN	6	5	11
SEVIER RIVER	57	7	64
SOUTHWEST	5	1	6
SOUTHEAST	43	26	69
TOTAL	1229	194	1423

TABLE 22. Status of exchange applications filed in Utah from 1975 to 1987 and the percent of total for each year

YEAR	TOT. APPR	TOT. REJ/WD	TOT. UNAP.	TOT. APPLIC.	% APPR	% REJ/WD	% UNAP.
1975	87	3	2	92	94.6	3.3	2.1
1976	97	2	8	107	90.6	1.9	7.5
1977	122	1	10	133	91.7	0.8	7.5
1978	156	4	11	171	91.2	2.4	6.4
1979	190	7	30	227	83.7	3.1	13.2
1980	83	3	6	92	90.2	3.3	6.5
1981	249	7	16	272	91.5	2.6	5.9
1982	96	16	8	120	80.0	13.3	6.7
1983	84	6	1	91	92.3	6.6	1.1
1984	76	5	5	86	88.4	5.8	5.8
1985	60	3	8	71	84.5	4.2	11.3
1986	62	2	10	74	83.8	2.7	13.5
1987	61	2	26	89	68.5	2.3	29.2
TOTAL	1423	61	141	1625	87.6	3.7	8.7

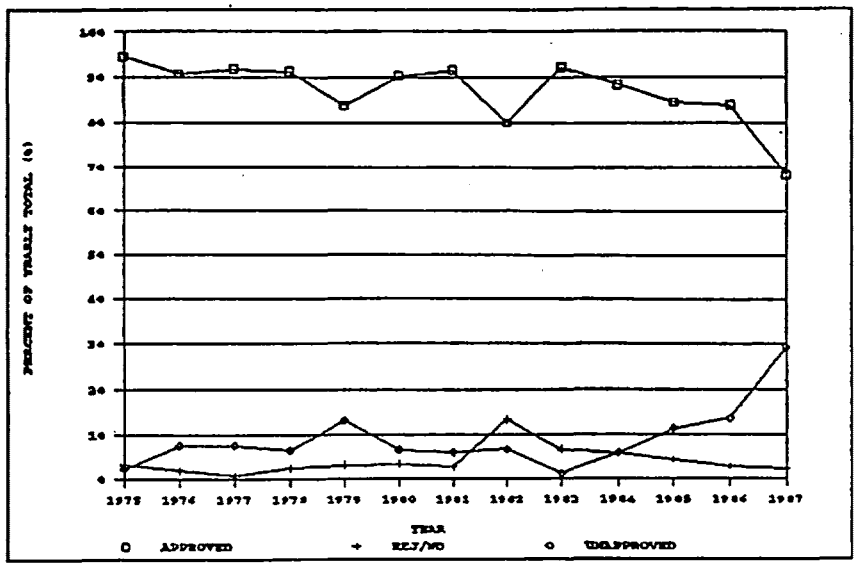


Figure 26. Status of exchange applications as percentage of total for each year from 1975 to 1987.

TABLE 23. Status of exchange applications filed in Utah from 1975 to 1987 and the percent of total for each area

AREA	APPR.	REJ/WD	UNAP. APPLIC.	TOTAL APPR.	% REJ/WD	% UNAP.	%
NORTHERN	29	5	0	34	85	15	0
OG/WEB RIV	1182	52	96	1330	89	4	7
UT/JORDAN	63	3	37	103	61	3	36
EASTERN	11	0	1	12	92	0	8
SEVIER RIV	65	0	2	67	97	0	3
SOUTHWEST	5	0	1	6	83	0	17
SOUTHEAST	68	1	4	73	93	1	6
TOTAL	1423	61	141	1625	87.6	3.7	8.7

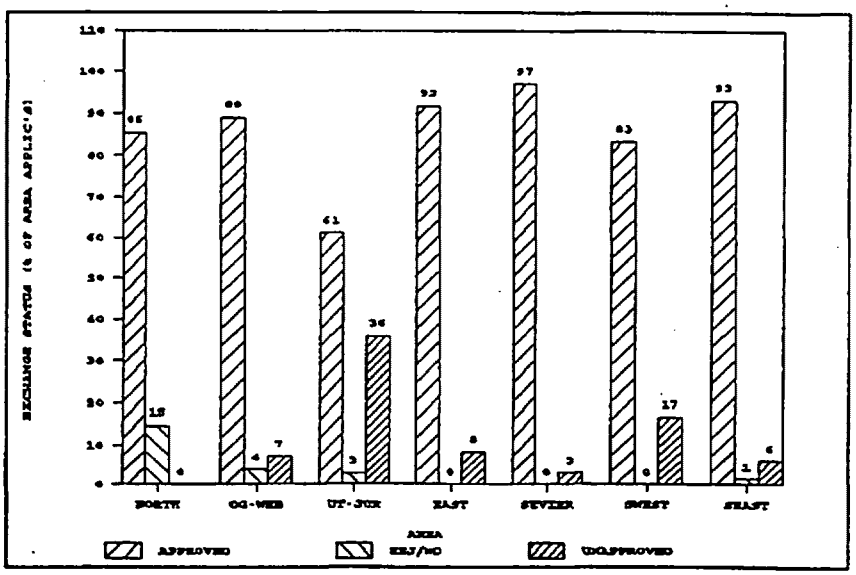


Figure 27. Status of all exchange applications as percentage of area totals for the period 1975-1987.

TABLE 24. Time-to-decision distribution of approved exchanges within the study sample organized by year of application. Approvals without sufficient time data were excluded

YEAR	TIME DISTRIBUTION (months) >0-3	>3-6	>6-12	>12-24	>24-48	>48	YEARLY TOTAL
1975	6	54	13	7	2	3	85
1976	10	63	18	3	2	0	96
1977	1	55	35	19	4	1	115
1978	1	70	47	24	7	2	151
1979	2	82	60	30	8	2	184
1980	1	37	28	11	4	0	81
1981	0	119	89	31	6	0	245
1982	2	58	25	7	0	0	92
1983	0	28	38	15	1	2	84
1984	1	23	36	11	3	0	74
1985	1	17	32	7	0	0	57
1986	3	44	13	1	0	0	61
1987	1	50	8	0	0	0	59
TOTAL	29	700	442	166	37	10	1384
% OF TOT.	2.1	50.6	31.9	12	2.7	0.7	

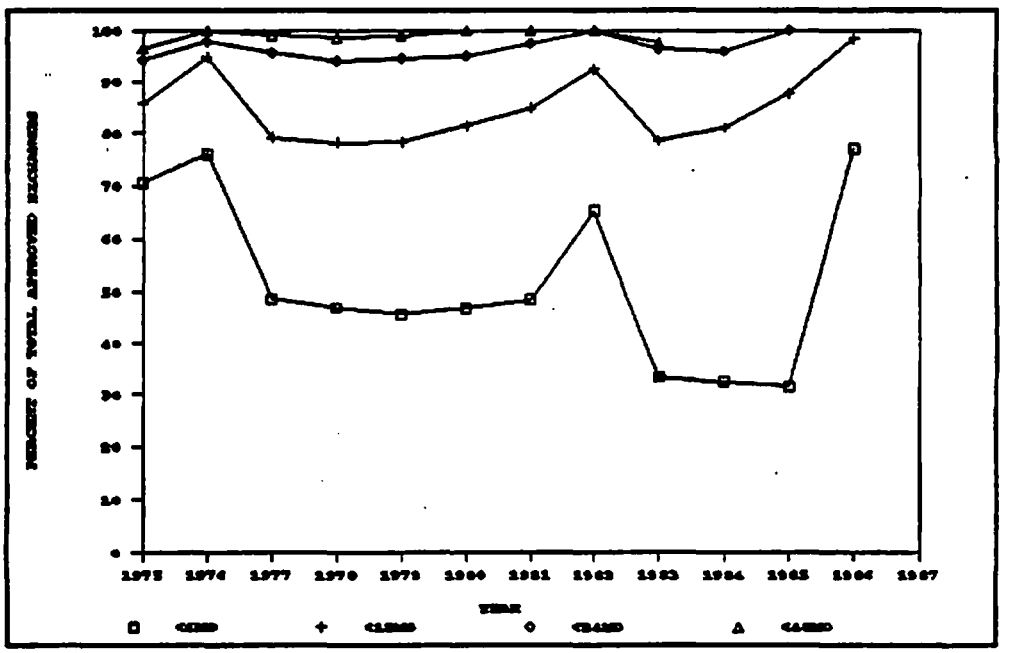


Figure 28. The percentage of all approved exchanges decided upon within 6, 12, 24 and 48 months, respectively, per year of filing.

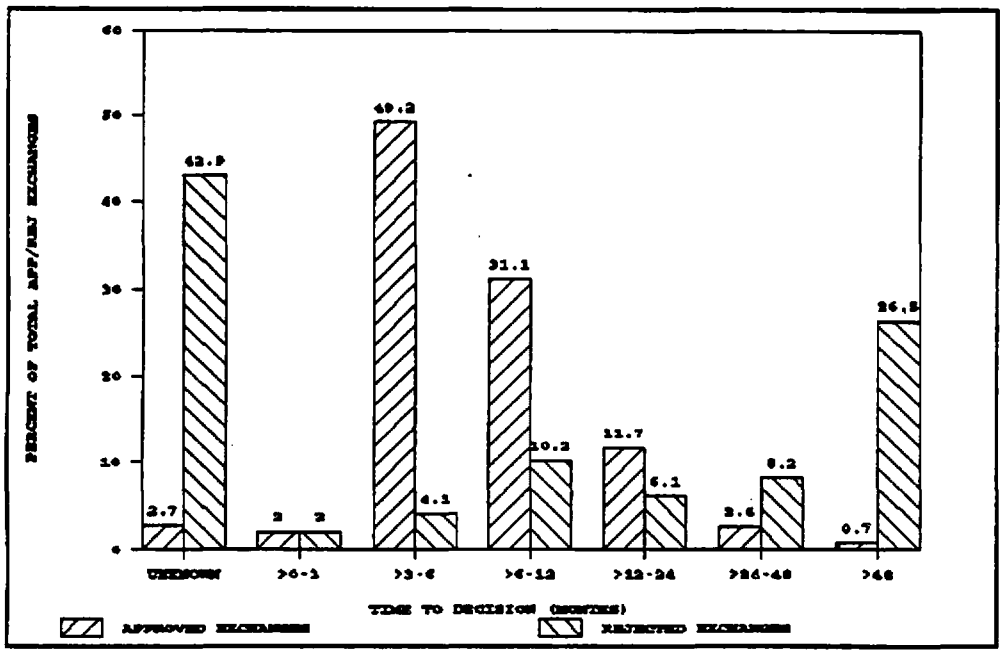


Figure 29. **Comparison of time-to-decision distribution of all approved and rejected exchanges for the study period.**

TABLE 25. Distribution of flow-rate quantities of approved exchange for each administrative subdivision from 1975 to 1987.

AREA	CFS 0-.5	>.5-1	>1-5	>5-20	>20-50	>50	AREA TOTAL
NORTHERN	3	3	7	1	0	0	14
OGDEN-WEBER RIVER	4	0	2	0	0	0	6
UTAH LAKE-JORDAN RIVER	1	0	2	0	0	0	3
EASTERN	0	0	0	0	0	0	0
SEVIER RIVER	0	0	0	0	0	0	0
SOUTHWEST	0	0	0	0	0	0	0
SOUTHEAST	0	0	0	0	0	0	0
TOTAL	8	3	11	1	0	0	23

TABLE 26. Distribution of the approved exchange quantity for each administrative subdivision from 1975 to 1987

AREA	ACRE-FEET 0-10	>10-100	>100-1K	>1K-5K	>5K-10K	>10K	AREA TOTAL
NORTHERN	32	2	1	0	0	0	35
OG/WEB RIV	1085	63	27	1	0	1	1177
UT/JORDAN	33	16	8	3	0	0	60
EASTERN	3	2	3	1	1	1	11
SEVIER RIV.	53	12	0	0	0	0	65
SOUTHWEST	3	1	1	0	0	0	5
SOUTHEAST	50	12	6	0	0	0	68
TOTAL	1259	108	46	5	1	2	1421
% OF TOT.	88.6	7.6	3.2	0.4	0.1	0.1	

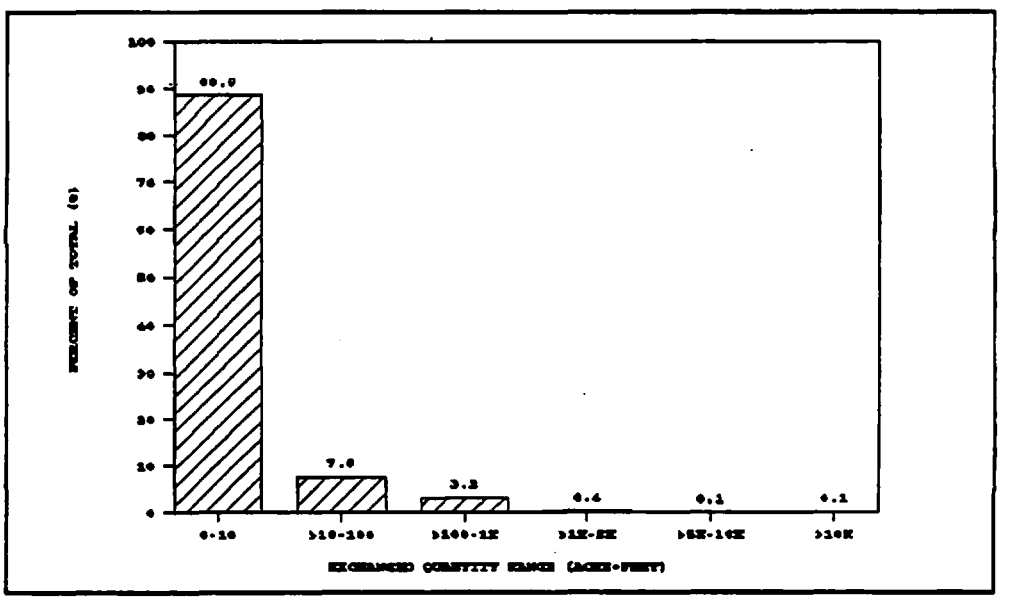


Figure 30. Percent distribution of approved exchanges within specified acre-foot quantity ranges (1975-1987).

TABLE 27. The average and median quantity of change and exchange applications and their status for Utah from 1975 to 1987

CHARACTERISTICS	APPROVED		REJECTED		WITHDRAWN		PENDING	
AVG. QUANTITY	AF	CFS	AF	CFS	AF	CFS	AF	CFS
"CHANGES"	513	4.3	464	4.2	25	111.1	164763	33.9
"EXCHANGES"	80	2.2	7	4.0	22	015	3870	1.5
MEDIAN QUANTITY								
"CHANGES"	5	0.14	14	0.65	8	1.1	8	0.22
"EXCHANGES"	1	1.8	1	1.9	2	1.015	23.3	1.24

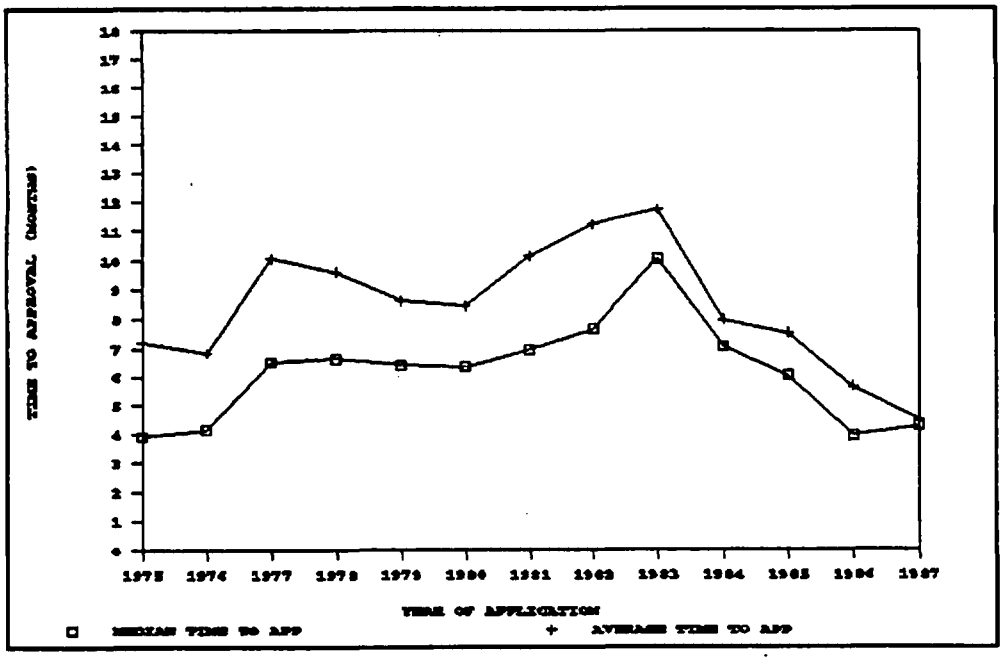


Figure 31. Average and median times to approval for all changes per year of application (1975-1987).

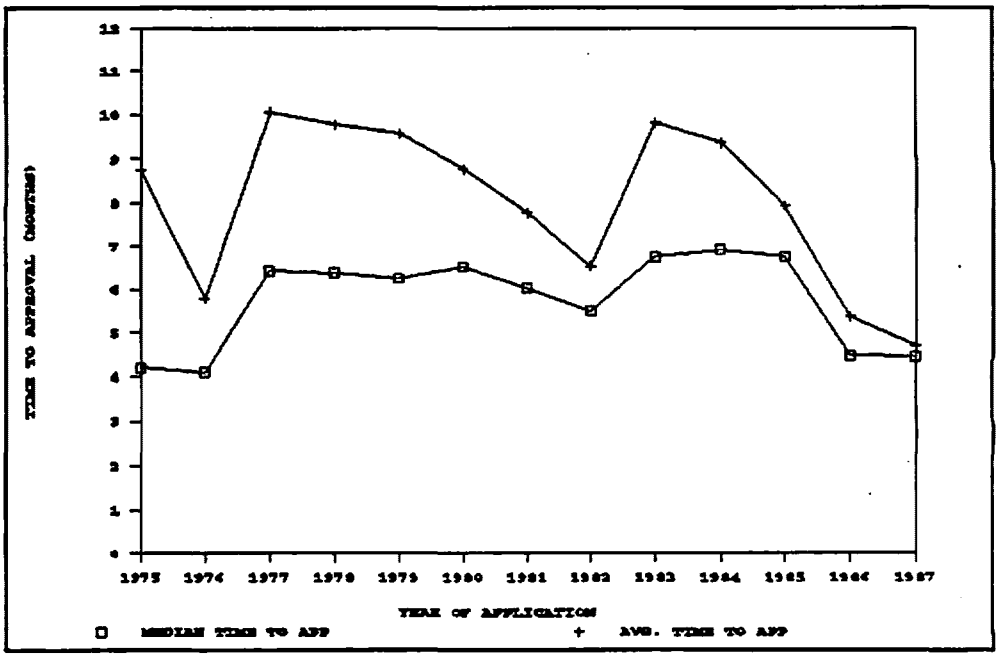


Figure 32. Average and median time to approval for all exchanges per year of application (1975-1987).

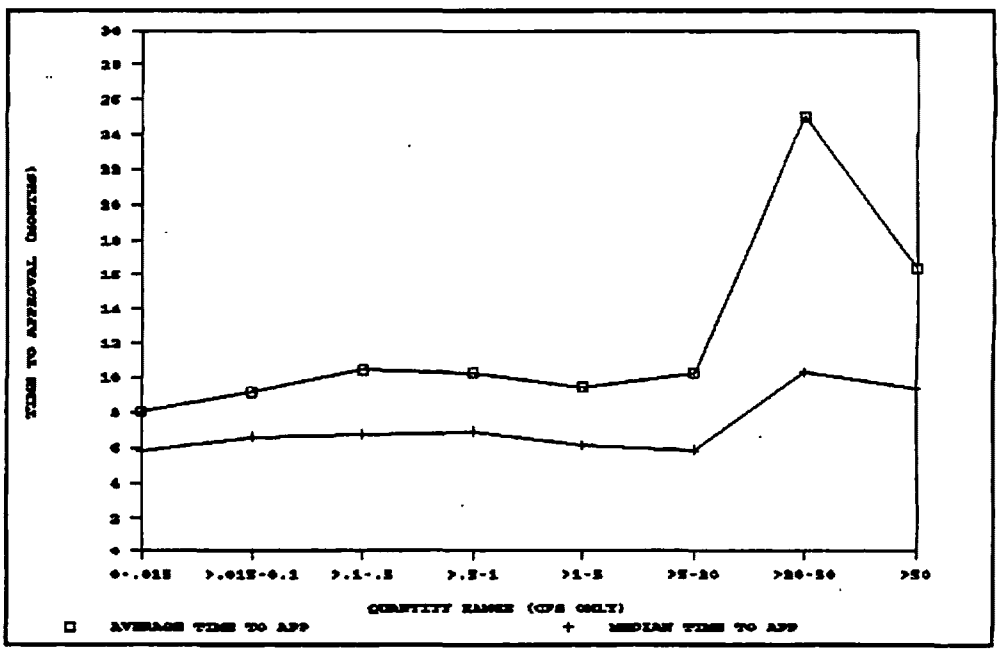


Figure 33. Average and median time to approval per cfs quantity range for changes quantified in cfs only (1975-1987).

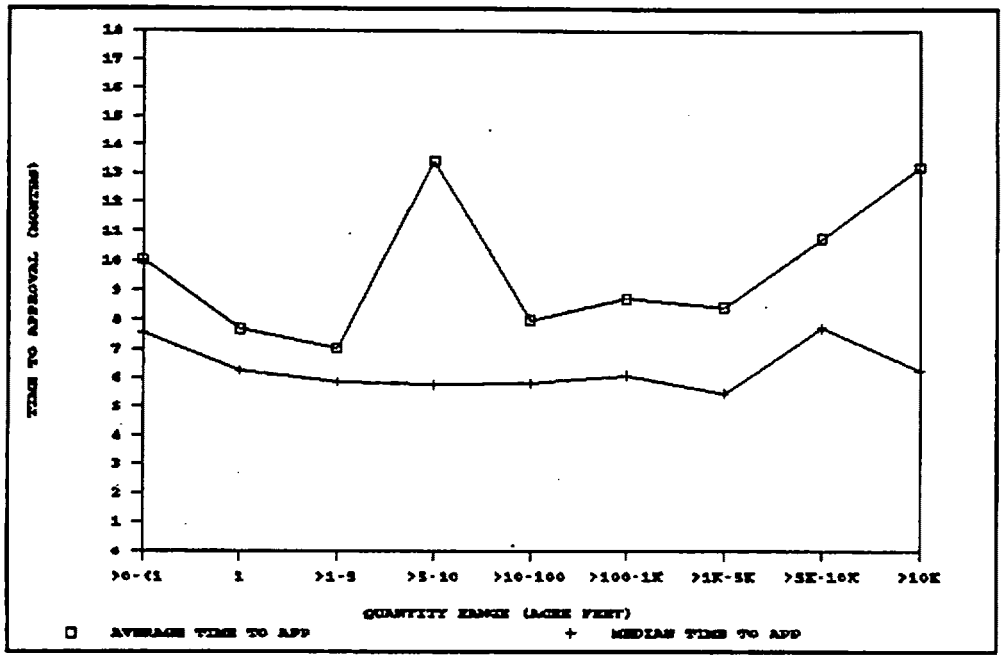


Figure 34. Average and median time to approval per acre-foot quantity range for all changes quantified in acre-feet (1975-1987).

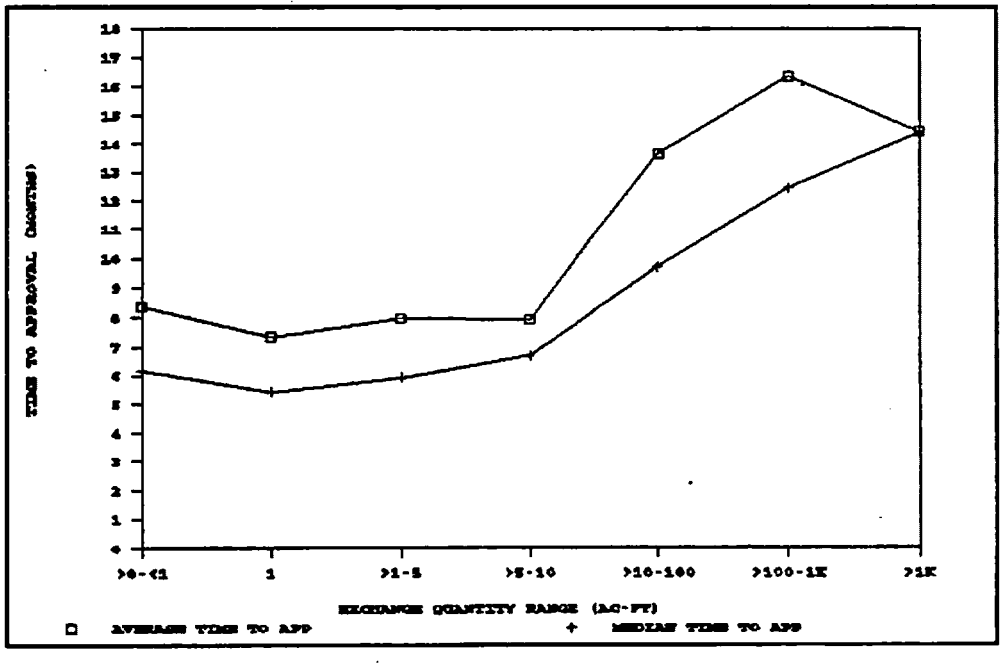


Figure 35. Average and median time to approval of exchange applications per acre-foot quantity range (1975-1987).

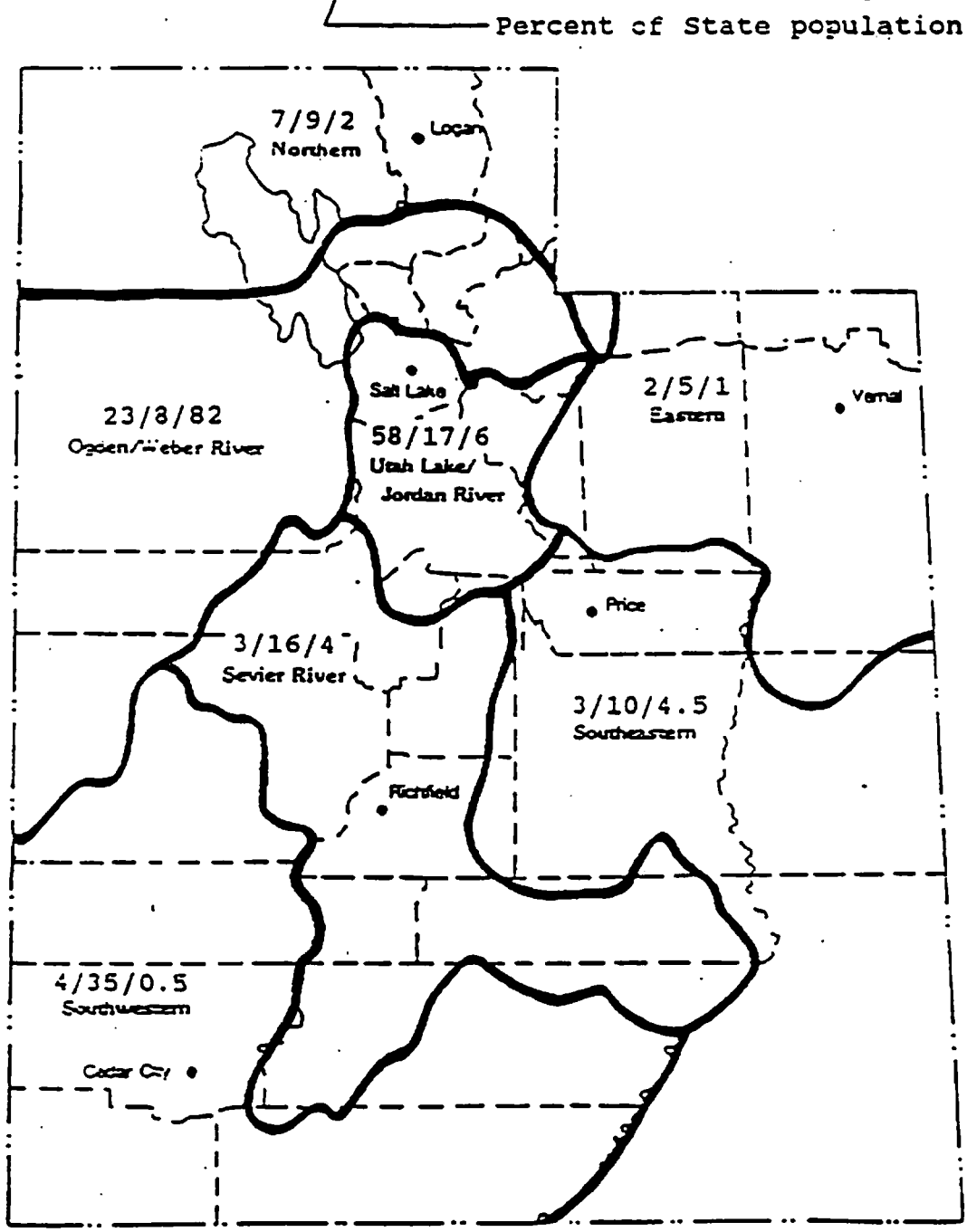


Figure 36. Approximate percentages of the entire state's population living within each of the seven waterright regions compared with the percentages of all change and exchange applications occurring within that region from 1975 to 1987.

Protests

The average percentage of exchange applications on record that were protested was 7.1 percent for the entire study period. Computer data from 1985-1987, believed to be more accurate, shows 19.7, 14.9 and 7.9 percent of yearly totals being protested, respectively. This more recent data indicate a decline in the percent of total exchange applications being protested, which is opposite to the previously discussed change-protest trends.

Quantities

The distribution of water quantities exchanged for approved applications filed between 1975-1987 is organized by administrative area and range of water quantity transferred as shown on Tables 25 and 26 for those identified in cfs only and acre-feet, respectively. Apparently, the vast majority (98.4 percent) of exchanges are quantified in acre-feet, rather than cfs, since storage rights are generally administered in acre-foot quantities. Figure 30 shows that 88.6 percent of the approved exchanges involved less than 10 acre-feet of water.

Change-Exchange Summary

Average and median analyses

To summarize the average and median quantities of water involved in change and exchange applications for the 13-year study period with relation to the application status, Table 27 was developed.

The average and median time to approval for all changes and exchanges per year are shown in Figures 31 and 32, respectively. There appears to be a period from 1977 through 1985 where both changes and exchanges required significantly greater time for approval than the years immediately preceding and following. As would be expected, the average-value ranges are more variable than median-value ranges because average values are more significantly influenced by extreme events.

Figures 33 and 34 relate the quantity ranges involved in an approved change to the time required for approval. Figure 33 relates to changes quantified in cfs only, while Figure 34 represents changes quantified in acre-feet.

A significant increase in time was required for approval of quantities greater than 20 cfs or 5000 acre-feet on the average. Since average values are more subject to extreme events the median shows less variation. The longer average time required for the 5 to 10 acre-foot range shown in Figure 34 may have been due to a few relatively extreme cases because the median values for this range remained fairly constant.

A similar relationship to that shown in Figure 34 was developed for approved-exchange applications and is shown in Figure 35 where a significant increase in time to approval for both average and median values was experienced for quantities greater than 10 acre-feet.

These relationships give an indication that larger change or exchange quantities do in general require more time to complete. The onset of the computerized record-keeping system will continue to be a positive influence in transfer turnaround time.

Population

The approximate percentage of the total state population within each of the seven administrative areas was tabulated from census (U.S. Department of Commerce 1982) and population estimates (Utah Department

of Health 1988) and compared with the percentage of change and exchange applications for the 1975 to 1987 period. This comparison is shown in Figure 36. Most noticeable in this comparison is the southwestern area, where approximately 4 percent of the entire population of the state resides, but where 35 percent of the total change applications occurred. Another prominent relationship occurs in the eastern portion of subbasin number 35 in the Ogden/Weber River area where approximately 1 percent of the state population resides and 61 percent of all exchange applications occurred. Both of the areas noted above experienced very high population growth rates during the study period, largely on the fringe of more densely-populated regions. The hydrology of these areas and their existing supply and distribution systems also appear to influence the rate of transfer activity. The institutional organization within the area also influences the likelihood of an exchange occurring over a change, with the Weber Basin exchanges as an example.

Transfer Case Studies

Case studies of specific change and exchange applications were investigated to better understand some of the factors that influence the completion of a formal transfer. Two different methods were used in choosing cases for study. The first group of cases was chosen through random-number generation from a set of change applications that had been compiled by Paul Hansen during his thesis research in 1988. The set of data from which these cases were selected generally consisted of post-1979 applications. The second method was to observe relationships developed in the change and exchange data analysis for the 1975 to 1987 study period and to investigate underlying causes. The relationships specifically targeted were transfers involving large amounts of water, those requiring more than 48 months to receive a decision and/or those being heavily protested. One limiting factor in choosing these cases was the specific file availability at the time of state water-right record research. The cases chosen may have included one or all of the above characteristics.

Case-study group 1

For the first group of cases, it was felt that the set of more recent filings would provide more accurate and relevant data. Approximately 120 potential cases were chosen at random. An introductory letter and a one-page questionnaire were drafted and sent to applicants, as shown in Appendix C. The information sought through this survey were costs borne by the applicant for filing, professional services, construction, the approximate value of uncompensated time put in by the applicant and the types of protests filed regarding the application.

A total of 31 responses to the questionnaire (approximately 26 percent) were returned. The areal distribution of cases coming from these responses is identified in Figure 37. The acquired information was supplemented with data retrieved from state water-right records and is summarized in Table 28. These cases are grouped into protested and non-protested applications. It is interesting to note that 100 percent of these applications involved a change in nature of use.

The range of costs incurred for each of the cases, separated into fees for filing, title search, attorneys, engineers, surveyors and structures built, are also given. A zero indicates that either no cost was incurred or cost was unknown.

As transfer applications are considered, the state engineer is making some effort to quantify the transferred right in acre-feet if not so previously identified

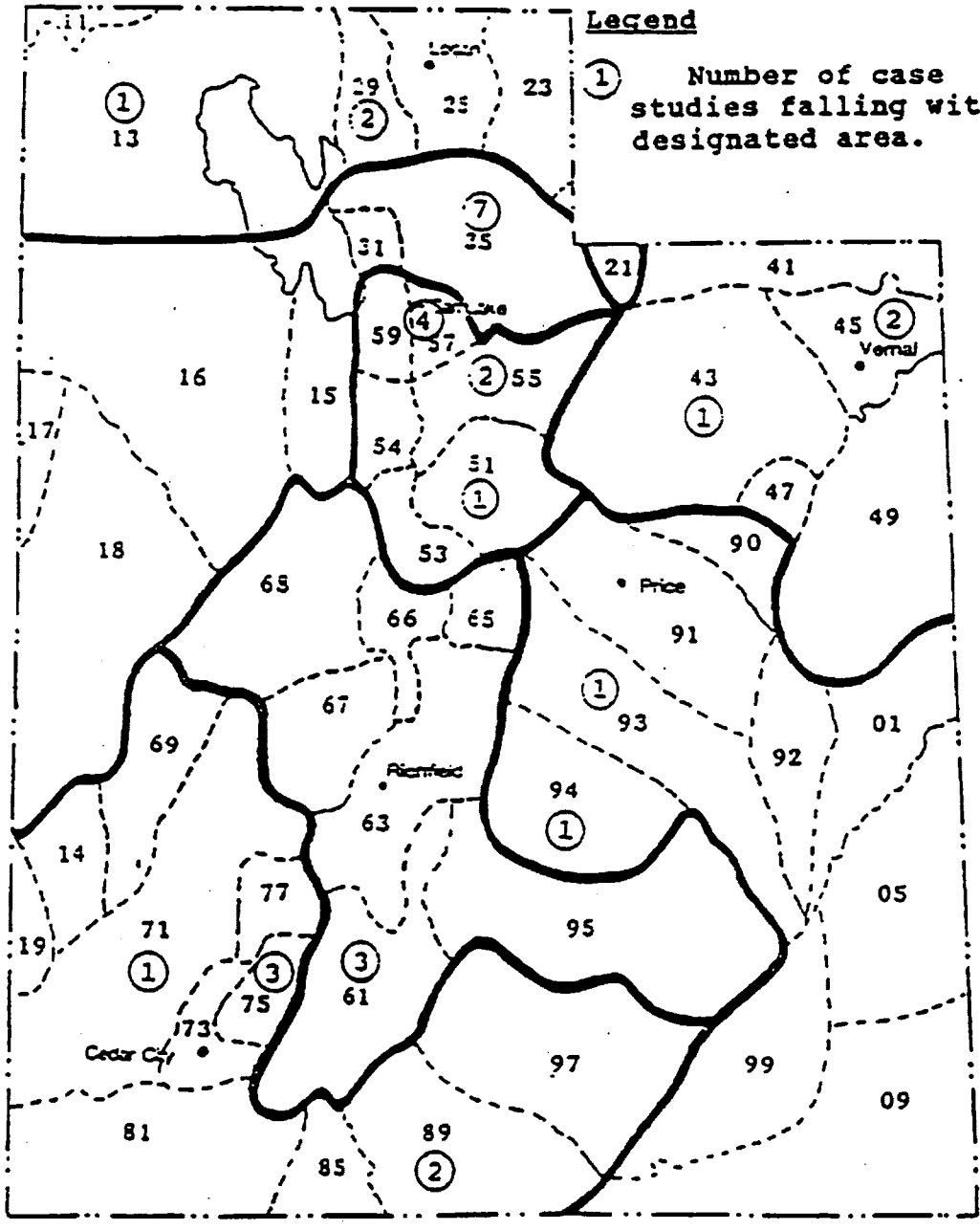


Figure 37. The areal distribution of randomly-selected case studies.

Table 28. Random "change" case-study summary.

APPLICANT TYPE	WATER RIGHT NO.	APPLIC NUMBER	CHANGE TYPE (PT/PL/N)	PROTEST YES/NO	TIME TO DEC. (MONTHS)	STATUS	NATURE OF USE EXISTING	NATURE OF USE PROPOSED	SOURCE BEF/AFT	AF2	CFS2	COSTS FIL	TTL	ATT	ENG	SUR	STR	APPROX UNCOMP COST
P	75-1512	a8714	CCC	NO	6.3	APP	AG	MUN,<AG	GW/GW	4	0	1	0	0	0	0	0	54000
D	89-1267	a10708	CCC	NO	11	APP	AG	MUN,<AG	GW/SW	11.3	0.043	1	0	0	0	0	0	
D	89-1266	a10709	CCC	NO	11	APP	AG	MUN,<AG	GW/SW	11.3	0.043	1	0	0	0	0	0	
P	75-3591	a11783	SCC	NO	7.8	APP	AG,SF	MUN	GW/GW	17.52	0	1	0	0	0	0	0	200
CP	13-2147	a12585	SCC	NO	7.3	APP	AG	MUN,IND	GW/GW	607	1.84	1	0	2A	1A	0	0	
WC	45-5109	a12848	CSC	NO	10.1	APP	AG,SF	MUN	SW/SW	1257.6	1.72	1	1	1A	1A	1A	0	
M	57-208	a12919	CSC	NO	18.7	APP	AG,SF	MUN	GW/GW	3006.9	4.373	1	0	0	0	0	0	
G	75-1566	a13287	CCC	NO	4.1	APP	AG	MUN	SW/SW	203.2	0	1	0	0	0	0	0	
M	43-3409	a13680	CSC	NO	4.9	APP	MUN	MUN	GW/GW	614.65	0.849	1	0	0	2B	0	0	
CP	71-3186	a14323	CCC	NO	3.3	APP	SF	SF,AG	GW/GW	0.25	0	1	0	0	0	0	0	
P	51-6045	a14407	CCC	NO	3.9	APP	AG	MUN,<AG	GW/GW	5.52	0.045	1	1	1A	1A	1A	0	200
P	61-1335	a14437	CSC	NO	9	APP	MUN	MUN	GW/GW	28.8	0.16	1	1	2A	2B	0	1A	3120
D	29-1560	a14456	CSC	NO	?	APP	AG	MUN	SW/SW	1.4	0.015	1	1	1A	1A	1A	2C	
G	93-952	a14198	CCC	NO	?	UNAP	AG	MUN,<AG	SW/SW	100000	0	2	1	1A	2B	1A	0	
P	55-4671	a14344	SSC	NO	?	UNAP	SF	SF	GW/GW	0	0.015	1	0	0	1A	0	0	576
M	35-5518	a14494	CCC	NO	?	UNAP	AG	MUN	SW/SW	697.55	2.18	2	1	1A	1A	1A	0	
D	29-1560	a11147	SSC	NO	3.7	WD	AG	MUN	SW/SW	0	0.015	1	1	1A	1A	1A	2C	
P	61-961	a9866	CCC	YES	11.6	CERT	AG	MUN,<AG	SW/GW	2	0.016	1	0	0	0	0	0	400
P	35-AREA	a10162	CCC	YES	10.9	APP	AG	MUN,<AG	SW/SW	0	0.25	1	0	0	0	0	0	10000
P	55-7087	a10783	CCC	YES	5.8	APP	AG	MUN,<AG	SW/GW	0	0.314	1	0	1A	0	1A	0	0
WC	35-8460	a10868	CCC	YES	12	APP	AG	MUN,<AG	SW/GW	160.7	0	1	0	0	0	0	0	
WC	35-8485	a10918	CCC	YES	10.9	APP	AG	MUN	SW/GW	17.14	0	1	0	0	0	0	0	
WC	35-8472	a10919	CCC	YES	10.9	APP	AG	MUN	SW/GW	35	0	1	0	0	0	0	0	
WC	35-8484	a10998	CCC	YES	7.3	APP	AG	MUN	SW/GW	111.43	0	1	0	0	0	0	0	
P	61-800	a12334	SSC	YES	?	APP	MUN	MUN	GW/GW	19.842	0.0551	1	0	0	1A	0	2C	1000
WC	45-2072	a13764	CSC	YES	10.2	APP	AG	MUN	GW/GW	560	0	1	0	0	1A	0	0	
WC	94-12	a14388	CSC	YES	9	APP	AG,MUN	AG,MUN,IND	SW/SW	9407.6	0	1	0	0	1A	0	0	
P	35-8208	a14426	SSC	YES	8.3	APP	AG,MUN	>MUN,<AG	SW/SW	4.5	0.02	1	0	0	1A	0	2C	6500
M	57-4082	a14250	CCC	YES	?	UNAP	AG	MUN	GW/GW	0	0.14	1	0	1A	0	0	0	
M	57-4081	a14256	CCC	YES	?	UNAP	AG	MUN	GW/GW	0	0.111	1	0	1A	0	0	0	
M	57-4080	a14257	CCC	YES	22.9	WD	IND	MUN	GW/GW	0	0.124	1	0	1A	0	0	0	

LEGEND:

Applicant Type:
- P = Private
- D = Developer
- CP = Corporation
- WC = Water Company
- M = Municipality
- G = Government

Change Type:
- C = Change Requested
- S = Same (no change)
- PT = Change in point of div.
- PL = Change in place of use
- N = Change in nature of use

Status:
- APP = Approved
- UNAP = Unapproved (pending)
- WD = Withdrawn
- CERT = Certificated

Nature of Use:
- AG = Agriculture
- MUN = Municipal
- IND = Industrial
- SF = Single Family

Source:
- GW = Groundwater
- SW = Surface Water

Costs:
- FIL = Filing fees
- TTL = Title search
- ATT = Attorney fees
- ENG = Engineer fees
- SUR = Surveyor fees
- STR = Structural costs
- 1 = $0 - $100
- 2 = $101 - $450
- 1A = $0 - $1000
- 2A = $1001 - $2500
- 2B = $1001 - $5000
- 2C = $1001 - $10000

(Morgan 1989). This practice is evident in these cases where six of the 24 approved applications involved the addition of an acre-foot designation when compared with the water-right quantification before the change.

Table 29 is given to summarize case-study facts and trends regarding the approved application protest rate, time to decision, nature of use and water source before and after the transfer. All applications involving agriculture decreased the amount of water designated for agriculture.

Case-study group 2

Following the second line of reasoning previously discussed, an additional set of seven case studies were investigated to identify the most common reasons for protests of transfer applications. The reasoning and priorities considered by the state engineer were also researched in these cases to gain a broader insight into how transfer applications are investigated and decided. Each of the seven cases is described in detail on the following pages.

Case study #1.
Change applic.: a12848
Filing Date: 7-8-83
Water Right No.: 45-5109
Status Date: 5-31-85
No. of Protests: 5
Status: Approved

The Ashley Upper Irrigation Company filed a change application affecting the point of diversion and nature of use of 1.72 cfs or 1257.606 acre-feet of water. The water had been used from April 1 through October 31 for the supplemental irrigation of 11,308.89 acres, from November 1 to March 31 for the domestic purposes of 55 families and year-round stock watering of 3,000 cattle and horses, 4000 sheep, 500 pigs and 2000 chickens.

Hereafter, it is proposed to divert the previously- mentioned quantity of water from Ashley Springs and use year-round for municipal and industrial purposes within the Ashley Valley Water and Sewer Improvement District.

The application was advertised as required by law in the local newspaper between September 28 and October 12, 1983.

Five protests were filed and their reasons are summarized below:

1. Vernal City, the United States Bureau of Reclamation, Uintah Water Conservancy District and George Merkeley protested possible impairment of their existing rights to direct flow and storage from Ashley Springs, which this transfer could cause.

2. The Utah Division of Wildlife Resources expressed concerns regarding the minimum flows necessary to protect fishery resources downstream from Ashley Springs.

A hearing concerning this change application was held on January 13, 1984. When taking irrigated acreage out of production to convert to domestic uses, the state engineer considers the following:

1. Historical and expected future diversion and hydrologic system depletion under the original and proposed rights.

2. No enlargement of the right.

3. Protection of existing water rights from impairment.

Studies by the state engineer's office showed that, under existing irrigation practices, 50 percent of the 3.7 acre-feet per

acre allotment of irrigation water in this area would be lost or depleted from the hydrologic system through evaporation. Conveyance losses for domestic use were estimated to be negligible, which in effect resulted in less return flow to the local hydrologic system.

Approximately 1.20 acre-feet was expected to be diverted for each residential connection to supply domestic and lawn-watering needs. Estimates of consumptive domestic use requirements per family were 0.45 acre-feet per year. Consumptive irrigation requirements indicated a 1.85 acre-foot/acre depletion from the hydrologic system. For an assumed 0.25 acre of lawn per family, approximately 0.45 acre-feet would be depleted. Total consumptive use for domestic and lawn watering would then be 0.90 acre-feet or, in other words, 75 percent of the 1.20 acre-foot diversion. Therefore, to have the depletion of water under the original irrigation use equal the depletion under the proposed municipal use, the new municipal diversion would have to equal 0.5/0.75 or two-thirds of the original irrigation diversion.

This application was initially approved on May 10, 1984.

On May 30, 1984, the Uintah Water Conservancy District petitioned for a rehearing of the state engineer's decision concerning this change application. This request was granted on July 10, 1984, and a rehearing held August 28, 1984. Additional hydrologic data were presented and investigated, and the state engineer determined that potential impairment of the Utah Water Conservancy District rights could occur. Since water under the irrigation company's right was available only between April 1 and October 31, the state engineer modified his previous decision and added the condition that this change application be approved, subject to the period of use requirements in the original right.

The application was approved on May 31, 1985, subject to the following conditions:

1. The quantity of water diverted may not exceed two-thirds of the quantity that could have been diverted under the original irrigation right.

2. The diversion of water is limited to the period April 1 to October 31.

3. Diversion periods and works should be controlled to prevent adverse affects on prior rights. Plans for diversion works must be approved by state engineer.

4. Maps identifying acreage no longer served because of this change shall be provided to the state engineer.

5. The applicant shall install measuring devices and keep records to ensure proper distribution of water. This decision was dated May 31, 1985.

Case study #2.

Change applic.: a13077
Filing Date: 12-30-83
Water Right No.: 57-3411
Status Date: 12-26-85
No. of protests: 1
Status: - Approved
- Appealed by protestant
- Approval overturned
- Appealed by applicant
- Pending

The Draper Irrigation Company and the Salt Lake County Water Conservancy District proposed to change the point of diversion place and nature of use of 9559.5 acre-feet of water with this change

TABLE 29. Case-study summary of protests, time to decision, nature of use and water sources involved

PROTEST-TIME RATE	Protested	Not Protested
Percent of approved changes	46	54
Avg. time to decision (mo.)	9.7	8.1

NATURE OF USE	Percent of Total Existing	Proposed
Agriculture	83	46**
Single Family domestic	13	4
Municipal	21	96
Industrial	0	8

WATER SOURCE (Existing/Proposed)	Percent of Total
Groundwater/Groundwater	42
Surface Water/Surf. Water	25
Groundwater/Surf. Water	8
Surf. Water/Groundwater	25

** In all cases, the use after change involved a significantly lesser amount of agricultural use.

application. The water was used for domestic municipal, storage, industrial, stock watering and irrigation purposes.

It was hereafter proposed to divert 9559.5 acre-feet from the same sources and same flow rates as heretofore but diverted from new locations. The nature of use of the water in question would include similar year-round uses while diminishing the amount of irrigated acreage.

The application was protested by Stanley Bonham for the following reasons:

1. Threat to life and property brought about by uncontrolled, excessive runoff from the present system of the applicant over property belonging to the protestant.

2. The environmental or other impact of this approval upon the properties included in the application or adjoining landowners.

3. The effect upon present easements and/or lack of necessary additional easements to accommodate changes.

This case is unique becuase it demonstrates which issues the state engineer is obligated to consider with respect to water-right transfers. First, Mr. Bonham did not hold a water right

which, precedence indicated, was necessary to file a protest of impairment. Second, the threat to life and property or public interest concerns were previously only an issue in new appropriations but not in transfer statutory law (Utah Code Annotated 1989, p.64).

The state engineer approved the change since he felt that he was without authority relative to damages which may have been sustained due to this change and that he was not aware of evidence indicating possible water-right impairment.

The state engineer's decision was overturned by the courts which, as a result, now require consideration of public interest or third-party effects for all water-right transfer applications. This court decision is presently being appealed. If the present court decision stands, the scope of what the state engineer must consider in transfer applications would be broadened considerably.

Case study #3.

Change applic's: a9236 a9237 a9238
Filing Date: 1-10-77
Water Right No.'s: 91-131 91-130 91-132
Status Date: 1-7-85
# of Protests: 21
Status: Approved

The above applications were filed by the Sanpete County Water Conservancy District. Applications were filed to amend points of diversion, place and nature of use of these three applications involving 30 cfs from Cabin Hollow Creek, 17,000 acre-feet from Gooseberry Creek and 130 cfs from Gooseberry Creek for applications a9237, a9236 and a9238, respectively.

Hereafter, the water under the above application numbers was to be stored in the proposed Narrows Reservoir with a storage capacity of 17,000 acre-feet. The intended use for the water is for municipal, industrial and supplemental irrigation of 30,000 acres of land within the boundaries of the Sanpete County Water Conservancy District.

All three applications were protested by of 21 individuals and organizations.

A hearing regarding these applications and protests was held by the state engineer on September 14, 1981. At this time, the protestants stated that approval of these applications would interfere with existing water rights on the Price River. The necessary diligence in pursuing the project was also questioned.

State engineer studies, along with investigations made by the applicant and the protestants, were considered to better determine the water resources of the Price River and its tributaries involved in this interbasin transfer. The state engineer reviewed the lengthy history of litigation and the sensitive nature of issues surrounding these applications and strongly advised that the best interest of all parties would be served if an agreement could be reached in this matter. Consequently, on July 19, 1983, the state engineer met with representatives of the Sanpete County Water Conservancy District and the Price River Water Users Association and Carbon Water Conservancy District (two of the major protestants) and proposed a settlement believed to be equitable to all parties.

An agreement was reached and signed on June 8, 1984, between the three above-mentioned parties. This agreement was also approved on June 28, 1984, by the USBR. Following this, an additional agreement was made between the Division of Wildlife Resources and the conservancy district regarding minimum stream flows and allowances to maintain acceptable stream-

flow temperatures for fishery protection purposes.

The terms of the agreements that were included in the state engineer's memorandum decision as conditions of approval on January 7, 1985, are given below.

1. A maximum 5400 acre-foot transmountain diversion shall be allowed in any given year.

2. The total active storage capacity of the Narrows River Reservoir shall not exceed 14,500 acre-feet.

3. No diversion of the water shall be made from Cabin Hollow Creek.

4. Minimum streamflows were set for water year-round in Gooseberry Creek immediately downstream of the Narrows Dam.

5. The outlet works of the proposed dam were to be constructed so that diversion from various elevations in the reservoir would optimize water temperature of reservoir releases.

6. Approved measuring devices shall be installed and maintained to properly control the administration and distribution of water under these applications. These devices shall be approved by the state engineer.

7. Plans and specifications for the dam/reservoir shall be submitted to the state engineer for approval prior to construction.

This decision is an example of the position that the state engineer takes in providing compromises for complicated transfers.

Case study #4.

Change applic: a8714
Filing Date: 12-22-75
Water Right No.: 75-1512
Status Date: 6-30-76
No. of Protests: 2
Status: Approved

This change application involved altering the point, place and nature of 4 acre-feet diverted from two wells used from April 1 to October 31 for irrigation of one acre.

Hereafter, the 4 acre-feet were to be diverted from an eight-inch well at the new location for the domestic use of five families and stock watering of 13 horses.

The point to be made from this case study is that the protestants were concerned not so much about this particular change but for the precedent that it might set for future development. Concern was also voiced that water from the proposed well area might feed the spring source of domestic supply for the town of Paragonah and for the Paragonah Canal Company.

The application was approved on June 30, 1976. The state engineer explained that the granting of an application does not set precedence or policy; and since he can approve this type of change application with certain requirements, an effort must be made by all water users to allow the fullest and most beneficial use of this natural resource. The state engineer also believed that this amount of water would have a negligible effect on prior rights.

Case study #5.

Change applic.: a10868
Filing Date: 7-31-79
Water Right No.: 25-8460
Status Date: 8-1-80

No. of Protests: 2
Status: Approved

The proposed change application involved the change in point of diversion, place, and nature of use of 1.25 cfs (high-flow years), 0.81 cfs (low-flow years) or 264.35 acre-feet diverted from Summit Creek for stock watering of 100 cattle and irrigation of 75 acres between April 1 and October 31 annually.

Hereafter, the above-mentioned quantity was to be diverted from an existing eight-inch well owned by the Utah Department to Transportation for domestic uses of 193 families and stock watering of 100 cattle.

Protests were made by Gorgosa Pines Ranch and a private individual; a hearing was held on March 6, 1980. The protests were regarding the potential impairment on existing water rights in the area. Also of concern for Gorgosa Pines Ranch was that they had also filed change applications with intentions to use the same well that applied for in this application. The argument was made that the Gorgosa Pines Ranch which had made application just prior to the Summit Water Distribution Company, therefore felt that priority to use of this water source should be theirs. It was later explained that the right to use someone's private property was dependent upon an express agreement between the owner and renter of the property and that this agreement had been made between Summit Water Distribution Company and the Utah Department of Transportation.

This application was approved by the state engineer on August 1, 1980, with the following reasoning regarding the transferable amount.

A duty of 3 acre-feet per acre of irrigated land has previously been established for this area. The 75 acres in question would, therefore, require 225 acre-feet of water. Using the 1977 and 1978 irrigating seasons as representative of low-flow and high-flow years, the state engineer determined that 2/7 of the time, water was cut from post-1882 priority rights and held a post-1882 priority. The application was approved, subject to allowing only 5/7 of the 3 acre-foot per acre duty to be changed, a quantity of 160.7 acre-feet. It was also required that a totalizing meter be installed for regular inspection by the river commissioner.

Case study #6.

Exchange applic.: e2209
Filing Date: 7-27-83
Water Right #: 63-AREA
Status Date: 12-31-87
# of Protests: 2
Status: Approved

This exchange application was filed by a private individual who wished to exchange 12.5 acre-feet of water by virtue of ownership of 5 shares of stock in the Brooklyn Canal Company.

The original source of the right was the Sevier River, and this water was to remain in the river and be replaced through diversion from 9 separate wells. The application requested that this water be used for domestic purposes of 9 families and irrigation of 2.25 acres of land and stockwatering of 18 horses. This application was protested by the DMADC Company and Brooklyn Canal Company. A hearing was held on January 18, 1984, to discuss the protestants' concerns. The applicant had purchased the water stock in the Canal Company from a private party and, based on an average of 2.5 acre-feet per share, intended to pump this amount from 9

separate wells in the subdivision. The concerns of the protestants focused on whether this exchange could result in an enlargement of the originally decreed surface right and impair existing rights. The Brooklyn Canal Company also was concerned that 5 shares being divided 9 different ways would result in less than 1-share units required by company policy.

Resolutions of these concerns were handled in the following manner. The applicant agreed to maintain ownership of the shares of stock in his name and, therefore, pay assessments allocated to the Canal Company. In the opinion of the state engineer, the water represented by the aforementioned stock could remain in storage in the Piute Reservoir and be released downstream to satisfy lower rights on the system. The state engineer approved this exchange because such action should not adversely affect downstream water right users. The following conditions were given for approval of the exchange:

1. The annual diversion of the water from the nine wells shall be limited to the amount made available through the applicant's ownership of the 5 shares in Brooklyn Canal Company water.

2. The applicant shall install permanent totalizing meters on each of the 9 wells.

3. Costs incurred in administrating this exchange shall be borne by the applicant.

Case study #7.

Change applic.: e1122
Filing Date: 7-14-77
Water Right #: 35-AREA
Status Date: 10-27-77
# of Protests: 0
Status: Approved

Through this exchange, the United States Bureau of Reclamation requested that the exchange of 50,000 acre-feet or 150 cfs previously diverted from the Weber River at Slaterville Diversion Dam and stored in Willard Bay Reservoir now be diverted from Willard Bay Reservoir through the Slaterville Diversion Dam into the Layton Canal through a pipeline in the Davis-Weber Canal. In lieu of this diversion, between April 15 and October 15 of each year, water would be diverted from Stoddard Diversion, which lies several miles upstream, and be used for irrigation purposes within the Weber Basin project as part of a drought relief plan for the Weber Basin Service area. This agreement was made between the Weber Basin Water Conservancy District and the Davis and Weber Counties Canal Company.

Both water quantity and quality were considered in this exchange application. Testing was conducted on water quality characteristics of water above and below the Slaterville Diversion, in Willard Bay and in the Hooper Canal. Test results indicated that, although Willard Bay water and Weber River water below the Slaterville Diversion were relatively higher in dissolved solids than upstream water, little if any difference in crop yields could be expected with use of Willard Bay water.

This exchange was not protested and was approved by the state engineer on October 27, 1977, subject to prior rights and the following conditions:

1. That this exchange be administered by the Weber River Commissioner.

2. That costs of regulation shall be borne by the applicant.

The contract agreement between the two previously-stated parties included among others the following conditions:

1. The time and quantity of diversion, water quality requirements and costs of water sold were agreed upon between the two parties.

2. Measuring devices shall be acceptable to both parties.
   In the case where two parties cannot agree, the state engineer will be called upon to cast the deciding vote, and all parties shall accept the majority vote.

A summary of the most common reasons for protests and the basis of state engineer decisions is given in Table 30.

Interbasin Transfers

Interbasin transfers by their nature involve complex hydrologic, legal, economic and social issues.

In early 1988, legislation was passed in Utah that allows districts to market water outside of their boundaries. This legislation came as a result of pressure from the Bear River drainage to market water to the Wasatch Front region (Hansen 1988). The successful completion of this type of transfer is dependent upon satisfactory compliance with existing water rights. The costs of such a transfer are, therefore, expected to be considerably higher.

The State Water Plan for 1989 addresses the implementation of potential interbasin exchanges and transfers as a means of meeting future needs. These possible interbasin transfers are summarized in Figure 38 in relation to the average annual population growth rates (State Water Plan Coordinating Committee 1989). General water movement is from the Bear and Colorado river basins to the more populated regions of the state.

Cost and Time Factors

Factors prior to approval

In most instances, an applicant filing for a water transfer is able to do so without hiring professional help. Estimates from the state engineer's office indicate that 70 percent of all applications are filed personally by the applicant, with the remaining 30 percent requiring aid of others (Hansen 1988). However, a substantial amount of time may be lost in the proper initial preparation of an application. This would seem to especially affect those unfamiliar with procedures and minimum requirements of the transfer process.

Additional up-front time taken by the staff of the Division of Water Rights with the applicant at the time of filing might be used to discuss general procedures and possible limitations of the proposed transfer. Two items that might be clarified through this initial review are the change application's possible effect on priority and the transferable amount of the water right.

The priority of a water right may, in some cases, be lost due to a change, usually in point of diversion upstream from the original right where other junior priority rights may exist. The application of the no-impairment rule may then be put into effect and limitations placed on the senior right, one of which may be loss of priority date (Morgan 1989).

The transferable amount is limited to the quantity of water historically put to beneficial use and, therefore, not necessarily the

TABLE 30. Case-study summary of the most common reasons for protest and the basis for state engineer decisions

Most common reasons for protest:

1) Fear of impairment of existing rights through:
   a) enlargement of applicant's right
   b) negative effects on common water source
   c) priority of water right or application questioned
2) Concern that an approval might set precedence for future transfers
3) Expression of general concern for any change application
4) Misunderstanding of applicant's full purpose in the application
5) Protection of natural habitat or environment
6) Threat to loss of life or property (Bonham case)
7) Question whether necessary permits, rights of way, etc. have been filed with proper authorities

State engineer's decisions regarding transfers, usually based on one or more of the following points:

1) Protection of existing water rights from impairment or enlargement of the applicant's right in quantity and quality, following these steps:
   a) Hydrologic data, models, studies relating diversion and depletion quantities
   b) Historical and expected future return flow and depletion from hydrologic system to protect existing rights
   c) Application of a standardized "duty" for specific uses
   d) Identification (maps) of acreage removed from irrigation if applicable
   e) Verifiable means of quantifying a right and gauging its use
2) Transfer fairly transacted according to state statutes
3) Evidence of due legal process in those areas beyond state engineer's jurisdiction (permits, easements, etc.)

quantity identified in the water-right documents.

Established basin policy is also a major consideration before a transfer is approved by the state engineer. Preliminary basin policy status is given in Appendix D.

The basic time constraints of the water-right transfer system, once an application is filed, are dependent upon minimum legal requirements. The transfer application must initially be approved for advertisement. The application is then advertised for three weeks in a local newspaper, after which a thirty-day protest period is allowed. Those protested applications are then scheduled for a hearing that generally occurs once every six months in each county. Once the minimum requirements are met, the time to decision is often dependent on the transfer complexity, Division of Water Rights workload, the types of protests received and their resolution.

Where hearings are required, informal proceedings are the general practice in Utah; in fact, a formal hearing has never been held to date (Morgan 1989). A formal hearing would substantially increase the time and costs of a water-right transfer.

Factors after approval

Change applications approved by the state engineer are given time limits within which

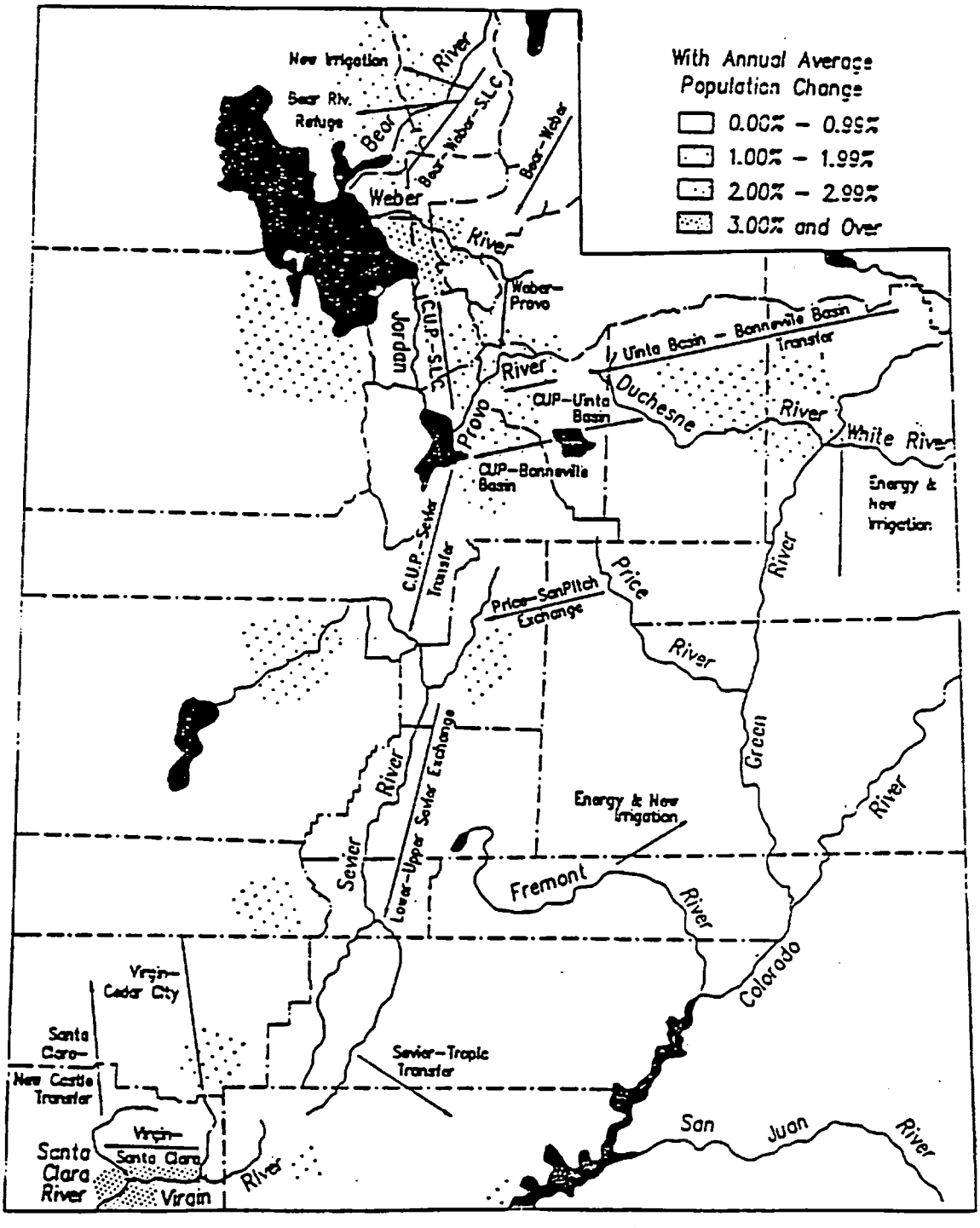


Figure 38. Existing and potential interbasin exchanges and transfers, as suggested in the State Water Plan, Utah, 1989.

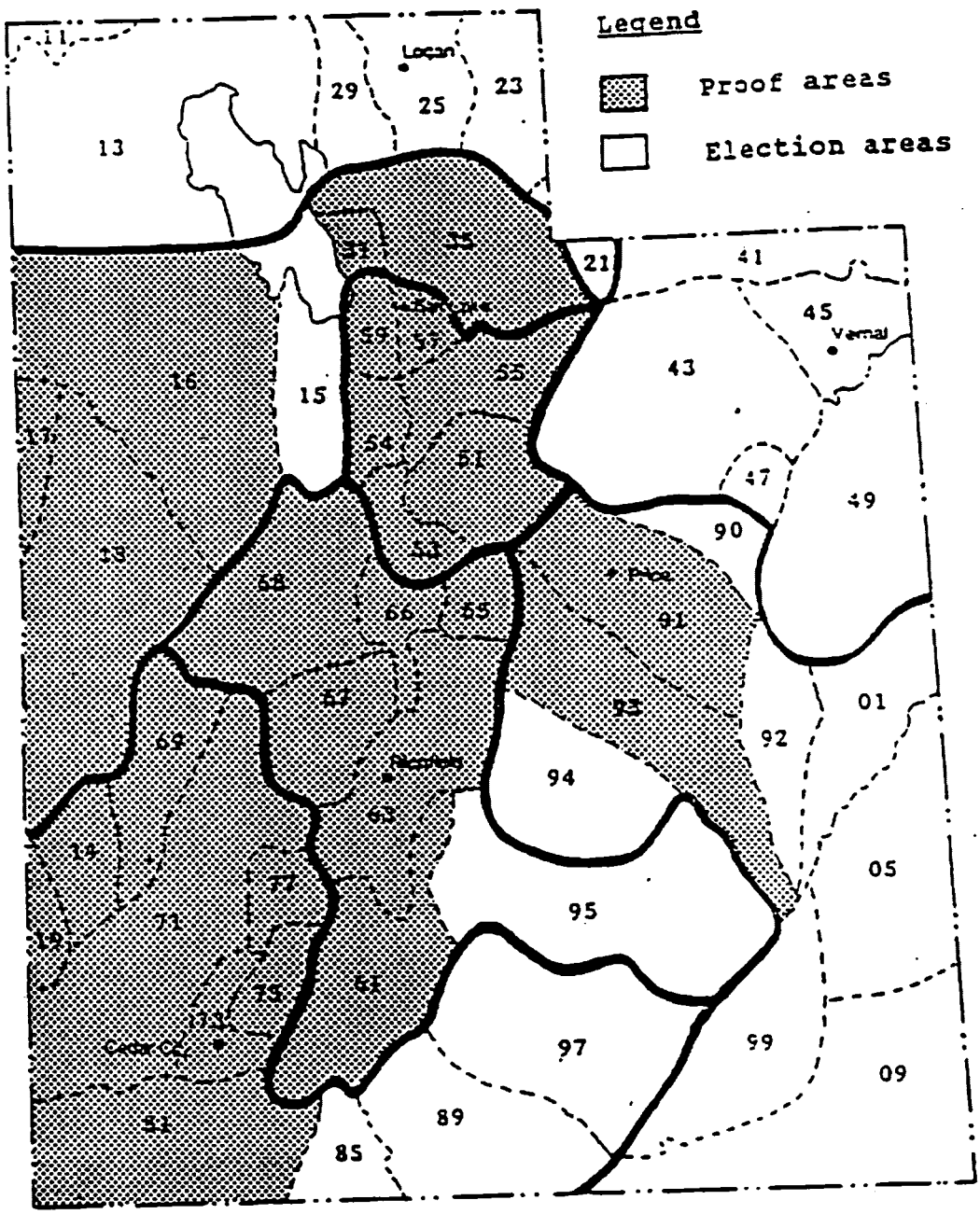


Figure 39. Areas currently requiring "proof" or "election" procedures by the applicant.

the necessary work must be fully constructed and water put to beneficial use. The time limit may vary from two to five years depending on the magnitude of the project. This time period may be extended by showing due diligence in completion of the transfer and proper application for extensions of time with the state engineer.

Verification that the works have been constructed and that the water is being put to beneficial use is known as a "proof." A licensed professional engineer or land surveyor may verify the existence, location and operation of new structures and uses of the water. The Division of Water Rights may also become involved in the proving of a right.

Specific areas in the state have been placed under an "election order" by the courts. This allows a rightholder to elect to have the Division of Water Rights certify changes or to have the proof done by others. The areas not covered with an election order require applicants to arrange for proof of their rights by hiring an independent consultant. The election and proof areas as of December, 1989, are shown on Figure 39 (Olds 1989).

The net effect of this process is that elections are done by the state at no additional cost to applicants and, therefore, costs are paid by the state. Election proofs can mean even more time due to limited manpower in the Division of Water Rights. Conversely, one would expect proofs done by others to be completed in less time, although the applicant has the personal responsibility of payment.

Several areas within the state have had their election orders rescinded in recent months at the request of the Division of Water Rights. This is done in an attempt to lighten the load of the staff of the Division of Water Rights and to quicken the certification process.

Standards and water planning

The amount of water allowed for diversion for specific uses has been quantified by the Division of Water Rights in order to standardize therecord-keeping system and minimize conflicting rights. This "duty" table is given in Appendix E and is used for new appropriations as well as for changes in existing rights.

The development and use of hydrologic models is being more regularly relied upon to aid in the decision-making process. The Division of Water Rights is currently working in conjunction with the U.S. Geological Survey in this regard to better assess water availability and the potential effect of water-right transfers on existing rights.

The items discussed above identify some of the steps being taken that affect not only the time and cost of a transfer but also address the long-term soundness of decisions.

As future water needs are considered, the availability of adequate supplies and the rising costs of development are major obstacles. Although there are 5.6 million acres of arable land within Utah, only 1.1 million acres are irrigated. Expansion of irrigated acreage is doubtful since most of the physically and economically affordable irrigation water has already been developed (State Water Plan Coordinating Committee 1989). Estimates of potential losses in the cropland base within the state over the next 20 years, due to high pumping costs and urbanization, are estimated to be 206,000 and 110,000 acres, respectively (State Water Plan Coordinating Committee 1989).

Section 4: Federal-State Law Interaction

Interstate Transfers

The Utah State Engineer is directed by statute to cooperate with administrative officials of adjoining states and, with the consent of the governor, to enter into agreements with states in order to determine and regulate water and water rights in interstate streams. Utah is a party to the Colorado River Compact, the Upper Colorado River Compact, the Bear River Compact, and the Columbia River Compact. These provide for allocation of waters from interstate streams which flow through Utah. Further development of the Bear River is still being considered. A proposal to transfer some of Utah's water right in the Colorado River system for a period of time to the benefit of San Diego met with hostility in the State. These types of transfers by their nature are more strongly influenced by public sentiment.

Water may be appropriated in Utah from interstate streams to be conveyed into another state for beneficial use therein, provided the State Engineer evaluates and publicizes the advantages in Utah of such water exportation. Some water from the upper Bear River in Utah is available for use in Wyoming, but that does not involve a transfer from a Utah appropriator to a Wyoming transferee. A proposal afoot for some time to operate an open pit coal mine near Alton, Utah (just outside Bryce Canyon National Park) and transport the coal into Nevada by a slurry pipeline involves a transfer of water out of the State. Among other objections, environmental concerns have thus far blocked the project. But, if it ever comes to pass, the Utah interstate water transfer provisions would be involved. The Commerce Clause of the Federal Constitution prohibits states from including protectionist features in their statutes restricting interstate water rights transfer. Utah's statute which, but for requiring an administrative evaluation of an interstate transfer, does not appear to impose an unconstitutional burden upon interstate commerce.

Federally Developed Contract Water

The original intent of federally developed water in the West was to provide a primary means of getting water to water-short areas. Federally developed water in Utah ties its earliest roots back to the 1902 Reclamation Act. As a result of this congressional act, three water projects were scheduled for construction. These included the Salt River Project in Arizona, the Newlands Project located near Reno Nevada, and the Strawberry Valley Project in Utah (Mendenhall 1989). Since the completion of the initial Strawberry Project in 1913, several additional projects have been put on line. Over the years this, and similar developments, has provided significant quantities of irrigation, municipal, and industrial water to users throughout the State. A summary of those projects constructed by the United States Bureau of Reclamation (USBR) are shown on Table 31.

The Jordanelle Dam, under construction at the present time, is anticipated to be the last of the large, new Bureau of Reclamation projects within the State. The bulk of the water rights for this project were obtained during the early 1980's, and are therefore not reflected in the data for this study.

The water rights division at the USBR Provo Project Office, has indicated that the primary function of the USBR is turning from developing new water supplies to resource management. One reason for this change in emphasis is social pressure. Because the Bureau receives public monies, it must shpae it's actions according to nation-wide public opinion. Currently, many groups are

TABLE 32. The uses and history of the Strawberry Valley Project, a Federal contract water development

Year authorized: December 1905
Project completed: June 1922
Repayment entity: Strawberry Water Users Association
Uses of the water:
Irrigation:
Sole supply 17,270 acres
Supplemental *27,301 acres*
Total 44,571 acres
Power: Total capacity 1,550 kilowatts
Recreation, Fish and Wildlife:

HISTORY OF WATER DELIVERED

Date	Total Diversion (acre-feet)	Farm Diversions (acre-feet)	Farm Population	Irrigated Acreage	Avg. Value of Irrig. Crop	Total O&M Costs
1975	62,784	54,509	5,235	40,042	$267.35	$226,874
1976	112,453	95,620	5,240	41,108	$272.75	$262,676
1977	86,281	69,389	5,460	41,260	$263.42	$241,436
1978	111,899	91,299	5,466	41,657	$277.82	$215,419
1979	70,741	62,874	8,540	41,719	$407.00	$284,328
1980	123,070	106,196	6,365	41,697	$388.70	$245,244
1981	67,554	56,685	6,365	41,638	$402.23	$294,042
1982	115,517	98,167	6,825	32,477	$339.27	$353,336
1983	18,334	16,294	6,417	41,349	$403.62	$364,827

TABLE 33. The uses and history of the Emery County project, a Federal contract water development

Year authorized: April 1956
Project completed:
Repayment entity: Emery Water Users Association
Uses of the water:
Irrigation:
Total 14,170 acres
Municipal and Industrial:

HISTORY OF WATER DELIVERED

Date	Total Diversion (acre-feet)	Farm Diversions (acre-feet)	Farm Population	Irrigated Acreage	Avg. Value of Irrig. Crop	Total O&M Costs
1975	72,249	65,031	1,459	17,219	$103.87	$43,465
1976	53,006	47,266	1,350	12,656	$121.23	$44,861
1977	30,152	27,493	1,349	12,569	$96.00	$52,030
1978	63,978	48,578	1,349	12,456	$107.41	$59,064
1979	28,809	21,607	817	12,486	$156.96	$67,000
1980	20,584	18,526	645	12,173	$141.54	$93,693
1981	17,945	16,153	670	12,820	$188.20	$90,000
1982	19,278	14,321	1,034	11,676	$?	$103,455
1983	17,194	9,324	1,350	12,812	$170.70	$65,322

TABLE 34. The uses and history of the Hyrum Project, a Federal contract water development

Year authorized: August 1933
Project completed: July 1935
Repayment entity: South Cache Water Users Association
Uses of the water:
Irrigation:
Sole supply 0 acres
Supplemental *6,800 acres*
Total 6,800 acres
Recreation, Fish & Wildlife

HISTORY OF WATER DELIVERED

Date	Total Diversion (acre-feet)	Farm Diversions (acre-feet)	Farm Population	Irrigated Acreage	Avg. Value of Irrig. Crop	Total O&M Costs
1975	14,117	10,633	3050	6,182	$108.11	?
1976	22,398	18,368	3050	6,182	$112.47	?
1977	19,661	15,261	?	6,376	$97.44	?
1978	25,779	19,335	4925	6,167	$104.13	?
1979	15,283	11,463	970	6,290	$173.03	$19,750
1980	13,600	11,421	958	6,218	$180.73	$21,750
1981	16,960	13,569	958	6,214	$158.40	$47,468
1982	13,630	11,360	964	6,264	$137.26	$53,422
1983	10,389	?	977	6,272	$142.48	$74,015

TABLE 35. The uses and history of the Moon Lake project, a Federal contract water development

Year authorized: December 1935
Project completed: May 1938
Repayment entity: Moon Lake Water Users Association, and the Bureau of Indian Affairs
Uses of the water:
Irrigation:
Sole supply 0 acres
Supplemental *75,256 acres*
Total 75,256 acres
Recreation, Fish and Wildlife

HISTORY OF WATER DELIVERED

Date	Total Diversion (acre-feet)	Farm Diversions (acre-feet)	Farm Population	Irrigated Acreage	Avg. Value of Irrig. Crop	Total O&M Costs
1975	?	?	1,969	62,460	$80.08	$57,290
1976	139,401	93,393	2,037	63,690	$76.07	$59,907
1977	70,786	35,732	1,574	52,583	$35.08	$49,182
1978	139,401	93,393	2,037	67,608	?	$57,917
1979	86,028	83,783	1,908	62,505	$77.86	$89,580
1980	48,365	43,528	1,908	64,840	$98.29	$92,684
1981	52,036	46,833	1,930	54,456	$85.26	$98,000
1982	39,252	32,535	1,908	?	$108.71	$112,181
1983	41,376	37,238	1,956	?	$132.03	$88,754

TABLE 36. The uses and history of the Bonneville Unit of the Central Utah project, a Federal contract water development

Year authorized: April 1946
Project completed: still under construction
Repayment entity: Central Utah Water Conservancy District
Uses of the water:

Irrigation	
Sole supply	29,370 acres
Supplemental	*213,490 acres*
Total	242,860 acres

Power: total capacity 1050 megawatts
Municipal and Industrial: 99,000 af to be used in Salt Lake, Utah, and Juab counties.

HISTORY OF WATER DELIVERED

Date	Total Diversion (acre-feet)	Farm Diversions (acre-feet)	Farm Population	Irrigated Acreage	Avg. Value of Irrig. Crop	Total O&M Costs
1975	39,233	33,239	352	8,095	$231.84	$10,360
1976	59,793	50,731	659	12,403	$232.66	$9,318
1977	53,559	45,525	539	20,209	$220.65	$13,910
1978	92,220	82,370	707	20,656	$173.56	$18,918
1979	?	53,293	757	21,603	$172.00	$26,962
1980	56,468	7,298	882	17,312	$208.45	$15,961
1981	55,692	33,059	897	18,787	$179.72	$31,362
1982	55,977	24,515	754	17,615	$236.87	$21,168
1983	64,119	63,653	564	13,261	?	$46,832

advocating that natural flowing rivers are more beneficial to the nation as a whole than is construction of a new dams or reservoirs. Additionally, USBR data suggest that strong social sentiment exists regarding subsidized water for particular groups, in particular agriculture (Richman 1988). If water development were solely a decision of people living in the West, additional facilities would in all likelihood go on line. Decisions and public pressure, however, are not made in such a manner, and the USBR must proceed accordingly (Baxter 1989). Due to the fact that new supplies are becoming more limited, the transferability of existing developed water supplies from one place of use to another, and/or from use to use, will continue to be of the utmost importance. To succeed in the long run, society must make choices which balance the values of efficiency, equity, and environmental quality.

In an effort to evaluate fairly the status of Federal contract water within the State, 5 USBR projects were selected based upon their particular characteristics such as age of contract, type of management, and area of distribution. The projects selected included the Strawberry Valley Project, Emery County Project, Hyrum Project, Moon Lake Project, and the Bonneville Unit of the Central Utah Project. Tables 32-36 provide a brief summary of each of these five projects in terms of the year authorized and completed, legal uses of the water, and a brief history of

water diverted by the project as provided by the USBR Salt Lake City Regional office.

On the part of the Federal Government, as of yet, water transfers are not a high priority. As a result of the 1982 Reclamation Reform Act, the USBR project offices were asked to make sure that project water remain on project land. It is also the opinion of the Federal Government that municipalities cannot "take" water from the USBR, even if non-use were to be shown (Richman 1988). This goes contrary to some extent, to the doctrine applied under Utah State law, wherein a municipality may condemn water for municipal use if it can be shown that no other supplies are available for use (Morgan 1988).

Under Utah law, when a district or association initially files on a block of water, it may file such that the water may be used in a variety of places and for a mixture of uses within the project area. Any change outside of the originally filed use description must be applied for with the State Engineer and falls under the formal transfer definition.

There are a few isolated cases in the State where a block of federal water has formally been moved from one designated use to another. The most prominent case involved the Emery County Project, and Utah Power and Light Company (UP&L). In 1972 UP&L purchased water stock and the associated land from private land owners in the area, and then sought to change the nature of use of 6,000 acre-feet of district water from agricultural to industrial usage. The district reports that the USBR project office was elated with the thought that it could boost the rate of repayment from that of agricultural to the new industrial rate. A second such transfer involving the same entities was completed in the fall of 1988, and involved 2,576 acre-feet of water. These transfers necessitated the re-writing of the contract between the Emery County Water Users Association and UP&L to reflect the change in repayment. The motivation behind these transfers, on the part of the district, was that of reducing their repayment obligation.

It was reported that the district recovered no renumeration as a result of the transfers other than a reduction in their repayment to the Federal Government. It should be further noted that none of the contracts for the projects studied allow for the taking of profit by the district as a result of a sale or transfer of water. The Emery Water Conservancy District reports that they currently have several cities which are interested in acquiring water for their systems. They indicate that the USBR projects office has been somewhat responsive, but feels that USBR rules and regulations make it almost impossible to complete further transfers of water at this time (Johansen 1989). Other than those transfers noted in the Emery Project area, there has not been any real interest observed by either the USBR or the operators of other project water to transfer water from one use to another. The probable reason for this is due in part to the water situation exhibited throughout the state at the current time. As early as April of 1989 several of the districts around the state reported that the storage levels of their reservoirs were only at 50 to 70 percent of normal. Under such limitations, the agricultural community currently is treating their water as a precious commodity, and not likely to be willing to trade it away in the near future (Christensen 1989).

The main facets integrated in the operation of each of these state's project areas is quite common. The contracts, as they exist for all of these projects makes no distinct mention as to the ability of the district to transfer water from one designated use to another. Rather, for the most part they do inhibit such

transfers by indicating that the water must remain on project land, and be used only for those purposes listed in the original contract. Additionally, the USBR generally retains ownership of the water rights as legal holder of the water right. Of the five projects studied the original contracts for the Strawberry, Moon Lake and the Hyrum projects have been repaid. Of those projects which have been fully repaid, the Moon Lake Project is the only project which retains the water rights in their name. The water rights from the Strawberry project were to have been turned over to the Strawberry Water Users Association upon repayment of their obligation. In 1940, the water users in this region renegotiated their contract with the USBR due to financial problems, and as a result lost the permanent rights that were granted under the original contract due to a change in wording of the new contract. In 1972 the Strawberry Valley Water Users Association filed suit against the federal government claiming those rights granted under the original contract. In 1979 the supreme court ruled that the water rights would remain in the name of the USBR (Mendenhall 1989).

Regarding the issue of informal contract water transfers, there is little information readily available. As previously indicated, informal transfers are those which occur without notification of the Division of Water Rights. For the most part, irrigation district contacts have been hesitant to provide information relating to informal activity. Generally, there appears to be a fear that indepth scrutiny of records by outside sources may result in either loss of water or additional restrictions. In some cases, extensive transfer records may not exist since there appear to be two levels of informal water transfers. Those which are filed with the irrigation district for approval by their Board of Directors and those where only the ditch master is made aware of the change such that the water can be diverted as necessary.

For practically all of the agencies studied, the water user desirous of changing his water claim must file an application with the district. The board of that district then confirms that the new place of use of the water is project land, and that the water indeed exists, and is transferrable. Information gathered from the large districts throughout the state varies. The Central Utah Water Conservancy District, for example, indicates that it has no form of informal transfers which occur, rather that all changes occur through the Office of the State Engineer (Talbot 1988). Based upon records kept by the Weber Basin Water Conservancy District, the amount of water transferred yearly since 1975 ranges from 20 to 390 acre-feet. This water is almost entirely comprised of irrigation class water (Anderson 1988). The Emery County Water Conservancy District estimates that they receive requests to transfer as much as 600 acre-feet of water per year (Christensen 1989), while the river commissioner over the Duchesne River estimates that the entire Uinta basin may informally transfer as much as 4500 acre-feet of water per year (Christensen 1989). As seen, the numbers and amount of information gathered varies tremendously throughout the State.

In summary, it is evident that federally contracted water plays an important role in meeting the water needs of the state. It is also evident, at least for the time being, that there is not much motivation on the part of either the local office of the USBR or the subscribers of federal water to transfer water from one use to another. After meeting with key directors of water districts throughout the state, the impression emerges that there is more informal activity occurring than what shows up on the surface. What really comes to light however, in discussing water transfers

with the various groups throughout the state, is that they basically feel that the system works as planned. Each would of course like everything to go in their favor, but stress the fact that the system protects all of the users at the present time.

Reserved Indian Water Rights

There are a number of Indian reservations in Utah--Goshute, Skull Valley, Piute (six bands), Navajo and Uintah-Ourary (which is usually known as the Ute Indian Reservation). Under the Indian reserved rights doctrine which originated in *United States v. Winters and developed in Arizona v. California*, Indian tribal reservations have sufficient implied water rights associated with them to irrigate all the "practicably irrigable acreage" thereon. Such reserved rights have a priority dating from establishment of the reservations (Davis 1989).

The largest existing Indian water right claim held within the State of Utah belongs to the Uintah and Ouray Indian Tribe, better known as the Ute Indian Tribe, which is located in the northeastern portion of the State. The Uintah-Ouray Indian Reservation encompasses over 4.5 million acres, and was established in 1861 by proclamation of President Lincoln (Hansen 1989). The State of Utah and the Ute Indian tribe negotiated a water compact in an attempt to quantify the water right claims of the Ute Indians. In 1980, the Utah State legislature ratified the Ute Indian Water Compact setting forth the State's position regarding the water right claims of the Tribe. This compact as written, allows for the

> "depletion of water in the amount of 248,943 acre-feet per annum, and the related gross diversion requirement of 471,035 acre-feet per annum , from all sources in accordance with and as more fully set out in the "Tabulation of Ute Indian Water Rights"..." (Ute Indian Water Compact 1980).

At the time this compact was drawn up, the Ute Tribe was generally supportive of the irrigable acreage proposed and quantities of water decided upon. Conflicts arose, however, in that the tribal leadership felt that additional mitigating factors were being overlooked in the compact. The most imminent item, in the opinion of the tribe, was that of obtaining additional water resources facilities, and used the water compact in an attempt to pressure the government into providing these desired structures (Hansen 1989).

Inasmuch as Indian tribal reserved rights are a product of federal law, selling or leasing such water for uses off reservations is subject to federal law. By congressional enactment, Indian property cannot be alienated without congressional consent. Presumably water rights are property within the meaning of that statute. Therefore agreements such as the Ute Indian Compact, require approval by Congress as well as the State and the tribe (Davis 1989).

In 1965 the Ute Indian Tribe and the U.S. Bureau of Reclamation entered into the so-called "Deferral Agreement". It was signed by officials of the Bureau of Reclamation and the Bureau of Indian Affairs. This agreement, which federal officials deemed necessary to federal financing of the Central Utah Project, allowed the Central Utah Project to proceed without tribal objection to interference with its water rights, recognized the Indian right to use necessary water on some lands within the reservation and allowed a water exchange. By its terms, the Deferral Agreement remains in effect for forty years--until 2005 (Davis 1989).

Bills have been introduced to Congress in efforts to settle the Indian water rights dispute but none have yet been approved by all parties. An example of these efforts is bill S.536, known as the Ute Indian Water Settlement Act was introduced to congress on March 8, 1989. Bill S.536 mandates the Federal Government to keep its commitment and compensate the Ute Tribe for deferring its water rights to the government to allow for construction of the Central Utah Project. The main tenements of the measure stipulate:

1. No water rights held in trust can be transferred from the lands of the reservation.

2. No water allocated, as a result of this bill, would be subject to loss or forfeiture under the laws of the State of Utah.

3. Finally, the water allocated under this bill shall not be restricted to any particular use, but may be used for any purpose as seen fit by the tribe.

4. Designates that certain water development projects shall be repaired, and others constructed.

The price tag attached to this bill is $514 million dollars. House bill S.536 has been referred jointly to the Committees on Energy and Natural Resources and the Select Committee on Indian Affairs where it yet remains.

On April 7, 1989, the Ute Indian Water Compact was signed into effect by Ute Tribal Chairman Lester Chapoose, and the State. All seemed to be moving forward, until the 19th of April 1989 when 3 new members were elected to the governing business committee of the Ute Tribe. First on their agenda was an attempt to scuttle the newly signed Ute Water Compact. The new leaders indicated that they planned to take the state to court over the water pact, because in their view, it violated the Winters Doctrine, which they argued gave tribes complete control over their water rights without any state interference (Deseret News April 19, 1989).

The second concern expressed by the new governing committee refers to the 1965 Deferral Agreement. In exchange for Ute tribal deferral of water use, the tribe was promised millions of dollars worth of water development facilities. House Bill S.536 is an attempt to compensate the Ute Tribe as part of the 1965 deferral agreement. The Ute Business Committee now claims that the monies indicated under House Bill S.536 are insufficient and that their interests have not been adequately considered (Deseret News April 20, 1989). The position of the Ute Business Committee has been strengthened even more with the recent recall election in which two new panel members were elected (Deseret News July 14, 1989).

As a result of these recent activities, the Ute Tribe and government agencies find themselves back at the negotiating table where they will attempt to reach an agreement which satisfies both parties. At the present time, the State is in a "holding" position until more is learned about the directions which should be pursued in regards to meeting water needs in the State.

The other Indian Tribes in the State also are undergoing similar disputes over the quantification of their reserved claims. For example, the Shivwits Band of the Utah-Piute Tribe, located in the southwest corner of the State, is encountering difficulties. When the Santa Clara drainage was initially decreed, the Shivwits band was given several hundred acre-feet of water for irrigation and domestic purposes. Within the last three to

four years an adjudication of the Santa Clara River basin was published and served to the various water users. The published results indicated a claim to 100.35 acres of irrigated land with the reservation. The United States, on behalf of the Shivwits Tribe, submitted a counter claim for additional acreage as well as storage water. A major problem with this claim is that the Santa Clara River is incapable of yielding sufficient supplies to satisfy all the new proposed demands.

Section 5: Conclusions and Recommendations

Water right transfers can be broadly defined as transactions involving legally binding alterations in the right to water usage. These alterations can be further segregated into formal and informal transfers. Formal transfer are defined as those requiring approval from the State Engineer while informal transfers are these transactions not directly regulated by the State Engineer.

The legal process, generally, does not block either formal or informal water right transfers. The volume of formal water right transfer activity in Utah demonstrates that the state code has not thwarted operation of the water rights transfer system. Informal transfers also occur very frequently within mutual irrigation companies and district organizations, and the system seems to operate well. When water can be put to a more valuable use, a prospective transfer recipient can pay a price exceeding the present owner's return, a transfer takes place, and the resource is employed more productively. Transfers (normally informal) occur frequently under the market system within irrigation companies and districts. Water transfers are a key to successful water resources management which is essential to Utah's economic well-being.

This research has concentrated on analysis of formally filed transfer applications since these records are regularly maintained and available to the public through the Division of Water Rights. The numbers and types of formal water right transfers applied for with the State Engineer are dependent on several variables. This report has attempted to identify those factors most apparent through data analysis, personal interviews, and related research, and are summarized below.

Transfers naturally occur in or near the population centers although the population growth rate in an area appears to be more directly correlative to the number of applications than the relative size of the population center. Development on the population center fringes appears to influence the number of changes in nature of use from agriculture to municipal or industrial uses. The status of the basin hydrology and the administrative restrictions placed upon it also influence the likelihood of transfer requests. Those basins closed to new appropriations necessitate transfers to accommodate new or changing developments. The large majority of changes and exchanges have occurred in areas closed to new appropriations. The institutional organization within an area strongly influences exchange activity along with additional administrative bounds set by the State Engineer.

Exchange totals peaked in 1981 in conjunction with rapid development in the mountainous eastern portion of watershed #35 but has since decreased considerably due to a moratorium on applications greater than one acre foot as ordered by the State Engineer. This moratorium was established in 1981 due to the lack of hydrologic data and general water availability questions.

Extreme climate swings also influenced transfer activity since they directly affect water availability on a short term basis. The

highest number of change applications occurred in the very dry year of 1977 while the fewest applications occurred in 1984 which was the second of two unusually wet years.

Change applications involving the nature or place of use are both gradually increasing while changes in point of diversion only are decreasing with time. Specific consideration of changes in nature of use shows a higher percent of total applications to change the nature of use occurring in the southern part of the State. New agricultural uses are gradually decreasing with lows in the wet 1983 to 1984 period while new municipal and industrial uses experienced peaks in both the dry and wet periods previously mentioned.

Ninety-three percent of the approved changes involved the same type of source before and after the transfer with the large majority of those involving groundwater. This trend may be substantially due to the absence of irrigation company and district informal transfer data since these entities control a large amount of the surface waters in the State.

The total change and exchange applications approved was found to be greater than 85 percent for the study period. However, the time required for approval is subject to a number of variables. Trends noticed in the data analysis were that applications filed in extreme climate shift periods (both wet and dry) required more time on the average. The overall shorter time to approval periods were found to be at the beginning and end of the thirteen year study period. The amount of water being transferred can affect the time to decision. Generally, the larger the quantity the longer the time required although the most significant increase in time to decision occurred for transfers involving greater than 20 cfs or 5 acre feet. The basin status, transfer complexity, and the workload of the Division staff also affect the time to decision. The recent incorporation of a computerized water right record keeping system is believed to have a significant positive effect on application turnaround time. Applicant unfamiliarity with transfer procedures and the occurrence of protests lengthen the approval process. The number of applications protested appears to be increasing and this trend is expected to continue in the future.

Over the years a variety of transfer applications covering a broad spectrum of situations have been submitted to the State Engineer. He is often able to draw upon established precedents of case history in approval or rejection of current applications. Unique filings do of necessity require longer times to decision then relatively routine cases.

Formal transfers require the State Engineer to obtain information. For protested applications, this process often involves hearings. While Utah law provides for both formal and informal hearing procedures, the informal process has worked so effectively that a formal hearing has not been held to this point.

Basin policy evolves as issues arise. Hydrologic studies, concerns expressed through protest and measured interference between users aid in formulating policies (Boulton 1988). The extension of these policies to predict future impacts resulting from the proposed changes is an important step which needs more development at this time. Hydrologic modeling applications are currently being developed to aid in the appropriation process. The application of modeling concepts is expected to become more critical in dealing with projected future needs.

Communication gaps between the various types of water right holders and the legal and

administrative requirements can often lead to delays and misunderstandings as a change application is being filed. Administrative practices which encourage better preparation by transfer applicants and protestors would save time. Development of a set of guidelines for water right holders and the holding of preliminary meetings with area engineers before applications or protests are filed may nip disputes in the bud and minimize appeals to the courts. More frequent hearing sessions may also speed the transfer process. These changes would require additional funding for the Division of Water Rights.

Further consideration might be given to negotiating additional Indian tribal water rights quantification and transfer agreements. Reservations are not hydrologically independent of neighboring lands, and parcels of reservation and non-reservation lands often are mingled. In some cases, transfers and exchanges could make irrigation more efficient on and around reservations. State, tribal and federal officials should negotiate agreements like the Ute Indian Water Compact. Congressional approval of such compacts can authorize sales, exchanges, leases and other transfers. Both Indians and their non-Indian neighbors could profit from such arrangements.

Dewatering stream beds during irrigation seasons is a fact of life in arid states. However, important aesthetic and ecological needs are served by maintaining minimum flows along some reaches of Utah streams. Environmental needs are important human needs--important in many senses, including economic. At present, the Division of Wildlife Resources has inadequate authority and funding to acquire water rights for instream flow protection purposes. Consideration should be given to broadening the Utah instream flow law to give explicit power to state water agencies to obtain and/or retain water rights to meet instream flow needs.

A necessary substantive change is repeal of Article XI Section 6 of the Utah Constitution which bans municipal water rights alienation. The ban, which now serves no useful purpose, burdens cities and towns. While this problem can be evaded by exchanges (if they can be accomplished) and by creating separate non-municipal water entities (such as the Metropolitan Water District), allowing municipalities to sell water reduces market transfer costs, thus enhancing efficient use of water and water rights.

The legal linchpin of the Utah water transfer system--the no-impairment rule--should be retained. The no-impairment rule both paves the way for meeting the needs of the urban present by making water marketing possible and protects the State's rural needs.

A recent lower court ruling (known as the Bonham case) has mandated that the State Engineer consider public interest issues involved in change applications. Some clarification perhaps is needed of the implications of this court decision in terms of the scope of the public interest issues to be considered by the State Engineer.

References

Anderson, Mark. 1988. District Engineer for the Weber Basin Water Conservancy District. Personal Interview, July 11.

Baxter, Lee. 1988. Chief of Water Rights, United States Bureau of Reclamation, Provo Projects Office, Personal Interview, September 15.

Boulton, Dorothy. 1988. State Engineer's Office, Staff Assistant. Personal interviews with Paul Hansen, May-August.

Christensen, Bill. 1989. River Commissioner, Duchesne River. Personal Interview, April 18.

Criddle, Wayne D. 1989. Former State Engineer for the State of Utah. Telephone conversation, December.

Davis, Ray J. 1989. Utah water rights transfer law. Arizona Law Review 31(4):841-864.

Finlinson, Fred. 1988. Utah State Senator. Personal Interview, April 21.

Fullerton, Herbert H. 1989. An economic appraisal of the status and future of voluntary water exchanges. Unpublished paper. February.

Garn, Jake. 1989. Press release from the Washington office of Senator Jake Garn. March 9.

Gates, Joseph S., Judy I. Steiger, and Ronald T. Green. 1984. Ground-water reconnaissance of the central Weber River area, Morgan and Summit Counties, Utah. Technical Publication No. 77. U.S. Geological Survey.

Hansen, Paul G. 1988. Review of the water right transfer process in Utah. Unpublished MS Thesis. Utah State University Library, Logan, Utah. 145 p.

Hansen, Paul G. 1989. Research Assistant during water right data retrieval in 1988. Telephone conversation, October.

Hansen, Paul G. and J. Paul Riley. 1989. Water rights transfers as a means of accommodating changing water demands. American Society of Civil Engineers Conference on Water Resources Planning and Management, May 21-25, 1989, Sacramento, California. pp. 95-98.

Higginson, R. Keith, and Jack A. Barnett. 1984. Water rights and their transfer in the western United States. A report to the Conservation Foundation.

Hoggan, D.H., Kirk R. Kimball, Jay M. Bagley, Frank W. Haws. 1982. Organizational alternatives to achieve greater uniformity in statewide water rights management in Utah. UWRL/P-82/03. Utah Water Research Laboratory, Utah State University.

Johansen, Eugene. 1989. President of the Emery County Water Conservancy District. Personal Interview, April 19.

Jones, Kent. 1988. State Engineer's Office, Hearing Officer. Personal Interviews, June-August.

Kapaloski, Lee. 1989. Attorney, Parson's, Behle and Latimer. Personal Interviews, December.

Mendenhall, Lynn. 1989. River Commissioner, Strawberry River. Personal Interview, April 14.

Morgan, Robert. 1988. State Engineer for the State of Utah. Personal Interviews, May-October.

Morgan, Robert L. 1989. State Engineer for the State of Utah. Personal interviews, April-November.

Olds, Jerry D. 1989. Director of Special Investigations, Office of the State Engineer. Personal interviews, January-December.

Richman, Lavar. 1988. Chief of Contracts, United States Bureau of Reclamation, Provo Projects Office. Personal Interview. September 19.

Sim, Lee. 1988. State Engineer's Office, Director of Adjudications and Proposed Determinations. Personal Interview, August 24.

Smith, R. T. 1988. Irrigation Districts: Obstacles to water marketing, American Water Works Association Journal. 80(3):10,102.

Sorenson, Steven, and Alec Avery. 1980. Listing of the independent water companies of Utah. Utah State Historical Society.

State Water Plan Coordinating Committee. 1989. Public Review Draft State Water Plan. Salt Lake City, Utah.

Talbot, Sheldon. 1988. District Engineer for the Central Utah Water Conservancy District. Personal Interview, April 5.

The Deseret News. 1989. April 19, April 20 and July 14.

U.S. Department of Commerce. 1982. 1980 Census of population. Characteristics of the population. Chapter A, Number of Inhabitants Utah. Bureau of the Census.

U.S. Geological Survey. 1985. Estimated use of water in the United States in 1985. U.S. Geological Survey Circular 1004.

Utah Code Annotated. 1989. Replacement Volume 7C, 1989 Edition. The Michie Company - Law Publishers, Charlottesville, Virginia.

Utah Department of Health. 1988. Utah's vital statistics annual report: 1987. Bureau of Vital Records and Health Statistics, Technical Report No. 119.

Ute Indian Water Compact. 1980. Article III, pages 2-5.

Wahl, Richard W. 1987. Promoting increased efficiency of federal water use through voluntary water transfers. National Center for Food and Agricultural Policy, Resouces for the Future. Washington D.C.

Wahl, Richard W., and Frank H. Osterhoudt. 1985. Voluntary transfers of water in the west. National Water Summary 1985. U.S. Geological Survey.

Wilkinson, E. 1927. Administration and Control of Irrigation. Thesis at Harvard Law School and J. Reuben Clark Law School, Provo, Utah.

APPENDICES

APPLICATION FOR PERMANENT CHANGE OF WATER

Rec. by: _____
Fee Paid $ _____
Receipt # _____
Microfilmed _____
Roll # _____

STATE OF UTAH

For the purpose of obtaining permission to make a permanent change of water in the State of Utah, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah.

*WATER RIGHTS NO. _____-_____ *APPLICATION NO. a_____

Changes are proposed in (check those applicable)

_____ point of diversion. _____ place of use. _____ nature of use.

1. OWNER INFORMATION

Name: _____ *Interest: _____%

Address: _____

City: _____ State: _____ Zip Code: _____

2. *PRIORITY OF CHANGE: _____ *FILING DATE: _____

*Is this change amendatory? (Yes/No): _____

3. RIGHT EVIDENCED BY: _____

_____

Prior Approved Change Applications for this right: _____

---------- HERETOFORE ----------

4. QUANTITY OF WATER: _____ cfs and/or _____ ac-ft.
5. SOURCE: _____
6. COUNTY: _____
7. POINT(S) OF DIVERSION: _____

_____

_____

_____

Description of Diverting Works: _____

8. POINT(S) OF REDIVERSION

The water is rediverted from _____ at a point: _____

_____

_____

_____

Description of Diverting Works: _____

9. POINT(S) OF RETURN

The amount of water consumed is _____ cfs or _____ ac-ft.

The amount of water returned is _____ cfs or _____ ac-ft.

The water is returned to the natural stream/source at a point(s): _____

_____

_____

*These items are to be completed by the Division of Water Rights.

10. NATURE AND PERIOD OF USE

Stockwatering: From _____ to _____
Domestic: From _____ to _____
Municipal: From _____ to _____
Mining: From _____ to _____
Power: From _____ to _____
Other: From _____ to _____
Irrigation: From _____ to _____

11. PURPOSE AND EXTENT OF USE

Stockwatering (number and kind): _____
Domestic: _____ Families and/or _____ Persons.
Municipal (name): _____
Mining: _____ Mining District in the _____ Mine.
Ores mined: _____
Power: Plant name: _____ Type: _____ Capacity: _____
Other (describe): _____
Irrigation: _____ acres. Sole supply of _____ acres

12. PLACE OF USE

Legal description of areas of use by 40 acre tract: _____

13. STORAGE

Reservoir Name: _____ Storage Period: from _____ to _____
Capacity: _____ ac-ft. Inundated Area: _____ acres
Height of dam: _____ feet
Legal description of inundated area by 40 tract: _____

********** THE FOLLOWING CHANGES ARE PROPOSED **********

14. QUANTITY OF WATER: _____ cfs and/or _____ ac-ft
15. SOURCE: _____ Remaining Water: _____
16. COUNTY: _____
17. POINT(S) OF DIVERSION: _____

Description of Diverting Works: _____

18. POINT(S) OF REDIVERSION

The water will be rediverted from _____ at a point: _____

Description of Diverting Works: _____

19. POINT(S) OF RETURN

The amount of water to be consumed is _____ cfs or _____ ac-ft

The amount of water to be returned is _____ cfs or _____ ac-ft

The water will be returned to the natural stream, source at a point(s): _____

_____

_____

20. NATURE AND PERIOD OF USE

Stockwatering: From _____ to _____

Domestic: From _____ to _____

Municipal: From _____ to _____

Mining: From _____ to _____

Power: From _____ to _____

Other: From _____ to _____

Irrigation: From _____ to _____

21. PURPOSE AND EXTENT OF USE

Stockwatering (number and kind): _____

Domestic: _____ Families and/or _____ Persons

Municipal (name): _____

Mining: _____ Mining District in the _____ Mine

Ores mined: _____

Power: Plant name: _____ Type: _____ Capacity: _____

Other (describe): _____

Irrigation: _____ acres. Sole supply of _____ acres

22. PLACE OF USE

Legal description of areas of use by 40 acre tract: _____

_____

_____

_____

23. STORAGE

Reservoir Name: _____ Storage Period: from _____ to _____

Capacity: _____ ac-ft. Inundated Area: _____ acres

Height of dam: _____ feet

Legal description of inundated area by 40 tract: _____

_____

_____

24. EXPLANATORY

The following is set forth to define more clearly the full purpose of this application. Include any supplemental water rights used for the same purpose. (Use additional pages of same size if necessary): _____

_____

_____

_____

_____

_____

_____

_____

The undersigned hereby acknowledges that even though he/she/they may have been assisted in the preparation of the above-numbered application through the courtesy of the employees of the Division of Water Rights, all responsibility for the accuracy of the information contained herein, at the time of filing, rests with the applicant(s).

Signature of Applicant(s)

APPLICATION FOR TEMPORARY CHANGE OF WATER

Rec. by: _____
Fee Paid $: _____
Receipt #: _____
Microfilmed: _____
Roll #: _____

STATE OF UTAH

For the purpose of obtaining permission to make a temporary change of water in the State of Utah, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of Section 73-3-3 Utah Code Annotated 1953, as amended.

*WATER RIGHT NO. ____-____ *APPLICATION NO. t ____-____-____

Changes are proposed in (check those applicable)

____ * point of diversion. ____ place of use. ____ nature of use. ____ period of use.

1. OWNER INFORMATION

Name: _____ *Interest: ____%

Address: _____

City: _____ State: _____ Zip Code: _____

2. *PRIORITY OF CHANGE: _____ *FILING DATE: _____

*Is this change amendatory? (Yes/No): _____

3. RIGHT EVIDENCED BY: _____

_____

Prior Approved Temporary Change Applications for this right: _____

========== HERETOFORE ==========

4. QUANTITY OF WATER: _____ cfs and/or _____ ac-ft.
5. SOURCE: _____
6. COUNTY: _____
7. POINT(S) OF DIVERSION: _____

_____

_____

_____

Description of Diverting Works: _____

8. POINT(S) OF REDIVERSION

The water has been rediverted from _____ at a point: _____

_____

_____

_____

Description of Diverting Works: _____

9. POINT(S) OF RETURN

The amount of water consumed is ____ cfs or ____ ac-ft.

The amount of water returned is ____ cfs or ____ ac-ft.

The water has been returned to the natural stream/source at a point(s): _____

_____

_____

*These items are to be completed by the Division of Water Rights.

10. NATURE AND PERIOD OF USE

Irrigation: From _____ to _____
Stockwatering: From _____ to _____
Domestic: From _____ to _____
Municipal: From _____ to _____
Mining: From _____ to _____
Power: From _____ to _____
Other: From _____ to _____

11. PURPOSE AND EXTENT OF USE

Irrigation: _____ acres. Sole supply of _____ acres.
Stockwatering (number and kind): _____
Domestic: _____ Families and/or _____ Persons.
Municipal (name): _____
Mining: _____ Mining District in the _____ Mine.
Ores mined: _____
Power: Plant name: _____ Type: _____ Capacity: _____
Other (describe): _____

12. PLACE OF USE

Legal description of place of use by 40 acre tract(s): _____

13. STORAGE

Reservoir Name: _____ Storage Period: from _____ to _____
Capacity: _____ ac-ft. Inundated Area: _____ acres.
Height of dam: _____ feet.
Legal description of inundated area by 40 tract(s): _____

********** THE FOLLOWING CHANGES ARE PROPOSED **********

14. QUANTITY OF WATER: _____ cfs and/or _____ ac-ft.
15. SOURCE: _____
Balance of the water will be abandoned: _____ or will be used as heretofore: _____
16. COUNTY: _____
17. POINT(S) OF DIVERSION: _____

Description of Diverting Works: _____
*COMMON DESCRIPTION: _____

18. POINT(S) OF REDIVERSION

The water will be rediverted from _____ at a point: _____

Description of Diverting Works: _____

19. POINT(S) OF RETURN

The amount of water to be consumed is _____ cfs or _____ ac-ft.
The amount of water to be returned is _____ cfs or _____ ac-ft.
The water will be returned to the natural stream/source at a point(s): _____

20. NATURE AND PERIOD OF USE

Irrigation: From ___/___/___ to ___/___/___
Stockwatering: From ___/___/___ to ___/___/___
Domestic: From ___/___/___ to ___/___/___
Municipal: From ___/___/___ to ___/___/___
Mining: From ___/___/___ to ___/___/___
Power: From ___/___/___ to ___/___/___
Other: From ___/___/___ to ___/___/___

21. PURPOSE AND EXTENT OF USE

Irrigation: _____ acres. Sole supply of _____ acres.
Stockwatering (number and kind): _____
Domestic: _____ Families and/or _____ Persons.
Municipal (name): _____
Mining: _____ Mining District at the _____ Mine.
Ores mined: _____
Power: Plant name: _____ Type: _____ Capacity: _____
Other (describe): _____

22. PLACE OF USE

Legal description of place of use by 40 acre tract(s): _____
_____
_____
_____

23. STORAGE

Reservoir Name: _____ Storage Period: from _____ to _____
Capacity: _____ ac-ft. Inundated Area: _____ acres.
Height of dam: _____ feet.
Legal description of inundated area by 40 tract(s): _____
_____
_____

24. EXPLANATORY

The following is set forth to define more clearly the full purpose of this application. Include any supplemental water rights used for the same purpose. (Use additional pages of same size if necessary): _____
_____
_____
_____

The undersigned hereby acknowledges that even though he/she/they may have been assisted in the preparation of the above-numbered application through the courtesy of the employees of the Division of Water Rights, all responsibility for the accuracy of the information contained herein, at the time of filing, rests with the applicant(s).

_____
Signature of Applicant(s)

APPLICATION FOR EXCHANGE OF WATER

STATE OF UTAH

Fee Rec'd By _____
Fee Paid $ _____
Receipt # _____
Microfilmed _____
Roll # _____

For the purpose of obtaining permission to make an exchange of water in the State of Utah, application is hereby made to the State Engineer, based upon the following showing of facts, submitted in accordance with the requirements of the Laws of Utah(Sec. 73-3-20, Utah Code Annotated, 1953).

* EXCHANGE NO.: E_____
* PRIORITY OF RIGHT: _____ * FILING DATE: _____

1. OWNER INFORMATION
   Name(s): _____
   Address: _____
   City: _____ State: _____ Zip Code: _____

CURRENT RIGHT

2. WATER RIGHT EVIDENCED BY: _____
3. QUANTITY OF WATER: _____ cfs and/or _____ ac-ft.
   SOURCE: _____ TRIBUTARY TO: _____
   _____ COUNTY: _____

4. POINT(S) OF DIVERSION: _____
   _____
   _____
   _____
   Description of Diverting Works: _____

5. NATURE AND PERIOD OF USE

Irrigation:	From _____ to _____
Stockwatering:	From _____ to _____
Domestic:	From _____ to _____
Municipal:	From _____ to _____
Mining:	From _____ to _____
Power:	From _____ to _____
Other:	From _____ to _____

6. PURPOSE AND EXTENT OF USE (Used w/other rights? Yes _____ No _____)
   Irrigation: _____ acres. Sole supply of _____ acres.
   Stockwatering (number and kind): _____
   Domestic: _____ Families and/or _____ Persons.
   Municipal (name): _____
   Mining: _____ Mining District at the _____ Mine.
   Ores mined: _____
   Power: Plant name: _____ Type: _____ Capacity: _____
   Other (describe): _____

* These items are to be completed by the Division of Water Rights

[redacted] Exchange [redacted]

7. PLACE OF USE
Legal description of place of use by 40 acre tract(s): _____

8. STORAGE
Reservoir Name: _____ Storage Period: from _____ to _____
Capacity: _____ ac-ft. Inundated Area: _____ acres.
Height of dam: _____ feet.
Legal description of inundated area by 40 acre tract(s): _____

9. EXPLANATORY
The following is set forth to define more clearly the full use of the current right. (Use additional pages of same size is necessary): _____

PROPOSED EXCHANGE

10. QUANTITY OF WATER: _____ cfs and/or _____ ac-ft.
SOURCE: _____
COUNTY: _____

11. POINT(S) OF EXCHANGE (DIVERSION): _____
Description of Diverting Works: _____
*COMMON DESCRIPTION: _____

12. POINT(S) OF RELEASE: _____
QUANTITY OF WATER: _____ cfs and/or _____ ac-ft.
PERIOD OF RELEASE: _____ to _____

13. NATURE AND PERIOD OF USE

Irrigation:	From _____ to _____
Stockwatering:	From _____ to _____
Domestic:	From _____ to _____
Municipal:	From _____ to _____
Mining:	From _____ to _____
Power:	From _____ to _____
Other:	From _____ to _____

14. PURPOSE AND EXTENT OF USE (Used w/other rights? Yes _____ No _____)
Irrigation: _____ acres. Sole supply of _____ acres.
Stockwatering (number and kind): _____
Domestic: _____ Families and/or: _____ Persons.
Municipal (name): _____
Mining: _____ Mining District in the _____ Mine.
Ores mined: _____
Power: Plant name: _____ Type: _____ Capacity: _____
Other (describe): _____

15. PLACE OF USE
Legal description of place of use by 40 acre tract(s): _____

16. STORAGE
Reservoir Name: _____ Storage Period: from _____ to _____
Capacity: _____ ac-ft. Inundated Area: _____ acres.
Height of dam: _____ feet.
Legal description of inundated area by 40 acre tract: _____

17. EXPLANATORY
The following is set forth to define more clearly the full purpose of this proposed exchange. (Use additional pages of same size if necessary): _____

If applicant(s) is a corporation or other organization, signature must be the name of such corporation or organization by its proper officer, or in the name of the partnership by one of the partners, and the names of the other partners shall be listed. If there is more than one applicant, a power of attorney, authorizing one to act for all should accompany the application.

The undersigned hereby acknowledges that even though he/she/they may have been assisted in the preparation of the above-numbered application through the courtesy of the employees of the Division of Water Rights, all responsibility for the accuracy of the information contained herein, at the time of filing, rests with the applicant(s).

_____
Signature of Applicant(s)

Exchange Policy and Practice

An important concept in the regulation of water rights and their transfer is the relationship between surface and ground waters. The potential hydraulic connection between these waters has been the object of considerable conflict and concern in many parts of the state. Of particular interest in this research is the effect of this interrelationship on the water right exchange concept and practice.

In Utah, the state engineer administers the water-right system. His responsibilities are essentially to protect existing water rights from impairment by those who wish to acquire an appropriation to unclaimed water or those who wish to make alterations in existing rights. This requires continuing research to make judgments that are both hydrological sound and fair to concerned parties.

The data on record for water-right exchanges show that nearly 82 percent of the exchange activity between 1975 and 1987 occurred in the eastern portion of watershed area number 35 within the Ogden-Weber River area. This peculiarity provided the incentive to understand why this activity had occurred.

As previously discussed, an exchange does not require an alteration in the underlying water right but rather occurs through a contract agreement between the water-right holder and another water user. The exchange applicant, therefore, does not have to be a water-right holder. This has been the case in the majority of the exchanges that have take place in the Weber River area.

Surface and ground waters in the upper Weber River drainage are considered to be fully appropriated. The United States Bureau of Reclamation (USBR) has constructed several storage facilities as part of its Weber Basin Project and, therefore, has rights to all storable surface water in excess of primary flows (Gates, Steiger and Green 1984). These rights and project facilities are managed by the Weber Basin Water Conservancy District, with the obligation of repaying debts incurred by project construction to the federal government.

From the 1950s to the present, this mountainous region has experienced considerable growth. In the 1950s, the question of acquiring water to support this development became an issue of considerable debate. The Weber Basin Water Conservancy District held that all excess waters, including groundwaters not previously claimed, were tributary to the Weber River and, therefore, part of their storage rights. This meant that entities desiring ground water for domestic, public or industrial supply should be required to contract with the district to lease water for their purposes. Others, including the state engineer at the time, questioned whether a small domestic well did in reality impair the district's storage right (Criddle 1989). A part of this argument was based on whether the development for which the water was needed in reality decreased consumptive water use within the hydrologic system through decreased evapotranspiration due to the development's removal of trees for roads and buildings.

Documentation of how the resulting policy was established is difficult to find, but the practice since that time has been to require that all ground water well withdrawals be contracted with the district, subject to state engineer approval. A requirement of that contract is that the district release the contracted amount from one of their storage reservoirs in order the "replace" to the hydrologic system the water drawn from the well. This became known as "replacement

water" and has been incorporated into the exchange process.

A major assumption in the policy of leasing surface water rights to balance groundwater withdrawals is the assumption that the river and groundwater reservoirs have a significant hydraulic connection. This further assumes that water pumped from a well is replaced by infiltration of the water released from storage (Gates, Steiger and Green 1984).

If well withdrawals are indeed balanced by increased recharge from or decreased discharge to streams, then additional wells would cause depletions in streamflow. A significant question that is not easily answered is, of withdrawal from a well is balanced by decreases in transpiration or discharge from isolated seeps, is the surface water flow right of the district affected, and if so, by how much (Gates, Steiger and Green 1984)?

Hydrologically, streamflow releases from storage facilities do not move directly to a well and physically replace well withdrawals unless the cone of depression created by the well actually intersects the stream. It is more likely, if the surface and groundwaters are hydraulically connected, that the well would decrease groundwater or surface water flow to the Weber River and that extra surface water storage releases would make up for the resultant decreased inflow (Gates, Steiger and Green 1984).

Another significant question is the potential time lag between groundwater withdrawals and the system's eventual recharge. This factor can come into play not only as a result of seasonal or sporadic pumping practices but also in instances where the well is a significant distance from sources of recharge or discharge. For greater distances, this time lag may be as much as several years before a well withdrawal affects the Weber River flow. Present policy requires equivalent releases on a yearly basis, although attempts are made to replace well withdrawals as realistically as possible (Gates, Steiger and Green 1984).

A limited hydrologic analysis of these relationships was performed by the U.S. Geological Survey in cooperation with the Utah Division of Water Rights (Gates, Steiger and Green 1984). They concluded that much of the groundwater between Coalville and Gateway, within the Weber River drainage, moves toward and seeps into the Weber River. They also concluded that most well withdrawals will be balanced by some form of decrease in streamflow; however, withdrawal from future wells, balanced by subsequent decreases in evapotranspiration from non-irrigated phreatophytes, will not affect surface water flow (Gates, Steiger and Green 1984).

A recommendation of the USGS study was that a better understanding of well withdrawal effects on evapotranspiration and subsequent surface water flows should be acquired. Such an understanding would require further data collection and development of a predictive computer model (Gates, Steiger and Green 1984).

In summary, past administrative policy has allowed a means for the district to collect funds to repay debts incurred to the federal government through the construction of the Weber Basin Project. However, questions do exist over the hydrologic realities and basis for this policy. Further research in this area would aid in clarifying the hydrologic soundness of and potential guidelines for future administrative policy development.

UTAH STATE UNIVERSITY · LOGAN, UTAH 84322
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Division of Water Resources
and Hydrology
(801) 750-2783

April 5, 1989

Dear

The Division of Water Resources at Utah State University has, over the past year and a half, been actively participating in a 6 state Federally funded water rights study. The intent of this study is to evaluate the water transfer process within the states of Utah, Colorado, Wyoming, New Mexico, Arizona, and California. During this time we have worked closely with the Utah State Engineer's Office evaluating their procedures and records regarding water transfers during the period 1975 to 1987.

As a result we have selected specific case studies which merit additional review. We ask for your cooperation, as a former change applicant, in completing a short questionnaire concerning your application. The specific water right number, application number, source and filing date of the rights in question are shown on the questionnaire. The compiled experience of past change applicants, such as yourself, will be of benefit to all parties involved in future water transactions within the state of Utah. The results of this study will be available to the public in the fall of 1989.

When you have completed the questionnaire, which is self-addressed and stamped, just fold, seal, and drop it in the mail. We would appreciate receiving your response by April 20, 1989.

We wish to thank you in advance for your input and consideration of this important issue. If you have any questions regarding this study, please call the Division of Water Resources at Utah State University, (801) 750-2783.

Sincerely,

Chris C. Hogge
Research Assistant

J. Paul Riley
Head, Division of Water Resources

Census of Applications to Change Place and/or Purpose of Water Use

Applicant: _____ Water Right # _____ Application # _____

Source _____ Date Filed _____ Quantity _____

Please identify your role ☐ applicant ☐ protestant

2. Please estimate your expenditures associated with this application other than purchase price or sales commission in the following categories (if no costs were involved, please leave blank):

Application and Filing Costs			☐ $0-$100	☐ $101-$450	☐ $451+
Title Search			☐ $0-$300	☐ $301-$1,000	☐ $1,001+
Attorneys	☐ $0-$1,000	☐ $1,001-$2,500	☐ $2,501-$5,000	☐ $5,001-$10,000	☐ $10,001+
Engineers	☐ $0-$1,000	☐ $1,001-$5,000	☐ $5,001-$10,000	☐ $10,001-$50,000	☐ $50,001+
Surveyors	☐ $0-$1,000	☐ $1,001-$2,500	☐ $2,501-$5,000	☐ $5,001-$10,000	☐ $10,000+
New Structures		☐ $0-$1,000	☐ $1,001-$10,000	☐ $10,001-$50,000	☐ $50,000+

What structures were added? _____

3. Please estimate the amount of uncompensated time in days or hours expended by you and your associates on this application. _____ days _____ hours

4. Please estimate the value of your time per hour ☐ $5-$10 ☐ $11-15 ☐ $16-$20 ☐ $20+

5. On the following scale, please indicate the extent to which this application was protested.

☐ Not protested 1 Routine Mild 2 3 Moderate 4 5 Strongly Protested

6. If protested, what were the reasons for protest, in order of importance?

1. _____
2. _____
3. _____

7. Was this application modified any, over an earlier application, in order to gain approval by the State Engineer?

☐ Yes ☐ No

If yes, how _____

Answer questions 8, 9, 10, and 11 only if the application involved a sale, and you were associated with either the buyer or the seller.

8. With which party to the sale were you associated? ☐ buyer ☐ seller

9. Through what mechanism did the buyer and seller come together?

☐ broker/realtor ☐ water district ☐ newspaper ☐ other

If other, please explain _____

10. Please estimate the total dollar value paid for these rights? $ _____ to the seller $ _____ to a realtor or broker for commission.

11. If a sale was involved in this application, was there remuneration other than price (lease-backs, land exchanges, etc.)?

☐ Yes ☐ No

12. Please indicate a phone number where you can be reached if there are questions about how to interpret your responses on this survey. _____

Turn page for additional comments.

PRELIMINARY
SUBJECT TO REVISION

SUMMARY OF THE UTAH STATE DIVISION OF WATER RIGHTS POLICIES REGARDING THE APPROPRIATION OF WATER AS OF SEPTEMBER 1, 1967

01 AREA

There is very little development in this area because of its remoteness. It is basically a grazing area, with some exploration for oil and gas. This area is limited to 0.015's, but temporary and fixed time aplications may exceed this limit.

05 AREA

There are three main regions of heavy development in this area. Castle Valley-Castleton area northeast of Moab, Moab and Spanish Valley area, and the LaSal-Old Lasal area of San Juan County. The policy in each of these regions is as follows:

Castle Valley-Castleton

The Castle Valley River Ranchos Development (Liesure Industries Inc.) is closed to new applications except 0.015's being submitted to replace applications which have lapsed. Other rights in this development are obtained from existing rights held by the developer. Other parts of this area are open to 0.015's, however, some temporary and/or fixed time applications may exceed this limit. Change applications based on perfected rights will be considered on individual merit.

Moab and Spanish Valleys

Appropriations for 0.015 cfs for the domestic uses of one family, the irrigation of not more than 0.25 acre and for limited stockwatering purposes will be considered on their individual merits. No appropriations for domestic uses within the city limits of Moab City will be approved, but applications for 0.25 acres, or for stockwatering will be considered within the city limits.

In Moab, the area between the Colorado River and a north-south line coinciding with the center line of Main Street in Moab, irrigation and other large quantity appropriations will be accepted and considered on their individual merits.

LaSal-Old LaSal

Open to 0.015's only, but temporary and/or fixed time applications may exceed that limit.

Other

The rest of the 05 area is restricted to 015's, except temporary and/or fixed time applications may exceed that limit. A liberal policy will be followed in this area concerning change applications. Change applications

to move surface rights, which have deteriorated because of the underground water development will be accepted. Under such circumstances enlargements will not be permitted. Each change application will be considered on it's individual merits.

09 AREA

Generally, only applications for 0.015 cfs are being acted upon. Heavy ground water development has occurred in the areas around Monticello, Blanding, Bluff and in the area of Montezuma Creek. These described cities are open to comestic type applications within the city limits, as opposed to Moab, because they do not have adequate central supply systems. Fixed time and temporary applications may exceed the 0.015 cfs limit.

11 AREA

Canyon areas above fully appropriated springs and streams are closed to new appropriations of both groundwater and surface water. Valley locations are open to groundwater appropriation, but most surface waters are appropriated.

13 AREA

In general, canyon areas above fully appropriated springs and streams are closed to new appropriations of both groundwater and surface water. In valley areas not discussed below, applications will be considered on individual merit.

All appropriations below elevation 4210 for mineral extraction, or otherwise, will only be approved if they are consistant with leasing policies set by the Utah Division of State Lands, and if the State Engineer deems them in the best public interest of Utah.

Park Valley

Open to .015 cfs applications. Ground water applications larger than 0.015 cfs in Park Valley will be held without action, pending change in disposition of 1.2 cfs of water perfected, 82.45 cfs approved, and 190.25 cfs unapproved (as per technical publication # 30).

Grouse Creek Valley

Open to .015 cfs applications. Typical groundwater applications larger than 0.015 cfs in Grouse Creek Valley (T10, 11, & 12N; R18 & 19W) will be held without action pending lapsing, or final proof of the 50+ cfs applications already approved. Certain applications exceeding .015 cfs may be approved in bedrock with depth restrictions.

Lucin

Most of the numerous approved applications for groundwater near Lucin (T7, 8, & 9N; R17, 18, & 19W) have now lapsed. Reasonable groundwater applications will normally be approved under a memorandum requiring evidence of drilling and the placing of water to application uses prior to any extensions of time being granted. However, all approvals will be subject to groundwater resources available.

PRELIMINARY
SUBJECT TO REVISION

Promontory Mountain Range

The east side of the Promontory Mountain Range (T6, 7, 8, 9, 10, 11N) is open to .015 cfs applications only, but due to probable interference with the current rights of Thiokol and/or others, most applications are being denied.

Blue Creek Valley

We are holding all large filings in T13 & 14N pending more groundwater information; T12N is open to all wells that are reasonable, but the water is usually saline (Ec = 3000+).

Pocatello Valley

T15N is open to all groundwater applications.

Curlew Valley

Open to 0.015's only from Hansel Mountains on the east including the Indian Creek Drainage on the west.

Pilot Valley

T5 & 6N are open to all groundwater filings. In T3 & 4N large filings are being held pending the perfection or lapsing of existing large filings, and more groundwater information.

Hansel Valley

The groundwater is open to reasonable applications. Limited information on groundwater development includes references to some mining of water in localized areas. Water quality is generally poor in this area.

14 AREA

Pine Valley

Surface waters are appropriated. Open to groundwater appropriations, but water yields are small, and quality is questionable in this isolated drainage.

15 AREA

Tooele Valley

Open to new appropriations from underground sources with limits of .015 cfs for single-family domestic, incidental stockwatering, and a maximum of 0.25 acres of irrigation (policy presently under review).

Limited surface water appropriations are being granted based on recently increased runoff from snowmelt and spring flows.

Rush Valley

Open to new appropriations of ground water, but limited to .10 cfs together with reasonable uses.

Limited surface water appropriations are being granted based on recently increased runoff from snowmelt and spring flows.

16 AREA

Skull Valley and Dugway Valleys

Open to new appropriations with each application examined for possible interference problems and speculative nature.

17 AREA

Deep Creek Area

Open to new appropriations with each application examined for possible interference problems and speculative nature.

18 AREA

Snake Valley Area - Same as areas 16 and 17.

19 AREA

Hamblin Valley

Open to groundwater appropriation. Current development in south end of valley; large number of applications to appropriate are being held with no action being taken pending further investigation. Will consider domestic filings on their own merits.

21 AREA

Upper Bear River

Groundwater is open to 0.015's for domestic (in house) purposes only, or changes of existing rights. All surface storage and appropriations except 0.015's after January 1, 1976 are subject to the Revised Bear River Compact.

Canyon Areas above fully appropriated springs and streams are closed to new appropriations of both groundwater and surface water.

All appropriations in Area 21 are limited to 0.015 cfs DOMESTIC ONLY unless the State Engineer deems the appropriation to be in the best public interest of Utah.

23 AREA

Canyon areas above fully appropriated springs and streams are closed to new appropriations of both groundwater and surface water.

Valley locations are open to all groundwater filings, except the area located South of highway 16 which is subject to a more restrictive policy. All appropriations except 0.015's after January 1, 1976 are subject to the Revised Bear River Compact which limits total depletion above Bear Lake to 13,000 acre-feet from both surface and underground water.

25 AREA

Areas other than those described below are open to application.

Canyon areas above fully appropriated springs and streams are closed to new appropriations of both groundwater and surface water.

The Clarkston Creek Drainage above Newton Dam is generally limited to appropriations of 0.015 cfs.

All surface water and drain approvals located above (East) of Cutler Dam greater than 1.0 cfs are subject to the applicant signing a compensation agreement with Utah Power and Light Company. All appropriations except 0.015's are subject to the Revised Bear River Compact. Cove area (T14N, R1E) is open to 0.015's only.

29 AREA

Areas other than those described below are open to application, but all appropriations except 0.015's are subject to the Revised Bear River Compact.

Canyon areas above fully appropriated springs and streams are closed to new appropriations of both groundwater and surface water.

Mantua valley is closed to all appropriations.

The area located along highway 69 from Collinston to Brigham City, and Highway 91 (Willard area) is subject to memorandum approval reducing flow to .015 cfs with comparable uses, or denial, particularly if the water source is above spring areas in general, or specifically near the Garland/Tremonton spring area.

The Bothwell Pocket area is limited to .015 cfs from groundwater sources.

The Thatcher area is open, but applications are critically reviewed and may be denied in excess of .015 cfs.

31 AREA

Davis County

Open to new appropriations of ground water for domestic, stockwatering and limited irrigation below the mouths of the canyons. New wells in the flowing well areas may be limited to small diameter wells (generally 2"), depending on the predominent size of wells in the vicinity of the proposed well.

PRELIMINARY
SUBJECT TO REVISION

35 AREA

Weber and Ogden River Drainages

Closed to new appropriations of water above the mouths of the Canyons. Changes or exchanges are required for development. In the Park City-Snyderville Area, because of excessive demands for water, a moratorium has been placed on exchanges in excess of 1.0 acre-foot until presently approved exchanges and changes have been developed to the extent, that further evaluation of water sources can be made in conjunction with the present study in the area (status subject to change in the near future). Below the mouths of Ogden and Weber Canyons, Weber County is open to new appropriations of water, but new wells in the flowing well areas may be limited to small diameter wells (generally 2"), depending on the predominant size of wells in the vicinity of the proposed well.

41 AREA

North Slope of Uintas

This area is closed to surface waters, except for isolated springs. Groundwater and isolated springs will be considered for 0.015 cfs only, together with uses limited to domestic purposes for one family, one quarter acre of irrigation and reasonable stockwatering. Fixed time (normally approved for five years), and temporary applications may be approved in excess of the 0.015 cfs limit.

43 AREA

Upper Duchesne River (that area above the Knight diversion on the Duchesne).

Same as 41 area except approvals are under memorandum to drill a well in the approval period in order to obtain extensions of time.

In those areas tributary to the Strawberry Reservoir above Soldier Creek Reservoir, applications are being taken for domestic puposes only, but are subject to careful review and may be rejected.

Lower Duchesne River (the area below the Knight Diversion).

Same as 41 area.

45 AREA

Green River - Same as 41 area

47 AREA

Nine Mile Creek

Argyle Canyon is basically the only area where groundwater is being developed. It is a recreation and livestock grazing area under the same policy as the 41 area.

The Pleasant Valley-Pariette Wash portion of the 47 area is under the same groundwater policy as the 41 area; 0.015's - most are recreational. Fixed time and temporaries over 0.015 considered.

49 AREA

Southeast Uinta - Same as 41 area

51 AREA

All "50" Areas are closed to domestic appropriations within city limits or where served by municipal water systems except in the 57 and 59 Areas.

Southern Utah Valley

All mountain and canyon areas are closed. Valley areas are open to 0.015 cfs with 3.0 acre-foot per year limitation on consumptive use. Approval by memo and wells to be drilled during initial period.

Indianola Valley Closed.

53 AREA

Goshen and Northern Juab Valleys

All mountain and canyon areas are closed. Valley areas are open to 0.015's with 3.0 acre-foot per year limitation in Goshen Valley. Approval in Goshen Valley by memo and wells to be drilled in initial period.

54 AREA

Cedar Valley

All mountain and canyon areas are closed. Valley areas are open to 0.015's except around the Fairfield Spring Area.

55 AREA

Northern Utah Valley and Provo River

All mountain and canyon areas are closed. Valley areas are open to 0.015's with no acre-foot limitation. The Devil's Hole area of Heber Valley is closed above the 5,800 foot elevation. Upper Provo applications are limited to domestic for one family, 0.25 acres of irrigation and nominal number of stock. Appropriations are not approved within recognized subdivisions.

57 AREA

Eastern Salt Lake Valley

Mountain and canyon areas are closed. All other groundwater appropriations are open. Wells in the Murray artesian basin are limited to the shallow unconfined aquifer, i.e., to a maximum depth of between 30 to 75 feet, depending on site-specific information. In the Jordan Narrows area

the State Engineer has adopted a somewhat cautious policy regarding further appropriations of ground water. This policy may be summarized as follows:

1. Applications to appropriate small quantities of cold or hot water are generally being approved at this time.

2. Applicants seeking to appropriate a large quantity of cold water may be required to develop water from a deep depth.

3. Applicants seeking to appropriate a large quantity of low-temperature geothermal water may be required, after use of this water, to return it to the same sources from which it was diverted.

4. A particular application may be held without specific action, or rejected if the State Engineer has reason to believe that approval of the application would not be in the best public interest at this time.

59 AREA

Western Salt Lake Valley

All mountain and canyon areas are closed. North of the middle of T3S, the ground water basin is open. South of the Middle of T3S, the ground water development is restricted to 0.015's. Rose Canyon above Rose Canyon Irrigation Company's diversion works is closed. In an area east of Magna in the vicinity of where 2100 south Street curves southwesterly (as one proceeds westward) into 2300 South Street, new applications to appropriate large quanitites of ground water (more than a few gallons per minute) are carefully considered and, if approved by the State Engineer, are subject to the requirement that the development of ground water be made from an aquifer which is deeper than that from which existing wells divert water.

61 AREA

Upper Sevier River

Appropriations of underground water in the 61 area are limited to applications for 0.015 cfs of water for domestic purposes of one family, irrigation of 0.25 acre and a nominal amount of stockwatering; all uses not to exceed 3.0 acre-feet. Also, the proposed well and use must not be located within a subdivision or within an area supplied by a municipality. It is the opinion of the State Engineer that the developer of a subdivision should supply water to the lot owners, which would come from existing rights transferred to the subdivision. It is also the policy of the State Engineer in these areas, that if a person lives within the municipal boundaries of a town or city, he should receive water from the municipality rather than appropriate a new source of ground water. In these areas, the proposed well must be located within the valley alluvium and cannot be located in canyons or on mountains which water could be tributary to existing rights. The State Engineer is also limiting appropriations to a maximum consumptive use of 3.0 ac. ft. per annum by memorandum.

PRELIMINARY
SUBJECT TO REVISION

63 AREA

Central Sevier River - Same as 61 area.

65 AREA

Sanpitch River - Same as 61 area.

66 AREA

Lower Sevier River

Upstream from the Sevier Bridge Reservoir is the same as for the 61 area. Downstream of the Sevier Bridge Reservoir (Mills Valley Area), the applicant must purchase shares of water from an irrigation company which has storage rights in Sevier Bridge Reservoir and file an exchange application to drill a well.

Southern Juab Valley is open to appropriations of 0.015 cfs, but is limited to 3.0 acre-feet. Mills Valley is closed - exchange only.

67 AREA

Pahvant Valley

Same as 61 area, 3.0 Ac. ft. limitation is imposed. 5 or 6 groundwater districts - no changes from district to district.

68 AREA

Same as 61 area except area in vicinity of Delta is closed (See Map), and this area (68) is limited to 2.0 acre-feet annualy. Approvals in this area are by memorandum to drill well in approval period.

69 AREA

Wah Wah Valley

Open to groundwater appropriation (no surface streams); several large test wells developed by Earth Sciences Corporation indicate a deep water table.

71 AREA

Escalante Valley (changes from one to another of the areas described below are not approved).

Beryl-Enterprise Area - Closed to appropriation; development under existing rights.

Lund-Nada Area - Closed to appropriation. Declining water table and land subsidence recorded. Development under existing rights.

Black Rock Area - Open to groundwater appropriation, but applications are currently being held, except for isolated domestic or stockwatering uses

with reasonable acre-foot limits. Isolated development from the underground water aquifer. Will consider applications to appropriate on own merits. Holding several large applications because of location and speculative nature of application. Deep well development in bed rock for geothermal development is being considered where it appears that it will not interfere with existing rights.

Cove Fort Area - Open to appropriation, a number of applications filed, holding applications because of locations and unknown reserves. Development fairly concentrated. Domestic uses in this area are even doubtful.

Milford Area - Same as Escalante Valley, Beryl-enterprise, and Lund-Nada areas.

73 AREA

Cedar City Valley - closed to appropriation. Development under existing applications. Valley spilt on U56 - no transfers across.

75 AREA

Parowan Valley - Closed to appropriation. Development under existing applications. Valley split on South line of T32S - no transfers across.

77 AREA

Beaver Valley - Closed to appropriation. Development under existing applications.

81 AREA

Virgin River

East Fork of Virgin River (Long Valley Creek) is closed to appropriation, both surface and underground water.

Virgin River and all tributary streams east of Hurricane escarpment (ridge or cliffs) are closed to appropriation; except Gould Wash drainage. A number of applications have been approved in the "plains" area of Gould Wash, but the State Engineer is presently holding all applications. All streams north of the Virgin River from Hurricane west to the river confluence with Ash Creek including the entire Ash Creek Drainage, and the entire LaVerkin Creek Drainages are closed to appropriations.

The Quail Creek drainage and the area west to the Middleton Black Ridge are closed to the appropriation of surface water and the underground aquifer directly connected to the surface supply. The State Engineer will consider applications to appropriate water from bedrock in this area (presumably, but not limited to the Navajo Sandstone), and each application will be weighed on its own merits, but most are being held at this time.

The Virgin River area south of the flood plain, is open to appropriation from the underground but the State Engineer is presently holding all applications without approval.

The Santa Clara River and its tributaries are closed to the appropriation of water, both surface and underground. Some consideration has been given to bedrock development.

The Beaver Dam Wash drainage area is open to the appropriation of groundwater. The surface water is fully appropriated, but it is unknown whether full development has been made of the underground aquifers.

85 AREA

Kanab and Johnson Creeks

Kanab Creek, Johnson Creek and all tributaries are considered fully appropriated and closed to further appropriation. The underground water directly connected to, or recharged from surface streams, unless further study confirms the aquifer is isolated from the surface flow, is considered fully appropriated. The State Engineer will consider applications to develop underground water from bedrock formations in an isolated situation based on the merits of the application.

89 AREA

Paria River

The area generally included with T36 & 37S, R1-3W, and part of the head waters of the Paria River, including North Creek, Henderson Creek, Campbell Creek, Bryce Creek, Henrieville Creek, and other tributaries, is considered to be fully appropriated on the surface supply of water and any directly connected underground aquifer. The State Engineer will consider applications to appropriate water for 0.015 cfs based on the proposed location, outside of any existing municipal, town, or subdivision system, and on the individual merits of the applications.

91 AREA

Price River

The 91 area, which is the Price River Drainage, is open to the appropriation of groundwater in the amount of 0.015 cfs in all parts of the area, with the exception of the water shed area west of Price, to and including the Willow Creek area, Scofield and Soldier Summit. In the water shed area of the 91 area, which is tributary to the Price River above the golf course, which is located immediately south of Helper, the applicant must acquire shares of stock in the Price River Water Users Association (Scofield Reservoir) and file an exchange application. Change applications are considered on an individual basis. The only areas with some development of the ground water resources (not to exceed 0.015 cfs) is on the west side of the Green River around Green River City, and around Scofield Reservoir (under exchanges), for recreation and industrial uses.

In the 91 area, the only areas where groundwater quality and quantity is acceptable for use is in the Scofield Reservoir region. Some small amounts of groundwater have been developed for minor irrigated tracts in and around Green River City.

PRELIMINARY
SUBJECT TO REVISION

92 AREA

Lower Green River

Applications of 0.015 cfs and change applications are being accepted and considered on their individual merit. The only area with significant water development is on the east side of the Green River at Green River, Utah. Temporary and fixed time applications may exceed 0.015 cfs in this area.

93 AREA

San Rafael River

Moutainous areas which supply water for the major irrigation diversions are closed except under exchange applications. Valley locations are open to 0.015's. Exchanges are being accepted on irrigation company shares. Temporary and fixed time applications may exceed 0.015's in certain areas. There are no areas of significant ground water development in this drainage area.

94 Area

Muddy Creek

Same policy as the 93 area.

95 AREA

Fremont River

The 95 area is open to applications not exceeding 0.015 cfs of water for the domestic purposes of one family, stockwatering and irrigation of 0.25 acre of land. Certain applications exceeding these limits may be approved based on individual merit. Applications are not being approved within municipalities, but subdivision and some locations above valleys may be approved.

97 AREA

Escalante River

The Escalante River and all tributaries are considered to be fully appropriated, and the underground water directly connected to the surface streams is closed to appropriation, with the exception of some limited applications for 0.015 cfs which have been approved on an individual basis. The State Engineer will accept applications to appropriate water from the underground aquifer located in bedrock and consider them on the individual merits of the applications.

99 AREA

There is very little water development in this area because of its remoteness. This is basically a grazing area. Approvals are limited to 0.015's. Temporary and fixed time applications may exceed this limit.

YEARLY DIVERSION ALLOWANCE IN ACRE FEET (JANUARY 1988)

Based upon the allowance of:

1 sheep or goat or swine	= 5 gpd	= .00560	ac. ft./year
1 chicken or turkey	= 0.75 gpd	= .00084	ac. ft./year
1 cow or horse	= 25 gpd	= .0280	ac. ft./year
1 family (domestic)	= 400 gpd	= .45	ac. ft./year
1 moose or elk	= 5 gpd	= .0056	ac. ft./year
1 deer, bighorn sheep, antelope or rocky mountain goat	= 1.25 gpd	= .0014	ac. ft./year
1 wild turkey, sage hen, chukar or pheasant	= .75 gpd	= .00084	ac. ft./year

1 cubic foot = 7.48052 U.S. Gallons
1 acre foot = 325,851 U.S. Gallons

NO.	SWINE SHEEP OR GOAT	CHICKEN OR TURKEY	COW OR HORSE	FAMILY	NO.	SWINE SHEEP OR GOAT	CHICKEN OR TURKEY	COW OR HORSE
1	0.01	0.01	0.03	0.45	55	0.31	0.05	1.48
2	0.01	0.01	0.06	0.90	56	0.31	0.05	1.57
3	0.02	0.01	0.08	1.35	57	0.32	0.05	1.60
4	0.02	0.01	0.11	1.80	58	0.32	0.05	1.62
5	0.03	0.01	0.14	2.25	59	0.33	0.05	1.65
6	0.03	0.01	0.17	2.70	60	0.34	0.05	1.68
7	0.04	0.01	0.20	3.15	61	0.34	0.05	1.71
8	0.05	0.01	0.22	3.60	62	0.35	0.05	1.74
9	0.05	0.01	0.25	4.05	63	0.35	0.05	1.76
10	0.06	0.01	0.28	4.5	64	0.36	0.05	1.79
11	0.06	0.01	0.31		65	0.36	0.06	1.82
12	0.07	0.01	0.34		66	0.37	0.06	1.85
13	0.07	0.01	0.36		67	0.38	0.06	1.88
14	0.08	0.01	0.39		68	0.38	0.06	1.90
15	0.08	0.01	0.42		69	0.39	0.06	1.93
16	0.09	0.01	0.45		70	0.39	0.06	1.96
17	0.10	0.01	0.48		71	0.40	0.06	1.99
18	0.10	0.02	0.50		72	0.40	0.06	2.02
19	0.11	0.02	0.53		73	0.41	0.06	2.04
20	0.11	0.02	0.56		74	0.41	0.06	2.07
21	0.12	0.02	0.59		75	0.42	0.06	2.10
22	0.12	0.02	0.62		76	0.43	0.06	2.13
23	0.13	0.02	0.64		77	0.43	0.07	2.16
24	0.13	0.02	0.67		78	0.44	0.07	2.18
25	0.14	0.02	0.70		79	0.44	0.07	2.21
26	0.15	0.02	0.73		80	0.45	0.07	2.24
27	0.15	0.02	0.76		81	0.45	0.07	2.27
28	0.16	0.02	0.78		82	0.46	0.07	2.30
29	0.16	0.02	0.84		83	0.46	0.07	2.32
30	0.17	0.03	0.84		84	0.47	0.07	2.35
31	0.17	0.03	0.87		85	0.48	0.07	2.38

NO.	SWINE SHEEP OR GOAT	CHICKEN OR TURKEY	COW OR HORSE	NO.	SWINE SHEEP OR GOAT	CHICKEN OR TURKEY	COW OR HORSE
32	0.18	0.03	0.90	86	0.48	0.07	2.41
33	0.19	0.03	0.92	87	0.49	0.07	2.44
34	0.19	0.03	0.95	88	0.49	0.07	2.46
35	0.20	0.03	0.98	89	0.50	0.08	2.49
36	0.20	0.03	1.01	90	0.50	0.08	2.52
37	0.21	0.03	1.04	91	0.51	0.08	2.55
38	0.21	0.03	1.06	92	0.52	0.08	2.58
39	0.22	0.03	1.09	93	0.52	0.08	2.60
40	0.22	0.03	1.12	94	0.53	0.08	2.63
41	0.23	0.03	1.15	95	0.53	0.08	2.66
42	0.24	0.04	1.18	96	0.54	0.08	2.69
43	0.24	0.04	1.20	97	0.54	0.08	2.72
44	0.25	0.04	1.23	98	0.55	0.08	2.74
45	0.25	0.04	1.26	99	0.55	0.08	2.77
46	0.26	0.04	1.29	100	0.56	0.08	2.80
47	0.26	0.04	1.32	200	1.12	0.17	5.60
48	0.27	0.04	1.34	300	1.68	0.25	8.40
49	0.27	0.04	1.37	400	2.24	0.34	11.20
50	0.28	0.04	1.40	500	2.80	0.42	14.00
51	0.29	0.04	1.43	600	3.36	0.50	16.80
52	0.29	0.04	1.46	700	3.92	0.59	19.60
53	0.30	0.05	1.48	800	4.48	0.67	22.40
54	0.30	0.05	1.51	900	5.04	0.76	25.20
55	0.31	0.05	1.54	1000	5.60	0.84	28.00

CHAPTER 6

WATER RIGHTS TRANSFERS IN WYOMING

Mark Squillace

Professor of Law

University of Wyoming
College of Law

CHAPTER 6

TABLE OF CONTENTS

Introduction

This report begins with a brief review of the Wyoming water rights allocation and transfer system. It then summarizes data on the 42 Wyoming water transfer applications that have been filed with the state since the current Wyoming water transfer law was enacted in 1973. Twenty cases were chosen for further study. Case selection was based on the potential for illustrating trends and issues that have developed with the water transfer process in Wyoming. The report concludes with recommendations for improving Wyoming's water transfer system.

Section 1: Wyoming Water Law

Like most states west of the 100th meridian Wyoming follows the prior appropriation scheme to allocate water rights. Wyoming was the first state to adopt a wholly administrative scheme for the allocation of water rights -- a scheme that proved so successful it was emulated by other western states.[1] The following material briefly reviews Wyoming water law with a more extensive discussion of Wyoming's water transfers policy.[2]

Administration of Water Rights

The Wyoming Constitution establishes a Board of Control and a State Engineer to administer water rights within the state. The State Engineer serves as the President of the Board and is the chief water official in the state. He is joined on the Board by the superintendents of the four water divisions established for each of the major drainage basins within the state. Most decisions relating to water rights are made by the full Board which meets quarterly to rule on various matters which are pending before it. Some decisions, however, such as the approval of water exchanges, are the sole prerogative of the State Engineer.

Distinctions Among Types of Water Rights

Wyoming water rights can be divided into three principal categories: (1) surface water; (2) groundwater; and (3) storage water. Water in each of these categories is allocated in accord with the prior appropriation scheme and all water rights are subject to the constitutional requirement that they be put to a beneficial use.[3] Nonetheless, some differences exist in each category. For example, Wyoming law provides for the designation of groundwater control areas in areas where groundwater conflicts exist or where such conflicts may foreseeably occur. Groundwater rights within such control areas may be regulated by the State Engineer to avoid future conflicts, and such regulation need not necessarily follow strict priority of rights. Persons holding storage water rights may be required to fill their reservoirs when water resources are plentiful, usually in the spring, and they may be precluded from taking water during other times of the year if they failed to take water when it was available to them, even where such rights have an earlier priority date than other water rights on the stream.[4] All primary water rights holders are required to obtain a permit.[5] Permit applications are made to the State Engineer on a prescribed form, and if the application is approved, the priority date relates back to the date of the application.[6] A permit application may be denied because no unappropriated water is available in the stream, the proposed use conflicts with existing water rights, or the proposed use threatens to be detrimental to the public interest.[7] If an application is rejected, the applicant may appeal the decision to the Board of Control. An unfavorable decision

by the Board of Control may be appealed to the state district courts.[8]

Once a permit is granted the applicant may proceed to construct the facilities necessary to divert the water.[9] Such construction must be completed within the time specified in the permit which may not exceed five years. Extensions are available, however, for good cause shown.[10] When the facilties are completed and the water is applied to a beneficial use, the permittee submits final proof of appropriation to the superintendent of the appropriate water division. The applicant's proof is then transmitted to the Board of Control which issues a certificate of appropriation.[11]

"Beneficial use [is] the basis measure and limit of the right to use water ..." in Wyoming.[12] Despite its importance, however, the benefical use concept has never been defined, and it has not proved a serious limitation on the right to use water. Indeed, Wyoming law expressly authorizes water rights for as much as two cubic-feet per second (cfs) for each 70 acres of irrigated land. The first cfs is authorized under an 1890 law which actually limits irrigation appropriations to one cfs for each 70 acres but then provides that any excess water may be divided among the various users *pro rata*.[13] The second cfs is available to pre-1985 appropriators in accordance with two laws -- the 1945 surplus water law, and the 1985 excess water law. The 1945 law vests in each person with an irrigation water right prior to March 1, 1945 a second cfs of water with a March 1, 1945 priority date. The 1985 law vests in each person with a water right dated after March 1, 1945 but before March 1, 1985 a second cfs with a March 1, 1985 priority date.

Wyoming's rules regarding loss of water rights differ from those in other western states. In most states, an abandonment occurs only where it can be shown that the owner had a specific intnent to abandon the right. Some of these states have adopted forfeiture statutes whereby the loss of water rights occurs automatically following a period of nonuse specified by statute.[14] Wyoming, however, distinguishes abandonment from forfeiture based on who may bring the proceeding.[15] Abandonment proceedings may be intitiated by private individuals; forfeiture actions are brought by the state. Neither abandonment nor forfeiture requires a specific intent to abandon, and water rights are not deemed abandonded or forfeited if reuse precedes the initiation of proceedings. Thus, nonuse itself most probably does not defeat a water right in Wyoming. Loss occurs only after the proceedings are completed.

Water Transfers Law in Wyoming

Unlike many of its sister states, Wyoming has traditionally adhered to a conservative policy towards water transfers. The original Wyoming water laws did not address water transfers, but as early as 1894, the Wyoming Supreme Court suggested that water rights were severable from the land,[16] a result which reflected the prevailing law in other western states.[17] In *Johnston v. Little Horse Creek Irrigating Co.*,[18] decided in 1904, the court confirmed its earlier dictum, and expressly held that an appropriator could sell his water right separate from the land so long as the right was for water that was being beneficially used, and was not unneeded surplus water, and so long as other appropriators were not injured.[19]

But even before the Wyoming Supreme Court rendered its decision in *Johnston*, sustaining the decision of the district court, State Engineer Elwood Mead was laying the groundwork for a dramatic change in the state's water transfer law. In his most famous work, *Irrigation Institutions*,

Mead criticized the district court opinion:

> If [the right to transfer water] is [sustained], water rights...will become personal property. The water of the public streams will become a form of merchandise, and limitations to beneficial use a mere legal fiction. It will render futile and useless the requirement of the State statute that the lands to which the appropriation is attached must be described in certificates, because the right can be separated from this land without any legal formality as soon as the certificate is recorded. If water is to be so bartered and sold, then the public should not give streams away, but should auction them off to the highest bidder.[20]

Mead acknowledged that transfers that are made "under a specific procedure" could "work much good."[21] He noted further that they might "promote a more economical use of water."[22] Ultimately, however, Mead remained persuaded that transfers encouraged water rights speculation.

> [S]o far as this writer's observation has gone [economy] is not the moving purpose of these sales. In every instance investigated the real purpose has been to make money out of excess appropriations.[23]

Mead's influence on Wyoming law was substantial and in 1909 he persuaded the state to enact legislation that prohibited the transfer of water rights or the change of use or place of use "without loss of priority."[24] Over time, many exceptions to the 1909 "no change" law were carved out of the law;[25] but it was not until 1973 that Wyoming adopted language which expressly authorized transfers.

This report focuses on changes in the use of the water. Other types of water transfers, some of which may be necessary to bring about a change in use, include: (1) changes in the place of use; (2) exchanges; (3) changes in the point of diversion; (4) changes in location of wells; (5) temporary changes.[26] The Wyoming provisions for each of these types of transfers are described briefly below.

Change in Use and Place of Use

As noted previously, Wyoming enacted legislation in 1973 expressly authorizing changes in use and place of use for water rights.[27] Such changes are the most common type of water transfer in Wyoming. They are initiated by filing a petition with the Board of Control.[28] The petition must set forth information about the existing use and the proposed change in use, and the Board may hold one or more public hearings at the petitioner's expense.[29] The decision to grant or deny the petition is based on a statutory modification of the common law "no injury" rule.[30] The Board may not grant a petition unless the following requirements are met:

> (1) the quantity of water transferred does not exceed the amount of water historically diverted;[31]
>
> (2) the proposed new use will not divert water at a higher rate than the historic rate of diversion;[32]
>
> (3) the proposed new use will not consume more water than was historically and beneficially consumed by the existing use; and[33]

(4) the proposed new use will not decrease the historic amount of return flow, nor change the place of return flow so as to injure another water user, nor cause any other injury to a lawful appropriator.[34]

In addition to the above requirements, the Board may consider other factors unrelated to other water users. These include:

(1) the economic loss to the community and the state if the use from which the water right is transferred is discontinued;

(2) the extent to which the economic loss will be offset by the new use; and

(3) whether other sources are available for the new use.[35]

Arguably, the Board of Control may also deny a transfer where demanded by the public interest, under their general constitutional authority to deny original applications on public interest grounds.[36]

One of the more interesting limits on transfers concerns that relating to the historic and beneficial consumptive use. The statute itself limits transfers only to that water which has been historically consumed. But in *Basin Electric Power Cooperative v. State Board of Control*, the Wyoming Supreme Court held that this water must be consumed beneficially as well.[37] In the *Basin Electric* case, which is described in greater detail below in the section on case studies,[38] the transferor was using water for agricultural purposes. The transferee, Basin Electric, proposed to use the water for power production in another watershed. Under the 1973 Wyoming statute, the amount of water available to be transferred was limited to that amount of water that was consumed by the transferor in his agricultural use. The dispute in this case centered on the amount consumed by the agricultural uses. A portion of the water used by the transferor was returned to the stream as irrigation return flows. No one disputed that these return flows could not be transferred. Because of the configuration of the land, however, another portion of the irrigation run off was captured in a closed basin where it eventually evaporated. Because this water was essentially lost to the water system under the existing use, Basin Electric argued that this water was "consumed" and should be available for transfer. The court disagreed, holding that the legislature intended to limit water transfers to the amount of water "beneficially" consumed. Although the peculiar facts in *Basin* might suggest a rather narrow holding, in fact the decision has broad implications. For example, imported water, i.e., water that is taken from one basin and put into another, is considered a 100% consumptive use of water. Thus, in some western states, imported water may be transferred without regard to the amount of water consumed.[39] In Wyoming, however, the transfer of such water rights would appear to be strictly limited by the beneficial consumptive use of the water, even though no one would suffer a legal harm if the entire water right was transferred.

The right to permanently change the use of water under the 1973 statute is limited to those with an adjudicated water right. In *Green River Development Co. v. FMC Corp.*,[40] the Wyoming Supreme Court distinguished a "water permit" which gives the permittee a right to apply water to a beneficial use for a particular purpose, from a "water right", which attaches to water applied to a beneficial use, and for which a certificate of appropriation has been issued. The statutory provisions for change in use and place of use were held applicable only to "water rights". Furthermore, the court expressly held that the

statutory provision which authorizes the State Engineer "to amend any water permit . . . prior to adjudication . . . for the purpose of correcting errors *or otherwise, when in his judgment such amendment seems desirable or necessary*",[41] did not authorize the State Engineer to approve a change in use or place of use of a water permit.[42] Following the decision in *Green River*, the Wyoming legislature amended the law to authorize limited changes in the place of use for a water permit.[43] Changes in the type of use for unadjudicated water permits, however, are still precluded.[44]

Exchanges

Since 1947, Wyoming law has encouraged interested parties to exchange water resources to better conserve and utilize the state's water.[45] Unlike other forms of permanent changes which must be approved by the Board of Control, exchanges need only be approved by the State Engineer.[46] Exchanges are authorized for "any combination of direct flow, storage, and groundwater rights."[47] They are, of course, subject to the general "no injury" rule, and to the requirements of "beneficial use and equality of water exchanged."[48] In determining the equality of the exchange, the State Engineer may consider relative consumptive uses and transmission losses. The statute, however, fails to address how the State Engineer should consider any disparity between the priority dates of the rights that are involved. This disparity may very well affect the value of the water right and the availability of the water during given times of the year.

Change in the Point of Diversion

Any person desiring to change the point of diversion of their water right must file a petition with either the Board of Control or the State Engineer, depending on whether the right has been adjudicated.[49] If the right has not been adjudicated a change in the point of diversion may only be approved if it is in the vicinity of the original diversion, the water is being diverted from the same source of supply, and the change does not alter the original project concept.[50] The statute also sets detailed filing requirements and provides for a public hearing before the petition may be granted. As with other transfers, no change of point of diversion may be granted if "other appropriators will be injuriously affected."[51]

Change in Location of Wells

Changes in well location for adjudicated water rights to a point within the same aquifer and in the vicinity of the original well may be made without loss of priority.[52] The Board of Control is authorized to grant changes in location of unadjudicated groundwater rights if the applicant can demonstrate that the water has been applied to a beneficial use. For reasons that are unclear, the State Engineer is granted the authority to change the well location of unadjudicated water rights which have *not* been applied to a beneficial use, including domestic or stock water wells.[53]

Presumably no loss of priority occurs in changes of well location approved by the State Engineer; otherwise the provision authorizing such changes would be meaningless since a person might just as easily apply for a new water right in that instance. Nonetheless, the statute itself is silent on this issue. New well locations are limited to the total amount of water appropriated in the original permit. A petition to change a well location is, of course, subject to the "no injury" rule.[54]

Temporary Changes

In addition to the other change

provisions, Wyoming law has allowed temporary changes of both adjudicated and valid but unadjudicated water rights since 1959.[55] Temporary changes of water rights may not exceed two years and may be acquired by purchase, gift or lease.[56] Temporary changes are subject to the prior approval of the State Engineer and are limited to the historic consumptive use and by the "no injury" rule.[57] The statute allows the State Engineer to assume 50% return flow for temporary changes of direct flow irrigation rights, although he may adjust that figure in his discretion if such figure would be "significantly in error."[58] When a temporary change is approved, the State Engineer enters an order designating the method, place and period of use.[59] During the period of the approved temporary change, the original owner suffers no impairment of his right and when the period ends he is automatically reinvested with the same rights previously held.[60] Thus, temporary changes can be used to toll the period for abandonment of water rights. A serious disadvantage of temporary water rights is that they are wholly subordinate to permanent water rights, including those with a later priority date.[61] This is unfortunate since it undoubtedly limits the utility of temporary changes which can help ensure efficient use of water resources.

Transfers of Secondary Water Rights

Since at least 1921, reservoir water rights have not been considered appurtenant to any particular tract of land, and, according to the statute, so long as the water is used for beneficial purposes it can be "sold, leased, transferred, and used in such manner and upon such lands as the owner of such rights...may desire."[62] Given the nature of reservoir rights this provision seems unremarkable. As a practical matter, the owner of a large reservoir right often intends for that water to be used by many different people. Indeed, often the reservoir owner will not even be an end user of water, as in the case of an irrigation or conservancy district or a mutual ditch company. Thus, the freedom to sell and transfer reservoir water among various end users on different lands without resort to the transfer statute seems a virtual necessity. The language authorizing the sale and transfer of reservoir water rights is not, of course, without limits. Most likely, it was intended to apply principally to transactions between the reservoir owner and the end user. Arguably, it does not extend to transaction between end users.[63] Moreover, it clearly ought not encompass the transfer of primary reservoir rights for purposes that do not involve filling the particular reservoir for which the rights were granted.

Despite, or perhaps because of, the ambiguity surrounding the provision for transferring reservoir water a considerable amount of transfer activity between end users of reservoir water has taken place without the approval or involvement of the Board of Control.[64] Ironically, the right to transfer such water appears to favor a person who fails to obtain a secondary water permit. Once a person obtains a secondary right he must comply with the transfer statute.[65] By contrast, the person who fails to apply for a secondary permit may freely transfer his water without seeking the approval of the Board of Control. Since the end user of reservoir water falls outside the prior appropriation system, it seems unnecessary to subject any such end user to the transfer statute. Nonetheless, the law will probably have to be amended to correct this deficiency.[66]

The most common type of transfer of secondary reservoir water rights are temporary transfers. During the latter part of the growing season some farmers in water distribution organizations have excess water, while others have insufficient water. In these cases it seems sensible to allow the water to be reallocated to the farmers who need it and

many districts have established programs to accomplish this result. The procedures for bringing about these transfers are largely informal and they are not uniform among the districts. Some districts allow individual farmers to arrange their own deal. In this manner the seller can command the best price that the market will bear. The district's involvement is limited to a requirement that the parties notify the district of the change so that the ditch riders know how much water each user should receive.

Other districts have evolved more sophisticated practices. For example, the Horse Creek Irrigation District sends a letter to each farmer around the middle of August asking whether they would like to sell or buy water. If more water is available for sale than there are purchasers, each seller is allowed to sell a *pro rata* amount to each buyer.[67] Conversely, if there are more buyers than sellers, the buyers receive a *pro rata* share of that available for sale. All such transfers are limited to the current growing season, and the price paid is set at the normal price established by the district for its water.

While the informal systems appear to work reasonably well, they are technically not authorized by the statute.[68] Moreover, inequities and other problems may surface. For example, the opportunity to sell water at a price above that charged by the irrigation district may lead some farmers to speculate with their water rights. Furthermore, unlike water rights which are temporarily transferred under the provisions of Wyoming law, informal transfers do not toll the period for abandonment. Thus, if a farmer ceases to use a water right every year on August 15 for five consecutive years because he has transferred that water to another user, he may be deemed to have abandoned any water rights after August 15.[69] To avoid these problems, some legal recognition of and standards for these transfers, perhaps in the form of regulations from the State Engineer, should be promulgated.

Section 2: Wyoming's Water Transfers Experience

Wyoming's early experience with water transfers is thoroughly described by Frank Trelease and Dellas Lee in a study published in the premier issue of the *Land and Water Law Review* in 1966.[70] That study was aimed primarily at refuting the notion that water transfers in Wyoming were virtually non-existent due to the "no change" language of the 1909 Wyoming statute. The study ably discredits that notion.[71] This is done with a review of the myriad legal provisions which had carved out exceptions to the "no change" rule, and a description of numerous cases which demonstrated the feasibility of various types of transfers. The authors concluded, nonetheless, that Wyoming's water transfers laws could be much improved.

Some improvements have been made since Trelease and Lee looked at Wyoming water transfers in 1966. Most significantly, of course, the legislature adopted specific legislation in 1973 that expressly allows transfers. But many restrictions on transfers remain. During the past several years, substantial data on water transfer activity in Wyoming has been gathered in conjunction with the regional study that is the basis for this report.[72] This section describes and attempts to interpret that data.

Background

The 1973 water transfers legislation was made applicable to all applications filed after February 1, 1974. Since that time, 42 water transfer applications have been filed.[73] Of these, 25 were granted without conditions,

7 were granted conditionally, and 9 were denied. One application is currently pending. The time for processing transfers of agricultural water to a non-agricultural use ranged from 3 to 61 months, with an average processing time of 16.67 months.[74] Twelve transfer applications were protested and two decisions were challenged in court -- in both cases by the applicant and not a protestant. Transfers from agricultural to a non-agricultural use resulted, on average, in reducing the total water right by 57.4 percent. Transfers of agricultural water that did not involve a change in use generally did not affect the amount of the water right.[75] The chart set forth as Appendix to this report describes all of the water transfer activity in Wyoming since February 1, 1974 -- the date that the 1973 stautute went into effect.

Of particular interest is the general dearth of transfers. This contrasts sharply with transfer activity in other states in the Rocky Mountain region where substantial transfer activity has been recorded.[76] Wyoming's relatively small population base surely accounts for some of this difference. But other factors appear to have contributed to the lower level of transfer activity as well.

First, Wyoming has a long-standing reputation as a state with restrictive transfer laws.[77] Despite the effort to liberalize Wyoming's transfer laws, court decisions such as *Basin Electric* continue to fuel the perception that Wyoming is not receptive to water transfers. To some extent, this reputation is unfair. The Board of Control fully and fairly considers transfer applications and as the data suggests, several significant water transfers have been approved. But the Board does show a decidedly conservative approach to transfer proposals. Moreover, whether deserved or not, Wyoming's reputation as hostile to water transfers undoubtedly discourages would-be applicants from looking at transfers as possible sources of water supplies.[78]

Second, the 1973 statute which authorizes transfers is extremely narrow. In addition to prohibiting transfers that cause injury to other appropriators, the statute precludes transfers that increase the amount of water historically diverted, or increase the historic rate of diversion, or increase the historic amount consumptively used, or decrease the historic amount of return flows.[79] In addition, as noted previously, the Board has discretion to deny a transfer after considering: (1) the economic loss to the community and the state where the use from the transferred right is discontinued; (2) the extent to which the economic loss will be offset by the new use; and (3) whether other sources of water are available for the new use.[80]

Finally, the Board interprets the law narrowly so as to further limit transfers. One of the best examples of the Board's attitude toward transfers is the decision in *Basin Electric*, affirmed by the Wyoming Supreme Court, which, as previously described, prohibits transfers of water that have been historically used and consumed, but which were not beneficially consumed.[81] The Board's abundance of caution in its decisions on transfer applications effectively limits the value of transfers. The cases described below amply demonstrate these problems.

Water Transfer Cases in Wyoming

In an effort to better determine how the Board is likely to respond to a transfer application, approximately one-half of the 42 transfer applications that have been filed since February 1, 1974 were reviewed in detail. These cases were not chosen randomly, but were selected because of the likelihood that the cases might prove

instructive of the Board's practices. For example, the nine transfer applications involving agricultural water which did not involve a change in the end use of that water were not studied extensively because such transfers were unlikely to illustrate the utility of water markets.

Agriculture to Industrial Use Transfers

Pacific Power

The water transfer proposed by Pacific Power and Light Company offers a good example of the conservative approach to transfers taken by the State Board of Control. In 1980, Pacific Power proposed to transfer 31.72 cubic feet per second (cfs) of direct flow irrigation water rights from the North Platte River and from Jack Creek, a North Platte tributary, for use at its Dave Johnson Power Plant near Glenrock.[82] The proposed diversion was 223 miles downstream on the North Platte River from the original point of diversion near Saratoga.[83]

Opponents of the transfer argued during a hearing that Pacific Power should not be allowed to transfer the water because of the potential for harm to other appropriators. The protestants argued that Pacific Power had not sufficiently studied the consumptive use and return flows of the irrigation water, because the Company had submitted data for only one year.[84] The protestants also questioned Pacific Power's conveyance loss estimate of .7 percent for the distance to the new point of diversion from the old.[85] One critic of the estimate said that the conveyance loss study "should include evaporation, transpiration, bank storage and inadvertent diversions associated with the incremental increased flow plus any additional losses of the original flows caused by the increase."[86] The protestants also contended that the Board should consider the economic impact of the transfer on the Saratoga area,[87] administrative problems involved in the transfer,[88] and whether Pacific Power could have found a water source closer to the proposed point of diversion.[89]

It was the distance from the original point of diversion that the Board of Control most criticized in its lengthy 1981 opinion rejecting Pacific Power's application. Among the Board's findings was a conclusion that Pacific Power's conveyance loss estimate of less than one percent, based on evaporation and the incremental increase in the surface area of the river, was inadequate. The estimate, the Board concluded, did not take into account such relevant factors as "bank storage, deep percolation into underlying geologic formations, and inadvertent diversions due to sporadic raising of the water elevation, all of which admittedly occur on the North Platte River."[90] In other words, the Board was concerned that 31.72 cfs upstream was not equivalent to 31.72 cfs downstream, because myriad factors contribute to water losses during transit.

The Board also found "[t]hat the North Platte River is a highly regulated river subject to numerous legal and operational constraints which result in complex management problems."[91] The Board elaborated that "with the personnel and equipment presently available," it would be difficult to administer water rights along the river without injury to other appropriators.[92]

The Board cited a number of additional reasons for rejecting the application, including a failure by Pacific Power to establish historic times of use for each right,[93] inadequate evidence with which to determine the acreage of land irrigated by the water,[94] possible injury to the economy of Carbon County for power generated for "possible out-of-state use,"[95] and an insufficient showing by Pacific Power that it had considered sources of water supply closer

to the power plant, such as Seminoe, Kortes, Alcova and Pathfinder Reservoirs.[96]

Pacific Power was frustrated in its transfer attempt despite having spent an estimated $270,000 on legal and engineering fees. To improve Wyoming's system of water transfers, Pacific Power officials suggested changing the application procedure from an administrative to a judicial process and establishing more definite criteria for approving or rejecting applications.[97]

The Pacific Power case demonstrates the reluctance of the Board of Control to approve changes in places of use or points of diversion over long distances that might be approved in other western states. It was the distance involved in this case -- 223 miles -- along with the fact that the transfer was to take place along Wyoming's most heavily regulated river, the North Platte, that most convinced the Board to deny the transfer.

Basin Electric

Since 1975, Basin Elecrtric Power Cooperative has been engaged in a complex series of administrative actions and judicial appeals in an effort to transfer water from agricultural to industrial uses.

In its earliest application, Basin Electric sought to transfer water from agricultural lands along the Laramie River for use at its Laramie River Station near Wheatland, Wyoming. Basin's plan was to sever three separate water rights from their previous uses and store the water (98.73 cfs) in the proposed Grayrocks Reservoir.[98] Protestants to the transfer, including the Wheatland Irrigation District, did not directly counter Basin's evidence, but simply questioned the sufficiency of Basin's data. For example, the protestants hired a consulting engineer and land surveyer who testified at the hearing before the Board that conveyance losses on the Laramie River were highly variable and largely unpredictable.[99] Another expert testified for protestants as to steps that could have been taken to "more accurately analyze Basin's information."[100] Protestants contended that the Board lacked sufficient information to make a good decision on the transfer and that the transfer should not be "imposed upon us at this time based upon conjecture or surmise."[101] Notwithstanding the protests, the Board of Control granted the bulk of the transfer. The amount of water transferred was limited, however, to the historic amount that had been consumptively and beneficially used for agricultural purposes, which was found to be 41.86 cfs.[102]

Basin appealed the Board's decision to the courts. Much of the agricultural water that Basin sought to transfer drained into Long Lake, a closed basin, and was thus lost to the Laramie River system.[103] Since this water did not return to the river, and since it was not used by any other person, Basin argued it should be available for transfer.[104] The statute expressly limits transfers to the historic rate of consumption but does not explicitly require *beneficial* consumption.[105] Nonetheless, the Board of Control found that consumptive use means water that is beneficially consumed by the crop.[106] Accordingly, water that flowed off the irrigation site could not be transferred.

The district court sustained the agency's decision, and the Wyoming Supreme Court affirmed, reinforcing the Board of Control's interpretation of the statute. The Supreme Court reasoned that the Legislature intended the Board to consider all of the criteria set out in the statute irrespective of injury to other appropriators.[107] Thus, the Board was required to limit the transfer to the historic amount of water consumptively used. In addition, the Court ruled that the Board must limit transfers to that water beneficially used, whether or not any injury to

TABLE 4
CONVERSION OF AGRICULTURAL ACREAGE AND WATER TO URBAN USES
Salt River Project, Arizona 1950-1988[1]

Year	Project Acreage	Agricul. Acreage	Urban Acreage	% Ag. Land	% Urban Land	Agric.2 Water	Urban[3] Water
1950	240,999	207,779	33,220	86.2	13.8	935,006	79,728
1951	240,904	205,727	35,177	85.4	14.6	925,772	84,425
1952	240,661	201,259	39,402	83.6	16.4	905,666	94,565
1953	240,388	197,798	42,590	82.3	17.7	890,091	102,216
1954	240,261	195,435	44,826	81.3	18.7	879,458	107,582
1955	239,908	192,825	47,083	80.4	19.6	867,712	112,999
1956	239,645	190,597	49,048	79.5	20.5	857,686	117,715
1957	239,289	188,354	50,935	78.7	21.3	847,593	122,244
1958	238,787	185,920	52,867	77.9	22.1	836,640	126,881
1959	238,582	181,136	57,446	75.9	24.1	815,112	137,870
1960	238,342	176,712	61,630	74.1	25.9	795,204	147,912
1961	238,191	173,839	64,352	73.0	27.0	782,276	154,445
1962	238,082	171,262	66,820	71.9	28.1	770,679	160,368
1963	238,252	169,834	68,418	71.3	28.7	764,253	164,203
1964	238,252	167,922	70,330	70.5	29.5	755,649	168,792
1965	238,252	167,120	71,132	70.1	29.9	752,040	170,717
1966	238,252	165,276	72,976	69.4	30.6	743,742	175,142
1967	238,252	164,495	73,757	69.0	31.0	740,228	177,017
1968	238,252	162,514	75,738	68.2	31.8	731,313	181,771
1969	238,262	162,874	75,388	68.4	31.6	732,933	180,931
1970	238,264	158,136	80,128	66.4	33.6	711,612	192,307
1971	238,264	153,558	84,706	64.4	35.6	691,011	203,294
1972	238,264	148,128	90,136	62.2	37.8	666,576	216,326
1973	238,264	142,931	95,333	60.0	40.0	643,190	228,799
1974	238,264	125,741	112,523	52.8	47.2	565,834	270,055
1975	238,264	124,452	113,812	52.2	47.8	560,034	273,149
1976	238,266	121,761	116,505	51.1	48.9	547,924	279,612
1977	238,220	118,951	119,269	49.9	50.1	535,280	286,246
1978	238,220	114,392	123,828	48.0	52.0	514,764	297,187
1979	238,221	109,223	128,998	45.8	54.2	491,504	309,595
1980	238,221	105,771	132,450	44.4	55.6	475,970	317,880
1981	238,221	102,105	136,116	42.9	57.1	459,472	326,678
1982	238,172	98,546	139,626	41.4	58.6	443,457	335,102
1983	238,172	95,292	142,880	40.0	60.0	428,814	342,912
1984	238,171	89,268	148,903	37.5	62.5	401,706	357,367
1985	238,170	81,911	156,259	34.4	65.6	368,600	375,022
1986	238,170	74,746	163,424	31.4	68.6	336,357	392,218
1987	238,170	71,245	166,925	29.9	70.1	320,602	400,620
1988	238,266	69,271	168,995	29.1	70.9	311,720	405,588

[1] Sources: Various SRP reports from 1977 and 1988.
[2] Assumes 4.5 acre-feet per acre, the 1980 agricultural use rate.
[3] Assumes 2.4 acre-feet per acre, the 1980 urban use rate.
Double figure 6 & 7

6 Conversion of SRP Land from Agricultural to Urban Uses
7 Estimated SRP Water Deliveries for Agricultural and Urban Uses

TABLE 5
TUCSON WATER PURCHASES IN AVRA VALLEY

Year	Number of *Purchases*	Total *Acreage*	Total Pur- *chase Price*	Average *per Acre*
1971	1	317	$156,000	$492
1972	2	2,286	1,089,000	476
1973	0	0	0	--
1974	0	0	0	--
1975	4	1,283	1,249,212	974
1976	11	6,553	5,390,500	823
1977	1	1,278	905,000	708
1978	0	0	0	--
1979	2	926	526,250	568
1980	0	0	0	--
1981	0	0	0	--
1982	0	0	0	--
1983	0	0	0	--
1984	8	6,465	10,842,000	1,677
1985	0	0	0	--
1986	*4*	*2,947*	*4,569,750*	*1,551*
Total	33	22,518	$24,727,712	$1,098

TABLE 6
TYPE I RIGHTS
Original and IGR Conversions

	Year	Number *Converted*	Total *Acres*	Total Water *(acre-feet)*
	1985	11	3,605	11,444
	1986	8	968	4,356
	1987	16	4,465	14,126
	1988	10	2,080	5,482
	1989	4	637	1,741
	1990	*1*	*30*	*87*
Total IGR Conversions		50 + *19* split 69	11,785	37,236
Original Type I Rights		*123*	*30,342*	*92,074*
Total Type I Rights		192	42,127	129,310

for approximately 30 years.[142] The Town was permitted to transfer the well water between May 15 and October 15 each year but only at the adjudicated rate of consumption, with a total groundwater withdrawal of 49.42 acre-feet annually, to be pumped at a rate not to exceed 2.45 cfs (1100 gallons per minute).[143] The transfer of water rights from the dry ditch was denied.[144] Pine Bluffs appealed the Board of Control's limitation on the groundwater transfer, contending that since its predecessor appropriators had irrigated as much as 186 acres, more than the well's present adjudicated right of 39 acres, the Town should be able to transfer the historic actual consumption. Both the state district court and the Wyoming Supreme Court sustained the Board's decision.[145] Pine Bluffs officials stated in response to a survey that "[i]f more water has been used than was originally adjudicated and it didn't hurt the water table any, then this should be considered in a transfer."[146] Such a rule would, of course, provide an incentive to appropriators to take more water than they are legally entitled to take.

Lander

In 1984, the State Board of Control approved an application by the City of Lander to transfer 1.01 cfs from agricultural to municipal use. The City's plan was to detach 1.35 cfs from a previously appropriated direct flow water right that was diverting from the Middle Fork of the Popo Agie River, a tributary of the Little Wind River, which is a tributary of the Big Horn River.[147] The City proposed to divert the water through a pipeline to the Golf Course Reservoir to water its golf course and adjacent city property, such as the hospital lawns, airport, city shop and rodeo grounds.[148]

The City did not provide the Board with a return flow and consumptive use study like most transfer applicants, because the City's representatives thought that, since the water would still be used for irrigation, it would not reduce the return flows.[149] The Board, however, was not convinced that return flows would be unaffected. "The Board felt it was necessary to reduce the water the petitioner requested to transfer ... by 25 percent to compensate for loss of return flows to the Big or Middle Fork of the Popo Agie River."[150] "The Board, therefore, felt that only 1.01 cfs should be allowed for this transfer and the remaining 0.34 cfs not transferred would be left undiverted to compensate for any loss of return flows."[151] No one protested the transfer.

Pinedale

In 1982, the Town of Pinedale applied for a series of transfers from agricultural to municipal use. The Town hoped to transfer portions of direct flow water rights from acquired lands in the amounts of 1.49 cfs, 0.43 cfs, 0.47 cfs, and 0.26 cfs.[152] The existing points of diversion were along various tributaries of the Green River. The Town proposed to change the point of diversion to the Pinedale Water Supply Pipeline, which diverts from Fremont Lake near Pinedale.[153] No one protested the transfer. Pinedale did not provide a study with specific figures on waste water return flows but argued that because Pinedale was "a fairly typical municipality in terms of waste water return flows," 60 to 75 percent of the water diverted by the Town would become waste water and return to the stream.[154] The Town hired the Wyoming Water Resources Research Institute to conduct a consumptive use study on the irrigation use of the water using the Blaney-Criddle Method.[155] The Institute estimated a maximum return flow for irrigation of 60 percent. Accordingly, the Town contended that "greater return flows will occur under the proposed municipal use than under the previous irrigation use."[156] The Board concluded, however, that "[t]he historic return

flows are to remain in the natural stream to compensate for return flows and to avoid injury to other appropriators."[157] Thus, the Board, which found historic consumptive use to be 22 percent, reduced Pinedale's transfers from the requested 1.49 cfs to 0.37 cfs, from 0.43 cfs to 0.11 cfs, from 0.47 cfs to 0.12 cfs, and from 0.26 cfs to 0.07 cfs respectively.[158]

The Town also requested that it be allowed to divert from the water system for 180 days each year. The Board of Control, however, found that "in the experience of the Board" the historic irrigation season in the area runs from the beginning of June to the end of August, or 92 days.[159] In addition, the Board approved the Town's request for a change in point of diversion without alteration.[160]

Baggs

In 1976, the Town of Baggs applied to the Board of Control to transfer 0.93 cfs of water from the Little Snake River from agricultural to municipal industrial use.[161] The water right held a 1901 priority date.[162] The transfer, which also involved a minor change in the point of diversion, was approved by the Board of Control in May, 1977. The Board found, however, that some of the lands from which the water rights were sought to be detached were above a slough and had not been irrigated and should be forfeited. The Board therefore subtracted 0.34 cfs from the Town's requested transfer.[163] Otherwise, the Board found that Baggs had complied with other prerequisites, such as providing a map of the area,[164] and demonstrating that there were no intervening tributaries or water sources that might affect the rights of other appropriators.[165] The Board allowed Baggs to detach 0.59 cfs from the lands and to transfer that water to its municipal water supply between April 15 and September 30 each year, or 168 days.[166]

Evanston

In 1974, the City of Evanston applied for a transfer of three different rights from agricultural to municipal uses. The City had actually been using this water for municipal purposes for many years. The City's application sought to detach portions of direct flow water rights in the Bear River from lands acquired by the city in three appropriations prior to 1915.[167] The requested transfers were for 1.03 cfs, 0.84 cfs and 1.37 cfs respectively.[168] No one protested the petition. Nonetheless, the Board was unconvinced by the City's claim that there had been very little historic return flows from the three properties because of their distance from the river and the nature of the area's topography.[169] Since a return flow and consumptive use study was not provided, and no records to establish historic diversion amounts were offered, the Board assumed a 50 percent return flow.[170] Furthermore, the Board found that much of the land involved in the transfer had not actually been irrigated and that accordingly some of the water rights should be forfeited.[171] In its May, 1975 decision, the Board accordingly lowered the amounts to be allowed in the transfer from 1.03 cfs to 0.39 cfs, from 0.84 cfs to 0.33 cfs, and from 1.37 cfs to 0.51 cfs.[172]

In addition, the Board noted that the water in question had, contrary to the certificate, been diverted through the City's pipeline, instead of the Evanston Water Ditch since 1915.[173] The Board issued a separate order to "correct the record," allowing a change in point of diversion of the water that Evanston had been diverting through its pipeline for many years.[174]

Two attorneys who have represented Evanston in water transfer cases described the Board of Control as very cooperative.[175] One of the attorneys suggested that the process

might be improved, however, if the state engineer were allowed to make rulings without a hearing in simple transfer cases. If any person was dissatisfied, he could appeal the decision to the Board for a hearing. But the appellant would bear the burden of proof of showing that the transfer should or should not be approved. Such a process might eliminate the need for full-scale hearings in many cases.[176]

Casper

In 1984, the City of Casper petitioned the Board of Control to transfer certain water rights that, like the application filed by the City of Evanston, involved changes that had occurred many years ago.[177] The first involved the diversion of 5.5 cfs from Elkhorn Creek that had originally been diverted through the Casper City Reservoir Ditch.[178] The ditch, however, had been unusable for years, so the City had been diverting the water through the Casper Elkhorn Creek Pipeline instead.[179] The City desired a change of point of diversion and means of conveyance order allowing the water to be diverted through the pipeline, which is 800 feet downstream from the ditch.[180] The Board allowed the change, regarding it as primarily clerical.[181]

The second request concerned appropriations Casper had made prior to 1896, allowed under then-existing law, that had been diverted to municipal use since that time. The City requested that the Board allow it to transfer 5.5 cfs of water from these lands.[182] However, since the City could not divert no more than 2.37 cfs of these water rights -- the capacity of the Casper Elk Creek Pipeline -- at any given time, the Board declared 3.13 cfs forfeited.[183]

Granger

In 1983, the Town of Granger petitioned for a change of use of direct flow water rights from agricultural to municipal use. Involved in Granger's proposal were lands with a water right of 9.61 cfs.[184] However, Granger needed only 1.5 cfs.[185] Accordingly, the Town proposed to take 673 acres, with an appropriation of 9.61 cfs, out of production and only use 1.5 cfs.[186] Under the circumstances, the Board of Control allowed the Town to omit the consumptive use and return flow study normally required for such transfers.[187] The Board found that of the 673 acres Granger was proposing to take out of production, 350 were actually irrigated.[188] At the statutory rate of 1 cfs per seventy acres, that meant that the water right on the land was 5.0 cfs.[189] The Board concluded that "a reasonable return flow rate for the area" was about 50 percent. That would mean Granger would need to assure the Board that half of the 5 cfs available for transfer would remain in the stream, which it did.[190] However, the transfer also involved a change in point of diversion 95 miles downstream to the Westvaco Pipeline, which diverts from the Green River Supply Canal, which diverts from the Green River.[191] Granger's engineer testified that a conveyance loss of 0.2 percent per mile can be expected on the Green River. Over 95 miles then, 19 percent would be lost.[192] Nineteen percent of the 2.5 cfs, which the Board found was available for transfer after deducting return flows, is a little less than .5 cfs. Since Granger proposed diverting only 1.5 cfs, the Board, granted Granger's transfer with the understanding that 673 acres with a water right of 9.61 cfs would be taken out of production, and the Town would only divert 1.5 cfs.[193] The Board of Control concluded that "in the experience of the Board of Control," the irrigation season in the area was 92 days per year rather than the 114 days requested by Granger.[194] The Board limited the transfer right to 92 days per year. No one protested the transfer.

Thayne

In 1985, the Town of Thayne applied for a change in use of 0.76 cfs of direct flow water from agriculture to municipal use.[195] The water right had irrigated 55 acres by diverting from Flat Creek, a tributary of Lost or Baxter Creek, which flows into the Salt River before reaching the Snake River.[196] The proposed transfer required a change in point of diversion of one-half mile upstream on Flat Creek.[197] The Town voluntarily abandoned 0.01 cfs of water, since 0.54 acres of land had been inundated by the Thayne sewage lagoons.[198]

The Town reported during the hearing that the historic crop grown on the land in question was barley. The consumptive use of barley, a small grain crop, is 32.64 percent with a return flow of 67.36 percent, according to a Wyoming water journal.[199] Accordingly, the Town requested that it be able to use only 0.25 cfs for 92 days each year, a period equivalent to the irrigation season for barley.[200] No protest was filed against the proposed transfer. The Board granted the change in use of 0.25 cfs of water for 92 days each year, or a total annual diversion of 45.27 acre-feet.[201]

Other Water Transactions

CAID-Casper

In 1982, the City of Casper and the Casper-Alcova Irrigation District (CAID) entered into a cooperative agreement whereby the City was to fund improvements to prevent losses in CAID's water delivery system. In return, the City would be entitled to the amount of water saved by the improvements, which consist typically of concrete ditch lining and pipelines.[202]

The Kendrick Project, the system involved in the CAID-Casper exchange, consists of two dams, Alcova and Seminoe, 62 miles of canal and 140 miles of lateral ditches that were constructed by the U.S. Bureau of Reclamation during the 1930s in southwestern Natrona County. CAID assumed operation of the project during the 1940s, and its members irrigate about 24,000 acres of land. Because the ditches and canal were unlined, however, substantial seepage losses occurred in the system. This was never a particular problem since CAID's cumulative water rights far exceeded water usage.[203]

During the 1970s, the City of Casper experienced a population boom and faced increased water demands. Meanwhile CAID held surplus water rights but was incurring large debts and facing increased operating costs and the need for capital improvements on its aging water system. These factors combined to create a climate in which cooperative water conservation could be made beneficial to both parties.[204]

Under the 1982 agreement, the City of Casper agreed to pay off a $750,000 debt owed by CAID to the Bureau of Reclamation. The City also agreed to pay $150,000 per year for water conservation projects to CAID and a $23 storage fee to the Bureau of Reclamation for each acre-foot used by the City.[205] Once the 7,000 acre-feet are saved, the construction phase of the contract will be satisfied. However, the City will then have to pay to CAID a minimum of $25 per acre-foot of water it uses for "continued system betterment consistent with the intentions" of the agreement until 40 years has expired.[206]

In 1985, the Wyoming Legislature passed special legislation that allowed the Casper-Alcova rehabilitation project to proceed.[207] Special legislation was necessary because the project could not have been approved under the Wyoming change of use statute. As noted previously, that statute

prohibits transfers of water rights that increase the beneficial consumptive use of the water. The CAID project will certainly have this result. Also, the State of Wyoming agreed to contribute $1,263,000 to the project or 50 percent of construction costs, whichever is less.[208]

In order to make the water conservation agreement work, it was necessary to undertake a study to quantify CAID's water losses so as to determine how much water will be saved by the improvement projects. A hydrologic study was conducted, and is repeated each year, using an inflow-outflow technique, among others. This technique requires researchers to place water level recorders at the beginning and end of a stretch of canal or ditch and to take periodic measurements to determine the amount of water lost over that length of canal or ditch.[209] The U.S. Soil Conservation Service provided technical assistance for the program and provided a long range water conservation plan.[210]

Under the 1982 agreement, the City is entitled to receive the amount of water that is determined by these scientific methods to be saved by the capital improvements. The City may not, however, take more than 7,000 acre-feet per year. Moreover, if the City does not use all of its entitlement during a year, it cannot carry over the unused portion to the following year. It can, however, borrow water from CAID to be saved under future construction projects if the City's water supply proves insufficient. If there is a shortage in the overall water supply, the City must share the shortage with CAID, but CAID must allow the city to use 5,000 acre-feet if there is at least that much available. Under the contract, CAID's main obligation is to make 7,000 acre-feet of water available to the City as soon as the improvements make such allocations possible. CAID is also responsible for administering the conservation program.[211]

Thus far, a total savings of 1,633 acre-feet of water per year has been confirmed as the result of five completed water conservation construction projects at the Kendrick Project. In 1984, an irrigation pipeline replaced the entire 2.9 miles of Lateral 41 for a water savings of 382 acre-feet per year. The project cost was $182,596. The cost per acre-foot for the saved water was $478. In 1985, 2.6 miles of Lateral 210 was lined with concrete. The total cost of the project was $268,000 for a water savings of 353 acre-feet, or $759 per acre-foot. The City's share of the project costs were $134,000, or $379 per acre-foot.[212] In 1986, an additional 2.5 miles of Lateral 210 was lined at a cost of $183,795. This resulted in a savings of 450 acre-feet of water at $408 per acre-foot. The City's share of that project was $91,898, or $204 per acre-foot. The final phase of the improvements on Lateral 210 was completed in 1988 at a cost of $156,320 for a savings of 275 acre-feet of water or $568 per acre-foot. The City's share of the construction costs was $78,160, making the cost per acre-foot to the City just $284.[213] In addition, phase one improvements on Lateral 102 were completed early in 1989 at a cost of $81,700 resulting in a savings 172.8 acre-feet of water. The cost per acre-foot of the water saved was $473. The City's share of the costs was $40,850, which means that the cost to the City of this water per acre-foot is $237.[214]

The total cost to the City of Casper for this project is uncertain at this time, but it appears the City will obtain the saved water cheaply as compared with other methods. An early estimate was that the project would cost the City about $56 per acre-foot per year.[215] Due to unanticipated costs, however, the cost may be somewhat higher.[216] Nonetheless the $56 per acre-foot per year Casper was projected to pay as a result of the CAID

Casper for use of water generated by the proposed Deer Creek Dam and Reservoir.[217] While the reservoir project includes other benefits, such as recreation and large scale water storage (for Deer Creek an estimated 66,000 acre-feet[218]), it seems clear that conservation and improvement of existing water systems can be a more cost-effective means for developing new supplies of water.

Wyoming Game and Fish

In 1983, the Wyoming Game and Fish Commission applied to the Board of Control for approval to change the use of water at Renner Reservoir from irrigation to fish propagation for recreational purposes.[219] The Renner Reservoir stores 366.95 acre-feet of water from Buffalo Flat Creek, a tributary of Nowood River, which flows into the Big Horn River in northern Wyoming.[220] The Game and Fish Commission stated that no one would be injured by the proposed change of use of the water, as the water was being changed from a consumptive use to a nonconsumptive use.[221] The Game and Fish Commission also stated that it was requesting the change only to reflect how the water in the Renner Reservoir had been used since its acquisition and how it would continue to be used.[222] No one protested the petition. In 1984, the Board of Control recommended approval of the nominal transfer of the requested amount, and the district court complied in February, 1987.[223]

Indian Springs

Indian Springs Improvement & Service District applied in 1980 to change the use of reservoir water and stream water from irrigation "to drinking purposes for man and beast," of municipal use.[224] Indian Springs attempted to transfer 13.5 acre-feet drawn from the Gothberg Reservoir, which stores water on Dobbins Springs Creek, a Natrona County tributary of the North Platte River. In addition, Indian Springs desired to transfer 0.85 cfs in direct flow water drawing from Dobbins Springs Creek for the same purposes.[225]

No one protested the proposed transfer, but the Board's own investigation showed that some of the land did not belong to the petitioner, and most of the land was not irrigated.[226] The Board found that in previous years water would occasionally be used for flood irrigation of a few lots of the Indian Springs Subdivision. But Indian Springs presented no evidence to quantify the amount of water used, the diversion period or the consumptive use of the crops irrigated even for the few lots on which the Board determined there had been irrigation.[227] In March, 1981, the Board rejected Indian Springs' petition, stating that Indian Springs had "failed to carry its burden of proof of establishing that the quantity of water transferred would not exceed the amount of water historically diverted under the existing use, nor exceed the historic rate of diversion under the existing use, nor increase the historic amount of water consumptively used under the existing use."[228] The Board concluded that the purposes for which Indian Springs sought the transfer could be fulfilled by a current date priority and that Indian Springs had a current permit for drinking water.[229]

An attorney who represented Indian Springs in this action said that the Board's decision was not unexpected, given the facts of the case. He said the Board ruled fairly and consistently with the evidence. He did add, however, that it might be advisable to clarify the statute somewhat to give applicants more guidance as to what proof will be necessary to support a transfer.[230]

Rawlins

In 1985, the City of Rawlins applied to change the use of 1.3 million gallons of water it received the from North Platte River through the Union Pacific Pipeline from railroad to municipal use.[231] The railroad and City had been diverting 1.5 million gallons daily from the river since 1900.[232] Since 1964, Rawlins had been using 1.3 million gallons daily, or 2.01 cfs, for domestic purposes.[233] Union Pacific still used 200,000 gallons daily for railroad purposes.[234] The Board of Control considered the Rawlins matter as a transfer "to correct the records to agree with the way water has been used by the City of Rawlins since the Union Pacific Railroad Company assigned the 1,300,000 gallons per 24 hours to the City" in 1964.[235] No one protested the transfer. Accordingly, the Board granted the City's request.[236]

Recurring Issues

The cases described above suggested several recurring problems and issues that are discussed below.

Evidence in Support of the Transfer

The burden of proving that a water transfer meets the statutory criteria falls on the applicant, and the burden is a substantial one.[237] Successful petitions generally include detailed studies or other information regarding -- (1) the historic consumptive use of the particular water right; (2) the historic rate of diversion and return flows; and (3) losses attributable to the distance between the original and new points of diversion.

Historic consumptive use/return flows

A consumptive use and return flow study should be based upon the prior or historic use of the water right. Applicants have the burden of showing that the transfer will not increase the demand on the water supply. When an applicant submits a consumptive use study that fails to show that the transfer will not increase the demand, the Board can be expected to reduce significantly the amount of water transferred, or to reject the application outright.

For example, Pacific Power & Light submitted a consumptive use study based solely on use during the year 1980.[238] Protestants to Pacific Power's transfer sharply criticized the submission of consumptive use figures for only one year.[239] The Board of Control, which denied the Company's transfer, agreed: "The Board does not feel that diversion records for only one year are adequate to establish historic use."[240] However, in one of Basin Electric's transfer cases, three years were sufficient to establish history.[241]

Where an applicant desires to transfer the full amount of a water right, he must, of course, demonstrate that the consumptive use will not increase as a result of the transfer. To support its proposed transfer of an entire water right, the Town of Pinedale merely claimed that it was "a fairly typical municipality" and that return flows from municipal water are between 60 and 75 percent of the water diverted.[242] The Board of Control assumed the lowest figure -- 60 percent -- and cut Pinedale's transfer request substantially to ensure that Pinedale would not consume more water than had been consumed historically.[243]

Even if a water transfer is considered primarily a correction of records, as in the transfer application filed by the City of Casper, the Board of Control will limit the transfer to the historic rate of diversion. The City of Casper had been diverting water for many years that had been appropriated for use on certain agricultural lands before 1896. The amount of water included in the appropriations far exceeded the capacity of

the pipeline through which the City diverted the water. Since the City could not have historically diverted any more water than the pipeline could carry, the Board declared the rest forfeited.[244] Consumptive use for agricultural purposes has been defined by the Board of Control as water that is beneficially consumed by the crop, as has previously been described in discussion of the Basin Electric transfers.[245]

Not surprisingly, when historic use on the land far exceeds the adjudicated water right, a petitioner is only allowed to transfer the adjudicated right. In 1982, the Town of Pine Bluffs appealed a Board of Control order to the Wyoming Supreme Court contending that since its predecessor appropriators had irrigated much more than a well's adjudicated right, the Town should be able to transfer the historic actual consumption. The Supreme Court affirmed the lower court's holding that the Board was correct in a transfer in excess of the adjudicated right.[246]

Conveyance loss

Where an applicant seeks to change its point of diversion over long distances as a part of its water transfer, a realistic conveyance loss report should be included in the application. The Board of Control has noted that myriad factors contribute to water losses during transit, and that accordingly, the amount of water upstream is not equivalent to an amount of water downstream.

In the Pacific Power case, the company proposed to transfer the point of diversion 223 miles downstream on the North Platte River. Pacific Power submitted a conveyance loss estimate of less than one percent which was closely scrutinized during hearings on the proposed transfer. The conveyance loss estimate was based on evaporation and the incremental increase in the surface area of the river.[247] One protestant argued that the report "should include evaporation, transpiration, bank storage and inadvertent diversions associated with the incremental increased flow plus any additional losses of the original flows caused by the increase."[248] The Board of Control essentially agreed, finding that the estimate should have taken into account factors such as "bank storage, deep percolation into underlying geologic formations, and inadvertent diversions due to sporadic raising of water elevation, all of which admittedly occur on the North Platte River."[249]

By contrast, the Town of Granger offered testimony by its engineer acknowledging an expected conveyance loss of 0.2 percent per mile on the Green River. The transfer involved a change in point of diversion 95 miles downstream. Over 95 miles, conveyance losses would be 19 percent under this evidence. The Board accepted Granger's estimate as reasonable.[250]

Where an applicant is unable or unwilling to provide the pertinent data, he may succeed simply by accepting a transfer of a relatively small percentage of a water right. For example, the Town of Granger had little difficulty transferring 1.5 cfs of water to municipal use from a water right of 9.61 cfs. The Board of Control in that case waived the consumptive use information requirement and the Town submitted only the conveyance loss estimate.[251] For some small transfers it may perhaps make sense to accept a small percentage of the water right proposed for transfer in exchange for not having to supply detailed evidence. Such an approach, however, obviously will reduce substantially the market value of the water rights which are being transferred.

Other Limitations on Transfer

The Board of Control looks at many other factors when it examines a proposed water transfer, including the amount of land actually irrigated, the economic impacts of the transfer, alternative sources of water near the point to which water is being transferred, and growing season.

Actually irrigated land

The Board of Control expects applicants to submit maps of the land on which irrigation has taken place in the past. The maps must depict areas on the lands from which water is to be transferred that have been irrigated. The Board typically will also conduct an on-the-ground inspection of the area to determine whether the lands the petitioner claims have been irrigated actually have been. If the Board finds that the lands have not been irrigated, the Board will declare the water right appurtenant to them to be forfeited.

The Board was favorably impressed with efforts by the Town of Saratoga in 1982 to document what lands were irrigated within the Town. To support its claim of irrigated acreage, the Town submitted not only a map but an aerial infrared photograph of the Town that showed vegetation resulting from the application of water in red.[252] In that case the Board allowed Saratoga to transfer water rights within Town limits to municipal use, except for rights on the lands of those residents who objected.[253]

By contrast, when the Town of Baggs sought to detach 0.93 cfs from lands in 1976 and transfer the water to municipal industrial use, the Board conducted a field inspection and discovered that 24 acres of the 65 acres involved were above a slough and had not been historically irrigated. Accordingly, the Board declared 0.34 cfs of the proposed transfer to be forfeited and allowed a transfer of only 0.59 cfs.[254]

The forfeiture ordered by the Board of Control against Baggs (and also forfeitures described previously against other applicants[255]) appears to be inconsistent with the forfeiture statute,[256] which requires notice by certified mail to owners of lands covered by the contested appropriation, or newspaper advertisements for three successive weeks, followed by a hearing. That hearing is supposed to be held for the express purpose of declaring water rights forfeited, assuming, of course, that the evidence supports such a decision. Transfer hearings are not plainly held for this purpose and thus arguably do not satisfy the forfeiture statute.[257] Thus, an appropriator might reasonably argue that the transfer proceeding was ineffective for purposes of declaring a water right forfeited. This is significant because once the appropriator resumes use of the water right, the Board may no longer initiate forfeiture proceedings. To avoid any possible question about the efficacy of its efforts to forfeit water rights in transfer proceedings, the Board would be wise to follow the formalities of the forfeiture law in any decision involving water transfers that requires a partial forfeiture of water rights.

Voluntary abandonment may also play a role in water transfers. As part of its water transfer proposal in 1983, the Town of Granger agreed to take 673 acres, with an appropriation of 9.61 cfs, out of production and use only 1.5 cfs, the amount it needed for municipal use.[258] Under the circumstances, the Board of Control allowed the Town to omit the consumptive use and return flow study normally required for such transfers. The Board found that of the 673 acres Granger was proposing to take out of production, 350 were actually irrigated.[259] At the statutory rate of one cfs per 70 acres, that meant that the water right on the land

was 5.0 cfs. Subtracting from that figure 50 percent to account for return flows and 20 percent for conveyance loss, Granger was allowed to transfer the 1.5 cfs.[260]

Economic loss to the community

Under the change of use statute, the Board of Control may consider, among other factors, "[t]he economic loss to the community and the state if the use from which the right is transferred is discontinued," and "[t]he extent to which such economic loss will be offset by the new use."[261] The unsuccessful Pacific Power water transfer provides the best example from among the case studies of the Board's consideration of economic harm. There, the Board found that the transfer could cause "serious, adverse effects on the economy of Carbon County."[262] The Board also raised concerns about the supposed benefits of the transfer and "the extent to which the economic benefits from power generated for possible out-of-state use would offset injury to Carbon County."[263]

Alternative water sources

The statute also allows the Board to consider "[w]hether other sources of water are available for the new use."[264] Again, the Pacific Power case provides the prime example of the Board's consideration of this factor. The Board found that Pacific Power had not shown that it had considered the availability of water supplies closer to its power plant, 223 miles downstream from the original point of diversion on the North Platte River. Along that stretch of river are the Seminoe, Kortes, Alcova and Pathfinder Reservoirs -- which the Board determined were potential alternative sources of water for Pacific Power.[265]

Irrigation season

Agricultural water rights are generally used seasonally. Thus, when such rights are transferred the right to the water is limited to the time over which the water was historically diverted. Generally, the Board uses a conservative estimate of the growing season to limit the period of time over which water can actually be used. In the Town of Pinedale's case, for instance, the Board of Control found that "in the experience of the Board" the historic irrigation season in the area of the transfer runs from the beginning of June to the end of August, or 92 days, rather than the 180 days the Town had requested.[266]

Water needs of transferee

In two separate transfer applications filed by Basin Electric, the Board severely restricted the total volume of water allowed to be transferred. These limits were imposed not on the basis of the volume historically used or consumed, but rather, on the perceived needs of the transferee. The two transfer applications filed in 1981 proposed to transfer water rights of 1.78 cfs and 2.67 cfs. The Board reduced those amounts to 1.25 cfs and 2.01 cfs to account for return flows. In both applications, Basin Electric stated that it would only draw upon the water intermittently. Accordingly, the Board set a limit of 100 acre-feet on each transfer. Because of this limit, Basin Electric would use all of it water rights for these two transfers in 40 days and 25 days respectively by pumping at the allotted rates.[267]

The Future of Water Marketing in Wyoming

Some water marketing is taking place in Wyoming but the restrictions on water transfers imposed by the state appear to

discourage significant transfer activity. By artificially limiting the water market, the state discourages the most efficient use of its limited water resources. In some respects, this may have a salutary, if unintended, consequence. By discouraging greater consumptive uses of water, state policy may help ensure that more water finds its way into streams where it may help protect the stream environment and help dilute the effects of water pollution. It may also help to store water in the stream system for use later in the irrigation system. But it may also encourage new (and expensive) water development projects that might be unnecessary if existing water rights could be used more efficiently.

The CAID project is an excellent example of how incentives for more efficient use of existing water rights can provide substantial quantities of water for other uses at a cost that is competitive with the cost of developing new sources of water. State law should build on its experience with the CAID project to promote more efficient use of its limited water resources. Special legislation should not be necessary to make a project like this work. While Wyoming has not seen the same kind of pressure on its water resources that other states in the West have experienced, the state should not wait for such pressures to build before changing its laws. Set forth below are some suggestions for improving Wyoming's current water transfer laws.

Improving Wyoming Water Transfers Law

Despite the difficulty in gathering accurate data on the effects of a water transfer on the water system, the state's insistence that the applicant provide sufficient evidence of those effects is reasonable. Nonetheless, improvements over existing law can be made. At the outset, the state should shed its historical distrust of water transfers. Perhaps transfers do reward speculation and waste as Elwood Mead feared. But Wyoming water law currently affords few sanctions against those who speculate or use water less efficiently than can reasonably be achieved. Nor can it realistically do so, absent a total overhaul of the prior appropriation system.[268] Many in Wyoming's farming community simply cannot afford to change their historical irrigation practices, however wasteful they might seem to the casual observer.[269] Instead, the law should provide water users with incentives to make the use of scarce water more efficient.

One obvious way to achieve this objective is by promoting water transfers. The following changes to current law would help to achieve this objective.

1. **Water Transfers Policy:** A statement of policy in the proposed law should reflect the state's fundamental support for water transfers, particularly those that promote efficient use of scarce water resources.

2. **Return to the "No Injury" Rule:** Wyoming should join other western states and allow transfers in any case so long as no injury is shown to other appropriators or the public interest.[270] Several transfer applicants have expressed concern over the broad discretion afforded the Board of Control in deciding whether to approve transfers.[271] The discretion to assess injury and the extent of injury is wholly appropriate. But current law affords such broad discretion as to make the Board of Control's decision on a particular application difficult to predict. Lack of certainty is bound to discourage transfer activity.

3. **Define the Phrase "Public Interest".** The phrase "public interest" should be defined to ensure protection of the stream environment and such other values as

determined by the State Engineer after the promulgation of rules. For example, the State of Alaska provides in its water code for issuance of water permits that are in the public interest. In determining the public interest, the state water commissioner must consider eight specific factors encompassing a broad variety of public values.[272] Most of these same factors should probably be considered in the context of water transfers as well as original appropriation. Although this recommendation arguably runs counter to the thrust of the other recommendations which are intended to facilitate and encourage transfers, it may actually promote transfers by diminishing the Board's broad discretion in ruling on transfer applications.

4. **Shift the Burden of Proof to Show Injury to the Protestants.** The applicant for a water transfer should be obliged to come forward with return flow studies, historical water usage data, and other information sufficient to make a prima facie case that the proposed transfer will not injure other appropriators. The applicant's requirements for establishing a prima facie case should be made explicit in regulations or statutes. In order to encourage transfers, however, the ultimate burden of persuasion that an that injury will occur should fall on the person who protests the transfer and claims injury. The Board should avoid conducting its own investigations, but rather should limit its role to that of the impartial decision-maker. Such a scheme would make water transfer procedures consistent with administrative practice in most other cases.[273] To help soften the blow that such a scheme might inflict on other water users, the law should allow any protestant to demand that the transfer be approved conditionally for a trial period of three years or some other time that would be fixed by the Board. If actual injury is demonstrated within the trial period, or if evidence is gathered which shows that additional water could have been transferred without injury, the decision could be reopened and the transfer rights changed to prevent injury or allow the additional transfer of water rights. Another trial period might then be established to account for information obtained following the adjustments. In each case, the transfer applicant would be required to pay for monitoring devices to assess potential injury, and to pay damages for injuries that were sustained. The proposed system would encourage transfers by establishing more certainty in the water transfer process, and by avoiding overly pessimistic projections of the impacts of water transfers. At the same time it would help insure that all parties affected by the transfer are treated fairly.

5. **Promote Trial Transfers.** Expert projections regarding the impact of the transfer on other water users and other interests are frequently inaccurate. The actual impact of a transfer may be much greater or much less than was projected. As a result, the person transferring the water right may have been allowed to transfer either too much water or too little water. Such errors should be corrected to allow the maximum legal transfer that will not cause injury. Thus, even where a protestant has not requested a trial transfer, such trial periods should be promoted by the Board as a means for maximizing the amount of water transferred. Trial transfers can also be employed in conservation programs like the CAID-Casper project. Here, the amount of water transferred would depend upon evidence showing the amount of water actually saved and which can be extracted without injury to other appropriators. Thus, for example, a person in need of water might agree to line the ditches of another water rights holder, in exchange for all or part of the water rights that would be saved by the project.

6. Promote Dry Land Options. Many domestic and industrial water users cannot afford to risk a significant but temporary reduction in their water supply. A common response to this risk is to acquire sufficient water resources and sufficient storage capacity to supply anticipated needs even in times of severe drought. An increasingly popular and econmical alternative involves the purchase of an option from a farmer that allows use of that farmer's water during drought years. Although the transaction may take a variety of forms, generally the user purchasing the option pays the farmer a certain amount of money up front with an additional payment made any year during which the option is exercised. During these drought years the farmer must forego farming. Unfortunately, Wyoming's current law does not permit such transactions. Nonetheless, given the unique advantages that dry land options offer, legislation should be enacted that encourages their use by domestic and other users in need of a secure water supply.

7. Promote Out of District Water Transfers. Wyoming law appears to preclude transfers of water rights outside water conservancy districts.[274] Although no such limitation exists with regard to irrigation districts, long-term transfers of water outside are uncommon. To the extent that water districts may hold water supplies that are beyond their real needs, this tradition is unfortunate. Promoting out of district transfers may encourage districts to require more efficient use of water resources as a means of increasing its revenues by selling water outside the district.

8. Establish a Statewide Water Conservation Bank. Water banks are not new. They are used in a variety of contexts, but primarily for short term water transfers such as those that take place informally within irrigation districts.[275] The bank proposed here would be fundamentally different from any of those currently in use. Under current law, a person holding water rights must use his water or risk losing it to abandonment or forfeiture. Moreover, a person cannot use appropriated water on land other than that for which it has been appropriated or for other uses without first complying with the water transfers process. In most cases such transfers cannot be approved even where no one is injured because they will increase the total amount of consumed water or reduce the amount of return flows. Thus a person with adequate water supplies to flood irrigate would be foolish to consider more efficient irrigation techniques. The initial capital costs for a pivot sprinkler can be substantial and though the water rights holder would save water, he would eventually lose all rights to the water that was saved. Suppose, however, that the water saved by using a more efficient technique could be banked. The state would issue the water rights holder a certificate indicating the amount of water banked. Banked rights could not be lost through abandonment or forfeiture, and they would retain their original priority date. Certificates would be freely marketable. The purchaser would still have to comply with the general transfer provisions of a revised an less onerous state law; but the assessment of water savings should be readily available to the applicant, thus holding promise for a simpler administrative approval process.

The state might bolster such a program by subsidizing the replacement of inefficient water systems and then banking all or part of the saved water in the state's name. The state could thereby focus its water conservation efforts in those areas where water needs are perceived to be greatest and where the physical circumstances would yield the greatest quantity of water at the lowest cost. In order to provide the state with an appropriate incentive to tackle such a program, the state should be assured the

resulted from water savings from a state-funded project. In this manner, the sale of such water rights would accrue directly to the state. Such a program might also help redirect the energy of the Wyoming Water Development Commission away from costly and questionable water development projects, and toward smaller scale water conservation projects.

No doubt, such a program would be controversial. But controversy could be minimized by assuring the water rights owner the first opportunity to carry out a water salvage program. Only after the owner refused to do so should the state step in, and even here, the program might be limited to volunteers who are assured appropriate incentives to participate. If the state was careful in selecting its initial projects and successful in both gathering new water supplies and appeasing existing users, others might then be encouraged to become involved. Once substantial quantities of water are banked along a given stream segment, a large new user would find it relatively easy to come in and assemble a block of water rights. If water could be easily obtained in such a fashion, Wyoming might more easily attract economic development projects, particularly those that are water intensive, without having to build large new dams.

Section 3: Conclusion

Wyoming has seen only *limited water* marketing activity since its water transfer laws were liberalized in 1973. One of the reasons for this is that the 1973 legislation did not go far enough. Water marketing holds much promise for encouraging more efficient use of water resources and more efficient water usage could benefit Wyoming substantially. But water marketing is not likely to increase unless significant changes to Wyoming's current laws are made. This report is intended to help push the state in that direction and to help Wyoming reclaim its reputation as an innovator in western water law.

ENDNOTES TO CHAPTER 6

1. *See*, **F. Trelease & G. Gould, Water Law Cases and Materials** 172 (4th ed. 1986) ("Most states have adopted one of several variations on the Wyoming theme, designed to combine in some degree efficiency of the administrative action with the sanctity of a court decree."). Elwood Mead, Wyoming's first State Engineer paid tribute to Wyoming's early success in the administration of water rights:

> Recently two men were talking about the importance of irrigation in the different arid States. One said that Colorado and California were the leading States, and that in these States about every question had been litigated and settled, so that irrigators knew what they were doing. The other asked why he did not include Wyoming, and was told that irrigation had not made much progress in Wyoming, that an investigation had shown that only two water-right cases had ever been decided by the State supreme court. In the mind of the speaker, litigation went with irrigation, as a fever with malaria, and a State with only two lawsuits was not worth notice.
>
> Nevertheless, over nine thousand irrigators are taking water from over six hundred streams with a certainty as to their rights and an absence of friction in the protection of these rights, which is in such striking contrast with the situation in surrounding States as to make the methods by which this result was accomplished of unusual interest.
>
> **E. Mead, Irrigation Institutions** 247 (MacMillan 1903).

See also Wilkinson, *Aldo Leopold and Western Water Law: Thinking Perpendicular to the Prior Appropriation System*, 24 **Land & Water L. Rev.** 1, 8-9 (1989).

2. For a more detailed overview of Wyoming water law, *See*, Squillace, *A Critical Look at Wyoming Water Law*, 24 **Land & Water L. Rev.** 307 (1989).

3. "Beneficial use shall be the basis, the measure and limit of the right to use water at all times. . . ." Wyo. Stat. § 41-3-101. In addition to requiring that water be applied to a beneficial use, some courts have required that the water be diverted out of the stream. *See e.g.*, Fullerton v. State Water Resources Control Board, 90 Cal. App. 3d 590 (1979); **D. Getches, Water Law in a Nutshell**, 96-97 (1984). The Wyoming Supreme Court has suggested that a "diversion" may be required for an appropriation, Moyer v. Preston, 6 Wyo. 308, 44 P. 845 (1896), but no Wyoming case has clearly ruled that an actual diversion is required. If a diversion is required those employing overflow irrigation techniques will be especially affected. Instream flows for fisheries should not pose a problem in Wyoming because they are expressly allowed under the law. Wyo. Stat. §§ 41-3-1001 to -1014.

4. Wyo. Stat. § 41-3-603 (Cum. Supp. 1989). Regulations and Instructions, Board of Control, Part IV, Ch. 1, § 7.a (1982). Reservoirs in Wyoming are subject to the "one-filling rule" which means that the amount of water taken in any one year cannot exceed the capacity of the reservoir. Wheatland Irrigation District v. Pioneer Canal Co., 464 P.2d 533, 540 (Wyo. 1970). Furthermore, "carryover storage," i.e. water left over from the previous year, is counted against the reservoir owner's appropriation for the succeeding year. Wyo. Stat. § 41-3-603(a) (Cum. Supp. 1989); Regulations and Instructions, Board of Control, Part IV, Ch. 1, § 7.b (1986).

5. As described below, however, persons holding secondary reservoir rights need not obtain a permit.

6. Wyo. Stat. § 41-4-512 (1977).

7. *Id.* at § 41-4-503.

8. *Id.* at § 41-4-517.

9. *Id.* at § 41-4-504.

10. *Id.* at § 41-4-506.

11. *Id.* at § 41-4-511.

12. *Id.* at § 41-3-101.

13. *Id.* at § 41-4-317.

14. D. Getches, *supra* note 3 at 179-82.

15. Actually, the State Engineer's office describes all such proceedings as abandonment proceedings. The statute, however, refers specifically to forfeiture proceedings only in the context of the agency initiated proceedings. *Compare*, WYO. STAT. § 41-3-401 (Cum. Supp. 1989) *with* § 41-3-402 (1977).

16. Frank v. Hicks, 4 Wyo. 502, 35 P. 475 (1894).

17. Trelease & Lee, *Priority and Progress -- Case Studies of the Transfer of Water Rights*, I Land & Water L. Rev. 1, 7 (1966).

18. Johnston v. Little Horse Creek Irrigating Co., 13 Wyo. 208, 79 P. 22 (1904).

19. *Id.* at 24-25.

20. E. Mead, *supra* note 1 at 264. Notwithstanding Mead's criticism, water rights have, of course, become a form of merchandise that are bought and sold often for large amounts of money. Regarding the decision in *Johnston*, Trelease and Lee note that Mead's characterization of the facts is at odds with the statement of facts by the court. Mead suggested that the sale of water more than doubled the demand for water on the stream. The court states, however, that the total acreage of land irrigated by the water sold was less than that which was irrigated before the sale. *See Trelease & Lee, supra* note 17 at 10.

21. *Id.* at 173-74.

22. *Id.* at 174.

23. Mead made clear, however, that his objection to sales of water rights "does not apply to the law which recognizes exchanges of water between reservoirs and ditches. Here there is an undoubted gain, both to public and private interests. It is a recognition of natural needs and gives sanction of law

to the most convenient and effective means of putting to the best use the ditches already built, and of storing the surplus water in the most convenient and economical manner. *Id.* at 175.

24. 1909 Wyo. Sess. Laws, ch. 68, § 1 (Wyo. Stat. § 41-3-101). In 1941 the legislature dropped the phrase "without loss of priority." 1941 Wyo. Sess. Laws, ch. 26, § 1. The reasons for this change and its significance are not apparent. Despite the fact that Wyoming has now adopted explicit provisions authorizing water transfers, the general language from 1909 which seemingly prohibits transfers has never been repealed.

25. These exceptions are described in great detail in Trelease & Lee, *supra* note 17 at 11-21.

26. State law does not expressly require approval for changes in the point of discharge. In Thayer v. City of Rawlins, 594 P.2d 95 (Wyo. 1979) the plaintiff claimed that the City was obliged to obtain approval for a change of the point of discharge under the general change of use statute. The court declined to reach the issue, holding instead that because the water involved was imported water, the City had an unrestricted right to dispose of those waters as it saw fit.

27. Wyo. Stat. § 41-3-104 (1977).

28. *Id.* at § 41-3-104 (a). A sample petition appears in the Board of Control's regulations. Regulations and Instructions, Part IV, Board of Control, Ch. VI, § 15 (1982).

29. *Id.* The Board's regulations set out detailed requirements for such petitions. Among other things, such petitions must include a map certified by a professional engineer or land surveyor licensed to practice in Wyoming. The rules also contain examples of petitions which are helpful in complying with the law. Regulations and Instructions, Part IV, Ch. V Board of Control (1986).

30. *See* **D. Getches**, *supra* note 3 at 165-67.

31. Wyo. Stat. § 41-3-104(a) (1977). Thus, for example, the fact that an appropriator has the right to divert 10 acre-feet per year does not guarantee the right to transfer that amount unless, historically, that full amount was diverted.

32. *Id.* If, for example, the existing water right authorizes diversions at the rate of two cfs, but only one cfs was historically diverted, the new use is limited to that historic rate.

33. *Id. See also*, Basin Electric Power Cooperative v. State Board of Control, 578 P.2d 557 (Wyo. 1978).

34. The Board of Control's regulations require that a petition include a comparison, in the form of a study on return flows, of the proposed use with the historic use of the water right. Regulations and Instructions, Part IV, Board of Control, Ch.V § 15(c) Item 6. The Board's stated policy is to "disfavor" petitions for change of use where at least 5 years of historic use cannot be documented. *Id.* at Ch.V, § 15 (f).

35. Wyo. Stat. § 41-3-104 (a) (1977).

36. Wyo. Const. art. 8, § 3. *Compare* Bonham v. Morgan, ___ P.2d ___, No. 88-0143, slip op. (Utah Feb 23, 1989)

37. 576 P.2d 557 (Wyo. 1978).

38. *See* discussion, *infra*.

39. *See e.g.*, Twin Lakes Reservoir and Canal Co. v. Aspen, 193 Colo. 478, 568 P.2d 45, 50 (1977).

40. 660 P.2d 339 (Wyo. 1983).

41. Wyo. Stat. § 41-4-514(a) (Cum. Supp. 1988) (emphasis added).

42. 660 P.2d at 349, 351-55. *Compare* Trelease & Lee, *supra* note 17 at 13-15.

43. 1947 Wyo. Sess. Laws, ch. 116, § 1-4; Wyo. Stat. § 41-4-514 (a) (Cum. Supp. 1989). Such changes must be within the same area and concept as described in the original permit.

44. The only exception to this rule is for temporary changes. *See* discussion *infra*.

45. Wyo. Stat. § 41-3-106(d) (Cum. Supp. 1989).

46. *Id.* at § 41-3-106(c).

47. *Id.* at § 41-3-106(b).

48. *Id.* at § 41-3-106(d).

49. *Id.* at § 41-3-114. Petitions on adjudicated rights are filed with the Board of Control.

50. *Id.* at § 41-1-114(a)(ii). This provision was adopted after the Wyoming Supreme Court's decision in Green River Development Co. v. FMC Corp., 660 P.2d 339 (Wyo. 1983), and authorizes a very limited exception to the Supreme Court's decision that unadjudicated water rights are not subject to transfer.

51. *Id.* at § 41-3-114 (f). *See* Regulations and Instructions, Board of Control, Part IV, Ch. V, § 12-13 for further information regarding petitions for changing the point of diversion. Additional standards apply to a change in the point of diversion of a reservoir. Wyo. Stat. § 41-3-329 (Cum. Supp. 1989). It should further be noted that changes in the point of diversion of foreign water (i.e. water belonging to another state) which occur in the state of Wyoming are subject to approval by the Board of Control. Wyo. Stat. §§ 41-3-209 to -216 (1977).

52. *Id.* at § 41-3-917.

53. *Id.*

54. *Id.*

55. 1969 Wyo Sess. Laws, ch. 170, § 1 (extending authority to railroads); and 1971 Wyo. Sess. Laws, ch. 193, § 1 (extending authority to general public). 1959 Wyo. Sess. Laws, ch. 148, § 1 (Authority given to State Highway Commission for temporary transfer); Wyo. Stat. § 41-3-110 (Cum. Supp. 1989).

56. Wyo. Stat. § 41-3-110(a) (1977).

57. *Id.* at § 41-3-110(a), (c).

58. *Id.* at § 41-3-110(c). The statute makes clear, however, that the 50% assumption shall have no application to any other provision of Wyoming law.

59. *Id.* at § 41-3-110(b).

60. *Id.*

61. *Id.* at § 41-3-111.

62. Wyo. Stat. § 41-3-323 (1977). The reservoir owner, however, does not have unlimited authority to transfer water. Any person who uses water from a reservoir has a preference right to the use of that water the following year. *Id.* at § 41-3-325. Furthermore, water conservancy districts in Wyoming may transfer only within the boundaries of the district. *Id.* at § 41-3-742(a)(ii). This seems an unnecessary limitation on the district's rights and is, in any event, inapplicable to Wyoming irrigation districts which is the more common form of water district in Wyoming.

63. The statute applies by its terms to "reservoir water and rights acquired under reservoir permits and adjudications." Wyo. Stat. § 41-3-323. Although end users may acquire secondary permits to use reservoir water they do not acquire water rights "under reservoir permits and adjudications."

64. Trelease and Lee documented such activity in their 1966 article, *supra* note 17 at 36-38, 48-50.

65. *See* Wyo. Stat. § 41-3-104 (1977). Issuance of a secondary permit has the effect of making the water right appurtenant to a particular tract of land. Thus, the water cannot be transferred to other land without petitioning for a change in the place of use of the water right.

66. The problem identified here is not one that can be handled through *pro forma* administrative action to approve the transfer of all secondary water rights. On the contrary, transfers which must comply with the stringent statutory standards might often be denied even where no one suffers injury if, for example, the new use reduces the return flows.

67. For example, if 10 farmers each want to sell one share of water but buyers want only 5 shares, each farmer is allowed to sell one half a share.

68. Indeed, some of the programs may run afoul of the requirements of Wyo. Stat. § 41-3-325 (1977) which requires the reservoir owner to make available at reasonable rates any water that the individual landowners cannot beneficially use on their own lands.

69. By contrast, the period of abandonment is tolled for temporary transfers that are carried out under the terms of the statute. Wyo. Stat. § 41-3-111 (1977).

70. *See* Trelease & Lee, *supra* note 17; *see also*, Trelease, *Transfer of Water Rights -- Errata and Addenda -- Sales for Recreational Purposes and to Districts*, 2 Land & Water L. Rev. 321 (1967).

71. *Id.* at 11.

72. Other states in the study include, Arizona, California, Colorado, New Mexico, and Utah.

73. This figure includes all transfers authorized by the 1973 statute (Wyo. Stat. § 41-3-104 (1977)) including both changes in use and changes in place of use. One additional case, the Casper-Alcova Irrigation District (CAID) project is also included in the study even though the transfer involved there was accomplished through special legislation rather than the general transfer provisions of the law. The CAID project is described in greater detail *infra*.

74. Transfers that did not involve a change in use (agriculture to agriculture) took considerably less time to process. On average such transfers were processed in 6.78 months.

75. The only arguable exception to this was the Big Horn Ranch transfer, Docket No. II-83-2-5 which resulted in a reduction of the water right from 45.72 cfs to just 3 cfs. The Board's decision, however, makes clear that the reduction was based entirely on the fact that most of the water right had been abandoned through non-use. The entire amount of water that had been beneficially used was allowed to be transferred.

76. The three states in the Rocky Mountain region which are included in the USGS study, Colorado, New Mexico and Utah, all found significantly higher levels of transfer activity. Some of these difference can perhaps be attributed to the smaller population base in Wyoming, but other factors appear to have contributed to this phenomenon and are described in the text.

77. *See* Treiease & Lee, *supra* note 17 at 11. ("[T]here is a widespread general perception among Wyoming irrigators that water rights are inseverably attached to land in Wyoming.")

78. An official, from the city of Casper describing why the city was seeking new sources of water made the following statement: "Denials of two proposed transfers from irrigation to municipal and/or industrial use in the period of 1980-85 have proven this [water transfers] to be a disfavorable method of water supply procurement." Engels, *Augmenting Municipal Water Supplies Through Agricultural Water Conservation* 6 (paper presented at the Joint Regional Conference of the Rocky Mountain Section of the American Water Works Association and the Rocky Mountain Water Pollution Control Association, Snowmass, Colorado, Sept. 11-14, 1988) (available from the author).

79. Wyo. Stat. § 41-3-105(a) (1977).

80. *Id.* It seems likely that the Board may also take into account general public interest considerations, which apply generally to all original water appropriations under the constitution. *Cf.* Bonham v. Morgan, P.2d . , No. 88-0143, slip op. (Utah Feb. 23, 1989).

81. Basin Electric v. State Board of Control, 578 P.2d 557 (Wyo. 1978). *See* discussion, Infra.

82. State Board of Control Order, Docket No. I-80-4-5, Findings of Fact 1-3 (1981).

83. *Id.* at Finding of Fact 4.

84. Transcripts of Board of Control Hearing, Docket No. I-80-4-5 (hereinafter Transcript) at 36 (Opening statements of attorney Bob Sigler) ("[W]hen we say historically and when the statute says historically, that isn't the year 1980, the year 1980 does not establish history.").

85. *Id.* at 45.

86. Transcript at 25 (Letter Written by David Wilde, Project Manager of the North Platte River Project).

87. Transcript at 33.

88. *Id.* at 34.

89. *Id.* at 33.

90. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 6.

91. *Id.* at Finding of Fact 7.

92. *Id.*

93. *Id.* at Finding of Fact 9.

94. *Id.* at Finding of Fact 11.

95. *Id.* at Finding of Fact 13.

96. *Id.* at Findings of Fact 5 and 14.

97. Responses by Pacific Power official to survey questionnaire from University of Wyoming researchers.

98. State Board of Control Order, Docket No. I-75-1-6, Finding of Fact 4 (1976).

99. Transcript of hearing for Board of Control Docket No. I-75-1-6, at 526 (testimony of J. Kenneth Kennedy: "What I am trying to say is the loss one day is going to be completely different than the loss a week later, or particularly two months later.")

100. Transcript for Docket No. I-75-1-6, at 536-540 (testimony of John Bereman, a civil engineer called to testify by protestants).

101. Transcript for Docket No. I-75-1-6, at 711 (Closing statement of attorney William Jones, who represented the Wheatland Irrigation District).

102. *Id.* at Findings of Fact 28-33 and Order Condition 4.

103. Basin Electric v. State Board of Control, 576 P.2d 557, 560 (Wyo. 1978).

104. 576 P.2d at 561.

105. Wyo. Stat. § 41-3-104 (1977).

106. State Board of Control Order, Docket No. I-75-1-6, Conclusion of Law 6.

107. 578 P.2d at 569-570.

108. 13 Wyo. 208, 79 P.2d 22 (1904).

109. 578 P.2d at 571-72 (McClintock, J., dissenting).

110. State Board of Control Order, Docket No. I-76-1-12, Findings of Fact 1 and 7-9 (Wyo. 1977).

111. *Id.* at Findings of Fact 5 and 11.

112. *Id.* at Finding of Fact 15 and Order Condition 4.

113. *Id.* at Order Condition 1.

114. *Id.* at Finding of Fact 12.

115. *Id.* at Order,Condition 7. (The Board's declared forfeiture of water rights without specific notice and a separate hearing was of questionable legality under the forfeiture statute, Wyo. Stat. *§ 41-3-402* (1977). *See* discussion of the Town of Baggs transfer, *infra*.

116. These same transfers had been denied by the Board without prejudice in 1981 because of Basin's failure to demonstrate that the transfers did not exceed the historic rate of diversion. Board of Control Orders I-U-80-1-2 and I-U-80-1-3.

117. State Board of Control Order, Docket No. I-U-81-3-2, Finding of Fact 15 (Wyo. 1982), and State Board of Control Order, Docket No. I-U-81-3-1, Finding of Fact 5 (Wyo. 1982).

118. Transcript of combined hearing on Docket Nos. I-U-81-3-2 and I-U-81-3-1, hearing held Jan. 20, 1982, at 37 (Testimony of George Palos. There were two hearings held to discuss these two water transfers. The first, at which Basin Electric proffered its evidence, was held on Nov. 12-13, 1981. The second, at which the protestants offered evidence, was held on Jan. 20, 1982.)

119. *Id.* at 48. (The consumptive use "history" established for the Forell No. 1 Well, or the transfer of 1.25 cfs, was 4.5 years. *Id.* The "history" for the Rex Johnson Well, for 2.01 cfs, was three years.)

120. Transcript of Board of Control hearing on Docket Nos. I-U-81-3-1 and I-U-81-3-2, held Nov. 12-13, 1981, at 16 (Opening statement of attorney William R. Jones).

121. State Board of Control Order, Docket No. I-U-81-3-2, Findings of Fact 5 and 8 (Wyo. 1982).

122. *Id.* at Finding of Fact 14.

123. *Id.* at Finding of Fact 15. The Board did not directly address protestants' claim that the 4.5 year history on this well was insufficient. However, the Board did question Basin Electric's consumptive use figures and determined that the consumptive use had been less than claimed. *Id.*

124. *Id.* at Finding of Fact 16.

125. *Id.*

126. State Board of Control Order, Docket No. I-U-81-3-1, Findings of Fact 5 and 9 (Wyo. 1982).

127. *Id.* at Finding of Fact 20.

128. *Id.* at Finding of Fact 19.

129. *Id.* at Finding of Fact 23.

130. *Id.* at Finding of Fact 22.

131. Telephone interview with Don Sherard, Basin Electric's attorney, April 28, 1989.

132. Response by Saratoga officials to survey by University of Wyoming researchers.

133. State Board of Control Order, Docket No. I-81-1-6, Findings of Fact 1-10 and Order Conditions 1 and 2 (Wyo. 1984).

134. *Id.* at Finding of Fact 17.

135. *Id.*

136. *Id.* at Finding of Fact 19.

137. *Id.* at Order Condition 2.

138. *Id.* at Finding of Fact 11.

139. *Id.* at Findings of Fact 13 and 14.

140. Response by the Town of Saratoga to survey by University of Wyoming researchers.

141. State Board of Control Order, Docket No. I-U-79-4-2, Finding of Fact 3 (Wyo. 1980). The Town had conditioned the purchase of the land upon transferability of the water right. Response to Water Transfers Survey by the Town of Pine Bluffs, at 1.

142. *Id.* at Findings of Fact 3 and 4.

143. *Id.* at Findings of Fact 14 and 16.

144. *Id.* at Order 5.

145. Town of Pine Bluffs v. State Board of Control, 649 P.2d 657 (Wyo. 1982).

146. Response by Town of Pine Bluffs officials to survey by University of Wyoming researchers.

147. State Board of Control Order, Docket No. III-83-1-11, Findings of Fact 1 and 2 (Wyo. 1984).

148. *Id.* at Finding of Fact 2.

149. *Id.* at Finding of Fact 4.

150. *Id.* at Finding of Fact 16.

151. *Id.*

152. State Board of Control Order, Docket No. IV-82-3-9, Finding of Fact 3 (Wyo. 1984).

153. *Id.* at Finding of Fact 4.

154. Investigation of Agricultural Uses of Pine Creek Waters Near Pinedale, Wyoming Proposed for Transfer to Municipal Use for the Town of Pinedale, 11 (1982).

155. *Id.* at 8.

156. *Id.* at 11-12.

157. *Id.* at Finding of Fact 15.

158. *Id.* at Order.

159. State Board of Control Order, Docket No. IV-82-3-9, at Finding of Fact 13. [The Board cited as its experience the prior Order of the State Engineer in the Matter of Green River Development Company, et. al., recorded in the State Engineer Miscellaneous Records Book 12, page 126 (Finding of Fact 91 on page 172). The finding from the earlier case stated simply that the irrigation season in the area was 92 days.]

160. *Id.*

161. State Board of Control Order, Docket No. I-76-2-10, Finding of Fact 3 (Wyo. 1977).

162. *Id.* at Finding of Fact 2.

163. *Id.* at Finding of Fact 8.

164. *Id.* at Finding of Fact 7.

165. *Id.* at Finding of Fact 5.

166. *Id.* at Order.

167. State Board of Control Order, Docket No. IV-74-1-10, Finding of Fact 3 (Wyo. 1976).

1. *Id.*

Id. at Finding of Fact 7.

I.

171. *Id.* at Finding of Fact 9.

172. *Id.* at Order.

173. *Id.* at Finding of Fact 6.

174. State Board of Control Order, Docket No. IV-74-1-12 (Wyo. 1975).

175. Telephone conversation with attorneys Dennis Boal and Marvin Bollschweiler, July 25, 1989.

176. *Id.* (remarks made by Dennis Boal).

177. State Board of Control Order, Docket Nos. I-83-3-3 and I-83-3-4, Finding of Fact 6 (Wyo. 1985).

178. *Id.* at Finding of Fact 3.

179. *Id.* at Finding of Fact 4.

180. *Id.*

181. *Id.* at Order.

182. *Id.* at Finding of Fact 14.

183. *Id.*

184. State Board of Control Order, Docket No. IV-83-3-4, Findings of Fact 3 and 7 (Wyo. 1985).

185. *Id.* at Finding of Fact 7.

186. *Id.*

187. *Id.*

188. *Id.* at Finding of Fact 17.

189. *Id.*

190. *Id.* at Finding of Fact 18.

191. *Id.* at Finding of Fact 4.

192. *Id.* at Finding of Fact 20.

193. *Id.* at Order.

194. *Id.* at Finding of Fact 22. (The Board cited the same document that it did in the Pinedale transfer order: Order of the State Engineer in the Matter of Green River Development Company, et al., recorded in the State Engineer Miscellaneous Records Book 12, page 126. The earlier decision found that the

Irrigation season in the upper Green River area was 92 days each year.)

195. State Board of Control Order, Docket No. IV-85-4-5, Finding of Fact 3 (Wyo. 1986).

196. *Id.* at Finding of Fact 2.

197. *Id.* at Finding of Fact 3.

198. *Id.*

199. *Id.* at Finding of Fact 4 (citing the Wyoming Water Planning Report No. 5).

200. *Id.*

201. *Id.*

202. Horsch, *A Cooperative Agreement to Augment a Municipal Water Supply Through Water Loss Reductions in Irrigation Canals* 1 (June 1988) (available from the author).

203. *Id.* at 1-2.

204. *Id.* at 2.

205. *Id.* at 3.

206. Agreement Between the City of Casper, Wyoming and the Casper-Alcova Irrigation District 4.

207. 1985 Wyo. Sess. Laws, ch. 90.

208. 1985 Wyo. Sess. Laws, ch. 90, § 3(a).

209. Horsch, *supra* note 202 at 3-4.

210. CAID-City of Casper Water Conservation Project -- 1987 Progress Report 2.

211. Horsch, *supra* note 202 at 3.

212. The figures on the CAID project were provided by L.K. Horsch in August, 1988.

213. Figures provided by L.K. Horsch.

214. Telephone interview with Bob Perala, the new hydrologist for the Casper-Alcova water conservation project, on July 18, 1989.

215. Engels, *supra* note 78 at 8.

216. David Engels, utility director for the City of Casper, estimated that costs over the first 20 years could run as high as $120 per acre-foot per year, although the costs are likely to decrease drastically after the 7,000 acre-feet of savings have been accomplished. *Id.* at 9.

217. Final Environmental Impact Statement for Regulatory Permits: Deer Creek Dam and Reservoir, 2-35 (1987).

218. Id. at vi.

219. State Board of Control Order, Docket No. III-83-3-5, Finding of Fact 1 (Wyo. 1984). The Board was acting as master for the District Court for the Fifth Judicial District. *Id.* Under a Wyoming statute, the attorney general may bring an action in District Court for general adjudication of water rights on any water system. Under the statute the District Court must then certify the legal and factual issues to be heard by the Board of Control. Wyo. Stat. § 1-37-196 (1977).

220. State Board of Control Order, Docket No. III-83-3-5, Finding of Fact 1.

221. *Id.* at Finding of Fact 2.

222. *Id.* at Finding of Fact 3.

223. *Id.* at Proposed Interlocutory Decree and Interlocutory Decree.

224. State Board of Control Order, Docket No. I-80-1-2, Finding of Fact 9 (Wyo. 1981).

225. *Id.* at Finding of Fact 2.

226. *Id.* at Findings of Fact 13 and 18.

227. *Id.* at Findings of Fact 14-20.

228. *Id.* at Conclusion of Law 3.

229. *Id.* at Conclusion of Law 4.

230. Telephone interview with attorney Russ Rauchfuss, who represented Indian Springs, July 24, 1989.

231. State Board of Control Order, Docket No. I-85-4-8, Finding of Fact 3 (Wyo. 1986).

232. *Id.* at Finding of Fact 2.

233. *Id.* at Finding of Fact 4.

234. *Id.* at Finding of Fact 3.

235. *Id.* at Finding of Fact 4.

236. *Id.* at Order.

237. State Board of Control Order, Docket No. III-77-1-2 (A & T Enterprises, Inc., petitioner), Conclusion of Law 4, (Wyo. 1980).

238. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 10, (Wyo. 1981).

239. Transcripts for Board of Control Docket No. I-80-4-5, at 36 (Opening statement of protestants' attorney Bob Sigler) ("[W]hen we say historically, and when the statute says historically, that isn't the year 1980, the year 1980 does not establish history.")

240. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 10.

241. State Board of Control Order, Docket No. I-U-81-3-1, Finding of Fact 19 (Wyo. 1982).

242. State Board of Control Order, Docket No. IV-82-3-9, Finding of Fact 7, (Wyo. 1984).

243. *Id.* at Finding of Fact 14.

244. State Board of Control Order, Docket No. I-83-3-4, Finding of Fact 14 (Wyo. 1985).

245. State Board of Control Order, Docket No. I-75-1-6, Conclusion of Law 6, (Wyo. 1976).

246. Town of Pine Bluffs v. State Board of Control, 649 P.2d 657 (Wyo. 1982).

247. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 8, (Wyo. 1981).

248. Letter by David Wilde, Project Manager of the North Platte River Project, read into transcript of record at page 25. An attorney for protestants, labelling the report a "humdinger," also questioned the adequacy of the conveyance loss estimate. Transcript of Hearing for Docket No. I-80-4-5, at 44 (Opening statements of attorney Bob Sigler).

249. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 6.

250. State Board of Control Order, Docket No. IV-83-3-4, Finding of Fact 20 (Wyo. 1985).

251. State Board of Control Order, Docket No. IV-83-3-4, Finding of Fact 7.

252. State Board of Control Order, Docket No. I-81-1-6, Finding of Fact 17, (Wyo. 1984).

253. *Id.* at 13.

254. State Board of Control Order, Docket No. I-76-2-10, Finding of Fact 8, (Wyo. 1977).

255. *See, e.g.,* Evanston, Casper and Basin Electric case studies *supra*, in this report.

256. Wyo. Stat. § 41-3-402 (1977).

257. *Id.*

258. State Board of Control Order, Docket No. IV-83-3-4, Finding of Fact 7.

259. State Board of Control Order, Docket No. IV-83-3-4, Finding of Fact 17.

260. State Board of Control Order, Docket No. IV-83-3-4, Finding of Fact 18.

261. Wyo. Stat. § 41-3-104 (1977).

262. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 13.

263. *Id.*

264. Wyo. Stat. § 41-3-104 (1977).

265. State Board of Control Order, Docket No. I-80-4-5, Finding of Fact 14.

266. State Board of Control Order, Docket No. IV-82-3-9, Finding of Fact 13. *But see*, Wyoming Water Planning Report No. 5, 9 (1970) (stated growing season to be *164* days).

267. State Board of Control Orders, Docket Nos. I-U-81-3-2 (Restriction 2) & I-U-81-3-1 (Restriction 2) (Wyo. 1982).

268. A compelling argument for such a change has been suggested by Charles Wilkinson. *See* Wilkinson, *Aldo Leopold and Water Law: Thinking Perpendicular to the Prior Appropriation Doctrine*, 24 **Land & Water L. Rev.** 1 (1989). Whatever the merits of this proposal, however, it does not seem a realistic option at this time.

269. An excellent comparison of irrigation techniques and their relative efficiency is provided in Shupe, *Waste in Western Water Law*, 61 **Or. L. Rev.** 483, 502-07 (1982). Predictably, Shupe criticizes flood irrigation techniques as particularly wasteful and inefficient. Though some of its bad reputation is certainly deserved, flood irrigation may not be as wasteful as it seems. Substantial return flows from flood irrigation techniques are stored in the ground before slowly returning to the stream during the irrigation season. This may have the salutary effect of actually extending the irrigation season for downstream farmers beyond the time that might exist if more efficient irrigation practices were used.

270. Wyoming should, however, continue to adhere to its restriction against transferring more water than is included in the adjudicated water right. Any other rule would invite abuse of the adjudication system.

271. Pacific Power officials, for instance, suggested moving the cases from an administrative to a judicial forum.

272. These include: (1) the benefit to the applicant resulting from the proposed appropriation; (2) the effect of the economic activity resulting from the proposed appropriation; (3) the effect on fish and game resources and on public recreation opportunities; (4) the effect on public health; (5) the effect of loss of alternative uses of water that might be made within a reasonable time if not precluded or hindered by the proposed appropriation; (6) harm to other persons resulting from the proposed appropriation; (7) the intent and ability of the applicant to complete the appropriation; and (8) the effect upon access to navigable or public waters.

273. *See e.g.*, Glenn v. Board of County Commissioners, 440 P.2d 1, 4 (Wyo. 1968).

274. Wyo. Stat. § 41-3-742(a)(ii)(1977).

275. *See, e.g.*, Idaho Code § 42-1761 (Supp. 1988).

276. Transfer applications that share the same docket number (designated 1A, 1B, etc.) involve cases where seprate water rights were addressed separately by the Board. The notes indicate multiple water rights handled in a single transfer.

277. This transfer involved three separate water rights, with appropriations of 5.76 cfs, 82.71 cfs and 10.26 cfs respectively. All had an 1884 priority date.

278. This transfer involved 25 separate water rights that were addressed cumulatively by the Board.

279. This transfer was denied by the Board without prejudice and involved the same water rights later approved for transfer in Basin Electric-4.

280. The Board denied this transfer without prejudice but approved transfer of the same water rights in Basin Electric-6.

281. This transfer involved a cooperative agreement between the City of Casper and Casper-Alcova Irrigation District (CAID) in which the City agreed to fund improvements to prevent losses in CAID's irrigation delivery system. In return, the City is entitled to the amount of water saved by those improvements.

282. The Johnson transfer involved 10 separate rights.

283. The Board of Control had not rendered a decision on this water transfer at the time this study was completed.

284. Pacific Power desired to detach the water rights from 1,150.8 acres, amounting to 1915 acre feet per year.

APPL	DOCKET#	APPL DATE	DEC DATE	PRE USE	POST USE	SRCE	DIV	CNTY	RE-SULT	PRO TST	APPL	PRIORITY DATE	PRE AMT	POS AMT
_ & T	III-77-1-2	10-76	1-80	AG	IND	RES	III	FREMT	D	N	N	1906	10 AF	N/A
BAGGS	I-76-2-10	11-76	5-77	AG	MUN	STRM	I	CARBON	G	N	N	1901	0.93CFS	0.59CFS
BSN EL-1[2]	I-75-1-6	1-75	4-76	AG	IND	STRM	I	ALBANY	G.C.	Y	Y	1884	98.73CFS	41.86CFS
N EL-2[3]	I-76-1-12	1-76	8-77	AG	IND	STRM	I	PLATTE	G	N	N	1878	13.24CFS	6.62CFS
N EL-3[4]	I-U-80-1-2	1-80	5-80	AG	IND	WELL	I	PLATTE	D	Y	N	1971	1.78CFS	N/A
N EL-4	I-U-81-3-2	7-81	3-82	AG	IND	WELL	I	PLATTE	G	Y	N	1971	1.78CFS	1.25CFS
BSN EL-5[5]	I-U-80-1-3	1-80	5-80	AG	IND	WELL	I	PLATTE	D	Y	N	1973	2.67CFS	N/A
BSN EL-6	I-U-81-3-1	8-81	3-82	AG	IND	WELL	I	PLATTE	G	Y	N	1973	2.67CFS	2.01CFS
ERR RH	II-83-2-5	4-83	3-84	AG	AG	STRM	II	JOHNSN	G	N	N	1889	45.72CFS	3CFS
F-1A	II-71-2-2-1.2	4-71	5-76	AG	MUN	STRM	II	JOHNSN	G	Y	N	1883	0.86CFS	.44CFS
F-1B	"	"	"	"	"	"	"	"	"	"	"	1883	1.02CFS	.51CFS
BURGESS	I-77-3-9	8-77	2-78	AG	AG	STRM	I	NATRNA	G	Y	N	1961	0.08CFS	0.08CFS
CAID[6]				AG	MUN	RES	I	NATRNA						7000AF
SPER	I-8-3-3,3-4	10-84	5-85	AG	MUN	STRM	I	NATRNA	G	Y	N	1884	5.5CFS	2.37CFS
OY	III-86-3-9	8-86	5-87	AG	MUN	STRM	III	PARK	G	N	N	1895	0.54CFS	0.17CFS
OGLAS	I-77-1-17	1-77	6-78	AG	MUN	STRM	I	CHVRSE	G.C.	N	N	1904	1.84CFS	1.2CFS
DOUG RES	I-74-2-7	4-74	1-75	AG	IND	RES	I	CHVRSE	G	N	N	1909	5000AF	5000AF
DMLAO	I-87-3-11	8-87	11-87	AG	REC	STRM	I	CARBN	G	Y	N	1977	0.09CFS	0.03CFS
NSTN-1A	IV-74-1-10	4-74	5-75	AG	MUN	STRM	IV	UINTA	G	N	N	1875	1.03CFS	0.39CFS
NSTN-1B	"	"	"	"	"	"	"	"	"	"	"	1875	0.84CFS	0.33CFS
NSTN-1C	"	"	"	"	"	"	"	"	"	"	"	1915	1.37CFS	0.15CFS
EVNSTN-1D	IV-83-1-2	1-83	11-85	AG	MUN	STRM	IV	UNITA	G	N	N	1896	0.37CFS	0.37CFS
GERBER	III-77-2-2	4-77	1-80	AG	IND	STRM	III	PARK	G	N	N	1904	1.22CFS	0.73CFS
ANGER	IV-83-4-3	11-83	8-85	AG	MUN	STRM	IV	SWTWTR	G	N	N	1908	9.61CFS	1.5CFS
SE CRK	I-83-3-5	8-83	11-83	AG	REC	RES	I	GOSHEN	G.C.	N	N	1908	1779AF	1779AF
D SP-1A	I-80-1-2	11-79	3-81	AG	MUN	STRM	I	NATRNA	D	N	N	1902	0.85CFS	N/A
IND SP-1B	"	"	"	"	"	RES	"	"	"	"	"	1902	13.5AF	N/A
JNSN[7]	I-U-79-3-2,4-1	8-79	3-80	AG	AG	WELL	I	PLATTE	D	Y	N	1969	8.91CFS	N/A
NDER	III-83-1-1	11-83	3-84	AG	MUN	STRM	III	FREMNT	G	N	N	1879	1.35CFS	1.01CFS
THROP	I-74-1-8	5-74	10-74	AG	AG	STRM	I	NATRNA	D	N	N	1884	(220 ACRS)	N/A
R V-1A	IV-82-4-6	11-82	5-83	AG	AG	STRM	IV	LINCLN	G	N	N	1898	1.74CFS	1.74CFS
LSR V-1B	"	"	"	"	"	"	"	"	"	"	"	1951	1.80CFS	1.71CFS
MILLER	II-87-3-3	8-87	8-87	RR	AG	RES	II	NATRNA	G.C.	N	N	1910	294.25AF	294.25AF
LLS[8]	I-89-1-4	1-89		AG	MUN	STRM	I	NATRNA	N/A				137.5AF	N/A
CULLOCH	IV-83-3-7	8-83	3-84	AG	AG	STRM	IV	UNITA	G.C.	N	N	1891	0.14CFS	0.14CFS
PWR[9]	I-80-4-5	11-80	10-81	AG	IND	STRM	I	CARBON	D	Y	N	1882	31.72CFS	N/A
PWE BP-1A	I-U-79-4-2	10-79	5-80	AG	MUN	STRM	I	LARAME	D	N	Y	1911	0.88CFS	N/A
PWE BP-1B	"	"	"	AG	MUN	WELL	I	LARAME	G	"	"	1920	2.45CFS	2.45CFS
EDLE-1A	IV-82-3-9	8-82	11-85	AG	MUN	STRM	IV	SUBLTE	G	N	N	1898	1.49CFS	1.49CFS
EDLE-1B	"	"	"	"	"	"	"	"	"	"	"	1899	0.43CFS	0.11CFS
EDLE-1C	"	"	"	"	"	"	"	"	"	"	"	1901	0.47CFS	0.12CFS
PWEDLE-1D	"	"	"	"	"	"	"	"	"	"	"	1906	0.26CFS	0.07CFS
RAUTE RCH	I-85-1-2	1-85	3-85	AG	AG	RES	I	CROOK	G	N	N	1951	35.96AF	20.0AF
WLINS	I-85-4-8	11-85	11-86	RR	MUN	STRM	I	CARBON	G.C.	N	N	1900	2.01CFS	2.01CFS
TOGA-1A	I-81-1-6	1-81	5-84	AG	MUN	STRM	I	CARBON	G	Y	N	1888	0.27CFS	0.07CFS
TOGA-1B	"	"	"	"	"	"	"	"	"	"	"	1961	0.14CFS	0.04CFS
SRTOGA-1C	"	"	"	"	"	"	"	"	"	"	"	1961	0.21CFS	0.06CFS
THAYNE	IV-85-4-5	11-85	8-86	AG	MUN	STRM	IV	LIBCLN	G	N	N	1907	0.76CFS	0.25CFS
WDRF	IV-81-4-18	11-81	8-82	AG	IND	RES	IV	UINTA	G	N	N	1959	1388AF	1388AF
X CP-1A	I-83-1-7	1-83	8-83	AG	AG	RES	I	ALBANY	G	Y	N	1905	38.45AF	28.45AF
X CP-1B	"	"	"	"	"	"	"	"	"	"	"	1906	38.45AF	38.45AF
WY G&P1	III-83-3-5	8-83	3-84	AG	REC	RES	III	WASHKE	G	N	N	1950	366.95AF	366.95AF
WY G&P2	II-83-2-2	4-83	11-83	DOM	REC	RES	II	SHERDN	G.C.	N	N	1912	0.02CFS	0.02CFS
POT-1A	I-U-78-4-2	11-78	5-81	AG	IND	WELL	I	LARAME	D	N	N	1940	1.39CFS	N/A
POT-1B	"	"	"	"	"	"	"	"	"	"	"	1946	1.23 CFS	N/A

1. Transfer applications that share the same docket number (designated 1A, 1B, etc.) involve cases where seprate water rights were dressed separately by the Board. The notes indicate multiple water rights handled in a single transfer.

2. This transfer involved three separate water rights, with appropriations of 5.76 cfs, 82.71 cfs and 10.26 cfs respectively. All had an 1884 priority date.

3. This transfer involved 25 separate water rights that were addressed cumulatively by the Board.

4. This transfer was denied by the Board without prejudice and involved the same water rights later approved for transfer in Basin ectric-4.

5. The Board denied this transfer without prejudice but approved transfer of the same water rights in Basin Electric-6.

6. This transfer involved a cooperative agreement between the City of Casper and Casper-Alcova Irrigation District (CAID) in which e City agreed to fund improvements to prevent losses in CAID's irrigation delivery system. In return, the City is entitled to the ount of water saved by those improvements.

7. The Johnson transfer involved 10 separate rights.

8. The Board of Control had not rendered a decision on this water transfer at the time this study was completed.

9. Pacific Power desired to detach the water rights from 1,150.8 acres, amounting to 1915 acre feet per year.