

WATER MARKETING IN CALIFORNIA: Past Experience, Future Prospects

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EXECUTIVE SUMMARY

Administrative means, rather than market forces, were used to allocate much of the water developed by large-scale state or federally sponsored water projects in the western states. Over the past decade no state has enacted as much legislation specifically directed at facilitating voluntary market transfers of water as has California. Yet the state has witnessed very few such transactions. The transfer of over 100,000 acre-feet of conserved water between the Imperial Irrigation District and the Metropolitan Water District of Southern California, and the acquisition in 1991 by the state-operated drought water bank of over 800,000 acre-feet of water in the midst of a drought is ample evidence that market forces can work to the benefit of water users. However, there have been very few long-term transfers within the Central Valley of California or involving the federal Central Valley Project. Moreover, the drought-banking operation did not really operate on market principles, but rather was a state-administered program that established uniform prices for all participating purchasers and sellers and adopted certain unduly restrictive rules for participation.

The Department of Water Resources has approached transfers cautiously, the Bureau of Reclamation in California has failed to broadly implement Department of the Interior policies to facilitate transfers, most agricultural water districts have viewed the potential for water transfers only very tentatively (out of concern over the security of their water rights and potentially adverse affects on the districts and the local communities), and environmental interests have relied on legal challenges to water rights and legislative mandates, rather than water purchases, to further their goals.

Several recent actions may alter the balance in favor of more water transfer activity in the state. The federal Central Valley Improvement Act of 1992 may alter the balance. First, it contains a number of provisions intended to facilitate transfer of project water. Second, even though the state is not experiencing drought conditions for 1993, water agencies will experience reductions in water availability because of environmental restrictions imposed by the act and by endangered species requirements (if not also by the State Water Resources Control Board)—what some have termed a new “regulatory drought.” As a result, *California water agencies should consider continuing the water bank in a form that incorporates more market principles and/or allowing privately negotiated transactions to serve the same function.* Finally, the act establishes a fund by which state and federal government bodies can make market purchases of water for fish and wildlife purposes.

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I. INTRODUCTIONI. INTRODUCTION

When it comes to treating water as a marketable commodity, California exhibits several contradictions. Over the past decade no Western state has enacted as much legislation specifically directed at facilitating voluntary market transfers of water. However, California has witnessed very few such transactions, particularly in comparison to the volume of water used and transported in the state. As Table 1 shows, a 1991 study covering six Western states found only three severance and transfer applications in California from 1975 through 1984, compared to much larger numbers in the other states examined.¹

On the other hand, the state is also the locus of two major, isolated examples of successful water-transfer activity. The 35-year agreement to transfer about 100,000 acre-feet of conserved Colorado River water between the Imperial Irrigation District and the Metropolitan Water District of Southern California is the largest single transfer of water in the West, and the acquisition in 1991 by the state-operated drought water bank of over 800,000 acre-feet of water in the midst of a drought, most of it within about 30 days time, is ample evidence that market forces can work to the benefit of water users in the state.

Still, for all the successful agreements entered into by the Metropolitan Water District in the southern part of the state, there have been very few long-term transfers within the Central Valley of California or involving the federal Central Valley Project. And there are criticisms that the drought-banking operation did not really operate on “free-market” principles, but rather was a state-administered program that established uniform prices for all participating purchasers and sellers and adopted certain unduly restrictive rules for participation.

Table 1

WATER RIGHT CHANGE APPLICATIONS FILED IN SIX WESTERN STATES, 1975–1984		
State	Number of Applications Filed	Percentage Approved
Arizona	30	93
California	3 ^a	83 ^b
Colorado	858	80
New Mexico	1,133	96
Utah	3,853	90
Wyoming	40	75

SOURCE: Adapted from Lawrence J. MacDonnell, *The Water Transfer Process As a Management Option for Meeting Changing Water Demands* (Boulder: Natural Resources Law Center, University of Colorado Law School, 1990), Vol. 1, p. 47, Table 3.2.4 and Vol. 2, p. 9, Table 2.

^aNo applications were filed in California until 1982.

^bCalifornia data on approvals reflect cases filed between 1982 and 1989.

transfers. Most agricultural water districts have viewed the potential for water transfers only very tentatively out of concern over the security of their water rights and potentially adverse effects on the districts and local communities. While the drought water bank and other recent transfers are taken by many to indicate that these attitudes are changing, other aspects of water management in the state indicate that wider adoption of market transfers will face certain other hurdles originating from long-standing conflicts over the management of water in California.

To some extent, these conflicts are representative of conflicts in other states as well—conflicts over urban versus rural uses of water and between environmental uses and other uses. In California, such conflicts have been particularly sharp regarding the water flows through the Sacramento/San Joaquin Delta and from the area north of the Delta to the southern part of the state. Historically, waters in the Delta joining these two major rivers flowed unchecked to the San Francisco Bay and the ocean. However, both the federal Central Valley Project and the State Water Project have developed storage of the more ample supplies in the northern part of the state principally for transport to those parts of the state south of the Delta. Transport through the Delta has involved the construction of large pumping plants on the south side of the Delta, which lift the water into canals for transport farther south.

More generally, market transfers of water in the state are not a routine phenomenon. The underlying causes probably have more to do with attitudes toward water transfers than with the legal basis for transfers in the state. While scholars and some environmental groups have strongly endorsed market transfers of water, other groups have not. The Department of Water Resources has approached them cautiously, and the Bureau of Reclamation in California has failed to broadly implement Department of the Interior policies to facilitate

Among the adverse environmental impacts of this pumping are the migration of saltwater further inland in the Delta and the entrainment of fish and other biota in the pumping plant. Upstream water withdrawals by project users, as well as diversions by other projects and water-rights holders have also reduced flows in the Delta and entrain fish at unscreened pumps. The quantities and timing of the altered flows in the Delta have impacted the migration of fish upstream in the Sacramento and San Joaquin Rivers. Water diversions and the conversion of land near streams and rivers to agricultural use have also substantially reduced the acreage of wetlands in the Central Valley. To date, in conflicts surrounding these environmental issues, the participants have focused on resolution through legal and legislative avenues, which have created additional uncertainty over water entitlements and market transfers of water.

II. WATER TRANSFERS IN THE EVOLUTION OF WESTERN WATER LAW

Market transfers of water can take various forms. They can be short-term (seasonal) leases of water, long-term leases (for example, 30 years), or permanent sales. They may involve transfer of all (or some fraction) of an underlying water right, or they may be transfers of all (or some fraction) of the contractual deliveries of water obtained from a wholesale water supplier, such as the California State Water Project (SWP) operated by the Department of Water Resources or the federal Central Valley Project (CVP) operated by the U.S. Bureau of Reclamation. Transfers may be initiated by owners of private water rights, by water districts, or by individual landowners receiving water within a district. In the latter case, some form of district review or approval is normally required.

Voluntary market transfers have benefits to buyers and sellers. Buyers can obtain water supplies more inexpensively than from new project construction. Sellers are compensated at a rate greater than they would have realized from retaining the water. Because water is moved to where it has greater economic value, productivity in the region encompassing the buyer and the seller is increased. Transfers also have the benefit of increasing the efficient use of water, particularly on federally subsidized projects where the low charges to contractors may be far less than the value of the water.² To be efficient, those transferring water must not be allowed to injure the water rights of other water-rights holders, unless those injured parties agree to accept compensation, and all Western states have provided such protection in their water codes. Similarly, there needs to be some vehicle for protecting water uses that do not normally participate in market transactions, but that provide economic benefits, such as fish and wildlife and instream uses.³

In fundamental ways, market transfers of water are a revolutionary concept. The allocation of surface water in the Western states evolved under the legal doctrine of “prior appropriation.” Under this doctrine, the first to divert water from a stream and put it to beneficial use, such as for

agriculture, industry, or domestic supplies, acquired the right to the quantity of water diverted. Subsequent appropriators on the same stream had more junior rights, which are the first to be subject to curtailment during times of low flow. Appropriative rights must be used continuously to remain valid: if a water user fails to exercise his or her right for a number of years, the right may be challenged in state forfeiture proceedings (handled in California by the State Water Resources Control Board).

The exact standards of use regarded as “beneficial” are often not well defined by states. Forfeiture actions or actions to prohibit waste or unreasonable use are normally undertaken only when a particular challenge is filed, and such actions normally involve time-consuming and costly proceedings. As a consequence, in its original form, the beneficial use doctrine has not served the West well as competition for water has increased. Its success would depend upon the continual development of new water-use standards by states and the policing of such standards on all water rights. Given the large number of individual water rights and the variety of water uses, this would be a vastly expensive undertaking.

However, concepts in the appropriative water doctrine have been evolving toward an alternative means to increase efficiency of use, namely allowing the lease or sale of water rights and conserved water. This approach, which is codified in detail in California water law (see the next section), provides a financial incentive to current water-rights holders to limit their use. The concept was regarded as revolutionary by some because it allowed senior, high-priority rights to be sold to very junior, or even new, appropriators. This was to the disadvantage of all the intermediate existing appropriators, who could argue that water unused by senior appropriators should belong to them. However, such an interpretation provided no incentives to senior appropriators, other than enforcement actions, to conserve on their water use. In fact, the incentives were just the opposite, an appropriator had to use all of his or her senior rights, no matter how meager the economic returns might be, or face losing some fraction of them.

The tension between these two administrative approaches in Western water law (enforcement of tighter beneficial-use standards versus providing incentives for conservation through voluntary water transfers) is by no means completely resolved. The transfer agreement between Imperial and Metropolitan, under which Imperial will receive over \$100 million from Metropolitan for conservation investments, was motivated in large part by an enforcement action under which Imperial was accused of wasting water.⁴ Metropolitan argued that Imperial, under its contract with the Department of the Interior for Colorado River water, had no right to sell water and that Metropolitan should receive any water Imperial was forced to conserve as a matter of course in the priority chain.⁵ On the other hand, Imperial took the position that it had the right to sell conserved water under the provisions of California law. One form in which this issue was framed was whether California law applied or federal law (in which these matters have not been well defined). The Department of the Interior postponed issuing a ruling on Imperial's right to sell water and encouraged the two parties to negotiate. Ultimately practicality prevailed, and the two parties

reached an agreement to transfer water without settling the legal question regarding Imperial's right to sell water, which could have required years of litigation.⁶

III. CALIFORNIA'S LEGISLATIVE INITIATIVES TO FACILITATE VOLUNTARY WATER TRANSFERS

A. Initiatives Before the Drought

One condition for efficient market transactions is security of tenure over and clarity of rights—otherwise, there is considerable uncertainty over what is being sold. Since the early 1980s, the California legislature has taken several steps to transform the concept of prior appropriation and to define water as a marketable commodity.⁷

In 1980, the legislature declared that “*efficient use of water requires certainty in the definition of property rights to the use of water,*” and that it is “*the established policy of the state to facilitate the voluntary transfer of water and water rights where consistent with the public welfare of the place of export and the place of import (Section 109(a) of the California Water Code).*”⁸

One fear that has plagued those that might be interested in transferring water is that the transfer itself would be used as evidence to cut back on their water rights. In other words, if a farmer transferred some fraction of his or her water, then it might be clear evidence that not all of the water specified in the original water right was necessary to sustain the existing beneficial use. The California legislature addressed this concern by declaring that the leasing or sale of water would not be used as evidence of waste and would not affect any determination of forfeiture: “*The sale, lease, exchange, or transfer of water or water rights, in itself, shall not constitute evidence of waste or unreasonable use (Section 1244).*”

Water law prior to 1980 established reclamation and conservation of water as beneficial uses of water and protected such water against forfeiture (Sections 1010(a) and 1011(a)). The definition of conservation in Section 1011(a) is broader than the conventional use of that term and includes water “not used by reason of land fallowing or crop rotation.” Legislation in 1982 authorized the sale, lease, or exchange of such reclaimed or conserved water (Sections 1010(b) and 1011(b)). Section 382, also enacted in 1982, makes explicit that the authority to lease or sell is not restricted to conserved or reclaimed water: water agencies are authorized “to sell, lease, or otherwise transfer water that is surplus to the needs of the agency's water users for use outside the agency.” Section 383 defines surplus very broadly to include not only water “which the agency finds will be in excess of the needs of the water users in the agency for the duration of the transfer” (Section 383(a)), but

also water for which a “water user and the agency agree, upon mutually satisfactory terms, that the water user will forego use for the period of time specified in the agreement” (Section 383(c)). This latter section also asserts the authority and the broker role of the water district by providing that “the agency shall act as agent for the water user to effect the transfer.”⁹ Originally, transfers were limited to a period of seven years, but this restriction was removed in 1986.¹⁰ Section 387 now provides that transfers may be for a longer period if mutually agreed upon by the transferring parties.

Except for the limitation of transfers to seven years, one might presume that the detailed amendments to the water code through 1982 would have provided adequate guarantees to transferring parties and would have led to a number of transactions, without the call for additional changes to the water code. But that has not been the case in California. Legislation was enacted in 1984 which specifically addressed the conservation of water by the Imperial Irrigation District, assuring that “no forfeiture, diminution, or impairment of the right to use the water conserved shall occur.”¹¹ The legislature has also amended sections of the Water Code to encourage state agencies and water districts to incorporate water transfers into their planning: in 1984, urban water-management plans were required to incorporate consideration of water transfers (Section 10632(b)).

Legislation enacted in 1985 made explicit that water districts had authority to contract for water conservation and to sell the conserved water (Section 11960). The Costa-Isenberg Water Transfer Act of 1986 contained another statement of water-transfer policy (Section 475), as well as directives to state agencies, such as maintaining a list of water agencies desiring to transfer water (Section 481) and the production of a water-transfer guide (Section 482). Other legislation in 1986 addressed another potential obstacle to water transfers by its “common carrier” provisions, which required that existing water agencies with surplus capacity in their conveyance facilities make up to 70 percent of the surplus capacity available to current users of the facilities for transferring water (Sections 1810-1814).

In 1988, existing statutes regarding temporary transfers (defined in statute to be transfers of one year or less) were consolidated (Sections 1725-1732). They protect the right of the transferee by guaranteeing that the rights to transfer water will revert to the original owner after the period of the temporary transfer without any action by the State Water Resources Control Board (Section 1731). Section 1720 exempts short-term transfers from the California Environmental Quality Act under which an environmental impact report might need to be prepared. The time required to prepare such documentation could have rendered it impossible to easily implement transfers that might be only a few months in duration. However, Section 1717 requires that short-term transfers not injure other water rights and “must not unreasonably affect fish, wildlife, or other instream uses.” In 1991, provisions requiring notice to the Department of Fish and Game and opportunity for review were added to several sections of the water code, including those sections referring to short-term and long-term transfers (Sections 1726 and 1736) and petitions for a change in use (Section 1704).

B. Drought Water-Bank LegislationB. Drought Water-Bank Legislation

The drought water bank in California (described in more detail below) was established in February 1991, pursuant to an executive order of the governor and recommendations by a state Drought Action Team. Participation in the bank would appear to have been protected by prior legislation regarding transfer of conserved water, temporary transfers, and the contracting authority of districts. However, three bills were enacted during the 1991–92 extraordinary session of the state legislature and signed into law on April 17, 1991, that specifically encouraged and protected participation in the bank. Assembly Bill 9 (Chapter 1) allowed a supplier of water to contract with a state water bank or other water user outside its service area if the governing body of the supply determined it to be in its best interest and if the water users consented.¹²

Among the sources of water recognized for transfer under Section 2 of Assembly Bill 9 were conserved water, growing crops with water from substitute sources, or land fallowing (not growing crops on the land). Senate Bill 9 (Chapter 2) declared that any temporary transfers made for drought relief would not affect water rights. Assembly Bill 10 (Chapter 3) also addressed the contracting authority of water districts for the purpose of conserving water during the drought. The authority of all three bills extended only until January 1, 1993. However, Assembly Bill 2897 (signed into law on August 12, 1992) generally extends the authorities in these three bills beyond 1992.

Assembly Bill 2897 authorizes contracts with water banks or other water suppliers or water users inside or outside the service area of the water supplier (Section 1745.04), allows transfer of water whether or not the water is surplus to the needs of the water supplier (Section 1745.05(b)), and specifically includes land fallowing within its definition of conservation (Section 1745.05(b)). If land-fallowing agreements involve the sale of more than 20 percent of the water supply of a district, then public hearings and district concurrence are required (Section 1745.05(b)). The authorities in the bill are not limited to drought periods.

Whether or not one regards all of the various amendments to the California water code as duplicative or as necessary extensions, this litany of amendments reflects an extreme degree of caution toward water transfers by irrigation districts, which are California's major water-rights holders. Some of the other reasons why this caution exists are discussed below. First, however, the operation of the state water bank is explored, as well as federal water legislation and water-transfer policy.

IV. OPERATION OF THE STATE WATER BANK

In early 1991, California had already suffered four years of drought and winter precipitation had again been meager.¹³ In February, the state Department of Water Resources announced that the State Water Project would make no deliveries for the coming year to its agricultural contractors, only 10 percent of normal deliveries to its municipal and industrial contractors, and only 50 percent of normal deliveries to those contractors with prior “settlement” rights on the Feather River.¹⁴ During the same period, the federal Central Valley Project announced that its contractors would receive only 25 percent of their contract amounts and that its water-rights settlement contractors would receive 75 percent.

As a result of this situation, Governor Wilson signed an executive order on February 1, 1991, addressing the drought.¹⁵ Among other actions, the order directed the Department of Water Resources to “develop a clearinghouse for facilitating water marketing transactions between willing sellers and buyers of water, consistent with the need to protect fish and wildlife resources.” The order also established a Drought Action Team consisting of the directors of several state agencies, chaired by David Kennedy, the Director of the Department of Water Resources. Among the responsibilities of the team were to “recommend any additional measures which it deemed necessary to combat the drought and protect the health, safety, and property of the people, while providing maximum feasible protection to the important environmental resources of the state.” The first report of the team was to be submitted by February 15, and recommended the creation of an emergency drought water bank to supply four critical needs: municipal and industrial uses, agricultural uses, the protection of fish and wildlife, and carryover storage for 1992.¹⁶ As noted above, the authority of water districts to participate in the bank and the protection of those transferring water to the bank were bolstered by legislation signed into law on April 17, 1991.

The Department of Water Resources was assigned responsibility for operating the water bank. Membership in the bank (as a purchaser) was limited to those who signed contracts to purchase water, and standardized purchaser and seller contracts set out the basic rules for the bank's operation.¹⁷ An important component of the bank is the Water Purchase Committee, on which each member is entitled to one representative. Recommendations of the committee are subject to approval by the bank members.

According to the voting rules set out in the purchaser contracts, each member has one vote and actions must be approved not only by a majority of the members, but also by members whose financial commitments to the bank total more than 50 percent of the dollars committed to both purchase contracts and option contracts (described below). However, in both 1991 and 1992, the bank normally operated by the consensus of its members, rather than by formal votes. According to the rules of the bank, each member submits its critical water needs to the bank, which, in 1992, had to be accompanied by either an option request or a purchase request.¹⁸ The standard price of an

option deposit established in the 1992 contract is \$20 per acre-foot (\$10 for the water, \$5 for “carriage water losses” for transporting water through the Sacramento/San Joaquin Delta, and \$5 for administrative costs). Option deposits are forfeited if the water is not taken or cannot be taken by another member. The standard price for a purchase deposit was set in the 1992 contract at \$90 per acre-foot (\$60 for the water, \$25 for Delta carriage water losses, and \$5 for administrative costs).

These prices are subject to modification by the water-purchase committee from time to time during the year, and the actual prices charged by the bank differed from these amounts, as discussed below. Options specify the month for delivery, and allocations of the available bank water are made about the tenth of each month to those members with purchase requests and exercised options. Allocations are made each month without reference to the date on which requests were submitted.¹⁹ According to the bank's rules, charges are set at the average cost, or “melded rate,” of the water available in the pool for sale that month. However, in its operations, the bank basically kept uniform purchase prices throughout the season.²⁰

Those purchasers with unmet needs from one month are automatically included in the pool of purchase requests for the next month. If the bank cannot deliver all of the water requested, it is obligated to refund the money forwarded to it, less half of the administrative costs. If the bank has excess water, members have the first right to purchase it. All purchases are made “at the Delta,” and purchasers must pay (through separate delivery contracts) the additional costs for pumping water from the Delta and conveying it to their districts. Purchasers can store water in State Water Project facilities up to December 1995, provided that such storage does not interfere with other project operations. This stored water is also subject to spillage if the SWP reservoirs fill.

All requests for purchases of water for fish and wildlife purposes must be channeled through the state Department of Fish and Game. In 1992, that department had the right to purchase 10 percent of the first 200,000 acre-feet of water made available for delivery by the bank at the melded rate. The Department of Fish and Game also had the right to purchase up to 10 percent of the water made available above 200,000 acre-feet at no cost (delivered at the Delta). The costs of such water are shared by other entities in the melded rate.

As Table 2 shows, water purchases were from three sources: land fallowing (making surface water supplies available by not planting and irrigating), ground water (making surface water available by relying on local ground-water sources or by means of direct ground-water pumping), and water already in storage (water reservoirs owned by local districts). In 1991, fallowing agreements covering a total of 166,000 acres constituted 50 percent of water purchases. Among the major crops fallowed were corn (59,000 acres), wheat (44,000 acres), pasture (16,000 acres), alfalfa (10,000 acres), and rice (8,000 acres).²¹

Most of the fallowing of land took place in the Delta region, where a large percentage of corn acreage was taken out of production. In fact, water acquired from fallowing agreements in the Delta

region constituted 41 percent of the total water acquired by the bank in 1991.²² By comparison, the fallowing of rice acreage was relatively small and constituted only a small fraction of bank purchases. Fallowing agreements were based on estimates of water use by crop, ranging from 1 acre-foot per acre (for wheat and barley) to 3.5 acre-feet per acre (for alfalfa, pasture, and rice).²³ At the bank's purchase price for water, these values resulted in purchases ranging from \$125 per acre to \$450 per acre.

In 1991, contracts resulting from use of local ground water accounted for approximately 260,000 acre-feet (32 percent of the bank purchases), with the majority of these purchases in the Yuba River and Feather River areas.²⁴ The bank monitored land fallowing through aerial reconnaissance and field checking, and the fallowing contracts contained an enforcement provision that any seller violating such an agreement was subject to paying liquidated damages equal to twice the contract price for the water.

Table 2

	1991		1992	
	Acre-feet	Percent of Total	Acre-feet	Percent of Total
Source				
Fallowing	414,743	50%	0	0%
Groundwater	258,590	32%	161,593	84%
Stored water	147,332	18%	31,600	16%
Total	820,665		193,193	
Delta water quality and other corrections	165,137	20%	34,478	18%
Net supplies	655,528		158,715	
Allocations				
Urban uses	307,373	47%	39,000	25%
Agricultural uses	82,597	13%	95,250	60%
State Water Project	265,558	40%	0	0%
Department of Fish and Game	0	0%	24,465	15%
Total allocations	655,528		158,715	

SOURCE: Steve Macaulay, Manager, State Water Bank, Sacramento, California, January 1993.

Because of local opposition to exporting ground water and concern over possible land subsidence,

ground-water contracts generally required that pumped ground water be used on lands overlying its source, that local water districts release an equal amount of surface water (rather than individual landowners), and that pumping from wells be metered and logged.²⁵ There were a few contracts, totalling less than 10,000 acre-feet, that involved pumping of ground water for direct transfer to the bank.²⁶ Purchases of surface water stored by local entities accounted for 18 percent of bank purchases in 1991, mostly in the Yuba and Feather River areas.²⁷

As Figure 1 shows, the water movement in the bank was generally from sellers in the northern part of the state to purchasers south of the Delta. Therefore, transport of bank water incurred not only evaporation losses, but also the need to maintain water-quality standards in the Delta as water is pumped from its southern side. As Table 2 indicates, Delta water-quality requirements accounted for 165,000 acre-feet in 1991, leaving 656,000 acre-feet for disposition by the bank. Purchasers bore the costs of carriage losses and Delta water-quality requirements in the melded price, as well as administrative costs of the bank. The resulting price to purchasers in 1991 was set at \$175 per acre-foot at the Delta (\$125 for water purchases, \$45 for Delta transport requirements, and \$5 for administrative costs).

Figure 1

DROUGHT WATER BANK PURCHASES AND ALLOCATIONS

SOURCE: *The 1991 Drought Water Bank*, Department of Water Resources, January 1992, p. 6.

The major water purchaser in 1991 was the Metropolitan Water District of Southern California, which accounted for 55 percent of the water purchased from the bank.²⁸ Purchases for urban uses were the principal component (47 percent of total sales from the bank, see Table 2), but even at the high purchase price, agricultural users purchased 82,597 acre-feet (13 percent). Water not purchased during 1991 (265,558 acre-feet, or 40 percent) was carried over as storage in the State Water Project for 1992.

Armed with this carryover storage and information on demands in 1992 and desiring to keep annual purchases and sales in closer balance, the bank offered only \$50 per acre-foot for 1992. This price was set to attract water from ground-water substitution agreements and from storage agreements, but was recognized as too low to elicit land-fallowing agreements. This lower price also avoided the controversy over community impacts associated with land fallowing. Table 2 shows the breakdown of sources for this water (as of December 30, 1992) and the allocation of water to Delta water quality requirements and purchasers. The sale price of water was set at \$72 per acre-foot in 1992 (\$50 for water acquisition costs, \$17 for Delta transport requirements, and \$5 for administrative costs), and all of the water was sold, leaving no carryover storage. Agricultural uses (95,250 acre-feet) accounted for a somewhat larger absolute amount at this lower price and, given the lower total sales from the bank, agricultural purchases comprised the largest percentage of purchases (60 percent), compared with urban uses (25 percent) and wildlife uses (15 percent).

The Department of Fish and Game did not make any direct purchases from the bank in 1991. However, the bank coordinated its operations with the Department of Fish and Game in order to minimize the impacts on fish and wildlife.²⁹ For example, the bank maintained water in Shasta Reservoir for temperature control for the 1991 fall and winter salmon runs. The Department also worked on other proposals to provide water to Central Valley wildlife refuges. Under one such arrangement (which occurred outside the formal bank transactions), 28,000 acre-feet of water was supplied by the Yuba County Water Agency from New Bullards Bar Reservoir at a reduced cost of \$50 per acre-foot for use at the Graylodge, Los Banos, Volta, and Mendota wildlife-management areas.³⁰

Although not all parties were supportive of the water bank, nearly all participants considered it a success, and a number of them singled out the bank's managers for high praise.³¹ It was organized quickly and rapidly acquired over 800,000 acre-feet of water in 1991, despite drought conditions. The purchase price of \$125 per acre-foot was clearly an attractive inducement to potential sellers. In round numbers the bank spent some \$100 million on purchases of water in 1991 and received \$68 million in revenues from sellers (the difference being accounted for by the unsold water carried over in storage for the State Water Project). The bank's tasks were far from simple, consisting not only of executing 351 contracts for acquiring water in 1991, but also assuring that the acquisitions did not injure other water rights, protecting fish and wildlife resources, and arranging the timing of deliveries to purchasers of bank water. In short, the urgency of the water-supply situation in 1991 led to a concerted effort to support a state-operated bank, an effort facilitated by the governor,

administrative agencies of state government, the state legislature, and water users themselves.

The principal groups expressing concern about water banking were the following. Representatives of agricultural communities worried about the potential for adverse impacts on the local economies (particularly from land fallowing) and the impacts of ground water pumping on local water levels and on land subsidence. Representatives of fish and wildlife groups were concerned that fish and wildlife habitats be protected when water was transferred.³² To some extent, these concerns were directed more at the concept of water marketing and prolonged future transactions than at the operation of the 1991 drought water bank.

A. Use of Private BrokersA. Use of Private Brokers

One question that arises is whether the same services could have been provided by private brokers acting independently of a state-organized bank. One view is that the state bank was necessary because large-scale water banking was a concept new to California and because individually brokered transactions would have been unable to produce the same number of contracts and quantities of water in as short a time period.³³ The state-operated bank was able to facilitate the reviews required under state law—i.e., Fish and Game review to determine whether the transfers would adversely affect fish and wildlife (and, where changes in place of use and purpose of use were required, review by the State Water Resources Control Board). In addition, the state-operated bank was able to perform the analysis necessary to coordinate changes in state and federal project operations to schedule deliveries from the bank without affecting the state's regular commitments to its contractors.³⁴

These review opportunities coupled with the state's control over the bank provided the opportunity for some innovations on the part of bank operators. For example, as originally proposed, most of the bank's transfers would have increased pumping from the Delta in the months from July through October, but analysis showed that July and August were months in which such pumping would be most harmful to American Shad, Delta smelt, and striped bass. To avoid this problem, the state was able to meet its bank commitments by releasing water from the San Luis Reservoir (south of the Delta) and then to replace it later in the summer and fall with water purchased by the bank.³⁵

In addition, the bank managers found an innovative way of utilizing “riparian” water rights. Unlike appropriative rights, riparian water rights are normally not transferrable and are tied to particular parcels of land bordering a watercourse. The bank made payments to riparian rights holders under fallowing contracts, thereby leaving this water in the stream. This water was used to maintain flows in the Delta for water-quality purposes, thereby freeing up other water stored in SWP and CVP facilities for transfer to bank purchasers.³⁶ The fact that the bank established a uniform price for acquiring water, along with an escalator clause in 1991, may have also facilitated rapid purchases, because potential sellers had no incentive to wait for a higher price. There had been some discussions among growers of holding out and selling water at \$300 per acre-foot,³⁷ but once the

bank established its pricing rules, farmers were induced to participate.

Information on privately brokered transactions during the drought is not readily available, but there were some instances where private brokers initiated transactions, but eventually found it easier to execute their agreements through the bank.³⁸ It is impossible to know, of course, whether exclusive reliance on private-brokerage arrangements would have yielded similar results. At a minimum, to have been as rapid, private brokerage would have required a well-structured state process to facilitate the required reviews and approvals under state law.

However, there is little question that if a well-functioning review process had been in place and if California had a history of utilizing market transactions to reallocate water then privately brokered arrangements could have substituted for many of the bank's activities during 1991. Furthermore, market transactions could have served to ameliorate the impacts of the drought prior to 1991, as did the sales of water from the Yuba County Water Agency in those years.³⁹ Also, as discussed in the next section, privately brokered agreements would have been more likely to bring the quantities of water purchased and sold by the bank into balance.

If the bank is to operate in the future, the bank should consider encouraging private brokerage arrangements, particularly as experience with water transfers increases and when the bank is operating on less of an emergency status. The state could also consider using brokers to assist directly in its operation. In any case, the long-term transfers in the state will almost certainly be privately negotiated. Such transactions are likely to be more diverse than the transactions facilitated by the bank (they may differ in duration, price, and other conditions), and the state has shown no indication of trying to organize them through a state-sponsored water bank.

B. Setting the Bank's Purchase Price

Even before the bank was established in 1991, the state Department of Water Resources had been negotiating purchases of water for the State Water Project. When the bank was formed, it took requests from its members for their "critical water needs." Because of the large amounts requested, the bank believed that it could sell virtually all of the water it acquired. Based upon past experience, the bank managers believed that while purchases of storage and ground-water substitution would be relatively inexpensive, the bank could not obtain the large quantities of water the bank needed without the use of fallowing agreements. Some quick analyses using farm budgets indicated that prices ranging up to \$115 per acre-foot might be necessary for farmers to forgo production and to cover their various fixed payments for land and equipment. Wanting to add some additional inducement and to err on the side of acquiring too much water, rather than too little, the bank established its purchase price of \$125 per acre-foot in 1991, with an escalation clause.

At this price, the bank rapidly began acquiring large quantities of water. Simultaneously, however, the bank was in the process of securing written agreements from its members as to the amount of

water they would purchase, and these amounts were totalling up to be significantly less than those in the original survey of members, owing in part to heavy March rains. Between mid-February and mid-April, the estimates of the critical needs of bank members fell from a level of more than 800,000 acre-feet to approximately 400,000 acre-feet.⁴⁰ At any rate, the bank quickly dispensed with the notion of further escalating the price and slowed its purchases. As noted above, the bank was left with 266,000 acre-feet of carryover storage in 1991. Under the contractual arrangements entered into by purchasers, the costs of this carryover storage (about \$33 million at the bank's purchase price) became an obligation of the State Water Project. This cost became one component of the capital costs of the project, and, as such, is distributed among all water districts that have SWP contracts and receive water from it. Dissatisfaction with this outcome was one factor that led the bank to reduce its purchases in 1992.

Being able to arrive at a “market clearing price,” at which the quantity supplied of a good or service matches the quantity demanded, usually depends upon either trial and subsequent adjustment in the prices of actual market transactions or considerable experience with or information about the amounts offered and sold at different prices. Since marketing water in these quantities and within this short period of time was new to California, this information was not available. However, there are some alternative methods of operation which could be used in future banking operations to develop this information and more closely match purchases and sales.

The oversupply problem could be eliminated simply by requiring bank purchasers to obligate themselves to pay for the amount of water requested at the price set by the bank and to stop acquisitions when the amount of water acquired sums to the requested amount. This is essentially what the bank did in its second year of operation. Of course, there is no guarantee that this procedure, by itself, will yield a market-clearing price. On the one hand, the bank may not be able to acquire the quantity of water requested at the bank's price. One procedure the bank could use in this situation is simply to ration the water acquired based on requests.⁴¹ Alternatively, the bank could proceed to offer higher prices. On the other hand, too much water might be offered at the initial price set by the bank (the condition that existed in 1991). In this situation the bank could simply stop making purchases when the amount of water acquired equalled the sum of the requests. However, in this situation, the bank purchasers will have paid too high a price for the quantity of water desired. In other words, neither of these modifications in the bank's operations are likely to yield a market-clearing price, except by chance.

An alternative method could be used: the bank could solicit offers to sell water, as well as offers to acquire water, in which each offer would specify the quantity, price, and the month for delivery. A given purchaser (or seller) could be allowed to submit more than one request for a given month, for example to purchase 20,000 acre-feet of water from the bank if the price were \$50 per acre-foot and 10,000 acre-feet of water if the price were \$75 per acre-foot.⁴² Those operating the bank would then rank the offers to sell and offers to buy by price and determine the “equilibrium price” at which the quantities requested and for sale were in balance.⁴³ Offers to sell water at or below this price would

be accepted, as well as offers to purchase water at or above this price. The bank transactions could then be executed at the equilibrium price.⁴⁴ At the equilibrium price, some sellers of water would be rewarded with a price above their asking price and certain purchasers of bank water would be rewarded with prices below their offer price.

Another alternative would be for state officials to rely on privately brokered transactions to accomplish many of the functions of the drought water bank: the operation of the market would work to bring the water offered for sale and the water purchased into balance. Brokers could operate in one of two ways, either 1) they would not consummate a purchase of water until they had located a buyer (i.e., they would first secure options to buy water); or 2) they would purchase quantities of water outright for subsequent resale. In the latter case, the quantities purchased by brokers would be in relatively small blocks, and brokers would respond quickly if they discovered that the prices they were paying were too high to facilitate quick resale.

Unlike the operation of the state water bank, privately brokered transactions would have been executed at a range of different prices during any given month.⁴⁵ These prices may also have varied over time, as the perception of the severity of the drought or other market conditions changed. Market operations could involve prices not only for water to be offered for sale in the current month, but also prices for water to be offered a few months hence. In other words, the market for water supplies could be similar to a “futures market” for grain or other commodities. The existence of a futures market could help to resolve uncertainty over prices and availability of supplies later in the growing season.

C. Regulations for PurchasersC. Regulations for Purchasers

The operation of the bank had another feature not synonymous with “free market” operations. Purchasers were required to meet certain criteria to participate in the bank. Among these conditions were “critical needs” requirements that municipal and industrial contractors had at their disposal in 1991 only 75 percent of the water available during a normal water year (80 percent in 1992). Given water availability, this requirement was easily satisfied in 1991, but not in 1992. This requirement was certainly economically inefficient at the wholesale level in that purchasers of water would want to balance the bank price against the value of water within their jurisdictions, rather than the value imposed by a rationing standard. In other words, in 1992, users within a service area may have been deprived of uses of water for which they would have paid at least the bank's price.

The bank exhibited some other behavior not consistent with economic efficiency. One rationale for setting the price lower in 1992 was to keep the cost of participation in the bank less expensive and therefore more viable for potential agricultural purchasers. The agricultural purchases were somewhat larger in absolute numbers during 1992 (95,000 acre-feet, compared with 83,000 acre-feet). However, it was also realized that the lower price would result in acquiring smaller quantities of water. Although the bank operated by consensus, it was the view of the Metropolitan Water

District of Southern California early in 1992 that this policy would exclude some of its demand for water. Put in other terms, the price set by the bank was below the market-clearing price. Repeated operation of the bank in such a manner would certainly encourage some purchasers to arrange for purchases of water outside the bank, namely those with higher-priced demands that were too large to be accommodated at the lower bank price.

V. LONG-TERM WATER TRANSFERS AND OTHER TRANSACTIONS OUTSIDE THE WATER BANK. LONG-TERM WATER TRANSFERS AND OTHER TRANSACTIONS OUTSIDE THE WATER BANK

The short-term trades undertaken by the drought water banks have not been the only recent water-transfer activity in California. Although this paper makes no attempt to provide an exhaustive list,⁴⁶ the arrangements in the southern part of the state, largely initiated by the Metropolitan Water District of Southern California, illustrate the variety of forms such transactions can assume. In addition to the transaction with the Imperial Irrigation District, Metropolitan has negotiated a ground-water storage agreement with the Arvin-Edison Water Storage District in the Central Valley, is working out a similar, short-term arrangement with the Semitropic Water Storage District in Kern County, and is implementing a test-land fallowing program with the Palo Verde Irrigation District along the Colorado River.

The agreement with Arvin-Edison is a dry-year option agreement that involves the conjunctive use of surface and ground water. Metropolitan paid for the construction of spreading basins and pumps in the Arvin-Edison Water Storage District so that up to 115,000 acre-feet of the water to which MWD is entitled from the SWP can be stored as ground water under district lands. During dry years, MWD will pay the district to pump and use this water within the district in exchange for up to 120,000 acre-feet of Arvin-Edison's CVP water.⁴⁷ The estimated cost to MWD of this water will be about \$90 to \$100 per acre-foot.

In the agreement being negotiated with the Semitropic Water Storage District, during 1993 Metropolitan would store up to 100,000 acre-feet of its SWP water in ground water basins underlying the district. Semitropic would be responsible for storing and for pumping back the water, but Metropolitan would pay the district \$80 per acre-foot for storing the water and \$70 per acre-foot for retrieving it, for a total of \$150 per acre-foot.

The test land-fallowing program with the Palo Verde Irrigation District is a two-year program that commenced in 1992. Under this agreement, Metropolitan pays farmers in the program \$620 per acre per year not to grow crops. At the estimated water savings of 4.6 acre-feet per acre, Metropolitan will receive about 93,000 acre-feet per year from approximately 20,000 acres enrolled in the program. Including administrative costs paid to the district and other Metropolitan expenses, the

water will cost over \$135 per acre-foot.

All of these agreements are expected to provide water to Metropolitan at prices below the costs of additions to the State Water Project and below the current cost of water from the SWP. The costs of supplies from adding the Los Vaqueros or the Los Banos Grandes storage facilities to the SWP are estimated to exceed \$300 per acre-foot per year,⁴⁸ and the current cost of SWP water to MWD is about \$200 per acre-foot. By comparison, the acquisition of long-term supplies from Imperial will cost Metropolitan about \$115 per acre-foot per year,⁴⁹ and the acquisitions in the three agreements outlined above are expected to be less than \$150 per acre-foot.⁵⁰

VI. PRIOR FEDERAL LAW AND POLICIES REGARDING TRANSFER OF FEDERALLY SUPPLIED WATER IN CALIFORNIA

VI. PRIOR FEDERAL LAW AND POLICIES REGARDING TRANSFER OF FEDERALLY SUPPLIED WATER IN CALIFORNIA

A. Prior Federal Law

By contrast with state law in California, which contains a number of provisions explicitly written to facilitate transfers, federal law dealing with water supplied by the U.S. Bureau of Reclamation, until very recently, did not address water transfers directly. However, a number of provisions in Reclamation law, some of them quite old, have been used by entities desiring to transfer water in a number of Western states.⁵¹

The original Reclamation Act of 1902 limited the water provided by the construction of federal facilities to irrigation use. However, once the dams were in place, other types of entities sought use of the facilities for delivery of nonproject water, as well as unused project water. The Town Sites Act of 1906 authorized the delivery of water to towns and cities in the vicinity of irrigation projects, provided the municipality owned the water. The Warren Act of 1911 provided authority to contract out the excess capacity in irrigation facilities to permit water owned by other entities to be delivered to irrigation water users.

The Miscellaneous Purposes Act of 1920 authorized the sale of project water for purposes other than irrigation, provided that the Secretary of the Interior first obtained permission from the existing water-user associations in the project and provided that the delivery of this water was not “detrimental to the water service for such irrigation project or to the rights of any prior appropriator.” The Reclamation Project Act of 1939, which remains the principal contracting authority of the Bureau, allows water formerly designated for irrigation to be contracted for municipal and industrial use (or hydropower use), so long as the irrigation uses are protected.

The Miscellaneous Purposes Act was cited by the El Paso County Improvement District No. 1 (an irrigation district in Texas) in arranging for the transfer of water by individual members of the district to the City of El Paso under a 1962 agreement and to the El Paso County Lower Valley Water District Authority for urban uses under a 1988 agreement.⁵² The Casper-Alcova Irrigation District in Wyoming utilized the Reclamation Project Act in its 1982 agreement with the City of Casper to line portions of its canal and lateral systems intended to provide the city with up to 7,000 acre-feet per year of conserved water.⁵³

More generally, the Supreme Court held in California vs. United States⁵⁴ that state law governs the control, appropriation, and distribution of project water unless the application of state law would be inconsistent with an explicit congressional directive. In United States vs. Alpine Land & Reservoir Co.,⁵⁵ the U.S. Court of Appeals for the Ninth Circuit held that “the conspicuous absence [in federal reclamation law] of transfer procedures, taken in conjunction with the clear general deference to state water law, impels the conclusion that Congress intended transfers to be subject to state water law.”⁵⁶

B. Past Federal Policies

In spite of past examples of transfers of Bureau water inside and outside authorized service areas under various existing authorities, a number of questions have plagued those interested in transferring such water. These include: 1) the need for clearer definition of the conditions under which water may be transferred outside of federal project service areas; 2) whether the federal government would limit any “profit” from transfers involving federally subsidized water; 3) whether the federal government might apply any beneficial use standards over and above those in state law; and 4) the applicability of acreage limitation to transferred water.⁵⁷ And even if prior legal authorities were sufficient to transfer water, there were no formal legal rulings by the Interior Solicitor on these matters, nor was there any written federal policies addressing the transfer of water prior to 1988.

Because of the increasing interest in voluntary water transfers in the Western states, the Department of the Interior responded to a call in 1987 by the Western Governors Association to formulate a water-transfer policy within existing federal law.⁵⁸ This policy was issued in December 1988, accompanied by more detailed guidance issued by the Commissioner of Reclamation in March 1989.⁵⁹ These directives recognize the legitimacy of financial payments between contractors for the purpose of providing an appropriate financial incentive for transfers. These guidelines also outline the circumstances under which increased payments need to be made to the Bureau of Reclamation. For example, when water is transferred from irrigation use to municipal and industrial use, water moves from interest-free repayment under Reclamation law to interest-bearing repayment. In general, the guidelines refrain from imposing additional surcharges on water transfers, beyond those required in Reclamation law and contracts.

One recent study has addressed, in part, how well the Bureau of Reclamation is implementing these directives.⁶⁰ Among the principal findings of this report are: 1) that there are a number of transfers that have taken place in a manner more or less consistent with the guidelines; 2) that the Bureau could do more to educate and train its personnel to deal with water transfers; and 3) that some regional offices of the Bureau appear to be doing a better job of implementing the policy than others. In particular, even though more than three years had passed between the adoption of the department's policy and the time of the study, Mid-Pacific Regional Office (which manages the Central Valley Project in California) had failed to implement the Department's policy.

More specifically, the Mid-Pacific Region's historical water-transfer policy differed from the 1988 principles in two principal respects: 1) the region allowed transfers of CVP water for periods of up to one year only; and 2) the region did not allow districts or farmers to "profit" from water transfers (districts were allowed to charge no more than the Bureau's subsidized contract rates for transferred water). To its credit, however, the region did adopt a 1991 interim water-transfer policy that allowed districts a profit, although transfers were still restricted to a one-year term.⁶¹ But the Bureau permitted only certain of its contractors to participate in the 1991 state-operated drought water bank.⁶² As discussed below, 1992 federal legislation contained directives specific to the Central Valley Project and overriding these restrictive policies.

C. Past Transfers of Federally Supplied Water in CaliforniaC. Past Transfers of Federally Supplied Water in California

Despite prior restrictions, there have been some transfers of federally supplied water in the Central Valley of California. Exchanges of water within the growing season between users in the same service area at the Bureau's contract water rates have been common.⁶³ The Sacramento River Water Contractors Association and the Tehama-Colusa Canal Authority each began operating exchange pools in about 1980.⁶⁴ Farmers offer surplus water to these pools for distribution to other members, but no exchanges outside of the pools are allowed. There have also been a small number of long-term transfers between districts. For example, in 1985, the Lindsay-Strathmore Irrigation District in the Central Valley Project of California reduced its contractual entitlement by 2,500 acre-feet to allow the City of Lindsay to contract for this amount (the city previously had no contract for CVP water).⁶⁵

VII. THE CENTRAL VALLEY PROJECT IMPROVEMENT ACT OF 1992 AND OTHER FEDERAL LAW DIRECTLY ADDRESSING WATER TRANSFERS

Water transfers were first addressed directly in federal legislation enacted for drought emergency purposes. Public Law 96-18, enacted in 1977, authorized the operation of federal water banks during the then-current drought. This act found its greatest application in California, in which a federally operated bank transferred over 40,000 acre-feet from 7 sellers to 27 purchasers for an average price of around \$60 per acre-foot.⁶⁶

Federal legislation was also enacted in March 1992 to cope with the recent drought. Although it did not specifically authorize the federal operation of drought water banks, as did the 1977 legislation, Public Law 102-250 did contain a number of measures designed to clarify federal transfer authority during drought, thereby removing some of the uncertainty plaguing transfers of federally supplied water. Section 102 specifically authorizes the use of federal facilities for storage and transport of project and nonproject water for use both within and outside an authorized project service area. Section 102(e) clarifies that nonproject water can be conveyed for municipal and fish and wildlife purposes, thereby extending the authority of the Warren Act, which limited storage and conveyance of nonproject water to irrigation purposes. Federal acreage limitation requirements were exempted from application to new lands (such as lands outside the federal project) receiving water during a drought (Section 102(b)(2)). The authorities of Section 102 are limited to drought periods, and all temporary contracts for the purposes outlined can be no more than two-years in duration.

Section 101 of the same act authorized the Bureau of Reclamation to make purchases of water from willing sellers. The authorities of Sections 101 and 102 taken in concert would appear to give the Bureau of Reclamation authority to operate a drought water bank, much as they did in 1977 in California. However, in deference to the State Water Bank, which was already in operation in California, the bureau had decided not to organize its own bank. Section 101(d) specifically authorizes the Department of the Interior to participate in water banks established by a state.⁶⁷

Outside of the drought context, the first piece of federal legislation which specifically addressed water transfers is the 1992 Central Valley Project Improvement Act (Title XXXIV of Public Law 102-575). The act contains various measures principally designed to “protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins” (Section 3402(a)). The bill also has as a stated purpose “to increase water-related benefits [of the CVP] through the expanded use of voluntary water transfers and improved water conservation” (Section 3402(d)). Section 3405(a) of the bill authorizes all individuals and districts who receive CVP water under contract (including water-rights settlement and exchange contracts) to transfer all or a portion

of their water to any other water user or water agency in California and for any purpose recognized as beneficial under state law. Therefore, clear authority is provided for out-of-project transfers.

Section 3405(a)(1)(E) provides that transfers authorized under the act shall be regarded as beneficial uses under the Reclamation Act of 1902, thereby satisfying any uncertainty that might arise as to how the federal government would interpret the beneficial use requirement. Section 3405(a)(1)(G) essentially exempts reclamation districts that transfer water from any additional requirements imposed by the Reclamation Reform Act, since it declares that transfers will not be considered as conferring “supplemental or additional benefits.” Section 3405(a) can be interpreted to authorize transfers by individuals within a district, provided that the Secretary of the Interior determines that the transfer “will have no unreasonable impact on the water supply, operations, or financial conditions of the transferor’s contracting district or agency or its water users” (Section 3405(a)(1)(K)). Transfers involving more than 20 percent of a district’s long-term contract water are subject to district approval (Section 3405(a)(1)). Districts have a 90-day period for their review (Section 3405(a)(2)(A)).

The act requires the Secretary of the Interior to determine that transfers do not “result in a significant reduction in the quantity or decrease in the quality of water supplies used for fish and wildlife purposes,” unless there are offsetting benefits and equivalent fish and wildlife mitigation (Section 3405(a)(1)(L)). The act also requires the Bureau of Reclamation to render its review of proposed transfers within 90 days of receiving written proposals (Section 3405(a)(2)(A)). If the bureau does not render a decision, then the transfer is deemed approved (Section 3405(a)(2)(D)). If the bureau disapproves the transfer, the reasons must be stated and, alternatives must be presented, if any exist, that could render the transfer proposal acceptable (Section 3405(a)(2)(C)).

Although it is restricted to the Central Valley Project in California, in general the CVP Improvement Act addresses some of the ambiguities in prior federal law as applied to water transfers and establishes a sound basis for water transfers. There are, however, some problematic provisions of the act. The first is that under Section 3405(a)(1)(F) transfers to uses outside of the CVP are subject to a first right of refusal by entities within the CVP service area. This right must be exercised within 90 days from the date that “notice” is provided of the proposed transfer. An entity exercising the right must meet the same terms and conditions as the original purchasing party and must “compensate the transferee who had first negotiated the agreement ... for that entity’s total costs associated with the development and negotiation of the transfer” (Section 3405(a)(1)(F)).

Depending upon how the Bureau of Reclamation implements this provision, it could invite opportunistic behavior on the part of those engaged in transfers of water outside of the Central Valley Project. As the negotiations between Metropolitan and Imperial indicate, negotiations for long-term transfers can often take years. If entities involved in out-of-project transfers are allowed to provide notice at or near the end of their negotiation process, they may have incurred such high costs developing the proposal that the compensation provision would be a significant barrier to exercising

the first right of refusal. This might be an appropriate outcome, however, because it could prove disruptive, at the end of such a process, to have another purchaser intervene. Furthermore, if the entity exercising the first right of refusal were in a different part of the state, then many of the factors involved in transferring water to the new entity could be different—for example, availability of surplus capacity for conveying the water to the new entity, transport cost, environmental impacts, etc. It could, in turn, take considerable time to evaluate the transfer to the intervening entity.

An alternate approach, one that would be of some advantage to potential sellers of water, would be for the Bureau of Reclamation to require notice very early in the negotiation process.⁶⁸ This would encourage other potential purchasers to enter the process early and to compete on the basis of price or other factors. Such a procedure would also allow state and federal agencies to compare proposals from different purchasers on the basis of potentially adverse impacts.⁶⁹

The provisions of the CVP Improvement Act also appear to be problematic for short-term transfers. As noted above, California law exempts temporary transfers from compliance with the California Environmental Quality Act and substitutes review by the Department of Fish and Game and a determination that they have no significantly adverse effects on fish and wildlife. The Bureau of Reclamation should consider implementing similar provisions in its guidelines and regulations for implementing Section 3405. For example, for short-term transfers, the bureau could establish a timetable for review much shorter than 90-days and could establish an accelerated form of compliance with the National Environmental Policy Act. There is some basis for this in Section 3405(a)(1)(D), which provides for consistency with state law. In the particular case of short-term, out-of-project transfers, the 90-day period for first right of refusal is also problematic. Allowing a 90-day time period to elapse before implementing short-term transfers could push many such decisions back into December of the year preceding the growing season, at which time the picture of winter precipitation is still vague. Congress should consider either doing away with the first right of refusal or providing an exception for short-term transfers.

On February 19, 1993, the Bureau of Reclamation issued interim guidelines for water transfers under the act, with the goal of providing guidance before the 1993 growing season.⁷⁰ Earlier drafts were circulated informally by the bureau to some interested parties.⁷¹ The guidelines provide little detail on how the bureau would implement the first-right-of-refusal provisions. The earlier January 14 draft appeared to severely constrain the transfer of conserved water by prohibiting districts from transferring water that did not meet beneficial use standards,⁷² but the February 19 draft indicates transfers involving conserved water will be considered on a case-by-case basis. The February 19 draft also indicates that not only will the bureau annually review long-term transfers to make sure that they have no adverse impacts on project operations and environmental conditions, but also that the bureau will subject long-term transfers involving more than 20 percent of a district's water to annual review by such districts. This provision for annual district review appears to go beyond the requirements of the CVP Improvement Act and is likely to severely constrain long-term transfers.

In conclusion, although the CVP Improvement Act represents a significant step forward in water-transfer law, it contains a few problematic provisions that will require some thought to implement in a way that will not discourage some desirable transfers. The Bureau of Reclamation intends eventually to pursue a formal rule-making process for its water-transfer guidelines, which would be one opportunity to air approaches for implementing some of the more problematic sections of the legislation. In some cases, these may require amended federal legislation.

VIII. ENVIRONMENTAL USES OF WATER AND WATER TRANSFER

Although common parlance may not recognize it, the concept of economic value includes not only uses that are normally marketed in some form, such as irrigation, domestic use, industrial use, and hydropower production, but also uses which human beings value even though they do not normally involve markets, such as providing recreational boating, fishing, and habitat for wildlife. There are various approaches to maintaining such resources, ranging from direct regulation, to establishing rights to instream flows, to purchasing water for such uses.

Many of the important events in the recent history of California water management reflect struggles between traditional water diversions and emerging demands for environmental uses, which usually call for more instream water. These have involved limiting the use by Los Angeles of waters flowing into Mono Lake in order to assure higher lake levels, defeating the Peripheral Canal which would have diverted more water from the north side of the Delta to south of the Delta, and establishing higher water-quality standards for the Delta. The impact of some of these events has been sweeping, affecting (or potentially affecting) a large number of existing water rights and contracts for project water. Two recent developments are the adoption of the federal CVP Improvement Act and the State Water Resources Control Board draft Decision 1630.

The CVP Improvement Act contains several measures for maintaining or restoring fish and wildlife habitat. For one, the act mandates an allocation of water for these purposes, including specified quantities of water to maintain a number of wildlife refuges (Section 3406(d)), an instream release of at least 340,000 acre-feet of water per year into the Trinity River (Section 3406(b)(23)), and an additional annual allocation of 800,000 acre-feet of water for the primary purpose of implementing fish, wildlife, and habitat restoration (Section 3406(b)(2)). These are sizable quantities of water: in normal water years the Central Valley Project delivers about 5 million acre-feet of irrigation water and 500,000 acre-feet of municipal and industrial water (although these deliveries are expected to rise to twice that level), and the State Water Project delivers from 1.2 million to 1.5 million acre-feet. In addition, the act puts forth goals for establishing higher levels of anadromous fish in Central Valley rivers (Section 3406(b)(1)).⁷³ The act includes surcharges on all contract water for deposit to a Fish and Wildlife Restoration Fund (described in more detail below), an increasing-block rate

(additional surcharges on water exceeding 80 percent of prior contract entitlements), and limits on long-term contracts until certain restoration goals are met.

Draft Decision 1630 was intended to improve existing fish and wildlife protection by specifying flow standards and water-quality standards at various points in the Delta and the river systems feeding it.⁷⁴ It proposed to severely limit the times at which “reverse flows” in the Delta could exist because such flows entrain fish and other biota in the Tracy and Harvey Banks pumping plants supplying water to the federal and state projects at the south side of the Delta. The order also proposed to mandate “pulse” river flows at key times of the year designed to assist migrating fish species. During these periods, appropriators could be constrained from diversions for periods of up to two weeks.

Based on modeling work by the state, the draft Decision 1630 standards were expected to reduce exports through the Delta to the state and federal projects by 800,000 acre-feet (to a level of 5.6 million acre-feet) and to increase Delta outflow to the ocean by the same amount.⁷⁵ However, the draft decision indicated that these water-supply impacts would be lessened by the 600,000 to 800,000 acre-foot yield of the CVP made available for fish and wildlife enhancement purposes under the CVP Improvement Act, although no quantitative analysis was provided.⁷⁶

On April 1, 1993, California Governor Pete Wilson requested the state Water Resources Control Board to stop work on Decision 1630 and to shift their focus to establishing permanent standards designed to protect San Francisco Bay and the Sacramento-San Joaquin Delta. Among the reasons cited by the governor for this request were that the reductions in Delta water exports that would likely be mandated by federal agencies acting under authority of the Endangered Species Act to protect the Delta smelt and the winter run of chinook salmon would be equally, if not more, restrictive than those contemplated by draft Decision 1630.

Therefore, recent federal actions threaten to reduce historical water entitlements by significant percentages (as would the state decision, as proposed). Uncertainty over the exact amount of the reductions also creates obstacles for water transfers, because it creates doubt concerning what is being purchased. For example, reductions in Delta exports are expected to have an impact on previously negotiated transfers that depended upon state or federal project water transported through the Delta, such as the ground-water storage agreement (described above) between MWD and the Arvin-Edison Water Storage District. If existing water rights are subject to continual reexamination and reduction by government, then they are considerably less valuable as a marketable commodity. So, even though the state water code has gone to great lengths to create certainty over the rights to conserved and transferred water, other federal and state activities have created uncertainties over water entitlements. These conditions are certainly one reason that water districts have been cautious about entering into more water transfers.

On the other hand, the CVP Improvement Act and the draft Decision 1630 (as proposed) create new

opportunities for water transfers. For example, Draft Decision 1630 indicated that some surplus pumping capacity would be available for transferring nonproject water.

“Pumping capacity for additional water transfer exports exists and can be used without violating the standards... The additional exports can be divided into two categories: additional exports when the QWEST (reverse flow standard) is not at maximum levels⁷⁷ and additional exports when the QWEST standard is at the limit.⁷⁸ The latter category allows approximately 30 percent of water released from the Sacramento River Basin to be exported (assuming the Delta Cross Channel gates are open). The remaining 70 percent must be allowed to flow to the ocean in order to avoid violating the QWEST restriction. This restriction would not apply to water transfers from the San Joaquin Basin. While additional exports by transfers are possible, such exports will have variable effects on the habitat in the central Delta depending on the source and timing of the water transferred.”⁷⁹

The exact impact of the decision on Delta exports was uncertain, and some modeling efforts indicated that greater reductions in Delta exports would be necessary.⁸⁰ If the requirements of the CVP Improvement Act and the Endangered Species Act impose large reductions, then the carriage-water requirements for transferring additional water through the Delta may be so high that the Delta will be a barrier to water transfers. Therefore, future transfers may well be divided into two pools—transfers among entities south of the Delta (which the above citation from the draft decision indicates are not constrained by water-quality considerations) and a smaller number of transfers among entities north of the Delta.

Because the deliveries from the state and federal projects to districts south of the Delta are to be reduced by federal requirements, some water managers in California are calling the current situation a new “regulatory drought.” Indeed, in its March 12, 1993, water-supply outlook for the coming year, the Bureau of Reclamation indicated that even though the runoff conditions were approaching those of a normal water year, south of the Delta agricultural contractors were projected to receive only 40 percent of normal supplies and urban contractors 75 percent of historic use. By contrast, north of the Delta, agricultural contractors were projected to receive 65 percent of normal supplies, urban contractors 90 percent of historic use, and water-rights contractors 100 percent of normal supplies.

The bureau attributed these reduced allocations to two factors: 1) the cumulative effect of six previous years of drought; and 2) regulatory requirements stemming from the CVP Improvement Act and the Endangered Species Act. Some districts are likely to attempt to make up for the reduction through water purchased through transfers. Therefore, a strong south-of-Delta market in the available project supplies and other sources may develop. Water agencies should consider extending the life of the drought water bank or encouraging privately negotiated transactions to address these needs. Even if improving precipitation prohibits the bank from operating under the

legislated authorities specifically addressed to drought, there appears to be ample authority in California law for the bank to continue in somewhat altered form (for example, using the authority for temporary transfers and for contracting by districts to implement them).

The CVP Improvement Act contains other provisions that are likely to create a market in water for environmental purposes (as did the draft Decision 1630, as proposed). The CVP Improvement Act places surcharges on water users of up to \$6 per acre-foot (at October 1992 price levels) for irrigation contractors, up to \$12 per acre-foot for municipal and industrial contractors, and up to \$25 per acre-foot for new purchasers outside of the CVP (for example, those receiving water through a water transfer) (Section 3407(d)). These surcharges and additional levies on power users in the project are to bring annual collections up to \$30 million for deposit in a CVP Restoration Fund (Section 3407(d)). An additional \$20 million is authorized for collection from other revenue sources outlined in the bill, for a total of \$50 million per year (Sections 3407(b) and (c)). Among the permitted uses of the Restoration Fund is the acquisition of water from willing sellers (Section 3407(a)).

Draft Decision 1630, as proposed, contained provisions that paralleled those in the CVP Improvement Act, including surcharges on State Water Project Contractors. Under the draft decision, users of surface water that consume water within the area of origin were to pay a “mitigation fee” of up to \$5 per acre-foot, while the fee for exported water could range up to \$10 per acre-foot (CVP contractors who pay similar fees under the CVP Improvement Act were exempt from these state charges, except for water obtained under their own water rights).⁸¹ These monies were to be paid into a Bay/Delta Estuary Fund to pay for loans, projects, and other activities designed to improve fish and wildlife habitat in the Bay/Delta estuary.⁸²

To achieve more certainty over water rights, it is highly important for California's water future to reach some resolution of Delta water-quality issues. In a December 9, 1992, press release, Governor Wilson stated flatly that, “*We must recognize a disturbing truth: the Delta is broken. It is the centerpiece of California's most intractable water problem.*”

To address this problem, the governor launched the Bay Delta Oversight Council and a state Water Policy Council. The Oversight Council is charged with developing a solution to the controversies involving Delta water-quality standards within three years. Whether this timetable can be met remains to be seen, especially given the large number of actors with different interests that are affected by water quality standards in the Delta and the independent regulatory status of the state Water Resources Control Board. After the call by the governor for withdrawing the draft Decision 1630, some environmental members of the council threatened to resign. Nevertheless, the advances that environmental interests have made toward their goals may pave the way toward a period of less confrontation. Too, because environmental purposes are now likely to have substantial funding (through surcharges) for purchases of water, environmental interests will have some stake in a reasonable degree of certainty over the water entitlements that are purchased for fish and wildlife

uses.

Reallocation of water, restrictions on long-term contracts, and the source of funds for purchasing water represent political judgments as to how the burden of paying for water for fish and wildlife purposes should be spread. However, regardless of one's views on this distributional issue, the idea of allowing public agencies charged with the protection of fish and wildlife resources to buy water to further their missions, just as they buy land and construct physical facilities, is an appealing one. If market transfers are to play an increasing role in water-allocation decisions, then not only should existing uses for these purposes be protected in water-transfer proceedings, as California law provides, but these uses should be granted appropriative rights. State programs for such public uses for water should be supplemented with private appropriations for the same purposes, for no public agency can be expected to know of all of the individual circumstances in which private individuals or organizations place a high value on instream water use.⁸³

California law appears incomplete in this regard. Even though instream uses of water are regarded as beneficial under California law, there is no appropriative right for such uses, as there is in most other Western states.⁸⁴ In some Western states (such as Arizona and Alaska), individuals or private organizations can file for and hold instream rights. In others, such as Colorado and Oregon, only state agencies can hold such rights. In Colorado and Oregon, private parties can donate (or arrange for donations) of rights to the state for instream purposes, and in Colorado, such donations may be accompanied by an enforceable contract between the donor and the state concerning how the water is to be used. The procedure in California differs from those in other Western states. The Department of Fish and Game reviews new appropriations for water diversions and transfers and can recommend that they be denied or that conditions be attached to them to protect fish and wildlife.

The California system appears to involve more agency review and less clarity and security than systems where appropriative rights are granted for such purposes and where such rights can be legally defended. The evolution in instream flow law has been gradual in other Western states and one recent change in California suggests some adoption of the appropriation view. In 1991, provisions were added to the California water code allowing owners of existing appropriative, riparian, or other rights, to change the purpose of use to “preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water” (Section 1707). This appears to open the door to conversion of existing rights, but does not establish instream uses as full appropriative rights.

IX. CONCERN OVER COMMUNITY IMPACTS

Another factor that may have inhibited water transfers in California is concern over community or third-party impacts. If there is a large change in agricultural production in one area, then businesses and individuals that supply agricultural producers or that process its output will also be affected. Although these businesses may have no legal right to the water involved or no legal protections against changes in economic conditions, they are legitimately concerned about their livelihood. If a water transfer involves only the use of conserved water, then the transfer will have no negative third-party impacts since the same amount of land will be left in production. In fact, there may be some increase in local employment connected with installing and maintaining the conservation measures.

If the water transfers are short-term in duration (such as the transfers under the water bank) or are limited to a small percentage of the acreage in one area, then they are unlikely to have severe impacts on third parties even if they involve reduced crop production. However, if the transfers are long-term and significant acreages of agricultural land are retired, then third-party impacts are inevitable. They are simply one price that society incurs for moving water to more economically productive activities. Similar impacts occur when industries of other types relocate. There are, of course, offsetting third-party gains in areas that purchase the water and areas where the proceeds from the sales are invested.

Some information on short-term, third-party impacts was developed for the 1991 operation of the state water bank in a state-commissioned study.⁸⁵ Among the counties with large amounts of agricultural production, some experienced a significant percentage of land fallowing: 20 percent of the acreage in Sacramento county, 12 percent in Yolo County, and 10 percent in San Joaquin County.⁸⁶ The corresponding estimates for losses in economic activity in these three counties were \$8 million, \$3 million, and \$20 million respectively, but the changes represented very small percentage changes in overall county employment (less than 0.5 percent in each case).⁸⁷

These estimates do not include any local gains from reinvestment of proceeds from water sales in the local community, such as purchases of new farm equipment or land improvements, such as laser leveling. The total estimated loss in employment in all counties affected by the bank was valued at \$13 million.⁸⁸ On a state-wide level, these losses were more than offset by the increase in just the agriculture income in the regions importing water (estimated at \$45 million).⁸⁹ Of course, the major purchasers of water from the 1991 water bank were urban users. The study estimates the direct benefits to urban areas at \$91 million, without including the additional indirect economic gains.⁹⁰

Another study of a hypothetical transfer of up to 500,000 acre-feet of water from agricultural to urban uses, sponsored by the Bay Area Economic Forum and the Metropolitan Water District of Southern California,⁹¹ estimated that if the water were transferred from the lowest-value agricultural uses, only 2,000 jobs related to agriculture would be lost (around 1 percent of total employment in

those sectors). The study noted that this impact was much smaller than normal fluctuations in agricultural employment related to weather and agriculture prices (which ranged up to six times as large) and much smaller than fluctuations that have resulted from land-fallowing associated with federal price-support programs.

The study estimated the loss in agricultural employment at two jobs and \$250,000 of revenue per every thousand acre-feet of water transferred. According to the estimates in the study, in the state's manufacturing sector, the same amount of water would be associated with some 2,600 jobs and \$387 million of revenues.⁹² The report also noted that there are several mitigation measures that could be put in place to compensate areas from which water is transferred, such as payments for job training and direct compensation. The report estimates that the economic gains from a transfer would be more than sufficient to fund them (through a tax on transfers or through other means).

X. CONCLUSIONSX. CONCLUSIONS

Market transfers of water have definitely taken a place in California's water future. Major transfer agreements have become common in southern California, largely initiated by the Metropolitan Water District. Although transfers of federal and state project water in California's Central Valley have been limited, the 1991 and 1992 drought water banks have broken new ground in a dramatic way, with over 800,000 acre-feet of purchases in 1991 and nearly 200,000 acre-feet in 1992. Even though the state is not experiencing drought conditions for 1993, water agencies are going to experience reductions in water availability because of environmental restrictions imposed by federal legislation and endangered species requirements (if not also by the State Water Resources Control Board)—what some have termed a new “regulatory drought.” As a result, California water agencies should consider continuing the water bank in some form and/or allowing privately negotiated transactions to serve the same function.

If the state does continue its water-banking operations, the state should consider restructuring the financial transactions in a way that will assure that purchases and sales are balanced at a market-determined price by either using something akin to a bidding process or allowing privately negotiated transactions. Consideration also ought to be given to changing other bank rules that were inconsistent with efficient markets, such as the requirement in 1992 that participants had to have less than 80 percent of normal supplies.

The experience gained from operation of the bank, coupled with the water-transfer provisions of the CVP Improvement Act, should provide an opportunity for more short-term and long-term water transfers. Privately negotiated transactions (including ones facilitated by water brokers) should certainly play a role in the latter, if not in the former as well. Certain of the provisions in the CVP Improvement Act, such as the first right of refusal, are likely to present difficulties for successful operation of market transactions unless the Bureau of Reclamation implements them carefully or

seeks their repeal. State water law on transfers, including protections for conserving and for transferring water and the streamlined process for approving temporary transfers, provides a useful guide. In fact, the federal legislation calls for consistency with state water law.

Recreational and other environmental uses of water represent an important component of economic value. Recent state and federal actions contemplate the establishment of funds by which state and federal government bodies can make market purchases of water for fish and wildlife purposes. However, these same actions have also resulted in a current state of great uncertainty regarding supplies that will be available to project contractors. This uncertainty cuts both ways. It is likely to encourage short-term market purchases of water by those seeking to firm up their supplies. However, it also creates uncertainty over current property interests in water and what quantities of water will attach to the rights being purchased, thereby casting a shadow over long-term transfers.

This uncertainty is likely to continue for some time as regulatory decisions are challenged and rewritten, and until the results of modeling the impacts of those decisions are clarified. The state is correct to place emphasis on resolving these critical issues. Because the purchase of water for fish and wildlife restoration is substantially funded, environmental interests will also have a stake in the certainty of the rights they plan to purchase, as well as security over the rights once they are acquired. In this regard, the state might also benefit from adding full appropriative rights for instream and fish and wildlife purposes to its water code, as other Western states have done.

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ENDNOTES

1. Lawrence J. MacDonnell, *The Water Transfer Process As a Management Option for Meeting Changing Water Demands* (Boulder: Natural Resources Law Center, University of Colorado Law School, 1990), Vol. 1, p. 47. Some of this difference can be accounted for by the fact that the water permits granted to the state and federal projects in California are quite extensive geographically and, therefore, transfers within these projects can take place without application to the state, *Ibid.*, Vol. 2, chapter 2. Also, transfers of pre-1914 rights in California do not require state approval and are not included in Table 1.
2. For additional discussion of the value of market transfers, see L. M. Hartman and Don Seastone, *Water Transfers: Economic Efficiency and Alternative Institutions* (Baltimore: The Johns Hopkins Press, 1970); Terry L. Anderson, *Water Crisis: Ending the Policy Drought* (Washington, D.C.: Cato Institute, 1983); Bonnie C. Saliba and David B. Bush, *Water Markets in Theory and Practice: Market Transfers, Water Values, and Public Policy* (Boulder: Westview Press, 1987); and Richard W. Wahl, *Markets for Federal Water: Subsidies, Property Rights, and the Bureau of Reclamation* (Washington, D.C.: Resources for the Future, 1989).
3. For a discussion of extending water rights to cover such uses, see Terry L. Anderson, 1983, and Richard W. Wahl, "Acquisition of Water for Instream Flows," *Rivers*, 1990, 195-206.
4. California. Department of Water Resources, *Investigation Under California Water Code Section 275 of Use of Water by Imperial Irrigation District* (Los Angeles, 1981); Environmental Defense Fund, *Trading Conservation Investments for Water* (Berkeley, CA: Environmental Defense Fund, 1983); Bonnie G. Colby, Mark A. McGinnis, Ken A. Rait and Richard W. Wahl, *Transferring Water Rights in the Western States—A Comparison of Policies and Procedures*, Occasional Paper Series (Boulder: Natural Resources Law Center, University of Colorado School of Law, 1989); Richard W. Wahl and Robert K. Davis, "Satisfying Southern California's Thirst for Water: Efficient Alternatives," in *Scarce Water and Institutional Change*, ed. Kenneth D. Frederick (Washington, D.C.: Resources for the Future, 1986), pp. 102–133.
5. In the system of priorities established by the 1931 "Seven Party Agreement" among California users of Colorado River water, the Coachella Valley County Water District and the Palo Verde Irrigation District both have rights with priorities between those of Imperial and those of Metropolitan. For additional detail, see Environmental Defense Fund, 1983; and Richard W. Wahl and Robert K. Davis, 1986, p. 110. In fact, objections raised by Coachella lengthened the negotiations over Metropolitan's transfer of water from Imperial.
6. One fact which would bolster Imperial's position in this dispute is that a large portion of the district's entitlement consists of "present perfected rights" under the Supreme Court's decision in *Arizona v. California* and such rights might arguably enjoy the transfer provisions of California law, rather than being subject to a potentially differing federal interpretation. The state asserted jurisdiction over the use of water by Imperial when it became involved in an enforcement action alleging waste and unreasonable use in the district. However, the form in which the issue was settled does not provide a clear answer as to whether the state considered all of the water transfer provisions of state law as applicable. More specifically, both Imperial and Metropolitan had water permits from the State of California, in addition to contract rights from the federal government. Both entities will continue to operate within these permits after the proposed transfer (both will be using quantities of water within the allowable quantities and places of use in their original permits). Therefore, neither entity filed for a change in

place of use with the State Water Resources Control Board to effectuate the transfer and none was granted. See also, Brian E. Gray, “Water Transfers in California: 1981–1989,” in *The Water Transfer Process as a Management Option for Meeting Changing Water Demands*, ed. Lawrence J. MacDonnell (Natural Resources Law Center, University of Colorado School of Law, 1990), pp. 38–40.

7. For more detailed discussion of the provisions of the California Water Code dealing with water transfers, see Brian E. Gray (1990) and Brian E. Gray, Bruce C. Driver and Richard W. Wahl, “Transfers of Federal Reclamation Water: A Case Study of California's San Joaquin Valley,” *Environmental Law* (Vol. 21, 1991), pp. 911–983.
8. Citations to the California Water Code, below, are generally taken from *West Supplement*, 1992. The more recent amendments addressing operation of the state water bank were obtained from the offices of the state legislature.
9. The authority of water users within a district to transfer water and the authority of the district to control such “user initiated” transfers has been a principal focus of recent bills in the California legislature. See also the discussion of the federal Central Valley Project Improvement Act, below.
10. See California Water Code, Section 387 (West Supp. 1990). Also see Brian E. Gray, 1990, p. 44, note 33.
11. Section 1011, which addresses conservation and protects conserved water from forfeiture, would appear to have provided Imperial with adequate protection for the agreements it was negotiating with Metropolitan. Presumably Imperial sought the additional assurance provided in this law because it was already under a State Water Resources Control Board proceeding and because section 1244 of the code (see above) provided a weaker protection (that the sale, lease, exchange, or transfer of water or water rights, in itself, did not constitute evidence of waste or unreasonable use). See Brian E. Gray, 1990, p. 38.
12. This legislation may have provided some protection against charges that the water could not be surplus to the needs of an agency during a drought (cf. Section 382 of the Water Code). Section 3 of Assembly Bill 9 provides that water may be transferred “whether or not the water ... is surplus to the needs of the service area of the water supplier.” However, Section 383 of the existing Water Code appears to have provided similar protection because it defined “surplus” to include any water that members of the agency decided to forgo using for the duration of a transfer.
13. The following statistics about the drought are taken from California, Department of Water Resources, *The 1991 Drought Water Bank* (Sacramento, Calif., 1992), p. 1.
14. Settlement rights resulted from legal settlements between the state agencies authorized to construct water storage facilities and those districts or individuals with prior water rights. Those holding prior rights agreed to forgo their rights in exchange for contracts for project water, provided they obtained higher priority than other project contractors. Similar contracts were developed in the federal CVP.
15. California Executive Department, “Executive Order No. W-3-91” (Sacramento, 1991).
16. California. *Department of Water Resources*, 1992, p. 1.

17. Most of the provisions discussed here are from the 1992 purchaser and seller contracts. The 1991 contracts were similar in most, but not all, respects.
18. In 1991, once the bank formalized its rules, buyers had to deposit 50 percent of the purchase price within seven days after submitting their requests and 75 percent within 15 days.
19. The 1991 bank did not incorporate monthly pools of water.
20. In 1991, the bank provided sellers of water with an “escalator clause,” guaranteeing that if the bank later raised its purchase price “for the same crop in the same area” by more than 10 percent of the price in a water sales contract, the seller would receive the higher rate. This provision was included to encourage early participation, rather than having those interested in selling water to the bank hold out for potentially higher prices later in the season.
21. California. *Department of Water Resources*, 1992, p. 4.
22. *Ibid.*, pp. 4–5.
23. California. Department of Water Resources, *The 1991 Drought Water Bank* (Sacramento, 1992). Based on its estimates of water use by crop, the bank could have allowed the sale of water saved by switching to crops that used less water per acre. However, no transactions of this type were reported by the bank. This type of crop switching would have required somewhat more policing, whereas crop fallowing could be monitored easily through aerial photographs.
24. *Ibid.*, p. 2.
25. *Ibid.*, p. 8.
26. *Ibid.*, p. 8.
27. *Ibid.*, p. 2.
28. Purchaser information by district and statistics on the 1992 water banking operations were obtained from Steve Macaulay, Manager of the State Water Bank.
29. California. *Department of Water Resources*, 1992, pp. 10–12.
30. *Ibid.*, p. 12; Richard Howitt, Nancy Moore and Rodney T. Smith (1992), p. 13; John B. Loomis, “The 1991 State of California Water Bank: Water Marketing Takes a Quantum Leap,” *Rivers* (1992), pp. 129–134.
31. See Richard Howitt, Nancy Moore and Rodney T. Smith (1992), pp. 21–37; and Jay R. Lund, Morris Israel and Richard Kanazawa, *Recent California Water Transfers: Emerging Options in Water Management* (Davis, California: Center for Environmental and Water Resources Engineering, 1992), p. 57.

32. See Jay R. Lund, Morris Israel and Richard Kanazawa, 1992, p. 56.
33. Richard Howitt, Nancy Moore and Rodney T. Smith, 1992.
34. Jay R. Lund, Morris Israel and Richard Kanazawa, 1992, p. 54.
35. Jay R. Lund, Morris Israel and Richard Kanazawa, 1992, p. 54.
36. Richard Howitt, Nancy Moore and Rodney T. Smith, 1992, pp. 15–17 and p. 41; Jay R. Lund, Morris Israel and Richard Kanazawa, 1992, pp. 54–55.
37. See California, *Department of Water Resources*, 1992, p. 5.
38. Richard Howitt, Nancy Moore and Rodney T. Smith, 1992.
39. During the first four years of drought, the Yuba County Water Agency sold about 290,000 acre-feet of water to other water users (exclusive of Delta carriage water requirements), Jay R. Lund, Morris Israel and Richard Kanazawa, 1992, p. 73.
40. Jay R. Lund, Morris Israel and Richard Kanazawa, 1992, p. 48. Also, see *op. cit.*, pp. 62–63.
41. Such a procedure has been used in the exchange pool operating within the Arvin-Edison Water Storage District. See Richard W. Wahl, 1989, pp. 140–141.
42. For the purpose of ranking, the offers could be segmented into incremental amounts: in this example, one offer to buy 10,000 acre-feet at \$75 per acre-foot and a second to buy an additional 10,000 acre-feet if the price were \$50 per acre-foot.
43. The bank could add a charge for carriage water and administrative costs to offers to sell water in determining the equilibrium.
44. The submitted prices could also be used, in which case the bank would make a profit.
45. There was a strong sense among the participants in the state water bank that sellers of water would feel it unfair to be paid different prices. But there is some evidence that water users would accept transactions consummated at different prices—namely, the operation of the federally sponsored drought water bank in California in 1977 under the authority of Public Law 96-18. Unlike the current state water bank, the bank did not fix a single price. The prices paid by the bank for water ranged from \$15 per acre-foot to \$85 per acre-foot. These prices included some profit incentive to sellers, but prices were restricted under the federal legislation, authorizing this bank to prevent “undue profit” to sellers. The prices paid by purchasers of bank water ranged from \$54.93 to \$142.44, but part of this range is accounted for by the fact that the prices included differential conveyance and pumping costs. See Richard W. Wahl (1989), pp. 136–138.
46. For a more complete description of water transfers in California, see Jay R. Lund, Morris Israel and Richard Kanazawa,

- 1992 and Brian E. Gray, 1990. Also see Brian E. Gray, Bruce C. Driver and Richard W. Wahl, 1991.
47. Lawrence J. MacDonnell, Richard W. Wahl and Bruce C. Driver, *Facilitating Voluntary Transfers of Bureau of Reclamation Supplied Water* (Boulder: Natural Resources Law Center, University of Colorado School of Law, 1991), Vol. 2, p. 73.
48. See Richard W. Wahl, *Markets for Federal Water: Subsidies, Property Rights, and the Bureau of Reclamation* (Washington, D.C.: Resources for the Future, 1989), p. 114.
49. Bonnie G. Colby, Mark A. McGinnis, Ken A. Rait and Richard W. Wahl, 1989.
50. Those agreements that depend upon water available from the Delta, such as the agreement with the Arvin-Edison Water Storage District, will be impacted by the recent CVP Improvement Act and by endangered species requirements that will limit pumping from the Delta.
51. For additional discussion, see Western Governors' Association, *Water Efficiency: Opportunities for Action*, Report of the Water Efficiency Working Group (Denver, Colo., 1987); Brian E. Gray, Bruce C. Driver and Richard W. Wahl, 1991, pp. 918–919; Lawrence J. MacDonnell, Richard W. Wahl and Bruce C. Driver, 1991; and Richard W. Wahl, 1989.
52. Lawrence J. MacDonnell, Richard W. Wahl and Bruce C. Driver, 1991.
53. David Engels, “Augmenting Municipal Water Supplies Through Agricultural Water Conservation,” in *Western Water: Expanding Uses/Finite Supplies* (Boulder: Natural Resources Law Center, University of Colorado School of Law, 1986); Richard W. Wahl, 1989, pp. 141–142; Lawrence J. MacDonnell, Richard W. Wahl and Bruce C. Driver, 1991, pp. 184–210.
54. 438 U.S. 678-689, 1978.
55. United States vs. Alpine Land & Reservoir Co., 697 F.2d, 858, 9th Cir. 1983.
56. For a detailed discussion of the relation between federal and state law regarding water transfers, see Brian E. Gray, Bruce C. Driver, and Richard W. Wahl, 1991.
57. The Reclamation Reform Act of 1982 restricts the amount of land for which any one owner can receive federally supplied water and the amount of land on which he or she can receive water at the federally subsidized rate.
58. Western Governors' Association, *Water Efficiency: Opportunities for Action*, Report of the Water Efficiency Working Group (Denver, Colo., 1987).
59. These two documents are available from the Department of the Interior and are reproduced in Lawrence J. MacDonnell, Richard W. Wahl, and Bruce C. Driver, 1991 as Appendices I and II, respectively.

60. Lawrence J. MacDonnell, Richard W. Wahl, and Bruce C. Driver, 1991.
61. United States. Bureau of Reclamation. “1991 Central Valley Project Water Transfer Guidelines” (Sacramento, Calif., 1991).
62. Richard Howitt, Nancy Moore and Rodney T. Smith, 1992, p. 27.
63. Brian E. Gray, 1990, Chapter 2, pp. 24–26.
64. *Op. cit.*
65. Contracting personnel, U.S. Bureau of Reclamation, Sacramento, California.
66. Richard W. Wahl, 1989, pp. 136–138.
67. However, in 1991, the Bureau prevented its contractors from participating in the water bank, except those that had prior water rights.
68. For example, notice could be required within 6 months of initiating negotiations. Enforcement could be facilitated by regulations requiring entities to document the date at which they commenced negotiations.
69. Of course, doing away with the first-right-of-refusal provision would provide a different form of level playing field because any potential purchaser could approach any potential seller.
70. United States. Bureau of Reclamation, “Draft Interim Guidelines for Implementation of the Water Transfer Provisions of the Central Valley Project Improvement Act,” (Sacramento, Calif., 1993).
71. Earlier drafts were dated December 17, 1992, and January 14, 1993.
72. The thrust of that section would have been contrary to that of California law which contains no such provisions, but rather deems the transfer of conserved water to be a beneficial use.
73. Anadromous fish are species that migrate from the ocean upstream to successfully complete their life cycle, such as salmon, which spawn in freshwater.
74. California. State Water Resources Control Board, *Draft Water Right Decision 1630* (Sacramento, December, 1992). This decision, as proposed, was to update the former Board Decision 1485.
75. *Ibid.*, p. 85.
76. *Ibid.*, p. 89.
77. Shown as 800,000 acre-feet per year for the 1984 to 1989 period, *Ibid.*, p. 88, Figure E.

78. Shown as 900,000 acre-feet per year for the 1984 to 1989 period, *op. cit.*
79. *Ibid.*, pp. 87–90.
80. Personal communication with Roger Patterson, Regional Director, Bureau of Reclamation, Sacramento California, February 10, 1993.
81. California. State Water Resources Control Board, 1992, p. 116.
82. California. State Water Resources Control Board, 1992, pp. 115–117.
83. For additional discussion of this point, see Terry L. Anderson (1983), Richard W. Wahl (1990), and Terry L. Anderson and Donald R. Leal, “Buy That Fish a Drink: The Water Marketing Alternative to ESA [the Endangered Species Act],” *Environmental Perspectives*, No. 6, September 1, 1992.
84. L. J. MacDonnell, T. A. Rice and S. J. Shupe, eds., *Instream Flow Protection in the West* (Boulder: Natural Resources Law Center, University of Colorado School of Law, 1989); Richard W. Wahl, 1990.
85. Richard Howitt, Nancy Moore, and Rodney T. Smith, 1992.
86. *Ibid*, p. 18.
87. *Ibid*, p. 21.
88. *Ibid.*, p. 19.
89. *Op. cit.*
90. *Ibid*, p. 20.
91. David L. Mitchell, *Water Marketing in California: Resolving Third-Party Impact Issues* (San Francisco: The Bay Area Economic Forum and the Metropolitan Water District of Southern California, 1993).
92. If the policies of urban entities are to curtail household water uses during drought while protecting industrial uses, then the transfer of water to urban areas during a drought may do more to relieve reductions in domestic uses than to enhance industrial uses.