

A Review of California Water Transfers

by Doug Malchow

Abstract: The California Department of Water Resources (DWR) predicts long-term increased water demands of approximately 2.7 million acre-feet by the year 2010. According to DWR, this demand for new water supplies can be met through additional diversions through and from the San Francisco Bay-Delta (Delta) system. However, due to fiscal constraints and opposition from environmental groups, these projects are problematic at best. One alternative to alleviate the predicted shortfalls of water supplies within California is long-term water transfers. Legislation exists to facilitate and promote water transfers, but few long-term transfers have taken place to date. California experienced a relatively high number of short-term transfers in 1991, mostly due to the Department of Water Resources Drought Water Bank, which may itself be short-term in nature. A variety of impediments may exist to the continued transfer of large quantities of water. However, pending legislation and past experience may lead to continued and expanded transfers in the future.

As California endures a sixth consecutive year of drought conditions, the call has again arisen for new diversions of water to quench California's thirst for urban and agricultural water supplies. These diversions include projects as far reaching as a \$150 billion undersea pipeline from Alaska to California¹ to shipment of \$2,300 per acre-foot Canadian water to Goleta Water District.²

However, the demand for new water supplies is not confined to years in which drought conditions exist. The Department of Water Resources (DWR) predicts long-term increased agricultural demands of approximately 700,000 acre-feet (AF) and increased urban demands of 2.0 million acre-feet (MAF) by the year 2010. According to DWR, this demand for new water supplies can be met through additional diversions through and from the San Francisco Bay-Delta system (Delta), including such projects as Los Banos Grandes, Cottonwood Creek, Auburn Dam, and possible enlargements of Shasta Dam and the California Aqueduct.³ Costs for these additional sources of future water supplies would range from \$100 to \$330 per AF (in 1981 dollars, exclusive of delivery costs) according to Wahl and Davis.⁴ However, due to fiscal constraints faced by both the federal government and the State of California, as well as opposition from environmental groups concerned about possible degradation of the Delta, these projects are problematic at best.

According to DWR planners,⁵ other alternatives exist to meet this increased demand, including desalinization, wastewater reclamation, and weather modification. However, there are problems associated with these alternatives. Desalinization is very expensive, with treatment costs of approximately \$1,090 per AF, far higher than the rates currently paid by either agricultural or urban water users.⁶ The Department of Water Resources predicts⁷ that under favorable conditions, use of reclaimed waste water could double from the 1985 annual level of 250,000 AF to approximately 500,000 AF annually by the year 2010. However, this change would meet less than 10% of the predicted increased demand of 2.7 MAF. Weather modification has proven successful only when storm clouds are present to be treated, which means that the technique is more successful in years of near-normal rainfall.

Another alternative to alleviate present and predicted shortfalls of water supplies within California is water transfers.

The National Research Council defines water transfers as a change in the point of diversion, type of use, or location of use.⁸ Such transfers have long been advocated by researchers as an alternative to developing new supplies.⁹

California irrigated agriculture currently consumes approximately 85% of California's developed water supplies (27 MAF of the 32 MAF developed water supply).¹⁰ A 10% reduction in current irrigated agricultural water use would free approximately 2.7 MAF of

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water which, if transferred, could meet the future urban and new agricultural demands projected by DWR. Not only would the transfer of this water alleviate the need for developing new projects or other expensive alternatives, but economic benefits could accrue to seller and buyer alike.

The concept behind water transfers on the open market is quite simple. Farmers, through water district water rights contracts with government projects, often acquire their water at prices as low as \$6.15 per AF from the CVP¹¹ to \$10.50 to \$56.10 per AF from the SWP.¹² Much of this relatively inexpensive water is used to grow crops with low economic value to the farmer. According to Argent,¹³ irrigated pasture uses approximately 4.2 AF of water annually for a crop value of \$93 million; on the other hand, grapes consume approximately 1.6 MAF water annually to produce a crop worth \$1.4 billion.

Meanwhile, other users are willing to pay substantially higher amounts for their water supplies. Final consumers within the Metropolitan Water District (MWD), which has some of the highest priced water available, typically pay \$200 to \$300 per AF for their water supplies.¹⁴ Other urban areas have recently shown a willingness to pay \$300/AF (\$175/AF for water rights plus \$125/AF for delivery fees) to acquire rights to State Water Bank water. Not only are urban areas interested in acquiring supplies on the market, but so too are agricultural water users. Farmers in the San Joaquin Valley, who have recently entered contracts with the state of California to acquire rights to Water Bank water, are paying approximately \$187/AF (\$175 for rights to water plus \$12/AF for delivery fees).¹⁵ The estimated social benefits (in 1980 constant dollars) of increased flows of water to higher value uses due to water marketing in California would be approximately \$66 million in 1995, rising to approximately \$83 million in the year 2020.¹⁶

Water transfer related legislation

California operates under a water rights system often referred to as a "hybrid system." California originally recognized riparian rights to surface water to any tract of land adjoining a lake, river, or stream. The riparian right is limited to the quantity of water that can be put to a "reasonable and beneficial" use on the riparian tract of land. Strict riparianism later converted to a dual system which awarded appropriative surface water rights that are dependent upon beneficial usage on land not adjacent to a water body. These appropriative rights may be established by the user or intermediaries such as private water companies or local public agencies. Ground water rights are subject to a separate dual system. Correlative groundwater rights allow the use of groundwater only on land overlying an aquifer and require the sharing of shortfalls in supplies by all users in the basin. Appropriative groundwater rights allow the export of water out of the basin.¹⁷

The California Legislature enacted legislation throughout the 1980's to facilitate water transfers. In 1980 the California Water Code was amended (§109(a)) to establish defined property rights to the use of water and the transferability of those rights.¹⁸

In 1982 the Legislature added new sections to the California Water Code to facilitate water transfers. First, the legislature recognized that most of the water offered for transfer would be water conserved specifically for that purpose. §1010(b) declares that the right to the use of conserved water can be sold, leased, exchanged, or transferred. Previous legislation (§1244, passed in 1980) addressed the risk of forfeiture of conserved water by stating that the sale, lease, exchange, or transfer of water or water rights does not constitute evidence of waste or unreasonable use, and that rights to that water would not be lost.

The 1982 legislation superseded previous Irrigation District Law and local water supply contract provisions which prohibited or restricted transfers. §382 of the California

Water Code states that local agencies (water districts) can sell, lease, exchange, or transfer surplus water for use outside the agency.

The Legislature also ordered DWR, the State Water Resources Control Board (SWRCB), and other appropriate agencies to encourage the voluntary transfer of water and water rights and authorized state financial assistance to implement water conservation to make water available for transfer.¹⁹

In 1986 the California Legislature enacted a series of bills to further facilitate water transfers. These bills permit a water transfer agreement to exist for more than 7 years (AB 3427), require DWR to set up a program to facilitate the voluntary exchange or transfer of water (AB 3722), and require a State or local agency owning a water conveyance facility to let other agencies transfer water within those conveyance facilities if unused capacity exists (AB 2746).²⁰ The 1980's legislation removed most of the legal impediments to water transfers. The legal framework exists to allow and promote long-term water transfers within California.

In 1991 Assemblyman Richard Katz (D-Sepulveda) introduced AB 2090 which would allow the users of water within water districts to transfer water to potential purchasers. This is a radical deviation from current policy which allows water districts to oversee and potentially block the transfer of water to willing buyers. AB 2090 abrogates the principle that water can be transferred outside a district only if it is surplus to the needs of the district and partitions the district's water right to each individual user.²¹ Potential pitfalls include uncertainties related to compensation for losses suffered by non-transferring users and the difficulty of estimating water available for transfer.

Past water transfers in California

In light of the obvious economic benefits available to both water seller and water buyer and the seeming lack of legal impediments, relatively few water transfers have taken place in California to date. According to Gray,²² the SWRCB received only 23 applications for water transfers between 1981 and 1989. Of the 23, only 19 were approved, and all were for one year or less. However, these figures do not accurately reflect the number of transfers that have taken place in California. According to Weisser,²³ intra-project transfers within the CVP or the SWP are not subject to review by the SWRCB. The CVP and SWP projects are rights holders which cover large geographic areas and a broad range of beneficial uses. Therefore, a transfer within these projects are not considered to constitute a change in point of diversion or change in use.

According to Lerseth,²⁴ "many" (but estimated to be less than 50) water transfers have taken place within the SWP rights jurisdiction. However, nearly all of these transfers have been from one agricultural user to another, intra-district in nature, and very short-term in nature (transfers of one year or less). Most of these transfers were in fact classified as "swaps" by DWR. The Devils Lake Water District-Castaic Lake Water District transfer constituted the only long-term, change of use transfer in which an urban district acquired agricultural land and its associated water rights.

According to the National Research Council,²⁵ approximately 1200 transfers between CVP contractors took place between 1981 and 1990). Central Valley Project transfers continue at a rate of approximately 100 per year,²⁶ but again, are almost exclusively short-term in nature and do not entail a change in use. However, between 1981 and 1988 CVP transfers were responsible for the transfer or exchange of more than 3 MAF of water.²⁷

Two ongoing "pooling" groups exist in the Sacramento River Valley. Both the Sacramento River Water Contractors Association and the Tehama-Colusa Canal Authority operate water banks into which members can contribute surplus water for later use during periods of water deficit. The pooling agreements stipulate that participating contractors may

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Current policy allows water districts to oversee and potentially block the transfer of water to willing buyers.

transfer only through that pool, thus prohibiting transfer of water to interested buyers outside the pool. Both pools are excellent examples of sources of supplemental supply which offer member contractors a means of responding to short-term changing needs.²⁸

One successful large-scale transfer mechanism is the California Drought Water Bank (DWB), which prompted the transfer of rights to approximately 835,000 AF of water.²⁹ Due to the continued drought conditions in 1991, the SWP cut urban entitlements to 10% of normal (approximately 225,000 AF instead of 2.2 MAF) and agricultural entitlements to zero (instead of approximately 1.2 MAF). These cutbacks were due to significantly lowered water levels in major reservoirs: approximately 54% of normal in February, 1991. Above normal March rains somewhat alleviated drought conditions. However, the governor, through Executive Order No. W-3-91, laid the groundwork for the 1991 Emergency Drought Water Bank (DWB). The mission of the DWB was the acquisition of water to meet municipal and agricultural needs, protect fish and wildlife, and provide carryover storage for 1992.³⁰

In early March, 1991, Governor Wilson, backed the DWR plan to buy water from farmers who voluntarily offered their water for transfer to a water bank. This water bank would purchase the water for use in geographic areas with critical need. Three categories of water contracts were negotiated: (1) fallowing (not planting a crop or not irrigating a previously planted crop) based upon the amount of consumptive use associated with the planned 1991 crop, (2) groundwater exchange which allowed the transfer of historical surface water rights to DWR with operators allowed to substitute groundwater, and (3) the direct sale of pumped groundwater.³¹

Sellers voluntarily transferred, through 351 contracts, approximately 830,000 AF of water to the DWB.³² The ultimate price paid for the transferred water was \$125/AF. This amount was based upon farm budgets and agricultural economics in order to provide agricultural operators with a net income comparable to that which would have been earned from farming plus an additional amount to prompt participation in the DWB.³³ Approximately 50% of DWB supplies came from agricultural land fallowing, approximately 33% from groundwater exchange contracts, while two reservoir storage contracts accounted for the remaining 17%.

The price for DWB water was set at \$175/AF for water delivered to the SWP Delta Pumping Plant. This figure covered the purchase price, losses due to movement through the Delta, and administrative and monitoring costs. The combination of 1991's "March miracle" and a relatively cool summer resulted in a large portion of the water acquired by the Drought Water Bank being held in carryover storage. Only approximately 389,000 AF of the purchased supplies was allocated to urban and agricultural uses³⁴ while carryover storage accounted for approximately 265,000 AF. The remainder of purchased supplies were classified as losses due to a variety of factors.³⁵

Another successful transfer mechanism, although much smaller than the DWB, was carried out by the Solano Irrigation District (SID). On March 14, 1991, SID contracted with the Solano County Water Agency (SCWA) to create the Solano County 1991 Emergency Water Pool (SID Pool). The contract allowed SID to enter into agreements with certain landowners and lessees (irrigators) within SID not to irrigate a portion of the irrigators' land. For each acre of land not irrigated, three AF of water was available for the SID Pool.³⁶ The SID Pool allowed for participation by irrigators of row crops only.³⁷

A total of 45 irrigators took part in the program, fallowing a total of approximately 5,000 acres of land, or approximately 10% of the total land historically allocated to row crops in Solano County. This allowed the transfer of over 15,000 AF of water from irrigators to SID, for which the irrigators were paid \$170 per acre foot. The water was then transferred by SID to the SCWA at a price of \$200 per acre foot (the price included \$15 for administrative and operational expenses and \$15 to the U.S. Bureau of Reclamation).³⁸

The transferred water was to be made available through the SCWA to the cities of Vacaville, Fairfield, and Benicia in Solano County. Again due to heavy rains in March, 1991, most of the SID Pool water is still stored in Lake Berryessa, California.³⁹

Potential impediments to transfers

Water users receive water under various types of rights, agreements, and allocations from a variety of sources. Water rights may be held by individuals, water districts, or state or federal governments. Other water users within the potentially transferring district or project area may have a higher priority to take the water offered for sale or transfer before the water can be moved out of the district. The sale of water may take a variety of forms, including sale of the water right or sale of the land to which the right is attached.⁴⁰

The institutional rational choice framework proposed by Kiser and Ostrom⁴¹ may be a useful tool for examining the water transfer arena. This framework combines the traditional focus of rational actor models on individuals' goals and resources with the realization that an individual's actions are potentially affected by a variety of variables. These variables include attributes of the individual, the decision situation confronting the individual, and community and institutional arrangements.

Potential impediments to water transfers may therefore include individual beliefs and goals; legal, contractual, and regulatory constraints; and concern for third party impacts.

In relation to water transfers, an individual's decision to market surplus water may be affected by that individual's beliefs concerning water transfers in general and the individual's motives for selling. The California Farm Bureau Federation (CFBF), although it favors water transfers, is still concerned with the effects of water market-director of natural resources with the CFBF, argues that are needed to feed the American people so that the United States does not become subservient to another country for its food source as it may be for oil. Others believe that farmers who sell their water to transfer to other areas will leave the agricultural area economically and/or environmentally devastated.⁴²

As discussed earlier, water transfers have been shown to be economically beneficial to both parties in the transfer. However, the goal of economic gain may be constrained by real or expected high transaction costs. Many appropriative rights in California have not been clearly quantified, requiring high adjudication costs as a prerequisite to the transfer of rights or water.⁴³ Other economic impediments may include the potentially high costs of determining the existence of surplus water, the price for that water, and the responsibility for engineering, environmental, and regulatory costs.

Legal concerns related to rights may also act to constrain transfers. According to Gray,⁴⁴ potential transferors may be concerned that water transfer negotiations will bring increased scrutiny of current uses, and that the SWRCB may investigate to ascertain waste or unreasonable use.

Contractual arrangements between seller and the seller's supplier may work to impede water transfers. Often, an individual's decision to sell water is affected by the rules of the water district in which the individual operates, since districts must approve all transactions and act as brokers when a potential transferor is a member of a water district.⁴⁵ The transfer process



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Potential impediments to water transfers include individual beliefs and goals; legal, contractual, and regulatory constraints; and concern for third party impacts.

suffers due to uncertainty surrounding these rules—uncertainty related to who has standing to block transfers and when an intervener is entitled to block a transfer.⁴⁶ Water district decisions are in turn affected by the availability of alternate sources of water, community attributes (e.g. importance of water to the district), and institutional arrangements and rules such as district voting and assessment procedures. These arrangements and rules are in turn a function of state law and the California Constitution.

Two other concerns within water districts are related to potential third party impacts. The first concern is that for every farmer that sells off his/her water, other farmers within the district will have to pick up the transferring farmer's share of maintaining district facilities and meeting financial commitments.⁴⁷

The second concern within districts is groundwater overdraft. As water is transferred from a basin, there is less water to percolate down and replenish groundwater supplies. This could result in overdraft and increased pumping costs for other pumpers in the basin. Also, farmers who transfer rights may replace the transferred water by increasing groundwater pumping—with the same results.⁴⁸

Concern for third party impacts may also constrain water transfers when potential transferors or water districts are concerned about local economic and social impacts. Yolo County experienced the transfer of over 154,000 AF of water in 1991 from entities within the county.⁴⁹ A Field Survey, based upon State Employment Development Department labor market information, prompted Yolo County to file a claim against DWR for \$129,305, the estimated amount of local discretionary funds expended by the county to provide services to the approximately 450 persons who were unemployed as a result of the water sales/transfers. Yolo County limited the claim to the public impacts of the transfers associated with fallowing contracts. Approximately 40,200 acres, about 13% of the total 1990 land used for crop production, was fallowed due to Water Bank purchases. This fallowing led to third party impacts, including reduced demand for labor, services, and supplies in Yolo county.⁵⁰

One potential impediment to short-term water transfers is that water which is identified for transfer may be lost if the agreements required for the transfer cannot be reached in short time frames, particularly if conveyance through the Delta is required.⁵¹

Future of water transfers

As discussed previously, 1991 saw the large scale transfer of water in California through the Department of Water Resources' DWB and Solano Irrigation District's Drought Water Pool. However, the DWB and the Drought Water Pool may be short-term solutions to the current drought-enhanced problem. On March 10, 1992, Governor Wilson announced the opening of the second year of the DWB. In the announcement, Wilson said that "(d)espite heavy rains in February, we continue to suffer from a severe drought", with far below normal levels of reservoirs, rainfall, snowpack, and runoff.⁵²

This year's DWB will differ from the 1991 DWB in several respects. First, the DWB will buy water without requiring acreage to go out of production. This will reduce or eliminate the economic impact on farm communities due to the idling of land. Water will only be purchased from agencies or districts with surplus water in storage and from farmers or districts which can replace the purchased water by pumping groundwater. Buyers of DWB water will be required to pay for purchased water up front to eliminate disagreements over price and quantity. Also, 10 per cent of the DWB water will be used by DFG to provide water for environmental concerns, including wetland, lakes, and streamflow.⁵³

According to the DWR, the 1992 DWB will seek to acquire approximately 100,000 AF of water. At this time, DWR is expecting to pay approximately \$50 - \$60/AF for water, with

the amount based upon a sliding scale dependent upon the Sacramento River Index Flow. The DWB is seeking to buy water only through groundwater exchange or surface water release agreements.

At this time, no plans exist for a Solano Irrigation District Drought Water Pool in 1992. However, the Solano Irrigation District and the Solano County Water Agency are currently revising the structure that was incorporated in the operation of the 1991 SID Pool in order to facilitate future Water Pools.⁵⁴

Neither the DWB nor the SID Pool have a mechanism to balance the purchase price against the selling price, which is illustrated by the large surpluses sustained in both cases in 1991. Also, ultimate water rights and the control of the water being sold need to be addressed. Most water districts, not the ultimate user, hold rights to water delivered within the district. As previously mentioned, some water districts retain the right to refuse transfers from that district.⁵⁵ However, the Katz Bill (AB2090), which proposes to grant to the ultimate agricultural water users (farmers) the right to transfer water, may overcome what some believe to be the most important remaining potential legal impediment to water transfers.

Current policy does not permit decentralized users to determine final allocation, but instead attempts to consider the myriad of decisions that are associated with a market economy. A decentralized market allows users to decide how much to use, while balancing the value of those uses against the value of potential uses by others. The Bay Area Economic Forum (Forum) believes that fundamental reforms are needed in the state's allocation system. The Forum report concludes that a decentralized market offers the best system to make most water allocation decisions. Given existing water rights, environmental quality standards, infrastructure, and institutions, changing to a market system may not be a difficult proposition.⁵⁶

The Forum has proposed a marketplace which would include a legislatively established commission or other governmental body, similar to the DWB, to handle transfer transactions. Such a body could reduce transaction costs while ensuring protection for each party. This proposal could facilitate both intra-district transfers and intra-project transfers which, at this time, lack a central clearing house. Others have suggested a companion environmental water authority to participate in aspects of transfers which might affect the environment.

Conclusion

Reallocation of water supplies in California through water transfers is an aspect of water management brought about due to the limited nature of California water supplies. Legislation currently exists to facilitate such transfers, but relatively few transfers have taken place, especially long-term transfers. A combination of proposed legislation to award users of water the ultimate right to transfer water and the establishment of a commission or other governmental body to handle transfer transactions may increase the frequency of water transfers in the future. Third party and environmental impacts are two areas which need to be addressed.

ENDNOTES

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