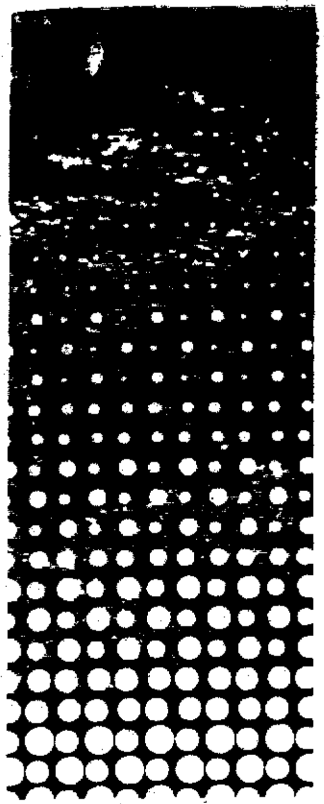

# Water Transfers in California: Translating Concept into Reality

*November 1993*

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Department of Water Resources

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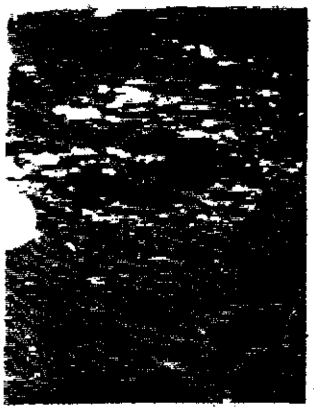

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# *Introduction*

California's population continues to grow, while dependable water supplies are diminishing due to the passage of various laws and regulatory actions. Prospects for developing any substantial additional water supply through traditional means (such as new reservoirs) are slim at best. In this stressful climate, increasing attention and hopes are focusing on water transfers.

Every Californian who reads has been repeatedly exposed to the message that: (1) agricultural water use within the State is about four times larger than the total water use for all municipal and industrial purposes, so (2) transfer of only a small fraction of the water from agriculture to M&I uses could easily meet the needs of a growing population. In addition, many believe that a market-based allocation system would result in more "efficient" water use. Thus, water transfers are receiving strong support and are viewed by some as a simple answer to a complex problem.

This paper is an overview of the issues involved in determining the amount of water available for a water transfer and reflects the success of Governor Pete Wilson's Drought Water Bank of 1991 and 1992 and the Department of Water Resources' experience in managing that effort. The Department has also participated in a number of separate transfers on behalf of either the State Water Project or one or more of its water supply contractors. Altogether, the Department has been involved in more than 400 water transfers, covering a very wide range of types of transfers, physical locations, institutional arrangements, and legal issues. Our experience leads us to conclude that individual water transfers proposals need to be evaluated on a case-by-case basis, but that there are some common principles that apply to most. A guiding principle in the Department's evaluation of water transfer proposals is the protection of the water available to satisfy the rights of others not involved in the transfer. Such rights are protected with respect to water transfers, and recent practice has tended to place the burden of proof on the transfer proponents. This paper summarizes some of that experience to provide general guidance to individuals and agencies interested in implementing a water transfer and who will need to address the full range of issues.

# *Evaluating Transfer Proposals*

Water transfers will undoubtedly play a major role in California's water future. However, most transfer activity through 1990 had been carried out between customers of a specific water supplier. Criteria and procedures were not developed and accepted for general use when Governor Pete Wilson launched the State's Emergency Drought Water Bank in 1991. Department of Water Resources staff who ran the Drought Water Bank developed operating rules as they went, virtually under "battlefield" conditions where immediate decisions were needed on price, crop production details, water amounts, environmental issues, etc. on a seven-day-a-week, 16-hour-per-day basis. In the process, they encountered some harsh realities underlying the simple concept of transferring water. The offering price of $125 per acre-foot brought forth a surprising number of willing (even eager) sellers. Water Bank operators soon discovered some universal truths of water transfers:

1. Every deal is unique and must be evaluated separately; however, there are some principles that are common to most proposals.

2. Every evaluation requires some degree of informed judgment about hydrologic reality;

3. Prospective sellers and the Water Bank operators often had differing views of hydrologic reality; and,

4. Care must be taken to avoid unintended reductions in the supplies of water users who are not parties to the transfer.

The following discussion covers terms used to describe water proposed to be transferred, potential impacts to the environment and the economy, special concerns of the State Water Project and the Federal Central Valley Project, and some of the details and concerns surrounding the different categories of transfer proposals.

## *Definition of Terms*

These definitions were developed by DWR staff to aid in evaluation and discussion of proposed transfers:

New Water: Water not previously available in the system, created by reducing irrecoverable losses or flow to unusable water bodies (such as the ocean or inland salt sinks like the Salton Sea). Examples: (1) Water stored when a reservoir captures runoff that would

otherwise flow to the ocean during periods of "excess" outflow; (2) Water conserved by reducing agricultural drainage discharge to salt sinks.

Real Water: Water for transfer that is not derived at the expense of any other lawful water user. Examples: (1) The net water savings resulting from not planting and irrigating a crop that would otherwise be irrigated; (2) Stored water released that would not otherwise be released. (Others often use the term "wet water.") Real water is not necessarily new water, but new water must, by definition, be real.

Paper Water: Water proposed for transfer that does not create an increase in the water supply. Example: A proposal to market water the seller is legally entitled to use under a water service contract or a water right, but has not historically used. Paper water transfers often involve an offer to sell water that someone else would otherwise use in the absence of the transfer. Example: An offer to transfer return flows that would otherwise be used by a downstream appropriator. To the extent that a paper water transfer results in an increase in consumption by the buyer, the water is really coming from a user other than the seller.

The "no-injury rule" prohibits transfers that would harm another legal user of the water (Water Code Sections 1706, 1725, 1736, 1810(d)). It is a statutory basis for prohibiting transfers of paper water.

## *Environmental Impacts of Transfers*

Closely related to the real water/paper water distinction is the issue of proposed transfers that would adversely affect riparian vegetation, wetlands, wildlife habitat or other aspects of the natural environment. State law prohibits transfers that would have an unreasonable impact on fish, wildlife or other instream uses, so the State Water Resources Control Board cannot approve such transfers (Water Code Sections 1025.5(b), 1725, 1736). The 1992 CVP Improvement Act (P.L. 102-575) prohibits transfers that significantly reduce the quantity or quality of water available for fish and wildlife. Similarly, public agency facilities cannot be used to convey transferred water if fish, wildlife or other beneficial instream uses are unreasonably affected or if the overall economy or environment in the county where the water originates would be unreasonably affected (Water Code Section 1810(d)). State and Federal endangered species laws may prohibit harm to particular plants, animals or habitat. Thus, a proposal to conserve and transfer runoff, tailwater, or seepage water may be barred by the legal protections accorded to the plant and animal beneficiaries of the prior "inefficient" use.

## *Economic Impacts of Transfers*

Some water transfers also have potential to harm the economies of areas from which water is transferred. Fallowing can have an adverse effect on local farm economies. Ground water pumping can result in ground subsidence or higher pumping costs for other local users of the basin. Both State and Federal law contain some protections against these impacts, and more have been proposed. Recently enacted provisions on transfers by water suppliers limit the amount of transferrable water made available by fallowing to 20 percent of the water that would have been applied or stored by the supplier (Water Code Section 1745.05(b)). P. L. 102-575 prohibits the Secretary of the Interior from approving any transfer of CVP water that would have a long-term adverse effect on ground water conditions in the transferor's service area. It also prohibits transfers that would unreasonably impact water supply, operations, or financial conditions of the transferor's contracting district or its water users. State law prohibits the use of public agency facilities unless a finding is made of no unreasonable impact on the overall economy of the county from which the water is being transferred (Water Code Section 1810(d); see also Water Code Section 386). Provisions of the water code prohibit transfers that would deprive areas of origin of water reasonably required to meet beneficial needs (Water Code Sections 1215 et seq.; see also Water Code Section 11460).

## *State Water Project and Federal Central Valley Project Concerns*

Most of California's agricultural water use is in the Central Valley, and this is where much future water transfer activity is likely to be concentrated. Within the Sacramento and San Joaquin river basins, all appraisals of water transfers must begin with the recognition that the Federal Central Valley Project and the State Water Project absorb most errors that are made in water transfers. This exposure results from the conditions of water rights permits under which the CVP and SWP withdraw water from the Delta and its tributaries. Those conditions, ordered by the State Water Resources Control Board, require the release of water from CVP and SWP reservoirs as needed to maintain specified water quality and flow criteria in the Delta. To the extent paper water transfers reduce the flow of water available to meet Delta criteria, the deficiencies must be made up by release of additional water from Federal and State reservoirs. If subsequent runoff soon refills the reservoirs, there may be no net harm. However, under continued drought conditions, significant water supply impacts may result. Thus, the Federal and State water contractors have an interest in ensuring that transfers of Sacramento-San Joaquin basin water do not simply take water from the CVP and SWP without compensation and

sell it elsewhere. (Conditions are somewhat different in other basins, but many of the principles described herein are applicable.)

### *Evaluation of Transfers in Different Categories*

Water transfer proposals generally fall into one of six basic categories:

1. Fallowing (not irrigating) crops;
2. Shifting to lower water-using crops;
3. Substitution of ground water for surface irrigation supplies;
4. Direct delivery of ground water;
5. Conserved water; and
6. Releasing water from reservoir storage.

The following discussion focuses on the practical aspects of identifying and quantifying the new water produced or real water available for transfer in each category.

### *Fallowing*

Fallowing requires that a grower withhold irrigation water from a field, usually for an entire irrigation season. The withheld water can then be transferred to another use. Provided that the grower would, in fact, have irrigated in the absence of the transfer, fallowing produces real water, but not new water; fallowing merely frees up an existing water supply for use elsewhere. The concept is simple, but a number of perplexing issues arise in regard to the grower's intentions, the adequacy of the water supply, and crop water use in determining the amount of water that may be transferred.

First, would the crop have been planted in the absence of the fallowing arrangement? Is it possible to determine with certainty what the grower would have done? A certain percentage of Central Valley cropland is fallow in any given year for various reasons (including normal rotation practices, federal acreage allotments and set-asides, weed control, and dedication to wildlife uses). In a short-term transfer situation, there is a chance that the land would not have been planted anyway, or that a lower water-using

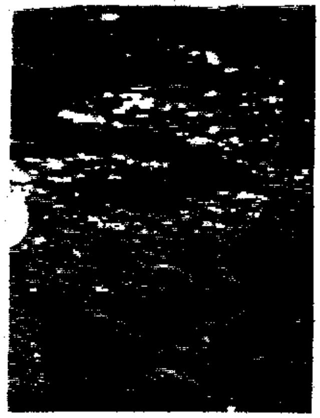
crop would have been planted. In a long-term transfer, there is the additional uncertainty of predicting future cropping patterns and water use. An individual grower often has interests in a number of different farm parcels and crop acreage allotments can be shifted around. It is sometimes difficult to verify that the crop proposed for fallowing would really have been planted and that it will not show up elsewhere. In most cases, however, long-term crop and water records and personal knowledge of farm advisors or other observers can provide trustworthy information on the adequacy of a fallowing proposal.

Next, it is necessary to determine how much water would have been available to irrigate the crop proposed for fallowing. This requires information about the rights or contracts pursuant to which the parcel receives water. For a one-year transfer such as those in the Water Bank, the only issue is the current year's supplies. Long-term transfers can give rise to considerable uncertainty. For example, the future water supply of a CVP contractor can change due to droughts, operational restrictions, Congressional mandates, or policy changes that affect contract renewals. A prospective seller may be able to identify current water supply quantities, but that is no guarantee of future supplies.

After crop and water supply issues are put to rest, the final question is: "How much real water is available for transfer?" At first glance, it might appear that a grower should be able to transfer all the surface water that would not be diverted. That approach is sound if the water is to be transferred to a nearby grower with a similar operation. If a grower fallows 100 acres of rice, the 500 acre-feet of water that would have been taken from the irrigation canal could clearly be transferred to a neighbor to grow an additional 100 acres of rice. In reality, most transfers involve moving water to other areas or to different uses, which can substantially impact the transferable amount.

The transferable (real) water amount varies with the circumstances because only a portion of the water diverted from a supply source is consumed by the crop. Some diverted water is consumed by vegetation along canals and ditches. Some may seep to shallow ground water that sustains nearby wetlands, some may percolate to deeper ground water aquifers that supply other users or discharge to surface streams, and some returns directly to surface supplies through agricultural drains. In the Sacramento Valley, virtually all diverted water that is not used to grow crops remains in the system and is available to downstream (or ground water) users. In parts of the San Joaquin Valley, some of the percolated water becomes unsuitable for further use due to quality degradation.

Consumptive use through evapotranspiration (water used by the crop) is gradually becoming accepted as the measure of water available for transfer. The 1992 CVP Improvement Act (P.L. 102-575) specifically designates "water that would have been consumptively used" and water "irretrievably lost to beneficial use" as water available for



transfer. The latter phrase clearly would include percolation to unusable ground water in the western San Joaquin Valley. It almost certainly does not include water draining to wetlands or used by vegetation that provides significant wildlife habitat. Certainly, water percolating to usable ground water cannot be considered "irretrievably lost to beneficial use," but a few prospective sellers hold a contrary view.

Recently adopted Water Code Sections 484(b) and 1725 apply to temporary water transfers. They introduce an element of uncertainty by defining "consumptively used" as *"...the amount of water which has been consumed through use by evapotranspiration, has percolated underground, or has been otherwise removed from use in the downstream water supply as a result of direct diversion."* (Emphasis added.) The reference to percolation broadens the definition beyond its traditional meaning and may encourage transfer proposals that are not hydrologically sound (i.e. proposals that do not acknowledge the links between surface and ground water). However, the Department feels the italicized phrase clarifies that the Legislature did not intend to authorize transfers of paper water or transfers that would injure other users. For example, percolation would be considered part of "consumptive use" only when the water percolated was irretrievably lost to subsequent beneficial use (the same approach as used by P.L. 102-575).

The consumptive use approach is technically sound since it generates real water, but it has one potential flaw: it may encourage those contemplating transfers to maximize water use prior to beginning the transfer process. Thus, development of an active water market may stimulate agricultural water use that would not otherwise be economically justifiable. Lands that are not fully irrigated tend to be the less productive, marginal parcels; any grower with such lands and a water source might be tempted to start maximizing water use in anticipation of receiving compensation to stop.

If all parties agree that consumptive use is to be the measure of water available for transfer in a fallowing arrangement, and all agree on the quantity of such use (a subject in itself), the issue of land management arises. As any homeowner can attest, an uncultivated piece of ground does not stay vacant long. Weeds and natural vegetation consume water, and that water must come from somewhere. The extent to which such use depletes system water supplies must be taken into account. Most 1991 Water Bank contracts provided for controlling excessive vegetation on fallowed parcels. A long-term water transfer should provide for long-term management or include some adjustment for consumptive use of encroaching natural vegetation. Continued monitoring would be required to assure that the seller complies with the agreement.

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*Crop Shifts*

One frequently mentioned drawback of fallowing is the potential for third party economic impacts related to the loss of agricultural productivity, such as a decrease in farm labor, equipment purchases, seed and fertilizer purchases, etc. Crop shifting provides a partial solution that can reduce third party impacts and still produce significant reductions in consumptive use. The concept is to substitute a crop that consumes less applied irrigation water for a crop that would use more water. Typical examples might involve switching from tomatoes to safflower or from corn to wheat.

The practical problems in applying the crop shift approach are essentially the same as those involved in fallowing. Additional complications can arise if the substituted crop grows in a significantly different season from the original crop. For example, winter wheat can be substituted for corn. Wheat is planted in the late fall and harvested in late spring. Wheat typically consumes a total of about two feet of water, much of which is furnished by natural rainfall. In dry years, one or more applications of irrigation water may be needed to bring the wheat crop to maturity. In contrast, corn grows during the summer and depends almost entirely on applied irrigation water. Therefore, the real water resulting from a wheat-for-corn switch varies with the wetness of the spring; the maximum amount of real water occurs in wet years and the least in dry years.

***Ground Water Substitution***

Under the ground water substitution concept, a grower plants the same crop, but irrigates by pumping ground water instead of exercising rights to surface supplies. The unused surface water is then available for use elsewhere.

Most Water Bank ground water substitution contracts have allowed transfer of one acre-foot of unused surface diversion for each acre-foot pumped from the ground. This approach is based on the implicit

assumption that return flows and ground water recharge would be unchanged, regardless of the water source.

How much water pumped from the ground is really new? Water pumped from the ground does not come from some distinctly separate source; surface and ground water supplies are generally interconnected. In essence, ground water withdrawals are borrowed from future streamflow. From a system standpoint, new water results only to the extent the borrowing can be repaid from future surplus flows.

The Water Bank recognized this hydrologic reality in a general way by requiring sellers to avoid pumping from wells that appeared likely to draw water directly from nearby rivers. This approach minimizes the gross problems, but does not account for the fact that pumping that causes a local depression in ground water levels anywhere creates an uncontrolled draft on future surface flow. If the ground water recharges naturally, it will ultimately deplete future streamflow. The problem is that current knowledge of ground water seldom permits prediction of just where or when that depletion will occur. In the Sacramento Valley, impacts on surface flow can occur in a matter of days or weeks. In heavily-drafted areas of the San Joaquin Valley, the impacts of additional ground water pumping on streamflows may not occur within the foreseeable future.

Most ground water transfers to date have been based on the implicit assumption that the induced future depletions of surface water will occur during times of surplus or that the risk of future impacts is low. In other words, the ground water withdrawn for transfer is assumed to refill largely from future flows that are in excess of all in-basin demands and Delta outflow requirements. In practice, the recharge process begins when the pumps are switched on; it doesn't wait for a period of surplus Delta outflow. As a result, ground water pumped in the Sacramento Valley is unlikely to be 100 percent new water. To the extent transfer activities deplete streamflow that would otherwise be used to meet in-basin demands or Delta outflow requirements, additional CVP and SWP storage releases will be required to make up the difference.

Of course, there is timing to consider. The depletion of future surface water flows will likely occur during both excess flow and balanced flow periods. (Balanced flow periods are those in which reservoir releases plus unregulated flow approximately equal the water supply needed to meet Sacramento Valley in-basin uses, plus exports.) Reductions of surface flow during excess flow conditions simply reduce the amount of water going out the Delta into San Francisco Bay. Reductions of surface flow during balanced flow periods necessitate a like amount of water being released from CVP and SWP reservoirs to insure that adequate freshwater flow out of the Delta is maintained. This additional release of water from upstream reservoirs is a major source of concern with regard to 607

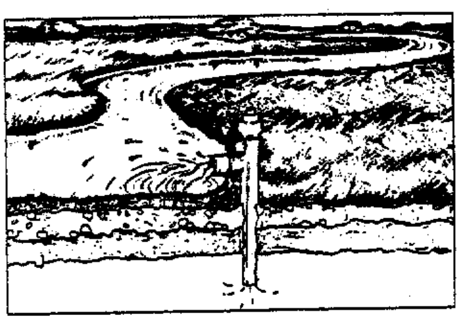
impacts of ground water substitution transfers on other water users.

If the interconnection of ground water with surface water is overlooked or ignored, a ground water transfer can give rise to what amounts to an involuntary reallocation of surface rights. If the demonstrable effect of ground water pumping or groundwater substitution is to diminish the supply to which a surface appropriator is otherwise entitled, it is not a transfer of real water and should not be allowed to proceed. The debate continues about how clear and convincing the hydrologic evidence must be.

A very important subset of ground water substitution is conjunctive use, which in the context of this discussion is the coordinated use of ground and surface waters. While straight ground water substitution is a form of conjunctive use, it tends to induce additional recharge from surface waters. A more workable approach from the standpoint of avoiding impacts to others is an accompanying recharge program. Such a program would be designed to offset the additional amount of ground water withdrawn, either in advance or after the pumping occurs. Recharge could take the form of a percolation program, where additional surface water is spread over porous ground. Another alternative is referred to as "in-lieu recharge", whereby surface water is provided to water users whose normal supply is ground water. In either case, the desire is to put additional surface water into storage in the ground water basin during years when surface water is abundant. In a sense, such a program would be operating a ground water basin like a reservoir.

Ground water issues (including the matter of conjunctive use) can be very complex, depending on the specific water transfer proposal. These issues frequently must be explored in detail.

### *Direct Ground Water Delivery*

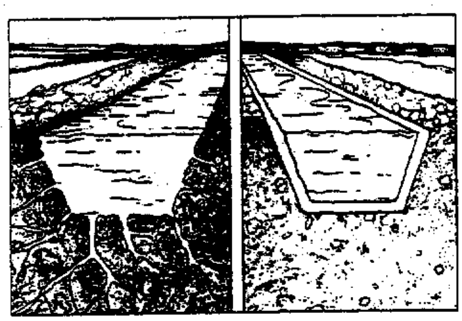


Subject to a number of major limitations, ground water in California may be pumped for out-of-basin transfer. One of the limitations on ground water export is the superior right to the ground water of all overlying landowners. Another is Water Code Section 1220, which prohibits most exports of ground water from the Sacramento and Delta-Central Sierra Basins unless the pumping complies with a ground water management plan approved by the voters in the areas overlying the affected

basin. Water Code Sections 10750 et seq. authorize local water agencies to adopt ground water management programs that could have significant impacts on ground water extraction and export. Statutes creating particular ground water management districts typically contain limitations on ground water export. Although the Water Code sets stringent requirements on direct export of ground water from the Sacramento and Delta Central-Sierra ground water basins, a number of in-basin transfers are being considered and a few have been carried out. In general, public opinion, particularly in the northern Sacramento Valley, is extremely wary of ground water pumping for transfer to other areas. Several counties are exploring means of assuring local control of ground water.

In concept, direct ground water transfer could not be simpler: turn on the pump and let the water run into the river. In practice, the problems are similar to those encountered with ground water substitution. If the wells draw from a ground water body that recharges naturally, only some indeterminate portion of the water pumped can be considered new.

### *Conserved Water*



The foremost example of the transfer of conserved water is Imperial Irrigation District's (IID) 1987 agreement with the Metropolitan Water District of Southern California. In this well known arrangement, water saved through lining of IID canals is made available to MWD. The water saved is clearly new, because the leakage from the canals would have found its way to the Salton Sea, a salt sink.

The IID-MWD project generated a wave of enthusiasm for similar arrangements elsewhere. But the benefits of canal lining are less apparent in many other areas of California. In the Sacramento Valley and throughout much of the San Joaquin Valley, canal leakage tends to contribute to usable ground water and/or supports riparian vegetation and wetlands. Reducing canal seepage can be quite beneficial to the canal owner, but it may produce relatively little new water from a system standpoint. In general, new water results only to the extent canal lining reduces: (1) ground water discharge to surface streams during times of future excess flow; (2) percolation to unusable ground or surface water; or (3) consumptive use by vegetation that is not needed to maintain environmental, habitat, or wetland values.

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A number of other conservation techniques can be used to stretch agricultural supplies through more intense water management. These generally result in reducing applied irrigation water and drainage outflow. As with canal lining, the results can be quite beneficial to a water district, since a greater acreage can be irrigated with a given supply, or the volume of problem drainage water may be reduced. The benefits may be less clear in terms of overall contribution to system supplies, particularly where the drainage outflow is appropriated for another beneficial use downstream.

Evaluation of new water made available through conservation is most challenging in the Sacramento Valley. Most irrigated areas of the valley overlie a common ground water basin and are linked by a network of surface streams and drains. Water leaving an upstream area usually contributes to the supply of downstream users (or to Delta outflow). Under these circumstances, new water can be created only by reducing losses to unusable water bodies (rare in the Sacramento Valley), reducing surface outflow during periods of excess Delta outflow, reducing consumptive use of crops, or environmentally acceptable reductions in consumptive use of non-agricultural vegetation. Reducing percolation to ground water depletes another part of the system and can penalize other users (by direct reduction of ground water supplies, decreasing ground water discharge to surface streams, or increasing percolation from surface supplies to ground water). Reducing drainage outflow during the irrigation season merely reduces the supply available downstream.

### *Storage Withdrawals*

The final source of water for transfer is the release of previously stored surface water that would not otherwise be released. Such storage withdrawals represent new water, provided the storage is refilled from future surplus flows. The amount of water available for transfer can be readily measured.

The complications related to storage releases come after the releases are completed. Downstream water users can be harmed if the reservoir storage that was evacuated for transfer is refilled with flow that would otherwise have been available for downstream water right holders. To protect the lower priority users, Water Bank contracts for storage withdrawals included a refill clause. In essence, the reservoir owners agreed to defer refill of the storage withdrawn until a time of high runoff when additions to storage would cause no detriment to others. (For operational reasons, storage might be refilled earlier,

but with the understanding that it might have to be released again if subsequent hydrologic conditions indicated it was stored at the expense of others.)

Although it involves a certain amount of bookkeeping and might possibly require several years to resolve, the refill concept is fair and equitable to all parties. It places a burden on the seller for the specific amount of water that is "real", which depends on the water supply in subsequent years and the conditions of refill of the reservoir. Similar refill constraints might overcome the principal reservations about ground water transfers, but a practical ground water refill criterion has not yet been developed.

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# *Water Transfer Challenges*

This section reviews some examples of water transfers, lists some unresolved issues, and concludes with comments about evaluation of future transfer proposals.

## *Example Cases*

A number of interesting and challenging transfer proposals have been advanced in the past year or two. The following examples illustrate some of the problems inherent in attempting to sort out new water, real water, and paper water:

1. Ditch Lining: An unlined ditch loses over half the water diverted from a surface stream before reaching the point of use. The owner proposes to line the ditch and sell the water "saved." The destination of the water percolating from the ditch is not definitely known, but there is no reason to believe it does not contribute directly to downstream springs and stream-flow. If the owners sells the water "saved" by lining the ditch, it would arguably be at the expense of downstream water users.

2. Excess Applied Irrigation Water: An owner has a long history of applying large amounts of irrigation water, but there are no reliable records of the amounts applied or what happens to the water applied in excess of consumptive requirements. The owner proposes to cease surface irrigation and transfer the amount consumed by the crop as well as water that is estimated to have percolated downward, claiming that the percolation takes decades to return to nearby surface streams. The interaction with adjacent streams may be much more rapid. Irrespective of the time lag in reaching the nearby stream, there will likely be induced impacts on stream flows at some time in the future which will reduce surface water available to other users.

3. Ground Water Interception: An owner proposes to capture surface water just before it percolates into the ground and transfer it via surface streams. Geohydrologists differ on how long the percolating water takes to emerge in downstream surface streams, and little field exploration or study has been carried out to date. If the proposed diversion were found to gradually impact downstream surface flows over a period of years, it is not at all clear how the effects could be quantified. A transfer like this could require close attention and monitoring for decades.

4. Surface Water Interception: In a proposal that is virtually a mirror image of the previous case, a landowner proposes to pump ground water just upstream from a major spring area. The ground water would be exported for transfer via the same stream that

issues from the spring. It appears the pumping would decrease the flow of the spring but the decrease would be offset by the discharge from the well. This is a good example of how ground water pumping has potential to reallocate water even though it may not produce any new water.

### *Unresolved Issues*

If water transfers are to play a meaningful role in California's water future, a number of policy issues must be resolved. Some of the issues are:

•How do we deal with the possibility that water marketing may stimulate water use that would not otherwise take place? If people will be paid to stop using water, some sellers may start using as much water as possible to establish a higher base level of use.

•Sooner or later, we must deal with problems that will arise from failure to recognize the interrelationship of surface and ground water. Unintended reductions of surface water supplies may otherwise result.

•Environmental interests, the local community, and CVP/SWP contractors have a stake in virtually every transfer proposal in areas tributary to the Sacramento-San Joaquin Delta; there is no such thing as a two-party water transfer that does not affect anyone else. Some mechanism is needed to assure that all interests are protected.

•Water conservation accomplishments must be evaluated realistically, from a system perspective. Transfers of water made available through conservation should be undertaken only after thorough analysis of the effects on other water users and environmental values.

### *Future Directions*

Mechanisms for evaluation and approval of water transfers are still being developed. The Bureau of Reclamation has developed guidelines for implementing transfers of CVP water under the CVP Improvement Act. Under the Costa-Isenberg Water Transfer Act of 1986, the Department of Water Resources is obliged to facilitate voluntary exchanges and transfers of water. That Act includes the Legislature's expression of public interest that such transfers be carried out "...in a manner that fully protects the interests of other entities which have rights to, or rely on, the water covered by a proposed transfer" (Water Code Section 475).

Every proposed transfer has some unique features, dependent on its location, timing, whether it is temporary or permanent, etc. While the Department has adopted rather specific criteria for evaluation of temporary transfers under the 1991 and 1992 Water Banks, it has approached other transfers on a case-by-case basis. The guiding principle in the Department's evaluations is protection of the rights of all parties and we have tended to place the burden of proof on the transfer proponents. The key issue in these case-by-case evaluations is, "How conclusive must the proof be that other parties' rights will protected?"

The Department recognizes that it is not always possible to provide "conclusive proof" that a proposed transfer will not adversely affect other parties and does not insist that this standard be met. At the same time it is not always possible to specify in advance what degree of proof may be acceptable. In general, as transfer proposals become more complex and uncertain they entail a higher degree of risk, and a more conservative evaluation or higher level of proof is needed. This may require substantial investment in exploration and testing, long-term monitoring, and having potential mitigation measures in place to implement if needed.

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