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Opportunities for Improving the Ways We Use Water

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OPPORTUNITIES FOR IMPROVING
THE WAYS WE USE WATER

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WESTERN WATER: EXPANDING USES/FINITE SUPPLIES

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I. INTRODUCTION

- A. In today's environment of discouragement and delays in constructing new water development projects our interests must turn to looking into any and all opportunities to stretch our existing sources to meet increasing water needs. The more feasible and cost effective projects have already been developed in most areas of the West. Therefore, we must look to other sources of supply. We must examine the means to squeeze more supply from the existing sources through more imaginative programs.
- B. Just as we have become accustomed to vastly increased costs of energy over the past 10 to 15 years, we must accomodate ourselves to greatly increased costs of water. To obtain increased uses from the existing sources we must sometimes pay more in dollars or sometimes pay more by way of reducing our life styles and comforts, or both. A few years ago in California this was called by the then governor--"lower your expectations."
- C. The potential for utilizing presently developed water supplies to meet increased needs will be discussed in this paper, as well as recent changes in water laws that could help to achieve more conservation in water utiliza-

tion practices. Also, the conflicts of off-stream and instream uses of water will be discussed.

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II. WATER DEVELOPMENT PROJECTS--LACK OF CERTAINTY

A. Traditionally in the western United States, when additional water was needed projects were constructed to store and conserve water and distribute it to areas of use. Planning for such projects frequently required many years, often as many as 30 or more years, between the time the project was conceived and planned until it was finally constructed and the water put to use. Many large water development projects were constructed in the West and this laid the foundation for the development of the

economy that is now enjoyed in much of the West.

B. However, in today's atmosphere of high costs, protection of the environment and lowered expectations, additional water development projects will face great difficulties. Projects were developed in the past which at the time of development were considered to be adequate to meet long-term requirements. Two recent events illustrate the uncertainty of some projects.

1. The waters of the Colorado River were divided by the Colorado River Compact in 1922. This Compact was a result of concerns of water users in the Upper Basin states (Wyoming, Colorado, Utah and New Mexico) as well as concerns in Nevada and Arizona about increasing water uses in California. The Compact divided the waters of that system between the states of the Upper Basin and the states of the Lower Basin with the division point being at Lee Ferry. Unfortunately, at the time that division was made there was insufficient historic data on the water supply of the river and the result was an over allocation of the supplies.

a. Sixteen million acre-feet (MAF) per year were allocated between the two basins, 7.5 MAF were allocated to the Upper Basin. The Lower Basin was also allocated 7.5 MAF on an equal priority. Additionally, as the next priority, 1.0 MAF was allocated to the Lower Basin. An allocation was also made for a then unquantified requirement to meet a future water treaty with Mexico. This treaty ultimately resulted in an allocation of 1.5 MAF per year to Mexico in normal years and up to 1.7 MAF per year in above normal years of water supply. Thus, the Compact allocated about 17.5 MAF from a river that has been proven to have a total water supply of some 14 MAF.

b. Huge investments were made to divert Colorado River water to southern California. The Lower Basin is now using about 6.2 MAF per year. With the Central Arizona Project now coming on line, it will soon be using about 7.5 MAF per year. When combined with the Mexican Treaty obligation this will amount to about 9 MAF per year of re-

quirement downstream of Lee Ferry. Thus, something must give at such time that the Upper Basin uses about 5 MAF. At that time there will be many issues to face, requiring statesman-like negotiations or litigation in order to determine how shortages in water supply will be allocated.

2. In California, the State Water Project was developed to ultimately serve about 4.23 MAF per year. About thirty contracts were entered into which by the year 1990 would have entitlements to about 4 MAF per year. Unfortunately, all of the water conservation facilities of that project have not been completed. Considerable effort has been made in the past 15 years to add facilities to the project which would increase the water supply. For one reason or another those facilities have not been constructed and are not apt to be in the very near future.

a. The State Water Project can now deliver a firm annual supply of about 2.4 MAF. In recent years, the Project planners have been focusing on other sources of water that were not originally con-

templated in order to stretch the project water supplies. These include conjunctive use projects, reclaimed waste water and local projects, which in effect would be in-lieu projects funded by the State Water Project but actually separate projects constructed or developed locally.

C. The Metropolitan Water District of Southern California (Metropolitan) derives its water supplies from both the State Water Project and the Colorado River. As to its Colorado River supply, Metropolitan will be the first California agency to take shortages when the Central Arizona Project impairs its existing supply. When the Lower Basin supplies are not capable of serving 7.5 MAF per year, the Central Arizona Project will take the next shortages. The Central Arizona Project will cause Metropolitan to cut-back from its present supply of 1,212,000 acre-feet to 550,000 acre-feet per year. Metropolitan's supply may be less than 500,000 acre-feet per year if certain Indian Reservations utilize all the water allocated to them on the portions of their reservations in California.

D. Metropolitan recognised this in 1963 when the U. S. Supreme Court rendered its opinion in Arizona v. California. At that time Metropolitan amended its state water contract from a maximum annual entitlement of 1.5 MAF to 2.012 MAF per year. Unfortunately, if the State Water Project is not completed so that it can actually deliver on the order of 4 MAF per year, Metropolitan will receive a reduced supply from that Project.

E. Metropolitan has been making efforts to acquire other sources of supply. One that is in the offing is for Metropolitan to pay the Imperial Irrigation District to improve its system to save water and then allocate that saved water to Metropolitan. The proposal most discussed in recent years is for Metropolitan to acquire about 100,000 acre-feet of Colorado River water from the Imperial Irrigation District and make payments to Imperial in the amount of about \$10 million per year. This would mean that Metropolitan would have an additional source of Colorado River water at a cost at the river of about \$100 per acre-foot. Metropolitan has sufficient energy under its Hoover power contracts to pump such water through its

Colorado River Aqueduct to supplement its reduced supply under its own rights.

F. Most have heard of the Galloway Group proposal to the San Diego County Water Authority. This is a proposal by developers in Colorado who would build storage reservoirs and acquire water rights in the Upper Basin. They propose to sell such water under a long-term contract to the San Diego County Water Authority. Such water would be released down the Colorado River. The San Diego County Water Authority would have to make arrangements with the Metropolitan Water District to divert that water and transport it to San Diego County through Metropolitan's facilities. This proposal is fraught with legal and institutional problems. However, it is apparently still under consideration by those who sponsor it.

G. At the present time, because of the depressed economic condition of the farming industry, some consideration is being given by the Metropolitan Water District to acquiring water rights now used for irrigation or State Project water now allocated to irrigation to supplement Metropolitan's long-term water supplies. Under this concept, when surplus water is available and Metropolitan can meet

its needs from its other sources, the water so acquired could be leased back to the agricultural landowners for their use. However, during drouth periods when there is a shortage in water supply to Metropolitan it would take this water for domestic and municipal use in its service area and the landowners from which the water was purchased would either leave their lands idle or would dry-farm them. This may have some merit in that the landowners giving up water would have a source of income from that water and it would stretch the water supplies of the Metropolitan Water District at the time it was needed.

The question of certainty on many of these types of arrangements is whether such arrangements would provide a permanent water supply upon which a permanent economy can be developed.

III. CONJUNCTIVE USE

- A. Conjunctive use, or conjunctive operation, is the practice of operating a ground-water basin in conjunction with a surface water supply whereby available water in excess of the storage capacity of a surface reservoir can be stored in the ground-water basin. The objective is to release water from the surface

reservoir and store it in the ground-water basin to the maximum practicable extent and refill the surface reservoir from subsequent streamflow. In some years this transfer of storage from surface reservoirs to ground-water storage can occur several times. In other years it may not occur at all depending upon the purposes served by the surface reservoir and water supply conditions. Care must be taken so that the surface reservoir is not drawn down to a level of storage which impairs its primary purposes.

B. Flood control reservoirs are an adaptable source of water supply for transfer to ground-water storage. The most effective reservoir for flood control purposes is an empty reservoir. Therefore, following the accumulation of storm flow storage in a flood control reservoir it is desirable to remove that water as soon as practicable and some or all of this water can be conserved where sufficient water spreading facilities and ground-water storage capacity is available.

C. The California Department of Water Resources is now considering acquiring lands near the California aqueduct in San Joaquin Valley, such as on the Kern River fan, for possible

conjunctive use between surface water and groundwater. The plan would be to acquire a large area of land that was underlain by available ground-water storage capacity so that surplus water when available in the Sacramento-San Joaquin Delta could be diverted to water spreading areas on those lands for storage underground for future use during drouth periods.

D. In addition, the California Department of Water Resources and The Metropolitan Water District of Southern California have made studies of ground-water basins in southern California including San Fernando Valley and San Gabriel Valley in Los Angeles County, and the Chino Basin in western San Bernardino County as possible areas for storage of surplus water in ground-water basins. The Chino Basin has the most promise in that it has a large quantity of available storage space and is not hampered unnecessarily by court judgments. Such water could be stored at times of surplus water supplies in the north and surplus aqueduct capacity to transport that water to the southern California area. During drouth periods such water could be withdrawn to supplement the supplies from the State

Water Project which could be severely reduced during drouth periods in the areas of origin far to the north.

- E. The San Gabriel Basin is under a restrictive court judgment, but that judgment provides for so-called cyclic storage agreements, which accomodate conjunctive use. Under such cyclic storage agreements excess water can be stored underground and then recovered at future times as needed. The only restriction on recovery of such water is that it must be used in accordance with the terms of the Judgment and by parties to the Judgment.
- F. There are many other conjunctive use programs in California, some of them formalized, some of them informal. All of these conjunctive use operations attempt to make maximum use of the combined surface and ground-water supplies.
- G. Surplus water which could be spread usually occurs at times of the year when there is excess supply and the water would otherwise go unused if not diverted. The major expenses of these operations are the conveyance to the spreading areas, acquisition of lands and development of spreading facilities on those lands, and the cost of recovering the water.

In many instances the water can be recovered from existing wells and therefore the only additional cost of recovering the water is the energy cost. In other instances, specific recovery wells are installed to recover the water when needed and conveying it to the areas of need.

IV. RECLAIMED WASTE WATER

A. Reclaimed waste water has been utilized for many years for irrigation of certain types of agriculture. For non-irrigation use, a demonstration project was developed more than 25 years ago by the Los Angeles County Sanitation Districts to utilize reclaimed water for ground-water replenishment in an urban area. That project, the Whittier Narrows Water Reclamation Plant, operates at a capacity of up to 15 million gallons per day (MGD) and has been very successful. The reclaimed water contributes about 14,000 acre-feet per year to the replenishment of a downstream ground-water basin. It has not only demonstrated the feasibility of its operations but has served as a testing grounds for a number of studies relating to the possibility of health effects from using the ground water. A recent extensive study has once again indicated that there

were no demonstrable health effects.

B. As a result of the successful operation of the Whittier Narrows Plant, the San Jose Creek Water Reclamation Plant was constructed in 1971. The two plants are near one another and share in a common sanitary sewer system for their influent. The San Jose Creek Plant was constructed in 1971 with a capacity of 37.5 MGD. In 1982 it was enlarged to a capacity of 62.5 MGD. The San Jose Creek Water Reclamation Plant produced about 56,000 acre-feet of reclaimed water in 1985, of which about 14,000 acre-feet was used for ground-water replenishment.

C. Upstream on San Jose Creek is an older plant, the Pomona Water Reclamation Plant, which sells most of its effluent for irrigation and some industrial uses. The plant produces about 12,000 acre-feet per year of reclaimed water, of which about 8,000 acre-feet is sold for irrigation and industrial use and the balance is discharged to the creek. Most of the quantity discharged to the creek percolates to underlying ground-water storage.

- D. These plants have made a considerable quantity of water available for ground-water replenishment but much of it has not been utilized because of restrictions imposed by local health agencies. With completion of the recent intensive health effects study, and the acceptance of the results of that study, increased amounts of the effluent may now be used for ground-water replenishment.
- E. Some of the effluent from the San Jose Creek Plant is used for irrigation of golf courses and other landscaping. Precautions must be taken, of course, in protecting the health of the public through provision of a completely separate distribution system for such reclaimed water. Ample precautions are taken to prevent accidental consumption of this water.
- F. Ultimately, it can be expected that uses of reclaimed water will increase, and properly monitored irrigation and ground-water replenishment programs are obvious customers for such water.
- G. Section 1010 was added to the California Water Code in 1977. It provided that the cessation or reduction in use of water under any existing right regardless of the basis of

right, as the result of using reclaimed water or water polluted by waste to a degree which unreasonably affects such water for other beneficial uses, is deemed to be equivalent to reasonable beneficial use, limited, of course, to the amount of reduction in use under the existing water right. The quantity of the reduced use of water may be sold, leased, exchanged or otherwise transferred.

H. Section 13550 was added to the California Water Code in 1978. It provides that the use of potable domestic water for the irrigation of greenbelt areas, including highway landscaping, golf courses, cemeteries and parks, is a waste or an unreasonable use of water within Section 2, Article X of the California Constitution when reclaimed water is available under certain conditions. It provides that the State Water Resources Control Board, after hearings, can require such uses of reclaimed water if the following conditions prevail.

1. The reclaimed water is of adequate quality for such use,
2. Such reclaimed water can be provided at reasonable cost,
3. The State Department of Health Services concurs that such use of reclaimed water

will not be detrimental to health, and

4. The use of such reclaimed water will not adversely affect downstream uses or water quality.

V. WATER CONSERVATION MEASURES

A. To some conservation means using less water through various means of increasing efficiencies in its application. To others conservation is the storing of excess flows by constructing surface reservoirs and putting the saved water to beneficial use. They are both forms of conservation. Storing flood flows has been the keystone to almost all large water developments in the West.

B. There are practicable limits to the amounts of water that can be saved by reduction in existing uses. In California, about 85 percent of the 42 million acre-feet (MAF) of water applied annually is for irrigated agriculture--about 35 MAF. About 6 MAF is applied to urban uses. The remainder is for power plant cooling, recreation, and other uses.

C. Reducing agricultural use of water does not always increase the supply available for additional uses. Depending upon the physical characteristics of the area, a reduced agri-

cultural use can affect the supply available to other users. For example, downstream diversions from most streams are dependent upon the return flow from upstream diversions and many unlined canals are a source of replenishment to ground water from which others, and often nearby irrigators, are pumping their supplies.

D. Urban water uses can be reduced to some degree. For example, about 22 percent of the water supplied for residential use is flushed down the toilet. Prior to the 1880's, toilets were flushed by pulling a chain that lifted a valve and released water from a cistern into a flush pipe. The valves did not fit well and many of the toilets leaked around the valves constantly. Literally thousands of leaking toilets were threatening to dry up reservoirs and cause water shortages in England in the 1870's. The British Board of Trade solicited a more efficient toilet. Mr. Thomas Crapper, a sanitary engineer of Chelsea, developed a device which he called the Valveless Water Waste Preventer. It was a valve and siphon arrangement. He demonstrated his device at the Health Exhibition in 1884. Through his invention he established a very successful

business and conserved water. ("Flushed With Pride" by Wallace Reyburn, McDonald & Co., 1969; Newsweek, December 1, 1969, p. 63.)

E. There are many conservation measures that can be effective in salvaging or saving water. For municipal and domestic water supplies these include reduced quantities of water used in flushing toilets, restrictors on shower heads, lower water using household appliances, as well as less water consuming landscaping for uses outside of the house. There are many plants and ground covers now being used for landscaping which require less water--plants which are more tolerant of drouth conditions.

F. In the past, the more water a customer used the less he paid per unit for the additional water under the reduced block rates. Reduced block rates are now being phased out. In some instances where they are retained they have been switched to an increasing block rate and/or peak load, or seasonal, rates. The more water used the higher the rate, or increased use during peak demand periods bear greater rates. This has been found to be an effective means of reducing water use.

G. Fortunately, in many areas of the country the flat-rate system has been eliminated. Under the flat-rate system a customer paid a monthly rate regardless of the amount of water he used. This, of course, did not encourage water conservation. Unfortunately, in some areas flat-rates are still used. There is a state law on the books in Nevada that prohibits domestic water meters in the Reno-Sparks area and flat rates are prevalent. Recently there has been a softening of this policy and water meters can now be installed for commercial customers.

H. Sections 10610 through 10656 were added to the California Water Code in 1983. These sections provided that all urban water suppliers serving more than 3,000 customers or supplying 3,000 acre-feet per year were required to prepare an Urban Water Management Plan and file it with the State Department of Water Resources by December 31, 1985. These plans emphasized the conservation of water.

I. There are now laws in California requiring low flush toilets and low flow plumbing devices in new construction and in replacement of existing fixtures. Most large municipal water agencies have public relations programs, dis-

tribute information and furnish speakers which inform the public and urge them to use water conservation measures. The 1976-77 drought in California definitely raised the consciousness of the general public to save water.

J. There are some agricultural irrigation practices that are less efficient than others. In many instances, however, increasing the efficiency would not necessarily conserve water. If the irrigator is in an area of abundant water supply the tendency is to divert excess quantities of water for the ease of irrigation and less costly maintenance of facilities. So long as water is abundant in that area it does not significantly increase the depletion of the water supply. The inefficient application of water usually results in a larger quantity of return flow. However, during drouth periods such practices are usually reduced and the same quantity of water can be made to serve more acreage.

K. It is often suggested that irrigation canals be lined with impermeable materials to prevent leakage. In some areas this is effective in saving water. In other areas it is not. For example, in a valley floor area underlain by a groundwater basin where some irrigation is

from surface water and other irrigation is from groundwater, the leakage from unlined canals supplies the ground-water basin and therefore lining of the canal does not, of itself, increase water supplies. It may make more surface water available for certain users but it would also reduce the safe yield of the ground-water basin for those who are pumping ground water.

- L. In most of the western states, agriculture is the big user of water, about 75 to 95 percent of total state-wide use. Much of this involves federal reclamation projects. Although the states should establish and administer their own water resource policies, including any policies for water conservation, the federal government could make an important contribution to water conservation in the West. A federal program of research on effective means of water conservation in the field of irrigated agriculture could be a valuable contribution. The U. S. Department of Agriculture, in cooperation with the Bureau of Reclamation and the Corps of Engineers, could conduct a program of reviewing Bureau of Reclamation and Corps of Engineers projects which now serve irrigation water. The

objective would be to develop more efficient operational practices which will still meet the water needs of agriculture, but with less water. The consumptive use of water by crops is essentially a fixed quantity. But the diversion of water to supply the crop consumptive use is a large variable. It can be anywhere from about 1.5 to 5 or 6 times the crop consumptive use, depending upon the individual diversion and conveyance system, soil characteristics, and a number of other factors.

VI. INSTREAM VERSUS OFFSTREAM USES

- A. Offstream uses are generally uses served by diverting the water from its source and applying it to a beneficial use on land.
- B. Instream uses are uses of the water within the stream with no actual diversion of water. Most hydroelectric uses are considered instream uses. The water used is usually stored or at least conveyed through the generating facility and returned immediately to the stream. Thus, some type of works are required in or adjacent to the stream for hydroelectric uses. Other instream uses are navigation, fisheries, recreation, some forms of groundwater recharge, scenic and aesthetic enjoy-

ment, preservation of rare and endangered species, maintenance of fresh water habitat and preservation of the free flowing condition of the stream (wild and scenic rivers).

C. In California, the public trust doctrine is actively being exercised to give preference to instream uses for one purpose or another. In the case of the preservation of Mono Lake it has placed in jeopardy an appropriative right acquired some 50 years ago by the City of Los Angeles to divert up to about 100,000 acre-feet per year for municipal purposes. At the time the permit was issued for this municipal water use it was recognized by the water right administrative agency that there would be an impact upon Mono Lake. Nonetheless, the permit was approved for what was then considered the preferable right of municipal use. If that right is lost to the City, the water will have to be replaced from another source. To replace such water in southern California will require extremely high costs and will in all likelihood involve adverse environmental impacts in one form or another at whichever source is ultimately used to replace it.

1. Mono Lake is the first major case (National Audubon Society v. Superior Court of Alpine County) in California where the public trust doctrine has been asserted which could have a serious impact upon an essentially fully developed appropriative water right for municipal purposes. Of course, the State has always had the power at the time a water right application was filed to determine that water from a particular source is not available for appropriation because it is needed to meet the requirements of other uses under the public trust doctrine, or that such appropriation would not best serve the public interest.

D. There have been at least two applications filed to appropriate water for instream fishery purposes in California. Both applications were turned down by the State Water Resources Control Board on the grounds that an appropriative water right is essentially a possessory right, and without possession, evidenced by physical control of the water, no appropriative right is possible. On appeal, the State Board was found to be correct under existing law in rejecting the applications.

E. Certainly, water can be required to remain in-stream for water quality control purposes. The State Water Resources Control Board has issued a number of orders in this regard. The most significant one relates to the Sacramento-San Joaquin Delta and San Francisco Bay. The Board adopts Basin Plans pursuant to the Porter-Cologne Water Pollution Control Act. These plans recognize instream uses and needs, such as "Water quality degradation, recreation, aesthetic enjoyment, and the preservation of fish, wildlife, and other aquatic resources or preserves."

F. There has been concern in most western states that offstream uses of water leave too little water in the stream for instream uses. These instream uses include fish and wildlife, water quality control, recreation and the value of simply having a free-flowing stream--aesthetics. Several Western states now have laws under which (1) moratoriums may be placed on new appropriations, (2) water may be reserved from appropriation to protect instream uses and (3) minimum flows may be established for instream purposes. Also several states have adopted wild and scenic rivers statutes and have authorized state agencies to appro-

priate water to protect instream uses. These instream uses will undoubtedly impact offstream uses in the already water-short West. Therefore, it becomes more important than ever that our water supplies be used as efficiently as practicable.

VII. WATER RIGHTS LAW

A. The constitution of California (1) declares that the general welfare requires that its water resources be put to beneficial use to the fullest extent of which they are capable, (2) forbids waste, unreasonable use, and unreasonable methods of use of water, and (3) commands that the conservation of water be exercised with the view to their reasonable beneficial use in the interest of the people and for the public welfare.

1. There are many court decisions that declare that unnecessary waste of water must be prevented and that it injures the public welfare. The real question of waste of water depends upon the circumstances in each case and the time when the waste is to be prevented.
2. The questions of waste and what is unreasonable waste as opposed to what could be a reasonable waste has generally been judge

on the basis of custom and usage in the particular area. What is reasonable in some areas can be very unreasonable in other areas. Since water supply is a recurring resource, the time of year in which the use occurs is also a factor in distinguishing between reasonable and unreasonable waste.

B. The quantity of a water right is usually measured by the quantity diverted. It is assumed that at the time the right was acquired it was quantified as a reasonable amount of water required for the purpose for which it was to be used. If water right owners increase their efficiency of use and thereby use less water for the stated purpose of the right it would seem to follow that the quantity of the water right may be reduced. Thus, it is not necessarily in the best interest of the owner of the water right to improve his efficiency.

1. Should the owner of the water right retain the full amount of the right after he has improved his operational efficiency to the point where it serves the same purpose as before but with, say, 10 percent less water?

2. Or since his right is only to "use" the water and it was appropriated for a specific purpose, which purpose is still being served, should the 10 percent that was saved become unappropriated water available for appropriation by others?

C. Section 109 was added to the California Water Code in 1980. It states that the established policy of the State is to facilitate the voluntary transfer of water and water rights where it is consistent with the public welfare of the place of export and the place of import. It also provides that the State Department of Water Resources and the State Water Resources Control Board shall provide technical assistance to persons to identify and implement water conservation measures which will make additional water available for transfer.

D. In 1979, Section 1011 was added to the California Water Code. It provides that when any person entitled to use water under an appropriative right fails to use all or any part of the water appropriated because of water conservation efforts, the portion not used shall be deemed equivalent to a reasonable beneficial use of water. No forfeiture

of that part of the right shall occur. To receive this benefit the owner of the appropriative right may be required to file periodic reports with the State Water Resources Control Board describing the extent and amount of the reduction in water use due to his conservation efforts. The term "water conservation" in this instance means the use of less water to accomplish the same purpose or purposes of use allowed under the existing appropriative right. If the water was appropriated for irrigation purposes and not used because of land fallowing or crop rotation, the reduced usage is deemed to be "water conservation."

1. Section 1011 then goes on to provide that such water saved through "water conservation" efforts may be sold, leased, exchanged, or otherwise transferred pursuant to any provision of law relating to the transfer of water or water rights.

E. In 1984 Section 1012 was added to the California Water Code which provides similar exemptions from forfeiture, diminution or impairment of the right to use Colorado River water conserved within the Imperial Irrigation District, except as set forth in agreements

between the parties accomplishing such conservation and the United States.

F. Sections 1725 through 1730 were added to the California Water Code in 1980 to allow a permittee or licensee to make temporary changes in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water right where such transfers would involve only the amount of water consumptively used by the permittee or licensee, would not injure any legal user of water, and would not affect fish, wildlife, or other instream beneficial use. "Temporary" means for a period of one year or less.

1. The transfer would be accomplished by the permittee or licensee filing a notice with the State Water Resources Control Board at least 30 days prior to the transfer. This allows the Board 30 days within which to object to the proposed transfer. If the Board objected, the permittee or transferee could still file for a change in point of diversion, place of use, or purpose of use under other provisions of the Water Code.

G. These changes were made in the water code to facilitate the transfer, presumably by sale or lease, of the use of the water, or water

right, to others. However, Sections 1392 and 1629 of the California Water Code, respectively, restrict the value of a permittee's or licensee's appropriative right. If the right is sold to or condemned by a public entity, the value is limited to "the actual amount paid to the State" in acquiring the permit or license.

H. The provisions added to the California Water Code after the 1976-77 drought are obviously for the purpose of encouraging water conservation and use of reclaimed waste water to increase the use of water without the need of additional appropriations.

1. The reliability of such sources of water based on water conservation measures may be questionable insofar as their use on a long-term basis. Obviously, reliability would affect the price that a willing buyer would pay. These measures may provide a windfall to the owners of appropriative rights who were using the water for a marginal operation. But for these provisions in the Water Code, some owners may have lost their appropriative rights through non-use.

2. It remains to be seen how effective these measures will be and how the State Board will monitor these transfers.
3. Problems could arise. For example, Owner A may lease 200 acre-feet per year of his appropriative right to Neighbor B for five or ten years. During that time nature may not cooperate and Riparian Owner C, or Senior Appropriator D, both senior to Owner A, require that Owner A's supply be reduced in a particular year by 300 acre-feet. Unless the contract of sale was on an "if available" basis, Owner A and Neighbor B may end up in Court.
4. Sales and leases of ground water and ground-water rights in adjudicated basins in California are common occurrences. But they are much simpler to administer. Since they are under a Court Judgment and Watermaster service, and since they know specifically the quantity of the right each year, they are not at the risk of overcommitment due to the whims of nature. Furthermore, the Watermaster keeps accurate records of the water production of each producer or from each well and can balance the books with relative ease.

5. The market value of a water right is based upon the availability of water. If there is a surplus of water at a particular source, the market value of water or a water right would be relatively small because a person could appropriate his own water right. But if that source is over-appropriated, the value increases markedly. Comparable sales, if there are any, or costs of water from the most feasible alternative source would probably determine the value.
6. It will be interesting to see how much water transfer activity takes place in California as a result of these new laws. There may be little activity until the next severe drouth, but at least the mechanisms are now in place to effect transfers.
- I. Appropriative water rights in the West have traditionally been acquired as a water right in perpetuity. Some states have considered limiting the term of such appropriative rights to something on the order of 50 years. One advantage of limited term water rights is that with changed conditions as time passes a water right could be reconsidered by the administrative authority and perhaps be

applied to a more beneficial purpose or one that is more in the public interest.

1. Limited term water rights could be compared to hydroelectric power licenses issued by the Federal Energy Regulatory Commission. At the time the Federal Water Power Act was past by Congress in 1920 it was the result of many years of discussion and debate over whether the public waters of the United States should be controlled by private investors, local public investors, or the federal government itself. To resolve what had become an impasse on this question, the Federal Water Power Act was enacted, which authorized the Federal Power Commission to issue limited term licenses for the development of hydroelectric power on the navigable waters of the United States and on federal lands. The licenses at that time were issued for a term of 50 years and the investor who developed the project was aware that he had a license for only 50 years and therefore must depreciate his investment within that time because there was no assurance that the license would be renewed.

2. Licenses have been expiring in recent years and new licenses issued. Most of those licenses have been reissued to the original license holder. But in more recent years there has been much debate on this and the municipal preference clause in the Federal Power Act. Under the municipal preference clause a municipality can apply for a license that was formally held by a private investor and to the extent that the municipal applicant can show that his proposed project will equal or exceed the benefits of the private investor's application for relicensing, the municipality stands a good chance of obtaining that license.
3. Some new licenses for existing projects are being issued for shorter term periods such as 30 years. This is apparently because the project is already constructed and has been largely depreciated and therefore the term of the license can be shortened without significant financial impact on the license holder.
4. This same concept could be applied to water rights to give the advantage of a specific review at the end of a specific period to

determine whether the purpose for which the license was originally issued is still the best use of that water. However, such a procedure would have to be very carefully drafted so that the original holder of that water right is properly compensated and is not impacted to any significant degree in the event that he is not successful in re-acquiring the license.