SHIFTING WATER TO URBAN USES: ACTIVITIES OF THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

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MOVING THE WEST'S WATER TO NEW USES:
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I. INTRODUCTION.

A. Summary.

Today, California is experiencing a drought of historic proportions. Combined with policies that for a quarter century have inhibited the development of reliable water supplies to meet growing demands, the drought promises to make the 1990s a decade of enormous challenge for water agencies. To restore and maintain adequate reliability in the water supply system, innovative approaches to water management are necessary which emphasize action on several fronts to get more out of the existing system. Water Management activities being emphasized by the Metropolitan Water District of Southern California include: (1) demand management through aggressive implementation of water conservation programs and innovative pricing strategies; (2) increased water reclamation and reuse; (3) water transfers to conserve and better manage water in agricultural areas and make additional water available for growing urban areas in ways that benefit both; and (4) infrastructure improvements to protect water quality, improve the environment, and enhance water transfer efforts.

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II. THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA.

A. Background.

Metropolitan is a water wholesaler created as a public agency by a vote of the people in 1928. Metropolitan provides supplemental imported water to 27 member agencies through two systems, the Colorado River Aqueduct and the State Water Project. The Metropolitan service area includes 5,200 square miles in parts of six counties in the Southern California coastal plain. The current population of the service area is about 14.5 million and is expected to increase to about 18 million within the next two decades. Current gross regional product in the service area is approaching $400 billion annually, which would rank the region among the top ten industrial nations of the world. The diversified Southern California economy currently provides about 9 million jobs.

B. Objectives.

Metropolitan is governed by a 51 member Board of Directors, which includes representatives from each of the Member Agencies. The central objective of the district, originally expressed in a 1931 Policy Statement and reaffirmed in the Laguna Declaration of

1952, is to provide reliable and high quality water supplies for the Southern California economy. The policies of the district neither advocate nor oppose growth, but Metropolitan is committed to the development of an adequate water supply infrastructure that can accomodate whatever growth occurs under the growth management policies established by the responsible political agencies.

III. THE CURRENT SITUATION: CONTINUING DROUGHT.

A. Drought Conditions.

Since the 1986-1987 water year, the last four years of runoff in California's primary watersheds have been classified as critical, critical, dry, and critical. 1988-1989 was classified as dry, rather than critical, only because of late record storms in March, 1989. This ranks among the worst water supply situations over a consecutive four year period since the sixteenth century.

B. Available Water Supplies.

The drought has seriously affected all of Southern California's water sources.

1. Colorado River.

a. Runoff is about 45 percent of normal in 1989-1990, the third consecutive year of drought in the Colorado River watershed. Storage in the Colorado River system is down by about 15 million acre-feet (AF).

b. Because of increased requests by the other lower basin states, Arizona and Nevada, the Secretary of Interior's commitment to deliver Colorado River water to Metropolitan has been reduced from the requested amount of 1.3 million acre-feet (MAF) to about 950,000 AF as of early May. Actual deliveries to Metropolitan will depend upon how much water the other states actually use.

2. State Water Project.

a. Runoff in the SWP watershed is about 45 percent of normal and the state has announced 50 percent shortages for agricultural water users.

b. End of year storage in Oroville Reservoir and other storage facilities of the SWP is currently expected to fall considerably short of the 1.7 MAF target established by the California Department of Water Resources (DWR) operating procedures. A fifth year of drought could be devastating for the SWP.

3. Central Valley Project.

a. Many Central Valley Project (CVP) reservoirs are also at extremely low levels. The CVP has announced shortages to its customers, primarily agricultural water agencies, of 25 to 50 percent.

4. Los Angeles Aqueduct System.

a. Runoff in the City of Los Angeles' Eastern Sierra watershed is about 47 percent of normal.

b. Because of recent court decisions to

protect the environment of Mono Lake, Los Angeles has been prohibted from pumping any water from the Mono Lake Basin during 1990. Pumping by Los Angeles in Inyo County is also constrained due to recent agreements designed to protect natural vegetation in the Owens Valley.

c. During 1990-91, the City expects to receive about 175,000 AF from the Los Angeles Aqueducts which have historically provided on average about 470,000 AF annually. As a result, Los Angeles' request for water from Metropolitan has increased from about 50,000 AF only 5 years ago to 444,000 AF for 1990-91.

5. Local sources.

a. In Southern California, runoff has been only 42 percent of normal during 1989-90, and six of the past seven years have provided precipitation below normal levels.

b. Storage in regional groundwater basins has been depleted by over 1 MAF during the past five years.

IV. LONG-TERM DEMAND/SUPPLY IMBALANCE.

A. Growing Water Demands.

1. Population growth.

a. Of the five most rapidly growing counties (in terms of population) in the nation, five are located in Metropolitan's service area.

b. In terms of absolute increases in

population, growth in the service area is expected to be divided about evenly between the cooler coastal areas, where water demands tend to be less, and the hotter inland areas, where water use tends to be higher. Compared to historical trends however, the higher relative growth rate in the inland areas is expected to increase system-wide per-capita water use rates.

c. About two-thirds of the projected population growth represents a natural increase in the existing Southern California population. The remainder is accounted for by net migration into the region.

2. Regional water demands. Despite planned widespread implementation of conservation programs (see Section VI.A and VI.B), total water demands in Metropolitan's service area, based on the most recent planning studies, are expected to increase from current levels of about 4.0 MAF annually under normal weather conditions to 4.4 MAF by 2000 and 4.7 MAF by 2010. Under hot weather conditions, water demands will be even higher.

3. Demands on Metropolitan.

a. Demands for imported water from Metropolitan have increased from about 1.3 MAF during 1980 to projected demands of 2.5 MAF in 1990.

b. Future annual demands for imported water to meet residential, commercial, and industrial water uses are expected to exceed 3 MAF by 2010.

B. Declining Supplies.

Despite rapidly growing water demands, available reliable supplies have declined over the past quarter century. Each of Southern California's water supply sources is threatened to some degree.

1. Colorado River. Under the decree of the United States Supreme Court in Arizona vs. California (1963), Metropolitan's reliable supply of Colorado River water declined by more than half from over 1.2 MAF to 0.55 MAF annually.

2. State Water Project.

a. Facilities of the SWP remain incomplete, notably in the Sacramento-San Joaquin River Delta (Delta). The absence of adequate Delta facilities results in large volumes of "carriage water" losses, degrades source water quality, threatens Delta fisheries, constrains water transfer activities, and makes water supplies for more than half of California's citizens vulnerable to catastrophic failure during a major flood or earthquake. (See Section IX)

b. The state remains unable to fulfill contracts entered into in 1960 with the State Water Contractors. Metropolitan's contract calls for the delivery of 2.0115 MAF of SWP entitlement water annually, but the state is unable to deliver full contract amounts even under favorable water supply conditions.

c. The current reliable yield of the SWP, about 2.4 MAF annually, is barely half of the

amount of entitlement held by the 30 State Water Contractors. During the 1990s, DWR estimates that the SWP will be unable to supply fully the requests of the contractors about 60 percent of the time.

d. SWP supplies could be further reduced by regulatory proceedings, including the Bay-Delta hearings being conducted by the California State Water Resources Control Board (SWRCB) and various inquiries by the United States Environmental Protection Agency (EPA).

3. Los Angeles Aqueduct system. Barring an unforeseen reversal of trends in the courts, Los Angeles is expected to incur a permanent annual loss of about 80,000 AF on average to protect the environment of Mono Lake.

4. Local groundwater supplies.

a. Local water sources, primarily groundwater, currently provide about one-third of the region's water needs, about 1.3 MAF annually including 235,000 AF of reclaimed water.

b. A recently completed report (Metropolitan Water District Report 969, 1987) indicates that virtually every groundwater basin in the region contains contaminants to some degree. Two of the area's groundwater basins, the San Gabriel Basin and San Fernando Basin, have been declared Super Fund sites by the EPA.

c. Contamination due to nitrates and other minerals has reduced groundwater production in

Metropolitan's service area by about 74,000 AF. Losses due to contamination by organic chemicals have been minimal to date, only about 6,500 AF, because groundwater producers have relocated wells and blended lower quality water with higher quality water to meet water quality standards. However, 17 percent of wells tested for the presence of organic chemical contaminants exceeded state action levels and 50 percent had at least some contamination. Followup studies are now underway to update information on the extent of contamination and possible losses of groundwater yield.

C. Conclusion.

The current water supply problems confronting Southern California result from two powerful factors: the drought, attributable to Mother Nature and beyond our control, and the growing imbalance between demands and reliable supplies, attributable to a failure of policy as the storied politics of California water has stymied water managers in efforts to properly plan and prepare for the inevitable droughts that will inevitably visit desert economies.

1. Potential Shortages. During 1990, potential shortages could reach 200,000 AF in Metropolitan's service area under worst case assumptions. If 1990-91 should become year 5 of the drought, the potential shortfall could be 500,000 AF.

2. Reliability. More fundamentally, the water supply system does not have an adequate degree of

reliability.

a. Based on currently available reliable supplies, by the end of the decade there will be roughly a fifty-fifty chance that some residential, commercial, or industrial demands will have to be disrupted during any given year, and a one-in-three chance that significant shortages in excess of 200,000 AF will occur absent actions to restore reliability to the system. By the turn of the century, Southern California could face a 10 percent chance each year of shortages exceeding 800,000 AF.

b. This level of reliability is far below the standards established, based on economic and other criteria, in other infrastructure industries, such as electricity and natural gas.

c. Restoring adequate levels of reliability in the water supply infrastructure must become a top priority for water regulators, water managers, and others involved in water policy formation throughout the arrid west.

V. DROUGHT MANAGEMENT.

A. Supply Augmentation.

To reduce impacts of the current drought, Metropolitan, DWR, and other agencies have negotiated and implemented several water transfer agreements.

1. Yuba Purchase.

a. During March, DWR, with the

assistance of staff of the State Water Contractors, completed negotiations with the the Yuba County Water Authority (YCWA) for the purchase of up to 300,000 AF for the SWP.

b. The negotiated price of the water was based upon the Sacramento River Index (SRI) value as of May 1, 1990, ranging from around $10 per AF if the year turned wet (it didn't) to $45 per AF if the remaining runoff was low (it was).

c. The United States Bureau of Reclamation (USBR) has contested a 1989 YCWA/DWR sale, arguing that a portion of the water sold was required to be released in any event to meet Delta water quality and outflow requirements. YCWA also holds contracts with Pacific, Gas, and Electric Company (PG&E) that may require releases of water from New Bullards Bar Reservoir for power generation down to specified storage levels. As a result, only about 110,000 AF is likely to be available for transfer to the SWP under the March agreement.

2. La Hacienda Water Purchase.

a. DWR is also in the process of purchasing in place 98,005 AF of water currently in groundwater storage in Kern County.

b. This water will be pumped and used by the Kern County Water Agency (KCWA), a SWP contractor, which will in turn release a portion of its SWP surface supply for use by the other contractors. The immediate

availability of this SWP groundwater supply will also allow less conservative operations of SWP surface reservoirs and indirectly make additional yield available to the SWP contractors.

c. The full cost of this water transfer to the SWP contractors is about $75 per AF.

3. Colorado River Negotiations. Metropolitan is also engaging in discussions with landowners and water agencies using Colorado River water regarding the possibility of fallowing land to create a water supply. The basic concept is to develop agreements under which Metropolitan could fill up the Colorado River Aqueduct from existing storage and pay landowners to fallow land and repay the "borrowed" water to the storage facilities next year.

B. Demand Management.

To respond to the drought, the Metropolitan Board of Directors has established a policy to reduce water demands and retain conserved water in storage.

1. Drought Ordinances.

a. In March, 1990, the Metropolitan Board of Directors approved a resolution requesting all relevant public agencies to adopt and vigorously enforce mandatory drought ordinances to prohibit certain water use practices and conserve water.

b. A companion resolution adopted in April requests all member agencies to reduce total water demands in their service areas by at least 10 percent.

2. Drought Pricing.

a. To encourage the development of effective drought conservation programs by member agencies and subagencies and to help pay for a portion of the costs of these programs, Metropolitan established a drought rebate program.

b. Under the rebate program, member agencies receive a rebate of $100 per AF (compared to average wholesale water rates of about $200 per AF) for reducing water demands by 5 percent or more below 1989 levels, after adjusting for population growth.

3. Media Campaign.

a. To enhance awareness of the drought and to provide "how to" information on water conservation, Metropolitan has expanded its Summer 1990 media budget by an additional $600,000 to a total of $2.6 million.

b. The campaign will include television, radio, and billboard media, emphasizing both the need for extraordinary efforts during the drought and the need for water conservation permanently whether a drought is ongoing or not.

4. Other Activities. Additional activities to reduce demands during the drought include:

a. The creation of a task force to help municipalities and others to implement drought ordinances and to enhance water conservation efforts by the public agencies, which sometimes become symbols of

water waste themselves during times of drought.

b. The development of newspaper slicks and other materials to assist member agencies with drought related public relations activities.

c. Expansion of the Metropolitan speakers bureau activities to provide information on the seriousness of the drought and actions being undertaken to respond to it.

d. Development of weathercaster slides for weekly display on television weather programs to inform the public on drought conditions.

e. Distribution of restaurant tent cards, outdoor water conservation kits, and other materials and information to encourage conservation.

5. Member Agency Response. As of early May, approximately 70 percent of the member agencies and subagencies of Metropolitan had adopted programs to reduce water demands during the drought.

a. The City of Los Angeles has moved to Phase II of their drought ordinance, which imposes mandatory rationing with a 10 percent reduction target for 1990 enforced by excess use fees. Los Angeles and several other cities in the Metropolitan service area have also created a corp of "water cops" empowered to enforce drought ordinances and to assist citizens in conservation efforts.

b. The San Diego County Water Authority (SDCWA) has developed a model water ordinance for the

water retailers in their service area. All 24 SDCWA member agencies have either implemented or have scheduled public hearings to consider implementing Stage II of the SDCWA plan, which is designed to acheive a 10 percent reduction in demands by placing mandatory prohibitions on certain water practices.

c. Resolutions and/or mandatory ordinances have been adopted by other cities throughout the service areas of Metropolitan's member agencies including: the member agency cities of Glendale, Pasadena, and Santa Monica; 15 cities served by the Central and West Coast Basin Replenishment Districts in Los Angeles County; all eight cities served by Calleguas Municipal Water District in Ventura County; and all eight cities in the Los Angeles County service area of Las Virgenes Municipal Water District.

6. Contingency Plans.

a. Metropolitan has created a monitoring system to track the effectiveness of the conservation element of the Drought Action Plan and to determine if storage objectives are being acheived to protect against shortage impacts next year.

b. If the drought situation worsens, the Metropolitan Board will consider more stringent approaches, possibly including drought pricing patterned after those adopted in 1976-77, which included pricing penalties for excess use in addition to financial rewards for reduced use.

VI. LONG-TERM PROGRAMS TO MANAGE DEMANDS FOR IMPORTED WATER

A. Best Management Practices.

Metropolitan has been a leader in developing the concept of "Best Management Practices" (BMPs) for urban water conservation in California.

1. Bay-Delta Hearing Process. BMPs have emerged as part of the Bay-Delta Hearings process, which is a major judicial/regulatory investigation into water rights and water quality in the San Francisco Bay-Sacramento/San Joaquin River Delta. BMPs will define conservation practices which urban water agencies throughout the state will be required to implement.

2. Assurances for Urban Water Users. In addition to assuring the aggressive implementation of urban conservation practices, the BMP approach helps to provide two important assurances to urban water users.

a. First, once widespread conservation practices are in place and demands have "hardened", regulators are more likely to recognize the substantial costs of shortage and increase their commitment to provide reliable water supplies to meet the remaining reasonable water demands.

b. Second, implemented conservation practices will be studied carefully in the field to assure that only reasonable and reliable estimates of the amount of water actually saved are used in the

regulatory decisionmaking process.

3. The Initial BMP List. Those practices identified as BMPs are likely to include: retrofit of indoor high-flow plumbing fixtures with low-flow fixtures and toilet dams in existing construction; installation of water meters in all new construction (all water in Southern California is already metered); installation of ultra-low-flush (ULF) toilets in new construction; improvements in outdoor water use efficiency; and audits of water agency distribution systems to reduce leakage.

4. Potential BMPs. Other conservation practices will be studied to determine if their costs and effectiveness warrant inclusion on the BMP implementation list. These future potential BMPs include installation of water meters in all existing California residences and buildings, replacement of high-flow toilets in existing construction with ULF toilets, and a wide variety of other practices.

B. Conservation Credits Program.

To assure the aggressive implementation of conservation programs through the use of financial incentives, the Metropolitan Board of Directors approved the Conservation Credits Program in August, 1988.

1. Credit Payments. Under this program, member agencies and subagencies as appropriate receive a payment from Metropolitan for the implementaton of effective conservation programs.

a. Currently, the conservation credit payment is $75 per AF of water saved or 50 percent of total program costs, whichever is less.

b. At its June, 1990, meeting, the Metropolitan Board will consider increasing the conservation credit payment to $154 per AF. This compares to a wholesale water rate for treated noninterruptible water of $230/AF.

2. Credit Programs. During the first year of the program, a variety of conservation programs have been implemented.

a. Santa Monica has implemented a pilot ULF toilet replacement program designed to retrofit 25 percent of the households in the city. Under this program, Santa Monica offers a $100 rebate per retrofitted bathroom to households or property owners in a total of 12,000 residences. (Total program cost $2,362,000).

b. Los Angeles has implemented a similar pilot ULF toilet replacement program designed to retrofit 7,500 households in the first year ($900,000).

c. The San Diego County Water Authority (SDCWA) has implemented an experimental large turf audit program to reduce outdoor water use ($285,000).

d. Major programs patterned after successful efforts in San Jose, California and Phoenix, Arizona to install low-flow showerheads and toilet dams in existing structures have been implemented in the

cities of Pasadena ($850,000), Irvine ($270,000), San Diego ($1,075,000), and Los Angeles ($2,200,000).

e. Eight additional conservation programs are currently under review. The proposed increase in the credits payment to $154/AF is intended to help encourage the development of numerous other successful conservation programs.

C. Local Projects Program.

To stimulate waste water reclamation, Metropolitan implemented the Local Projects Program (LPP) in 1983.

1. LPP Payments. Under the LPP, as recently revised, Metropolitan will pay $154 per AF for qualifying waste water reclamation programs to stimulate reclamation activity.

2. Reclamation activity.

a. Currently, Southern California reclaims about 235,000 AF annually. Of this amount, 180,000 AF of reclaimed water is used for groundwater replenishment and 45,000 AF is directly reused, primarily for irrigation of large turf areas.

b. In the future, the total use of reclaimed water is expected to increase to about 430,000 AF annually. Of this amount, about 80,000 AF will be financed partly under the LPP and the remainder will be undertaken unilaterally by other Southern California water agencies.

D. Media Campaign.

As part of an ongoing effort to change water use

attitudes in Southern California, Metropolitan continues to invest substantial amounts of money in television, radio, and billboard campaigns to encourage conservation: $1 million in the summer of 1988, $1.5 million in summer, 1989, and $2.6 million in summer, 1990.

E. Pricing.

Historically, Metropolitan has relied on both property taxes and water rates for revenue. Under longstanding policies, basic water rates are established on a "postage stamp" basis with the same rate charged for the delivery of a like class of water anywhere in the service area. Especially during the last decade, a variety of innovative pricing strategies have emerged to encourage conservation and better water management.

1. Declining Tax Revenues (1983).

a. Through legislation, Metropolitan has dramatically reduced reliance on property tax revenues, once the Districts sole revenue source.

b. Since 1945-46, the property tax rate to support Metropolitan has declined from 0.125 percent of full assessed valuation to only 0.011 percent of full assessed valuation. Over this same period, water rates for untreated water increased from less than $10/AF to $197/AF.

2. Interruptible Program (1981).

Metropolitan sells interruptible water at a discount (currently $49/AF less than noninterruptible water), in

exchange for the right to later interrupt such deliveries and require the member agency to rely on local water sources to reduce demands for imports during drought.

3. Local Projects Program (1983). As revised by the Metropolitan Board at its March, 1990, meeting, the LPP offers a $154/AF payment for reclaimed water to stimulate maximum use of available water supplies. (See Section VI.C)

4. Conservation Credits Program (1988). The credits program provides strong financial incentives for conservation similar to an increase in the marginal price of water. Under the program, the financial benefit of conservation includes the $154/AF direct payment (under the proposed new rate) and the avoided payment to Metropolitan of $230 for treated noninterruptible water -- the equivalent financial incentive of raising the marginal wholesale water rate to $384/AF. (See Section VI.B)

5. Seasonal Storage Program (1989).

a. To better manage peak water demands and to encourage the conjunctive utilization of local groundwater basins and surface storage facilities, Metropolitan in 1989 established a seasonal storage rate.

b. During the winter months, when water supplies are relatively abundant and water demands low, Metropolitan sells seasonal storage water at a

substantial discount -- the seasonal rate in 1990-91 is $110/AF for untreated water and $130/AF for treated water.

c. Part of this water is provided in exchange for assurances that the receiving agency will reduce demand on Metropolitan during the peak summer demand months; the remainder is placed into long-term storage, primarily in groundwater basins, to meet future demands during droughts.

6. Drought Pricing (1990). During the current drought, as well as in 1976-77, Metropolitan has relied in part on drought pricing to manage demands and reduce the potential impacts of water shortages. (See Section V.B.2)

VII. LONG TERM PROGRAMS TO RESTORE ADEQUATE RELIABLE SUPPLIES: THE ROLE OF WATER TRANSFERS

A. Increasing Role of Water Transfers.

During the past decade, water transfers have gradually occupied a more prominent role in water planning. For more than a half century, California water agencies have used transfers to manage water, primarily within established water basins or service areas and in response to local shortages. However, water transfer activities at Metropolitan are evolving beyond these past practices in at least two important ways.

1. Interbasin Transfers. While the vast

majority of past transfers in California and the other western states have invloved intrabasin transfers of water, Metropolitan's primary negotiations involve major interbasin water transfers.

2. Transfers as Part of Long Range Planning. Rather than relying on transfers after the fact to recover from shortages that have already occured, Metropolitan is incorporating water transfers as an integral -- indeed, essential -- component of long range reliability planning.

B. Transfer Programs: Some Examples of Success.

In the past few years, Metropolitan and other California water agencies have made substantial progress negotiating and implementing water transfer agreements.

1. Imperial Conservation Program. This highly publicized agreement was finalized in December, 1989.

a. Under the Metropolitan/Imperial Irrigation District Conservation Agreement, Metropolitan agreed to pay for 16 specific water conservation projects within IID, where it is estimated that conservation could save 325,000 AF or more annually.

b. The initial Conservation Agreement is expected to save 106,110 AF annually at a cost of about $128/AF.

c. To resolve concerns of the Coachella Valley Water District, Metropolitan and IID agreed to provide protection for Coachella during extremely dry

periods when Colorado River supplies fall to critical levels. This protection, if implemented, would reduce the availability of water to Metropolitan during these rare hydrologic events. To compensate for this, Metropolitan will receive 106,110 AF annually instead of the original 100,000 AF agreed to in 1985. In addition, the minimum agreement period (currently 35 years) will be extended by two years for each year that Metropolitan's supplies are reduced.

d. Followup negotiations are now underway between Metropolitan and IID for an additional 150,000 AF conserved water.

2. All American Canal Lining.

a. In 1988, Congress passed legislation authorizing the lining of portions of the All American Canal and the Coachella Branch of the All American Canal. All costs would be paid for by the California agencies receiving the saved water.

b. The lining project is expected to save another 100,000 AF annually. An experimental project is now being conducted by USBR to develop new techniques to line the canals while water continues to flow through them.

3. Arvin-Edison/Metropolitan Exchange.

a. In the San Joaquin Valley, Metropolitan has developed a program with the Arvin-Edison Water Storage District, a large federal CVP contractor, for the storage and transfer of water.

b. Under this program, Metropolitan receives dry year CVP supplies that would otherwise be used by Arvin-Edison in exchange for SWP supplies previously delivered to Arvin-Edison during wet periods. When Metropolitan withdraws water from its storage account, Arvin-Edison would pump up and deliver the previously stored SWP water to the farmers in its service area.

c. The program is expected to increase reliable supplies available to Metropolitan by about 93,000 AF annually under conditions similar to the 1928-1934 drought, while improving the local agricultural economy.

d. Implementation of the program, which is now in the final stages of the environmental documentation process, will require capital expenditures within Arvin-Edison of about $20 million for expanded spreading works, a distribution system, and increased groundwater extraction capacity. The unit cost of the program is about $90/AF.

4. Desert-Coachella Exchange.

a. Under an agreement initially negotiated in 1967, Metropolitan provides additional Colorado River water to groundwater basins serving Coachella and the Desert Water Agency (DWA). In exchange, Metropolitan can receive during dry periods over 60,000 AF of SWP entitlement water paid for by these other agencies.

b. By April, 1986, Metropolitan had accumulated a storage account of 552,000 AF. During the ongoing drought, Metropolitan has stopped delivery of water to the exchange and drawn down its storage account to about 420,000 AF.

5. Palo Verde Water Utilization Agreement.

a. Beginning in 1986, Metropolitan conducted negotiations with Palo Verde Valley landowners and the Palo Verde Irrigation District (PVID), which has the most senior rights to Colorado River water.

b. The purpose of the negotiations was to reduce the amount of irrigated land in the Palo Verde Valley in order to make an additional 100,000 AF of water available to Metropolitan.

c. Discussions with PVID have recently resumed, following the finalization of negotiations on the Imperial Conservation Program.

6. DWR Activities. In addition to the short-term water purchases from the Yuba County Water Authority and from La Hacienda, Inc. in Kern County, DWR continues to explore water transfers as a means of increasing the long-term yield of the SWP. These activities include:

a. Negotiations with YCWA for a long-term water transfer supply.

b. DWR is also exploring possible conjunctive use programs with other Central Valley agencies to increase available supplies to SWP

contractors.

c. Water transfers are being incorporated as an integral part of the Kern Water Bank. Part of the yield of this innovative and complex conjunctive use program in Kern County will require a transfer of SWP entitlement water from the Kern County Water Agency (KCWA) to the other SWP contractors in exchange for use of the water previously stored underground in Kern County by DWR.

7. Future Transfer Activities. Metropolitan will continue to identify and develop water transfer programs in the future. These future programs will emphasize the use of financial incentives in agricultural areas to increase conservation and improve water management, making additional water available to meet Southern California's needs. Future programs will include:

a. IID-type conservation programs, especially where technically and politically feasible in the drainage impacted portions of the western San Joaquin Valley.

b. Conjunctive use programs similar to the Arvin-Edison exchange.

c. Agreements with landowners and their water agencies to alter farming practices, for example, by fallowing additional acres in their crop rotation or implementing on-farm conservation, to make additional water available for use by growing urban areas.

VIII. INSTITUTIONAL, POLITICAL, AND TECHNICAL CONSTRAINTS ON WATER TRANSFERS

A. Institutional and Political Constraints.

Because of the complicated nature of water law and the raw emotions that often surround water issues in the arrid west, numerous institutional and technical issues affecting water transfers must be approached on a case-by-case basis. Examples of some of the issues involved include the following.

1. Imperial Conservation Program.

a. The IID program required six years to complete, in large part because of legal disputes -- some still unresolved -- and the political emotions involved. On the Colorado River, all water transfers must occur under the umbrella of the "Law of the River", which protects the rights and priorities of water rights holders in the system.

b. To protect the interests of other priority rights holders and to assure that the transferred water is reliably available, Metropolitan entered into an Approval Agreement with Coachella, PVID, and IID in addition to the basic Conservation Agreement with IID. To finalize the transfer, Metropolitan also entered into a Supplemental Agreement with Coachella.

2. All-American Canal Lining. Recently, the IID has indicated an interest in paying for the lining of the All-American canal, apparently in an attempt to

save water in this federal facility and sell it at a profit. Howerver, such a plan would violate the priorities identified in the Seven Party Agreement, which allocates Colorado River water among the California agencies which rely on it.

3. Arvin-Edison Program. The Arvin-Edison program, although widely supported today, has been the source of considerable controversy.

a. The primary issues involved possible impacts on other water rights holders. Other State Water Contractors were concerned that increased use of SWP water by Metropolitan could increase shortages to them under the water allocation rules of the State Water Contracts. Federal CVP contractors were concerned about the possible expansion of the CVP service area to include Southern California.

b. Because of these concerns, dozens of agencies have been involved in the decisionmaking process. The project is scheduled to go to construction later this year, five years after the initiation of negotiations.

4. Third Party Concerns. The above programs are expected to have positive rather than negative impacts on third parties. This has been one of the important factors in their success. To the extent that future transfers reduce agricultural production to make water available for urban uses, third party impacts will emerge as a major political constraint. To date,

California has no guidelines or policies to define what types of impacts are acceptable or what types of mitigation might be built into transfer agreements.

5. Environmental Opposition.

a. Ironically, although some environmentalists are among the most vocal supporters of water transfers in theory, environmental opposition has emerged to many of the practical transfers being developed.

b. For example, the Environmental Defense Fund (EDF) has filed a formal protest regarding the Arvin-Edison Program and has in one form or another opposed at various stages the IID program and the lining of the All-American Canal. EDF's opposition to particular transfers appears to stem, in part, from a commitment to enhance the environment. If a mutually agreeable transfer project increases urban supplies but does not directly enhance the environment, EDF has indicated that it will oppose the transfer or seek significant changes in previously negotiated agreements. This position attempts to acheive environmental enhancement objectives, in effect, by taxing innovative water transfer proposals and will discourage their development.

c. Generally, any water transfer in California that involves moving water accross or pumping water from the Delta draws automatic opposition from environmental groups unless the purchased water is

destined for a wildlife refuge or other environmental use. The State Water Resources Control Board (SWRCB) staff have indicated that applications for approval of water transfer agreements may be viewed as an "opportunity to open up" the involved water rights permits of would-be transactors and force improvements in Delta conditions. Such a policy approach would have a chilling effect on water transfer activity in California.

B. Technical Constraints

1. Wheeling.

a. California has a vast network of aqueducts and dams for the transportation of water which will generally facilitate water trading. For many transfers, access to this transportation network may be critical to the success of a proposed transfer.

b. In 1986, the California legislature passed the Katz wheeling bill to assure access to these transportation facilities. Under the provisions of the bill, the owners of transportation facilities (generally public agencies) must provide wheeling services for transferred water up to 70 percent of unused capacity. The bill stipulates that the owner of such facilities must receive "fair compensation" for wheeling services, including a reasonable capital or capacity charge.

2. "Structural" and "Nonstructural" Transfers. Water transfers are sometimes supported in concept because they ostensibly offer a "nonstructural"

solution to water supply problems. However, many water transfers require construction activities, e.g. to build spreading ponds or distribution system improvements. These construction projects can face the same concerns about endangered species, etc., that confront more traditional structural solutions.

3. Restrictions in the Delta.

a. The vast majority of surface water used in the Central Valley eventually flows through the Sacramento/San Joaquin River Delta. Consequently, most major water transfers involving water agencies in the Central Valley involve the Delta.

b. Currently, there is only limited ability to move water from north of the Delta, where water supplies are relatively plentiful and prices low, to the export pumps, where the water can be transported to buyers south of the Delta. This results in the loss of about 30 percent of the purchased water, which adds considerably to the cost of the transfer.

c. Conjunctive use programs, like the Arvin-Edison Program or the DWR Kern Water Bank, also face serious Delta constraints. The Harvey O. Banks Delta pumping plant of the SWP, which has a capacity of 10,300 cubic feet per second (cfs) is limited to 6,400 cfs under the existing Corp of Engineers permits. During the environmentally sensitive spring months, operations at the Banks plant are limited to a mere 3,000 cfs under SWRCB Decision-1485. These constraints

impose a serious cap on the potential for conjunctive use as a means of meeting growing urban demands in an environmentally sound manner.

IX. INFRASTRUCTURE IMPROVEMENT.

A. Need for Infrastructure Improvement.

Before water transfer activities can reach their full potential in California, it will be necessary to improve the state's physical water supply and distribution infrastructure.

B. Key Areas for Improvement.

The two key infrastructure requirements are increased storage south of the Delta and Delta facilities.

1. South of the Delta Storage. These facilities are required to allow conjunctive use programs to divert more water for storage during periods of abundant supply. Major storage facilities in various stages of development include: Los Banos Grandes Reservoir, the Kern Water Bank, the Arvin-Edison expanded spreading works, a proposed Metropolitan reservoir in Riverside County, and various facility improvements to facilitate groundwater storage in Southern California.

2. Delta Facilities. Although controversial, Delta facilities must be considered as a possible element in a comprehensive plan for meeting key water policy objectives. In addition to facilitating

Delta-related water transfers, Delta facilities might advance other vital water policy objectives, including: protection of water quality and public health; enhancement of Delta fisheries; and reliability protection against the possible collapse of the water supply system for 18 million California during a major earthquake or flood.