

CHAPTER 8

WATER SUPPLY STRATEGY

ACWD's Integrated Resources Plan recommended a water supply strategy to meet the District's planning objectives for water supply reliability, costs, water quality, environmental protection and risk. Included in the District's water supply strategy are programs for additional conservation, recycled water, brackish groundwater desalination and water banking/transfers. This chapter summarizes the planning criteria utilized by ACWD in developing the District's water supply strategy as part of the IRP process, followed by a summary of the recommended water supply strategy for the District and the implementation status of key IRP recommended programs.

8.1 PLANNING CRITERIA

The IRP utilized the following planning criteria in the formulation and evaluation of potential water supply strategies:

Costs: In addition to avoiding rate shocks, key IRP objectives related to costs are to 1) minimize resource costs, and 2) maintain low average customer bills. The District believes that keeping costs, and therefore customer bills, low is a paramount objective.

Reliability: The District intends to maintain a high level of service reliability for its current and future customers. The IRPs' primary focus was long-term water supply reliability because the District has contingency plans and internal standards (e.g., storage standards and peak-day spare capacity for pumps and tanks) to address short-term reliability issues. Through public and stakeholder input during the IRP process, the District determined that a shortage of greater than 10% in 1 out of every 30 years is unacceptable. Likewise, frequent small shortages have also been deemed unacceptable. Hence, resource strategies that result in shortages of greater than 10% or chronic shortages were not considered.

Water Quality: In addition to maximizing the health-related treated water quality, the District's IRP objectives also included avoiding sudden changes in water taste or appearance. Aesthetics, especially taste, are extremely important to District customers. Major fluctuations in aesthetics are noticeable to customers and may generate customer inquiries. One determinant of taste is hardness, expressed as mg/L, or parts per million (ppm) as CaCO₃. A key criterion used in the IRP process was to provide uniform hardness levels and limit the maximum monthly hardness.

Environmental Impacts: The District's planning objective was to avoid or mitigate environmental impacts. For a resource option to be considered viable, appropriate mitigation needs to be provided such that any significant environmental impacts are reduced to levels that are less than significant.

Local Control: In light of the current uncertainties associated with the District's imported supplies, the District determined that local control of future resources is desirable. Factors considered in evaluating local control include:

1. The number of entities involved in developing or acquiring the supply options;
2. The firmness of the District's water rights or contractual allocations;
3. The amount of water that the District would have to share with other contractors; and
4. Whether state or federal agencies are involved in allocating water deliveries.

Risk: The last key planning objective was to minimize risks due to future uncertainty. These risks include:

- **Financial risk:** The likelihood of spending more money than expected or spending money unnecessarily. This rating is affected by factors such as the ratio of fixed to variable cost, construction and permitting lead times and resource size. For example, resources with high capital cost are more financially risky than resources characterized by variable costs.

- **Water quality regulatory risk:** The likelihood of being unable to comply with future health-related water quality regulations. Even though the cost of treatment needed to comply with current standards is included for all source options, some sources have an inherently higher risk of not meeting future standards with existing treatment facilities.
- **Availability risk:** The likelihood that a supply source is not available due to external legal or regulatory changes or uncertainties in the quantity of supply provided or saved. For example, agricultural transfers may be risky because of contractual and through-Delta delivery issues.

8.2 WATER SUPPLY STRATEGY AND IMPLEMENTATION STATUS

As part of ACWD IRP process, the District evaluated a wide range of water supply and water conservation options. These options were packaged into nine alternative water supply strategies, each of which was evaluated against the District's planning objectives (described above). The recommended water supply strategy, chosen because it best met the District's objectives, included desalination, recycled water, conservation, groundwater management and off-site banking/transfers. Table 8-1 provides a summary of the key projects incorporated in the District's water supply strategy and their current implementation status.

**Table 8-1
Recommended IRP Strategy and Implementation Status**

<i>IRP Component</i>	<i>2000</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>	<i>Implementation Status</i>
Conservation	Package 2 (IRP)	Package 2 (IRP)	Package 2 (IRP)	Package 2 (IRP)	All cost-effective BMPs are being implemented. New programs focused on landscape irrigation in place.
Desalination (mgd)	5	10	10	10	Phase 1 Desal (5 mgd) completed and in operation. Grant funding secured for Phase 2 (10 mgd).
Off-Site Storage/Banking Capacity (1,000 AF)	65	95	100	140	Secured 150,000 AF of off-site banking storage capacity at Semitropic Groundwater Banking Program.
Groundwater Management (Min. Inland GW Elev., ft mean sea-level)	1	-5	-5	-5	Completed the Quarry Lakes rehabilitation project to enhance groundwater recharge capacity.
Treatment Plant Upgrades (mgd)	---	---	---	4	Added 2 mgd of treatment capacity to MSJWTP during plant upgrade and conversion to ultra-filtration.
Recycled Water	---	---	Phase 1 (1,600 AF/Yr)	Phase 2 (1,000 AF/Yr)	ACWD/USD Recycled Water Master Plan updated and satellite treatment plant feasibility study completed.

ACWD's previous Urban Water Management Plan (2000-2005) was based on the same IRP water supply strategy that is included in this 2006-2010 Plan. Since the 2000-2005 Plan was adopted by the ACWD Board in 2001, ACWD has made significant progress in the implementation of this strategy. This progress includes: (1) on-going implementation of the District's water conservation program; (2) securing of an additional 100,000 AF of off-site storage capacity at the Semitropic Groundwater Banking Program (2001); (3) completion of the Phase 1 (5 mgd) Newark Desalination Facility (2003); (4) completion of upgrades to the District's Mission San Jose Water Treatment Plant (2005); and (5) completion of a joint ACWD/USD feasibility study for a recycled water satellite treatment facility (2003).

Each of the key components of ACWD water supply strategy are discussed in greater detail below:

Desalination

As described in Chapter 5, the IRP recommended developing a brackish groundwater desalination facility which would provide a new local source of water supply for the District. The desalination facility would produce potable water by removing salts and other minerals from brackish (slightly salty) groundwater in the local aquifer system.

ACWD completed construction of the first phase of the Newark Desalination Facility in 2003. This desalination facility has a capacity of 5 mgd, and was constructed to allow for future expansion to 10 mgd. The Newark Desalination Facility utilizes state-of-the-art reverse osmosis technology to convert brackish water to potable water. This process forces water under pressure across a semi-permeable membrane. The membrane allows water molecules to pass through but stops dissolved minerals such as salts and iron. The soft water produced by the Desalination Facility is blended with the harder groundwater to provide a supply with lower overall hardness.

The source water for the desalination facility comes from a series of wells that remove brackish water from the Niles Cone Groundwater Basin. This program, called the Aquifer Reclamation Program, was developed to stop the spread of saltwater already in the groundwater basin and to reclaim the aquifers of the basin for future potable use. With the start-up of the Newark Desalination Facility in 2003, a portion of the brackish groundwater pumped from these wells has been treated for subsequent potable use rather than being allowed to flow to San Francisco Bay, as was previously the case. This represents a new source of supply to the extent that this brackish groundwater would be pumped regardless (through the District's Aquifer Reclamation Program) in order to improve water quality in the basin and to protect the District's Mowry Wellfield.

ACWD plans on expanding the capacity of this desalination facility to 10 mgd by the year 2010. ACWD was recently awarded a \$2.8 million grant from the California Department of Water Resources for this expansion. ACWD is currently evaluating various operational strategies for this expanded facility as part of the update to the District's IRP. Alternative strategies include the use of this expanded facility to meet peak summer production needs during normal and dry years (i.e. providing 5,100 AF/Yr supply), and base-loading the facility (10 mgd year-round) during above-normal and wet years. For the purpose of this UWMP, it is assumed that the expanded desalination facility will provide 5,100 AF/Yr of treated water supplies under normal year conditions. This assumption will be reviewed in future updates to this Urban Water Management Plan.

Recycled Water

The District's long-term supply strategy includes a recycled water program to be implemented by 2020, which will provide up to 1,600 AF/yr of non-potable supply (e.g. landscape irrigation and industrial process water). As described in Chapter 6 of this report, the source of recycled water will be from a joint project with ACWD and Union Sanitary District (USD). Reclaimed water distribution pipelines will be separate from the District's existing potable distribution system and, therefore, would not adversely affect existing potable supply operations. The volume of reclaimed water produced would be the same in drought years as in normal years, thus providing a firm source of supply. Demand for reclaimed water for irrigation purposes is highest in the summer months. Therefore, in addition to increasing water supply, use of reclaimed water would help meet peak monthly and daily production capacity needs.

In 2003 ACWD and USD completed an evaluation of the feasibility of constructing a satellite recycled water treatment facility in southern Fremont at USD's Irvington Pump Station. This satellite facility would benefit ACWD by providing a recycled water source for customers in southern and central Fremont, and would benefit USD by providing advanced treatment for a potential new wet-season outfall, thereby addressing some of the wet-weather disposal issues facing USD. As described in Chapter 6, prior to moving forward with this project, primary customers (i.e. golf courses) demands must be in place.

Demand Management

As discussed in Chapter 7, demand management is a key component of ACWD's long-term water supply and management strategy. The IRP recommended program ("Package 2") includes components to reduce both indoor and outdoor use for all customer groups within the District's service area. However, the focus of the recommended program is to reduce peak summer demands in order to reduce the need for additional production and storage facilities. In addition, as a signatory to the MOU on Urban Water Conservation, ACWD is committed to implementing locally cost-effective water conservation best management practices ("BMPs"), as developed by the California Urban Water Conservation Council (CUWCC). A summary of ACWD's water conservation program is presented in Chapter 7 and Appendix B (BMP Implementation Report).

As part of the IRP process, the District estimated that the total long-term savings from District sponsored conservation measures would range from approximately 1,600 AF/Yr to 4,900 AF/Yr. A range in potential savings was developed due to the uncertainties in actual savings associated with water conservation programs. For planning purposes, an average annual projected savings of 2,900 AF/Yr by the year 2020 is utilized. This quantity of savings is based on year 2000 base conditions. Of this total quantity of savings, it is estimated that approximately 700 AF/Yr of savings has occurred to date (i.e. from the 2000 baseline conditions through 2005) due to conservation measures already implemented, and another 2,200 AF/Yr of annual savings will be achieved by the year 2020. It should be noted that these projected conservation savings do not include savings that would occur due to "natural conservation" (i.e., savings due to the retrofit of non-conserving plumbing fixtures with low flow fixtures). Rather, savings from natural conservation are accounted for in the District's water demand projections as are savings from pre-2005 District sponsored conservation programs.

Groundwater Management

As stipulated in the District's Groundwater Management Policy (adopted on January 26, 1989, and amended on March 22, 2001), it is the policy of the District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational and agricultural water needs in the ACWD service area (see Chapter 4 for a more detailed discussion of local groundwater management). In order to protect the Basin from seawater intrusion, the District's operational goals are to maintain groundwater levels above sea-level in the Newark Aquifer system (the upper aquifer which is hydraulically connected to San Francisco Bay). However, during critically dry periods the District may temporarily reduce groundwater levels slightly below sea-level (-5 feet mean sea-level minimum level), in the Newark Aquifer in the Forebay (inland) area. Detailed modeling analysis has indicated that temporarily drawing the aquifer down in this inland area could provide additional supply in critically dry years without impacting the integrity of the Basin. This analysis assumes that (1) there are no new parties pumping from the Basin, and (2) that groundwater outflows from the Basin are not increased due to increased pumping in adjacent groundwater basins that are hydraulically connected with the Niles Cone Groundwater Basin.

A key component of ACWD's management of the Niles Cone Groundwater Basin is the capability to recharge the groundwater system through the District's groundwater percolation ponds. In order to maintain the recharge capacity at these ponds, the District completed a rehabilitation of these percolation ponds in 1997. Under an agreement with the East Bay Regional Park District, the Quarry Lakes rehabilitation project also allowed for joint use of these percolation ponds for recreation and wildlife purposes.

Off-Site Banking and Transfers/Exchanges

Even with new programs for water conservation, recycled water and desalination, the District identified the need for additional supplies during dry and critically dry years. Analyses performed during the development of the IRP indicated that the District will require up to 20,000 AF/Yr in critically dry years and up to 100,000 AF over an extended 7-year drought. In 1999, the District completed an evaluation of a wide-range of alternatives to meet our dry year water needs. The report identified the potential methods to secure dry year supplies through both off-site banking and transfers/exchanges.

Off-site storage involves storing excess ACWD SWP supplies during wet and above normal years, for use during dry years. Since ACWD has limited local storage in the Niles Cone Groundwater Basin, storage needs to take place at off-site surface reservoirs or groundwater basins. The IRP shows a total need of 100,000 AF of off-site storage capacity by the year 2020, and 140,000 AF by the year 2030. To meet these goals, in 1997 ACWD secured 50,000 AF of storage capacity at the Semitropic Groundwater Banking Program and in 2001 secured an additional 100,000 AF, for a total combined storage capacity of 150,000 AF. As of December 2005, ACWD has stored approximately 100,000 AF at the Semitropic Groundwater Bank

A key limitation to the Semitropic Banking Program is the capacity to return water to ACWD during dry years. Under ACWD's water banking agreements with Semitropic, the amount of return (or "take" capacity) from the program is based on the total amount of storage capacity. Because of this limitation, the amount of storage capacity ACWD has secured at Semitropic has exceeded the IRP recommended quantity. ACWD water supply analyses has indicated that in most dry years this groundwater banking capacity, in combination with the District's other water supplies, will be sufficient to meet the District's water needs. However, during the most critical droughts (e.g. 1977 conditions), ACWD may still not have adequate take capacity from the Semitropic Banking Program to meet all in-District water demands.

Another option to meet dry year water supply needs is for ACWD to enter into exchange agreements for dry year supplies or to purchase raw water supplies in dry years. Typically, these options would involve purchasing Delta water supplies from an entity which could temporarily use a local groundwater supply in-lieu of surface water supplies provided to ACWD. ACWD currently participates with the Department of Water Resources and State Water Contractors on an annual basis to evaluate potential water transfer opportunities.

Treatment Plant Upgrades

The District's IRP recommended that, by the year 2030, an additional 4 mgd of treatment plant capacity should be added to help meet peak summer day demands and to ensure that ACWD water quality goals could be met. In 2003 ACWD began construction at the District's Mission San Jose Water Treatment Plant (MSJWTP) to convert the treatment plant to ultrafiltration. In this process, water is forced through porous membranes. Due to the small size of the membrane pores, ultrafiltration provides a very effective barrier against the passage of particulate matter, protozoan cysts, bacteria and viruses. An advantage of this technology is that it reduces the amount of chemical disinfection that is required to kill disease-causing agents. As part of this upgrade, the overall peak summer capacity of the treatment plant was also increased by 2 mgd.

8.3 WATER SUPPLY AND DEMAND COMPARISONS

A key recommendation in the District's 1995 Integrated Resources Planning Study was that the implementation status and planning assumptions be reviewed every ten years. As of December 2005, ACWD is in the process of completing this update to the IRP. As part of the update process, ACWD has completed its analysis of the projected water supply availability and demands under average year, single dry year, and multiple dry year conditions. These analyses are based on the most recent water supply availability projections (as described in Chapter 3) provided by the DWR and the SFPUC for ACWD's imported water supplies. Projections of local water supply reliability are based on modeling analyses under long-term local hydrologic conditions (1922-1994 historical rainfall and runoff in the Alameda Creek Watershed). These analyses also assume implementation of the ACWD water supply strategy as detailed in the IRP and ACWD's Capital Improvement Plan.

The results of these analyses are presented in Table 8-2 and indicate that under normal year water supply conditions (representing median-year water supply availability based on 1922-1994 historical hydrologic conditions) ACWD will have sufficient supplies to meet projected future water demands, as adjusted for estimated future water conservation savings. As indicated in Table 8-2, this analysis also indicates that during these hydrologic conditions, ACWD would have sufficient supplies available (in excess of the projected demands) for placing into groundwater storage (locally or at the off-site Semitropic Groundwater Bank) for later use in the service area in dry years.

**Table 8-2
Projected Normal Year Water Supply and Demand Comparison (AF/Yr)**

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	32,700	33,800	34,900	36,000	36,000
- San Francisco Regional	15,300	15,300	15,300	15,300	15,300
Total Imported Supplies	48,000	49,100	50,200	51,300	51,300
Local Supplies					
- Groundwater Recharge	25,700	25,700	25,700	25,700	25,700
- Groundwater Storage	0	0	0	0	0
- Del Valle Release	3,400	3,400	3,400	3,400	3,400
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0		1,600	1,600	1,600
Total Local Supplies	34,200	34,200	35,800	35,800	35,800
Banking/Transfers					
- Semitropic Banking	0	0	0	0	
TOTAL SUPPLY	82,200	83,300	86,000	87,100	87,100
DEMAND COMPONENT					
- Distribution System Demand	59,500	61,400	63,200	63,700	64,300
- Estimated Conservation Savings	(700)	(1,500)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	14,800	14,800	14,800	14,800	14,800
TOTAL DEMAND	73,600	74,700	75,800	76,300	76,900
SUPPLY & DEMAND COMPARISON					
- Supply Totals	82,200	83,300	86,000	87,100	87,100
- Demand Totals	73,600	74,700	75,800	76,300	76,900
- Difference	8,600	8,600	10,200	10,800	10,200
- Difference as % of Supply	10%	10%	12%	12%	12%
- Difference as % of Demand	12%	12%	13%	14%	13%

Notes:

- Normal Year conditions are based on the median supply availability based on a review of 1922-1994 historical hydrologic conditions. The year 1944 was selected as it is the closest year to the statistical median for current and future total water supply availability.
- Groundwater System Demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows.
- ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
- Under Normal Year conditions, ACWD does not anticipate utilizing Groundwater Storage (groundwater use in excess of recharge) or Semitropic Groundwater Banking. These supplies would be used under dry year conditions when imported and local supply availability would be reduced.
- As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-3 provides a summary of the supply availability under the most severe single-year drought on record (1977). This drought year represents the projected minimum water supply availability considering all of ACWD's water supplies (i.e. State Water Project, San Francisco Regional and local supplies). This analysis indicates that ACWD would experience a shortage of approximately 15% during a similar critical drought under all future demand conditions (2010, 2015, 2020, 2025 and 2030). Under this dry year scenario, ACWD's SWP supplies would be cutback by approximately 95%, and ACWD would need to rely on local and off-site groundwater storage for approximately 24,000 acre-feet to help make up for this shortfall. Under such severe critical drought conditions (1 in 70 year occurrence), ACWD would look to secure additional supplies through a DWR drought water bank or similar water purchase/transfer program. In addition, ACWD would also likely implement the drought contingency plan described in Chapter 9 of this Plan.

Tables 8-4 through 8-8 provide summaries of the projected supply availabilities under a long-term (5 year) drought for 2006-2010, 2011-2015, 2016-2020, 2021-2025, and 2026-2030 demand conditions. This multiple year drought sequence is based on the 1929-1933 historical hydrologic conditions, which represents the most severe 5-year drought on record (based on projected availability of ACWD's supplies over the 1922-94 hydrologic period). The results from these analyses indicate that ACWD will have sufficient supplies to withstand a similar long-term drought. The maximum shortage projected (4% in the third year of the drought sequence) is well within the District's reliability goals of no more than a 10% shortage on a one in thirty year basis. As with the single dry year condition, both local groundwater storage and off-site groundwater storage in Semitropic will play key roles in offsetting shortfalls in the District's other local and imported supplies.

**Table 8-3
Projected Single Dry Year Water Supply and Demand Comparison (AF/Yr)**

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	1,700	1,800	1,800	1,900	1,900
- San Francisco Regional	11,700	13,700	14,100	12,700	13,100
Total Imported Supplies	13,400	15,500	15,900	14,600	15,000
Local Supplies					
- Groundwater Recharge	15,600	15,600	15,600	15,600	15,600
- Groundwater Storage	10,000	10,000	10,000	10,000	10,000
- Del Valle Release	100	100	100	100	100
- Desalination	5,600	5,600	5,600	5,600	5,600
- Recycled Water	0	0	1,600	1,600	1,600
Total Local Supplies	31,300	31,300	32,900	32,900	32,900
Banking/Transfers					
- Semitropic Banking	13,500	13,500	13,500	13,500	13,500
TOTAL SUPPLY	58,200	60,300	62,300	61,000	61,400
DEMAND COMPONENT					
- Distribution System Demand	59,500	61,400	63,200	63,700	64,300
- Estimated Conservation Savings	(700)	(1,500)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	10,500	10,500	10,500	10,500	10,500
TOTAL DEMAND	69,300	70,400	71,500	72,000	72,600
SUPPLY & DEMAND COMPARISON					
- Supply Totals	58,200	60,300	62,300	61,000	61,400
- Demand Totals	69,300	70,400	71,500	72,000	72,600
- Difference	(11,100)	(10,100)	(9,200)	(11,000)	(11,200)
- Difference as % of Supply	-19%	-17%	-15%	-18%	-18%
- Difference as % of Demand	-16%	-14%	-13%	-15%	-15%

Notes:

1. Single Dry Year conditions are based on the projected supply availability under 1977 drought conditions.
2. Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
3. ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

**Table 8-4
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2006-2010 (AF/Yr)**

SUPPLY/DEMAND	Year				
	2006	2007	2008	2009	2010
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	11,300	28,900	10,500	14,800	13,600
- San Francisco Regional	15,300	15,300	13,500	15,300	15,300
Total Imported Supplies	26,600	44,200	24,000	30,100	28,900
Local Supplies					
- Groundwater Recharge	12,900	13,000	9,000	20,900	13,700
- Groundwater Storage	8,800	0	10,000	0	4,100
- Del Valle Release	900	5,100	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,600	4,500
- Recycled Water	0	0	0	0	0
Total Local Supplies	27,600	23,100	24,500	29,900	23,300
Banking/Transfers					
- Semitropic Banking	16,100	2,300	15,600	17,900	17,400
TOTAL SUPPLY	70,300	69,600	64,100	77,900	69,600
DEMAND COMPONENT					
- Distribution System Demand	57,300	57,800	58,300	58,900	59,500
- Estimated Conservation Savings	(100)	(300)	(400)	(600)	(700)
- Groundwater System Demands	11,900	10,400	8,800	13,800	8,700
TOTAL DEMAND	69,100	67,900	66,700	72,100	67,500
SUPPLY & DEMAND COMPARISON					
- Supply Totals	70,300	69,600	64,100	77,900	69,600
- Demand Totals	69,100	67,900	66,700	72,100	67,500
- Difference	1,200	1,700	(2,600)	5,800	2,100
- Difference as % of Supply	2%	2%	-4%	7%	3%
- Difference as % of Demand	2%	3%	-4%	8%	3%

Notes:

- Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.
- Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
- ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
- As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

**Table 8-5
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2011-2015 (AF/Yr)**

SUPPLY/DEMAND	Year				
	2011	2012	2013	2014	2015
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	11,400	28,500	10,700	15,200	13,600
- San Francisco Regional	15,300	15,300	13,700	15,300	15,300
Total Imported Supplies	26,700	43,800	24,400	30,500	28,900
Local Supplies					
- Groundwater Recharge	12,800	12,300	9,800	19,800	14,100
- Groundwater Storage	9,300	0	10,000	0	3,100
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,500	4,500
- Recycled Water	0	0	0	0	0
Total Local Supplies	28,000	22,500	25,300	28,700	22,700
Banking/Transfers					
- Semitropic Banking	16,100	5,400	15,900	18,700	17,400
TOTAL SUPPLY	70,800	71,700	65,600	77,900	69,000
DEMAND COMPONENT					
- Distribution System Demand	59,800	60,200	60,500	60,900	61,400
- Estimated Conservation Savings	(900)	(1,000)	(1,200)	(1,300)	(1,500)
- Groundwater System Demands	11,300	10,000	8,700	10,100	8,700
TOTAL DEMAND	70,200	69,200	68,000	69,700	68,600
SUPPLY & DEMAND COMPARISON					
- Supply Totals	70,800	71,700	65,600	77,900	69,000
- Demand Totals	70,200	69,200	68,000	69,700	68,600
- Difference	600	2,500	(2,400)	8,200	400
- Difference as % of Supply	1%	3%	-4%	11%	1%
- Difference as % of Demand	1%	4%	-4%	12%	1%

Notes:

- Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.
- Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
- ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
- As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

**Table 8-6
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2016-2020 (AF/Yr)**

SUPPLY/DEMAND	Year				
	2016	2017	2018	2019	2020
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	11,400	28,200	10,800	15,600	13,600
- San Francisco Regional	15,300	15,300	14,100	15,300	15,300
Total Imported Supplies	26,700	43,500	24,900	30,900	28,900
Local Supplies					
- Groundwater Recharge	12,600	12,100	9,700	19,600	14,100
- Groundwater Storage	8,100	0	10,000	0	2,600
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,500	4,500
- Recycled Water	0	0	0	0	1,600
Total Local Supplies	26,600	22,300	25,200	28,500	23,800
Banking/Transfers					
- Semitropic Banking	16,100	5,400	15,900	18,700	17,400
TOTAL SUPPLY	69,400	71,200	66,000	78,100	70,100
DEMAND COMPONENT					
- Distribution System Demand	61,600	61,900	62,200	62,400	63,200
- Estimated Conservation Savings	(1,600)	(1,700)	(1,900)	(2,000)	(2,200)
- Groundwater System Demands	10,900	10,000	8,700	10,200	8,700
TOTAL DEMAND	70,900	70,200	69,000	70,600	69,700
SUPPLY & DEMAND COMPARISON					
- Supply Totals	69,400	71,200	66,000	78,100	70,100
- Demand Totals	70,900	70,200	69,000	70,600	69,700
- Difference	(1,500)	1,000	(3,000)	7,500	400
- Difference as % of Supply	-2%	1%	-5%	10%	1%
- Difference as % of Demand	-2%	1%	-4%	11%	1%

Notes:

- Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.
- Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
- ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
- As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

**Table 8-7
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2021-2025 (AF/Yr)**

SUPPLY/DEMAND	Year				
	2021	2022	2023	2024	2025
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	11,400	27,800	10,900	16,000	13,600
- San Francisco Regional	15,300	15,300	14,600	15,300	15,300
Total Imported Supplies	26,700	43,100	25,500	31,300	28,900
Local Supplies					
- Groundwater Recharge	12,600	12,000	9,700	19,700	14,100
- Groundwater Storage	6,900	0	10,000	0	3,100
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,500	4,500
- Recycled Water	1,600	1,600	1,600	1,600	1,600
Total Local Supplies	27,000	23,800	26,800	30,200	24,300
Banking/Transfers					
- Semitropic Banking	16,200	5,400	15,900	18,700	17,400
TOTAL SUPPLY	69,900	72,300	68,200	80,200	70,600
DEMAND COMPONENT					
- Distribution System Demand	63,300	63,400	63,500	63,600	63,700
- Estimated Conservation Savings	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	10,700	9,900	8,700	10,200	8,700
TOTAL DEMAND	71,800	71,100	70,000	71,600	70,200
SUPPLY & DEMAND COMPARISON					
- Supply Totals	69,900	72,300	68,200	80,200	70,600
- Demand Totals	71,800	71,100	70,000	71,600	70,200
- Difference	(1,900)	1,200	(1,800)	8,600	400
- Difference as % of Supply	-3%	2%	-3%	11%	1%
- Difference as % of Demand	-3%	2%	-3%	12%	1%

Notes:

- Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.
- Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
- ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
- As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

**Table 8-8
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2026-2030 (AF/Yr)**

SUPPLY/DEMAND	Year				
	2026	2027	2028	2029	2030
SUPPLY COMPONENT					
Imported Supplies					
- State Water Project	11,400	27,800	10,900	16,000	13,600
- San Francisco Regional	15,300	15,300	13,100	15,300	15,300
Total Imported Supplies	26,700	43,100	24,000	31,300	28,900
Local Supplies					
- Groundwater Recharge	12,700	12,100	9,900	19,800	14,000
- Groundwater Storage	9,100	0	10,000	0	3,300
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	2,000	1,900	2,600
- Recycled Water	1,600	1,600	1,600	1,600	1,600
Total Local Supplies	29,300	23,900	24,500	26,700	22,500
Banking/Transfers					
- Semitropic Banking	16,200	6,200	15,900	18,700	17,400
TOTAL SUPPLY	72,200	73,200	64,400	76,700	68,800
DEMAND COMPONENT					
- Distribution System Demand	63,800	63,900	64,000	64,100	64,300
- Estimated Conservation Savings	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	10,800	9,900	5,600	5,500	6,400
TOTAL DEMAND	72,400	71,600	67,400	67,400	68,500
SUPPLY & DEMAND COMPARISON					
- Supply Totals	72,200	73,200	64,400	76,700	68,800
- Demand Totals	72,400	71,600	67,400	67,400	68,500
- Difference	(200)	1,600	(3,000)	9,300	300
- Difference as % of Supply	0%	2%	-5%	12%	0%
- Difference as % of Demand	0%	2%	-4%	14%	0%

Notes:

- Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.
- Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.
- ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.
- As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.