5-AVUMG-9 (PART 2 OF 3)

3.1 WATER SUPPLY MANAGEMENT ASSESSMENT

As rapid development has increased the demand for both more and higher quality water in the Antelope Valley Region, the competition for available water supplies has also increased. Developing new water supplies and protecting existing water supplies, recognizing the lack of proper infrastructure and the need to maintain the groundwater levels, is crucial to successfully meeting the future water demands within the Antelope Valley Region.

In order to assess the water supply for the Antelope Valley Region, a water budget approach was utilized in-lieu of a direct comparison of supply and demand to better capture the regional understanding of the groundwater basin. Figure 3-1 presents a schematic of the water budget elements and their relationships to each other. The main components of the water budget include water entering, surface storage, groundwater storage, direct deliveries, recycle/reuse, demands, and water leaving. Each of these components is discussed in more detail below.

3.1.1 Water Entering

This component of the water budget includes sources of water from outside of the Antelope Valley Region entering the water budget boundary, such as precipitation and imported water.

3.1.1.1 Precipitation

As discussed in Section 2, the average annual precipitation for the Antelope Valley Region is approximately 7 inches per year. Precipitation entering the Antelope Valley Region is either lost to evaporation (see Section 3.1.7), percolates to groundwater storage as natural recharge (see Section 3.1.3.3), or is carried as runoff to surface storage (see Section 3.1.2.1).

3.1.1.2 Imported Water

Imported water entering the Antelope Valley Region could come from a number of sources including the State Water Project (SWP), desalination, or transfers/exchanges with surrounding agencies. Currently, the only source of imported water to the Antelope Valley Region is SWP water. SWP water enters the Antelope Valley Region as direct

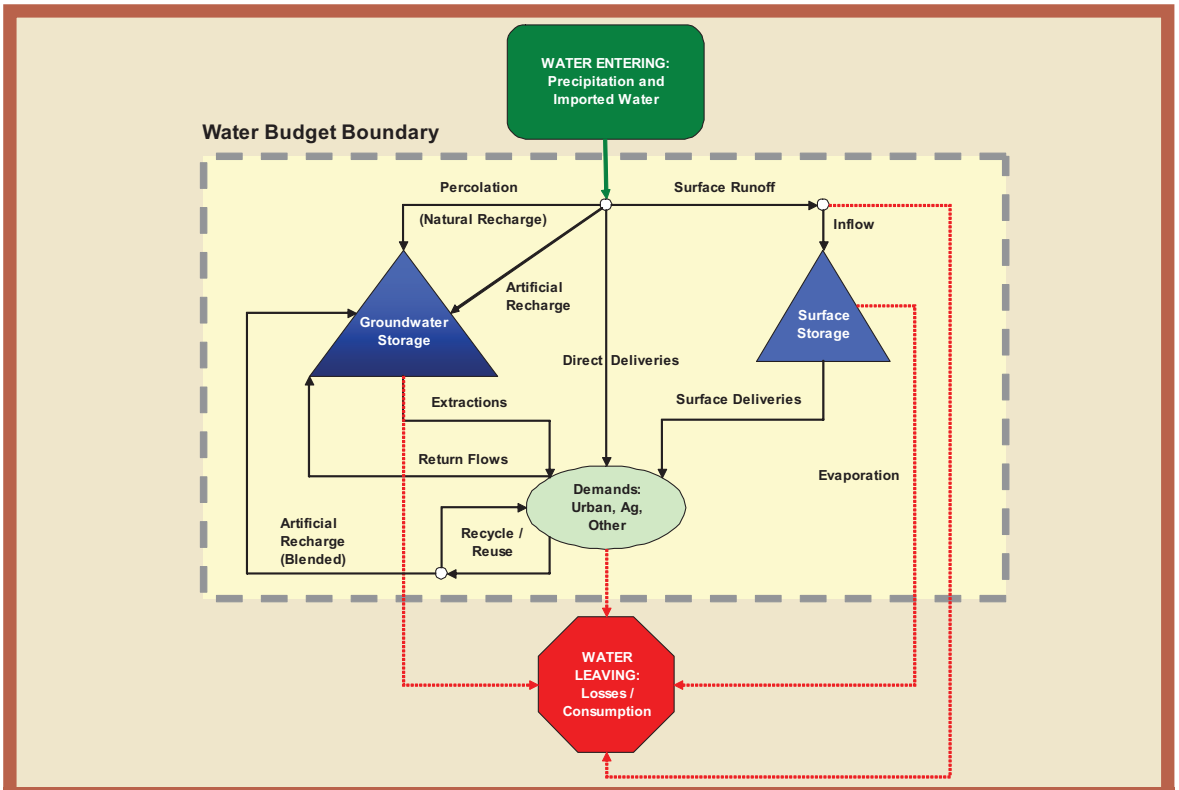


Figure 3-1 Water Budget Schematic

deliveries (see Section 3.1.4) or artificial recharge to groundwater storage (see Section 3.1.3.4).

3.1.1.2.1 Imported Water Infrastructure

Imported water to the Antelope Valley Region is generally SWP water that is released from Lake Oroville into the Feather River where it then travels down the river to its convergence with the Sacramento River, the state's largest waterway. Water flows down the Sacramento River into the Sacramento-San Joaquin Delta. From the Delta, water is pumped into the California Aqueduct. The Antelope Valley Region is served by the East Branch of the California Aqueduct. Water taken from the California Aqueduct from the local SWP Contractors is then treated before distribution to their customers.

The Antelope Valley-East Kern Water Agency (AVEK) currently treats SWP water with four Water Treatment Plants (WTPs) that are capable of treating approximately 104,260 acre-feet per year (AFY) of imported water. The main WTP, Quartz Hill WTP, is rated for 65 million gallons per day (mgd) (72,870 AFY). The Eastside WTP, expanded in 1988, provides a treatment capacity of 10 mgd (11,210 AFY). Rosamond WTP is a 14 mgd (15,695 AFY) capacity treatment plant. The fourth AVEK plant, Acton WTP, has a capacity of 4 mgd (4,484 AFY) and is located outside of the Antelope Valley Region boundaries. Los Angeles County Waterworks District 40 (LACWWD 40), Quartz Hill Water District (QHWD), and Rosamond Community Services District (RCSD) all receive treated water from AVEK and thus have no SWP treatment facilities of their own.

Palmdale Water District's (PWD's) water treatment plant capacity is 30 mgd (33,632 AFY), but it is limited to treating 28 mgd (31,390 AFY) in accordance with the California Department of Public Health (DPH) (formerly the Department of Health Services) requirements to keep one filter offline in reserve (PWD 2001). Planned improvements at the plant will increase its capacity to 35 mgd. PWD is also in the preliminary design stage for a new water treatment plant with an initial capacity of 10 mgd.

Littlerock Creek Irrigation District (LCID) has an agreement with PWD to treat its raw SWP water and thus has no treatment facilities of its own.

Major water-related infrastructure in the Antelope Valley Region is shown on Figure 3-2.

3.1.1.2.2 Reliability

The amount of SWP supply that would be available for a given water demand is highly variable and depends on hydrologic conditions in northern California, the amount of water in SWP storage reservoirs at the beginning of the year, regulatory and operational constraints, and the total amount of water requested by the contractors. The variability of SWP deliveries is described in the California Department of Water Resources (DWR's) "Final 2005 SWP Reliability Report" (Reliability Report), the intent of which is to assist SWP contractors in assessing the reliability of the SWP component of their overall supplies.

In the Reliability Report, DWR presents the results of its analysis of the reliability of SWP supplies, based on model studies of SWP operations. In general, DWR model studies show the anticipated amount of SWP supply that would be available for a given SWP water demand, given an assumed set of physical facilities and operating constraints, based on 73 years of hydrology history. The results are interpreted as the capability of the SWP to meet the assumed demand, over a range of historic conditions, for that assumed set of physical facilities and operating constraints. Although new facilities are planned to increase the water delivery capability of the SWP (such as delta improvements), the analyses contained in the Reliability Report assume no additional facilities.

The Reliability Report shows that existing SWP facilities will on average receive 69 percent of their full Table A Amount for current demand conditions and 77 percent of their full Table A Amount for 2025 demand conditions. This means that the SWP, using existing facilities operated under current regulatory and operational constraints, and with all contractors requesting delivery of their full Table A Amounts in most years, could deliver 77 percent of total Table A Amounts on a long-term basis. The Reliability Report also projects that SWP deliveries during multiple-year dry periods could average about 25 to 40 percent of total Table A Amounts and could possibly be as low as 5 percent during an unusually dry single year (the driest in 73 years of historical hydrology). DWR set the 2006 SWP allocation at 100 percent. The initial allocation for 2007 has been set at 60 percent of Contractor requested amounts and may increase during the winter months (DWR 2006).

On August 31, 2007, a U.S. District Judge ruled that the SWP was in violation of the federal Endangered Species Act because it is threatening the existence of the Delta smelt, a fish species living in the Sacramento Delta. To help protect the species, the Judge ordered water imports from the north to be cut by up to 35 percent from the SWP and the Central Valley Project, until the Biological Opinion for

the species can be prepared. SWP allocations for 2008 are anticipated to be lower than average, and could foreseeably be as low as the Judge's initial ruling.

The SWP supply estimates in this IRWM Plan rely on the projections made in DWR's Reliability Report for future supply. This Plan acknowledges that the current supply will be impacted by the delta smelt ruling, and the supply analysis will be updated when DWR prepares its next Reliability Report Update. This Plan also acknowledges that the Integrated UWMP is currently being updated to reflect the Judge's decision.

3.1.2 Surface Storage

3.1.2.1 Runoff

Surface water in the Antelope Valley Region is generally runoff from Littlerock and Santiago Canyons in the Angeles National Forest that is intercepted by the Littlerock Dam and Reservoir. Littlerock Reservoir is co-owned by PWD and LCID. PWD and LCID jointly have long-standing water rights to 5,500 AFY from Littlerock Creek flows. Raw water is conveyed to Lake Palmdale for treatment and use via the Palmdale Ditch.

One of the existing actions of the PWD is to conduct a study to determine the feasibility of enhancing the yield at Littlerock Reservoir. This study may show or quantify any additional source of runoff available to the Antelope Valley Region that is currently lost due to inadequate storage facilities. Additionally, there may be the potential for additional runoff from Amargosa Creek. However, at this time, there is no quantification of additional runoff available to the Antelope Valley Region.

3.1.2.2 Surface Deliveries

LCID is currently able to purchase 1,000 AFY, or 25 percent yield from the reservoir from PWD, whichever is less (PWD 2001). This amount exists until the 1992 reservoir rehabilitation agreement between PWD and LCID ends in 2042. When the 50-year term of the agreement expires, LCID regains its water rights according to the 1922 agreement between PWD and LCID. The 1922 agreement states that LCID has the exclusive right to the first 13 cubic feet per second (cfs) measured at the point of inflow to the reservoir. Flows greater than 13 cfs will be shared by PWD and LCID, with 75 percent to PWD and 25 percent to LCID. In addition, each district is allotted 50 percent of the Littlerock Reservoir storage capacity (PWD 2001). Currently, water from Littlerock Reservoir is only used for M&I uses.

A hydrological model of the Littlerock Reservoir has indicated that annual diversions (surface deliveries) range between 1,180 to 15,900 acre-feet (AF) (PWD 2001). Table 3-1 provides a summary of the historical surface deliveries from Littlerock Reservoir.

3.1.2.2.1 Surface Water Infrastructure

The surface water storage facilities in the Antelope Valley Region include Littlerock Reservoir and Lake Palmdale. Littlerock Reservoir has a useable storage capacity of 3,500 AF of water.

Littlerock Reservoir discharges into Lake Palmdale, which has a capacity of approximately 4,129 AF (PWD 2001). Lake Palmdale stores both surface water runoff and SWP imported water until the water is conveyed from the lake through a 42-inch pipeline to PWD's water treatment plant.

3.1.2.2.2 Reliability

In the PWD 2005 Urban Water Management Plan (UWMP), historical data was used to determine how the reliability

Table 3-1 Historical Surface Deliveries From Littlerock Reservoir (AFY)

Year	PWD Diversions	LCID Diversions	Total Diversions
1975	1,586	1,513	3,099
1980	913	1,950	2,863
1985	1,460	1,375	2,835
1990	110	200	310
1995	3,771	0	3,771
2000	6,500	0	6,500
2005	6,900	0	6,900

Source: PWD 2001.

Note location of Amargosa Creek.

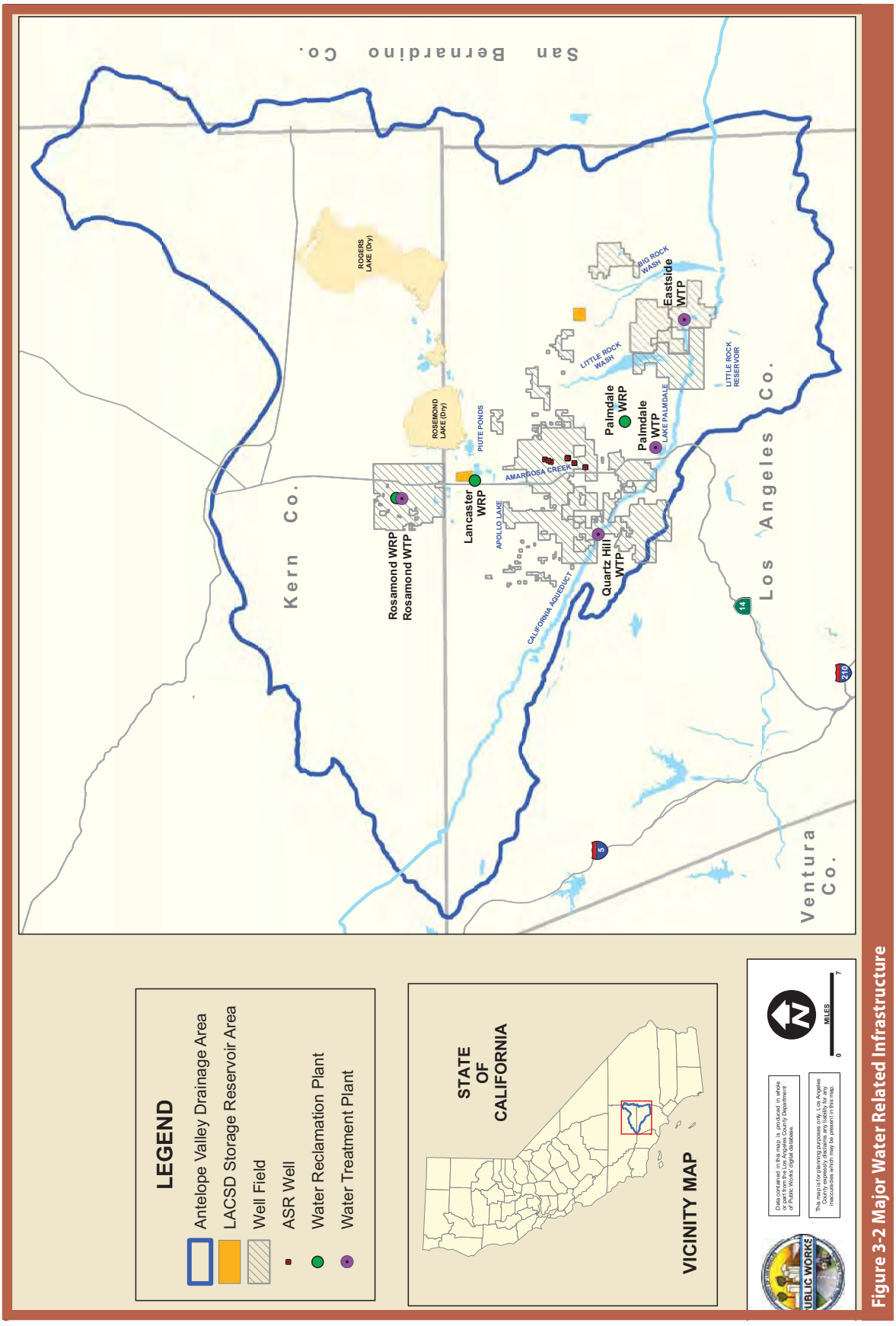


Figure 3-2 Major Water Related Infrastructure

of the Littlerock Dam and Reservoir surface water supplies would be affected for an average, single-dry, and multi-dry water years. An average water year results in approximately 4,400 AFY, which includes allotments for both LCID and PWD. This estimate is based on annual averages for years with average precipitation and should not be confused with the average expected yield of the reservoir, which is the annual average for all water years. For a single-dry water year, the annual yield is approximately 300 AFY. In a multi-dry water year, Littlerock Dam and Reservoir is expected to yield 2,200 AFY.

According to the PWD 2001 Water Master Plan, a reliability analysis was performed for the reservoir yield using actual hydrology from 1949 to 1999, obtained from the Los Angeles Department of Public Works (LADPW). This analysis projected surface deliveries ranging from 1,178 to 15,900 AFY. The average annual yield was estimated to be 7,396 AFY.

3.1.2.3 Evaporative/Conveyance Losses

There is an estimated conveyance loss of 9 percent for surface water deliveries (PWD 2001). This reduces the expected average annual yield to approximately 6,920 AFY. Additionally, there are evaporative losses at the reservoir site. In the PWD 2001 Water Master Plan, evaporative loss was estimated using monthly data for the Antelope Valley Region and reservoir area-capacity curve. Evaporative losses were incorporated into the expected annual surface deliveries and therefore do not need to be accounted for separately.

3.1.3 Groundwater Storage

3.1.3.1 Overview of Groundwater Storage

3.1.3.1.1 Groundwater Infrastructure

LCID has five (5) groundwater wells that supplied approximately 2,160 AFY of water in 2004. Four (4) of the wells provide potable water and one well is strictly for agricultural use.

LACWWD 40 has 42 wells with a combined maximum pumping capacity of approximately 55.5 mgd (62,172 AFY).

PWD has twenty-six (26) equipped groundwater wells and four (4) additional drilled, unequipped wells throughout the Lancaster and Pearland groundwater subunits, and the San Andreas Rift Zone. Two of the equipped groundwater wells have been taken out of production due to water quality concerns. The total instantaneous capacity for all PWD wells operating is 15,737 gpm. PWD's total groundwater pumping in 2004 was 11,046 AFY.

QHWD currently operates seven (7) wells for a total maximum pumping capacity of 6,831 AFY. The District is currently constructing a pipeline to two (2) more wells drilled a couple of years ago (QHWD 2006). In total, these nine (9) wells are expected to increase capacity to 8,448 AFY. QHWD pumped approximately 1,450 AFY until 2001 when a shortage in SWP water required the QHWD to increase pumping to 3,050 AFY (QHWD 2002).

Rosamond Community Service District (RCSD) pumps about 1,800 to 2,000 AFY from five (5) wells.

3.1.3.1.2 Reliability

Since long-term recharge is expected to be stable, it is anticipated that groundwater pumping, and hence supply, will be reliable even in short-term and multiple year droughts. Thus groundwater is considered a very reliable supply for the Antelope Valley Region. However, the pending adjudication may affect how much groundwater can physically be supplied to the Antelope Valley Region in the future. It is important to note that the return flows are dependent upon anticipated demand and may fluctuate with any change in the anticipated demand. The return flows estimates are meant to indicate a sense of the impact of return flows to the groundwater basin.

3.1.3.2 Percolation

For purposes of this IRWM Plan, direct percolation from precipitation on the Antelope Valley Region floor is assumed to be 0 AFY. However, indirect percolation from irrigation return flows on the Antelope Valley Region floor do occur as discussed in Section 3.1.3.5. There is the potential for direct percolation on the Antelope Valley Region floor to have an impact to the overall water budget. This component of the water budget is currently being studied in the Antelope Valley Region, and if new information is discovered that greatly differs from this assumption, this IRWM Plan may be amended to reflect this.

3.1.3.3 Natural Recharge

Natural recharge can be variable and difficult to quantify. Historical estimates of natural recharge have ranged from 30,300 AFY to 81,400 AFY based on a variety of approaches (USGS 2003, USGS 1993). The earliest estimates of natural recharge ranged from 50,000 AFY to 81,400 AFY and were

based on limited streamflow and rainfall data (USGS 1993). Later estimates were based on developing a relationship between rainfall and runoff and ranged from 40,280 AFY to 53,000 AFY (USGS 1993). The most recent estimate of recharge was based on a groundwater model, which modified the natural recharge estimate to 30,300 AFY to achieve balance within the model (USGS 2003).

For the purposes of this IRWM Plan, the full range of estimates (30,300 AFY to 81,400 AFY) is utilized to approximate natural recharge.[2] Furthermore, natural recharge is assumed to occur from direct percolation in the surrounding alluvial and from stream runoff to the alluvial fans. This IRWM Plan may be amended to incorporate any new information regarding natural recharge that is developed in the future. As with agricultural return flows, time delays likely exist for natural recharge as well. These delays are extremely difficult to estimate and may vary by geographic location. However, for the purposes of this IRWM Plan, no time-delay is included since the water budget comparison is for long-term averages over the entire basin (or steady-state conditions), which absorb the variations from the time-delay.

3.1.3.4 Artificial Recharge

One typical source of artificial recharge is through Aquifer Storage and Recovery (ASR) projects. ASR projects involve the storage of water in an aquifer via artificial groundwater recharge when water is available (usually during spring runoff), and recovery of the stored water from the aquifer when water is needed (usually late summer). The source of water used for ASR can vary. Currently, the only sources of ASR water available to the Antelope Valley Region are SWP water and recycled water. These two sources of water may be injected individually or blended (mixed) before being injected. Although the City of Lancaster is developing a groundwater recharge project with blended recycled water, currently only SWP water is utilized for ASR in the Antelope Valley Region.

LACWWD 40 is currently the only agency within the Antelope Valley Region that is actively using ASR as a water supply management practice. Their program includes the use of new or existing wells for direct injection of water into the aquifer. LACWWD 40's ASR program operates under a Conditional Waiver of Waste Discharge Requirements, for a period of 5 years with groundwater monitoring requirements stipulated in the waiver. The waiver stipulates that LACWWD 40 can only inject water to fill the basin to the 2,150 feet groundwater contour interval. This groundwater depression has a radius of approximately 2 miles centered around the middle of Lancaster. The permit allows for injection up to 6,843 AFY. During Winter 2005/06, LACWWD 40 used four (4) wells to store approximately 1,500 AF in the groundwater basin (personal communication, David Pedersen, LADPW).

3.1.3.4.1 Aquifer Storage and Recovery (ASR) Infrastructure

LACWWD 40 started the 2006 ASR program in November with 6 wells in operation, with a combined injection rate of 2,500 to 3,000 gallons per minute (gpm) (personal communication, David Pedersen, LADPW). Approximately 10 additional new ASR wells are currently planned for development with operation potentially beginning as early as 2008.

3.1.3.4.2 Reliability

ASR water is only to be used during dry water year conditions (personal communication, David Pedersen, LADPW) and is assumed to be 100 percent reliable. Future estimates of availability will assume maximum injection rates and continuation of the permitting Waiver. For average year conditions, it was assumed that the maximum injection rate (6,843 AF) of SWP would be added to the ASR each year, with the exception of 2005 in which only 1,500 AFY was injected. Thus by 2010, a total of 29,000 AFY will have been injected (1,500 [for 2005] plus 4 × 6,843 [for 2006 to 2009]). This stored ASR water will then be available for pumping in dry year conditions. The volume available from storage in dry years was assumed to be the difference in the existing and maximum pumping rates, or approximately 31,600 AF. Thus, for a single dry year occurring in 2010, the stored 29,000 AFY is assumed to be available for pumping in 2010. For a multi-dry year starting in 2010, again 29,000 AFY is assumed to be available with the lesser of the 31,600 AFY available pumping capacity or the full supply deficit being pumped. Any remaining water in ASR storage is then considered to be available in 2011. This process is repeated for each subsequent year in that 5-year interval. Availability of water in ASR storage for 2015, 2020, 2025, and 2030, assumes average water year conditions have occurred prior to that year (i.e., full availability of ASR stored water).

2 During the analysis for this IRWM Plan, the RWMG was aware that a separate analysis of water supplies (including revised estimates of natural recharge) was being conducted by a TAC to the adjudication. The range of possible natural recharge provided in the IRWM Plan is strictly for long-term planning purposes and has not been conducted to answer the questions being addressed within the adjudication. Once the detailed analysis of historic water use and available groundwater are completed within the adjudication, the supply numbers for the IRWM Plan will need to be updated.

3.1.3.5 Return Flows

The term return flows refers to the part of applied water that is not consumed by evapotranspiration and that migrates to an aquifer or surface water body. For purposes of this IRWM Plan return flows were determined by the following equations:

$$\text{Return Flows} = \text{Water}_{\text{applied}} - \text{Water}_{\text{required}}$$

$$\text{Water}_{\text{required}} = \text{Irrigation Efficiency (IE)} \times \text{Water}_{\text{applied}}$$

Substituting the second equation into the first,

$$\text{Return Flows} = \text{Water}_{\text{applied}} - \text{IE} \times \text{Water}_{\text{applied}}$$
$$= (1 - \text{IE}) \times \text{Water}_{\text{applied}}$$

For the Antelope Valley Region there are three types of return flows: agricultural, urban, and recycle/reuse return flows. Each of these is discussed in more detail below.

3.1.3.5.1 Agricultural Return Flow

Agricultural return flow rates were determined using the projected range of supply available for agricultural use and an irrigation efficiency of 75 percent. Assuming an irrigation efficiency of 75 percent and the equation above, agricultural return flows would be 25 percent (1 – 0.75 = 0.25) of the agricultural water applied. The agricultural water applied was assumed to be the water available for agricultural use and was determined by applying the projected percentages of agricultural demand to the total projected water deliveries (sum of the surface deliveries, imported water deliveries, recycled water, banked ASR water, natural recharge, and return flows). Projected percentages of agricultural demand are presented in Table 3-9. Basing the return flows on the available supply, as opposed to demand, allows for a better representation of future supplies. Estimates based on demand can overestimate supply since they include return flows on future demands which may not be met if there is not sufficient supply. Table 3-2 provides the projected agricultural return flows.

Previous studies have indicated that there is some time-delay between when the water is applied to when it actually reaches the aquifer, however these estimates have varied from 1 to 2 years to as much as 10 years (USGS 2003). Time delays are extremely difficult to estimate and may vary by geographic location. However, for the purposes of this IRWM Plan, no time-delay is included since the water budget comparison is for long-term averages over the entire basin (or steady-state conditions), which absorb the variations from the time-delay.

It is important to note that any changes in the projected agricultural land-use will directly affect the agricultural return-flow. Increasing temperatures due to global warming also influence agricultural demand by increasing natural plant evapotranspiration (ETo) rates and crop water use, resulting in declining agricultural return flows.

3.1.3.5.2 Urban Return Flows

The ratio of indoor to outdoor water use for the Antelope Valley Region was used to estimate the return flows from deep percolation resulting from urban water use. The statewide average for outdoor water use is approximately 50 percent of total residential demand. However, estimates of outdoor water use for the Antelope Valley Region are closer to 70 percent (personal communication, David Pedersen, LADPW).

Table 3-2 Projected Agricultural Return Flow (AFY)

	Average Year				Single Dry Water Year				Multi-Dry Water Year			
Year	Total Water Delivered	% Ag	Applied Ag Water(a)	Ag Return Flow(b)	Total Water Delivered	% Ag	Applied Ag Water(a)	Ag Return Flow(b)	Total Water Delivered	% Ag	Applied Ag Water(a)	Ag Return Flow(b)
2010	201,000	47	95,000	24,000	159,000	49	78,000	19,000	219,000	49	107,000	27,000
2015	205,000	43	89,000	22,000	160,000	45	72,000	18,000	221,000	45	99,000	25,000
2020	208,000	40	83,000	21,000	160,000	41	66,000	17,000	221,000	41	92,000	23,000
2025	211,000	37	78,000	19,000	163,000	38	62,000	16,000	221,000	38	85,000	21,000
2030	211,000	34	72,000	18,000	163,000	36	58,000	15,000	222,000	36	79,000	20,000
2035	211,000	32	67,000	17,000	163,000	33	54,000	14,000	221,000	33	74,000	18,000

Notes: Numbers rounded to the nearest 1,000 AF.

(a) The agricultural water applied was assumed to be the water available for agricultural use and was determined by applying the projected percentages of agricultural demand from Table 3-9 to the total projected water deliveries (sum of the surface deliveries, imported water deliveries, recycled water, banked ASR water, natural recharge, and return flows).

(b) Assumes return flow rate of 25 percent of water applied.

[NOTE TO READER: This 70 percent will be compared to a calculation of outdoor water use involving summer water demand and winter treatment plant flows upon receipt of additional data. Winter treatment plant flows will be assumed to be equivalent to indoor water use since there is minimal outdoor water use during winter months. Summer water demand is then assumed to be equivalent to the total indoor and outdoor water use. Thus subtracting the winter treatment plant flow from the summer water demand would yield an estimate of outdoor water use for the Antelope Valley Region. The outdoor water use is then compared to the total water demand to get a percentage of outdoor water usage. At the time this report was finalized this necessary data had not yet been received and thus the calculation could not be made. The comparison will be included in the next update of this IRWM Plan.]

As with agricultural use, an irrigation efficiency of 75 percent is assumed, and thus urban return flows are 25 percent of outdoor urban applied water. Outdoor urban applied water was assumed to be 70 percent of total urban applied water. As with agricultural use, the total urban applied water was assumed to be the water available for urban use and was determined by applying the projected percentages of urban demand (shown in Table 3-9) to the total projected water deliveries. Table 3-3 provides a summary of anticipated urban return flows.

3.1.3.5.3 Recycle/Reuse Return Flows

To determine the projected recycle/reuse return flows, projected recycled water demands (see Section 3.1.5) are subtracted from the future water reclamation plant (WRP) capacities, since return flows from urban outdoor use are considered separately. Historically, a significant portion of treated effluent was lost to evaporation from both the Palmdale and Lancaster WRPs effluent management sites. However, due to recent changes in effluent management, effluent not used for urban recycled water use will be applied to agricultural re-use sites throughout the Antelope Valley Region, thus evaporative losses are limited to oxidation ponds and storage sites. Palmdale WRP currently has 149 acres of effluent management sites and, with an evaporation rate of 83 inches per year (6.9 feet/year), approximately 1,030 AF are lost to evaporation annually (personal communication, Brian Dietrick, Los Angeles County Sanitation District [LACSD]). Similarly, Lancaster WRP plans for approximately 600 acres for storage reservoirs (240 acres existing and 360 acres planned) for a loss of 4,150 AFY due to evaporation. Assuming no urban recycled water demand, the LACSD would require approximately 11,400 acres of agricultural re-use sites to be developed over the next 15 years. It is anticipated that these re-use sites would mostly be alfalfa with some wheat/sudan grass. Application rates at these sites would be less than agronomic rates. An argonomic rate is the rate of nutrient application to fulfill a plant's nitrogen requirements while minimizing the amount of nutrients that pass to groundwater. From personal communication with LACSD, the return flow at these sites is expected to be between 10 and 20 percent. A return flow of 10 percent has been used in this IRWM Plan as it represents a more conservative estimate of the return flow.

Table 3-4 presents the projected wastewater return flows for both Palmdale and Lancaster WRPs. These estimates will vary with changes in recycled water use and changes in effluent management at the agricultural re-use sites.

Table 3-3 Projected Urban Return Flow (AFY)

	Average Year				Single Dry Water Year				Multi-Dry Water Year			
Year	Total Water Delivered	% Urbn	Outdoor Urban Applied Water(a)	Urban Return Flow(b)	Total Water Delivered	% Urbn	Applied Ag Water(a)	Outdoor Urban Applied Water(a)	Total Water Delivered	% Urbn	Outdoor Urban Applied Water(a)	Urban Return Flow(b)
2010	201,000	53	74,000	19,000	159,000	51	57,000	14,000	219,000	51	78,000	20,000
2015	205,000	57	81,000	20,000	160,000	55	62,000	15,000	221,000	55	85,000	21,000
2020	208,000	60	88,000	22,000	160,000	59	66,000	16,000	221,000	59	90,000	23,000
2025	211,000	63	93,000	23,000	163,000	62	70,000	18,000	221,000	62	95,000	24,000
2030	211,000	66	97,000	24,000	163,000	64	74,000	18,000	222,000	64	100,000	25,000
2035	211,000	68	101,000	25,000	163,000	67	76,000	19,000	221,000	67	104,000	26,000

Notes: Numbers rounded to the nearest 1,000 AF.

(a) Outdoor urban applied water was assumed to be 70 percent of total urban applied water. The urban water applied was assumed to be the water available for urban use and was determined by applying the projected percentages of urban demand from Table 3-9 to the total projected water deliveries (sum of the surface deliveries, imported water deliveries, recycled water, banked ASR water, natural recharge, and return flows).

(b) Assumes a return flow rate of 25 percent of outdoor water applied.

Table 3-4 Projected Recycle/Reuse Return Flow

Year	MGD(a)	AFY(a)	Recycled Water Demand (AFY)	Evaporation Loss at Effluent Management Sites (AFY)(b)	Total Applied to Ag Reuse Sites (AFY)(c)	Return Flow from Ag Reuse Sites (AFY)(d)
Palmdale WRP						
2010	13.2	14,800	0	1,000	13,800	1,400
2015	16.4	18,400	0	1,000	17,400	1,700
2020	19.5	21,800	0	1,000	20,800	2,100
2025	22.4	25,100	0	1,000	24,100	2,400
2030	25.5	28,600	0	1,000	27,600	2,800
2035	25.5	28,600	0	1,000	27,600	2,800
Lancaster WRP						
2010	14.8	16,600	3,400	4,200	9,000	900
2015	19.0	21,300	3,400	4,200	13,700	1,400
2020	23.0	25,800	3,400	4,200	18,200	1,800
2025	27.1	30,400	3,400	4,200	22,800	2,300
2030	31.2	34,900	3,400	4,200	27,300	2,700
2035	31.2	34,900	3,400	4,200	27,300	2,700

Notes: All values rounded to nearest 100 AFY.

(a) LACWWD 40 2006.

(b) Assumes an evaporation rate of 6.9 AF/acre (personal communication, Brian Dietrick, LACSD). For Palmdale WRP, assumes 149 acres of effluent management sites. For Lancaster WRP, assumes 600 acres of effluent management sites (LACSD 2004).

(c) Total plant capacity less recycled water demand and evaporative losses rounded to nearest 500 AF.

(d) Assumes a return flow rate of 10 percent.

3.1.3.6 Extractions

Groundwater for the Antelope Valley Region is extracted from the Antelope Valley Groundwater Basin, as described in Section 2. Historically, groundwater has been the primary water supply source for the Antelope Valley Region.

When significant pumping in the Antelope Valley Region began (early 1900s), a decline in groundwater levels ensued in response to the change in the extraction versus recharge ratio. These changes varied spatially and temporally across the Antelope Valley Region. For instance, the eastern portion of the Buttes and Pearland subunits (described in Section 2.4.2.1) had relatively unchanged groundwater levels (declines of approximately 20 feet), whereas the western portion of these subunits had declines up to 100 feet. The groundwater level changes in the Lancaster subunit were more dramatic and varied with land use, with depressions of up to 200 feet in 1961 in areas with increased agricultural pumping (City of Lancaster 2007). With the introduction of SWP water and increasing urbanization, the water table depressions have either stabilized or increased in the Antelope Valley Region. However, a significant pumping depression from concentrated municipal groundwater pumping is still evident within the southern portion of the Lancaster subunit, between the Cities of Palmdale and Lancaster. Figures 3-3 to 3-7 provide a set of contour maps of the groundwater levels for the Antelope Valley Region from 1915 to 2006.

In order to ensure a zero net change in groundwater levels, it is assumed that future extractions of groundwater will be limited to the available groundwater supplies (sum of the natural recharge and the allowable extractions of banked ASR water).

3.1.3.7 Losses/Subsurface flow

Losses from evaporation and riparian evapotranspiration are discussed in Section 3.1.7 and have been included in the overall estimate of water loss for the water budget. Since the basin is a relatively closed basin, losses from subsurface flow are assumed to be negligible for the purposes of this IRWM Plan.

3.1.4 Direct Deliveries

Direct deliveries to the Antelope Valley Region consist of the SWP water contracted through the AVEK, LCID, and PWD. The SWP is operated by DWR for the benefit of the SWP contractors. The SWP is the nation's largest state-built water and power development and conveyance system.

The SWP includes 660 miles of aqueduct and conveyance facilities from Lake Oroville in the north to Lake Perris in the south. It also includes pumping and power plants, reservoirs, lakes, storage tanks, canals, tunnels, and pipelines that capture, store, and convey water to 29 water agencies.

The SWP is contracted to deliver a maximum 4.17 million AFY of Table A water to the 29 contracting agencies. Table A water is a reference to the amount of water listed in "Table A" of the contract between the SWP and the contractors and represents the maximum amount of water a contractor may request each year. AVEK, which is the third largest state water contractor, has a Table A Amount of 141,400 AFY. Approximately three (3) percent of AVEK's Table A Amount has historically been delivered to areas outside of the Antelope Valley Region.

By October 1st of every year, each contractor provides DWR a request for water delivery up to their full Table A Amount. Actual delivery from DWR may vary from the request due to variances in supply availability resulting from hydrology, storage availability, regulatory or operating constraints.

When supply is limited, water is allocated based on a percentage of full contractual Table A Amounts.

A summary of the historical deliveries of SWP to the Antelope Valley Region are provided in Table 3-5. The table illustrates the Antelope Valley Region's increasing dependence on SWP water.

Future availability of the SWP water was estimated by DWR in its Reliability Report (2005). For an average water year, it is anticipated that 69 percent of the Table A Amount in 2005 and 77 percent in year 2025 would be available for delivery to contractors. For a single dry water year, delivery of Table A water decreases to 4 percent for 2005 and 5 percent in year 2025. For a multi-dry water year, delivery of Table A water is estimated at 32 percent for 2005 and 33 percent in year 2025. For the purposes of this IRWM Plan, 2030 and 2035 deliveries were estimated at the 2025 delivery percentages. Table 3-6 provides a summary of future SWP availability to the Antelope Valley Region.

Table 3-5 Summary of Historical Wholesale (Imported) Supply (AFY) Antelope Valley Region

Year	AVEK Deliveries	AVEK Table A	PWD Deliveries	PWD Table A	LCID Deliveries	LCID Table A	Region Deliveries	Region Table A
1975	8,068	35,000	0	5,580	520	520	8,588	41,100
1980	72,407	69,200	0	11,180	191	1,150	72,598	81,530
1985	37,064	40,000	1,558	14,180	0	1,730	38,622	55,910
1990	47,206	132,100	8,608	17,300	1,747	2,300	57,561	151,700
1995	47,286	138,400	6,961	17,300	480	2,300	54,727	158,000
2000	83,577	138,400	9,060	21,300	0	2,300	92,637	162,000
2004	97,203	141,400	13,176	21,300	0	2,300	110,379	165,000

Source: DWR 2005a

Table 3-6 Summary of Projected Wholesale (Imported) Supply (AFY) Antelope Valley Region

	2010	2015	2020	2025	2030	2035
Average Year(a)	74,000	77,000	79,000	81,000	81,000	81,000
Reliability(b,c)	70%	73%	75%	77%	77%	77%
Single Dry Year(d)	6,000	6,000	6,000	8,000	8,000	8,000
Reliability(b)	4%	4%	4%	5%	5%	5%
Multi-Dry Year(d)	51,000	53,000	53,000	53,000	53,000	53,000
Reliability(b)	32%	33%	33%	33%	33%	33%

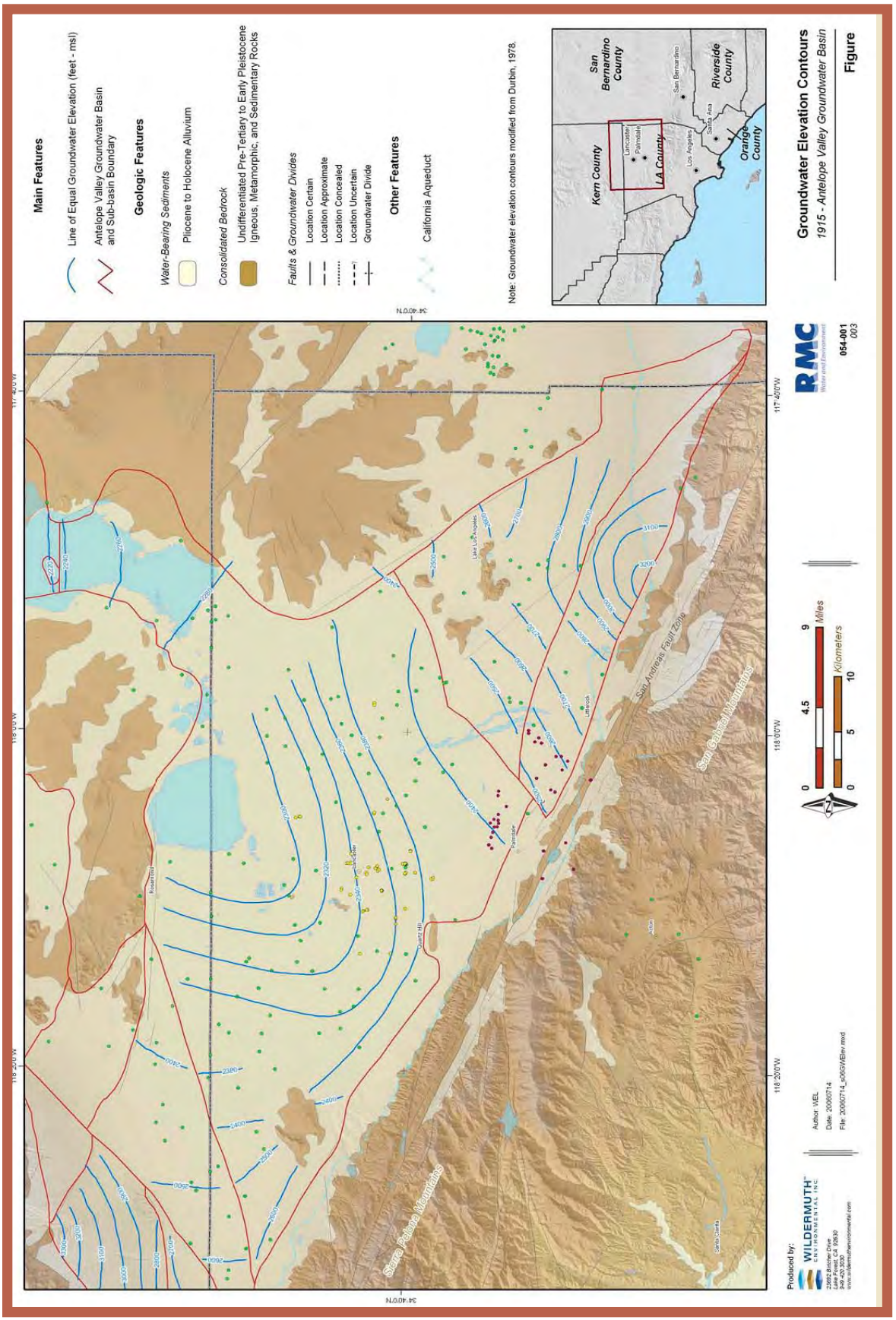
Notes: Numbers rounded to nearest 1,000 AFY.

(a) Assumes supply equivalent to the Antelope Valley Region's total Table A Amount (105,350 AFY) times the reliability, after adjusting for the local conveyance facility constraints.

(b) Determined from DWR's Final 2005 "State Water Project Reliability Report" (DWR 2005b).

(c) Future construction, facility improvements, or other actions can increase the reliability of SWP supplies (e.g., the CALFED Bay-Delta Program, the Napa Accord, and the South Delta Improvement Program). As these improvements are made and Contractor demands increase, the SWP is currently projected to be able to deliver an average of about 77 percent.

(d) Assumes supply equivalent to the Antelope Valley Region's total Table A Amount (160,750 AFY) times the reliability.


Main Features
Line of Equal Groundwater Elevation (feet - msl)
Antelope Valley Groundwater Basin and Sub-basin Boundary
Geologic Features
Water-Bearing Sediments
Pliocene to Holocene Alluvium
Consolidated Bedrock
Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
Faults & Groundwater Divides
Location Certain
Location Approximate
Location Concealed
Location Uncertain
Groundwater Divide
Other Features
California Aqueduct
Note: Groundwater elevation contours modified from Durbin, 1978.
Kern County
San Bernardino County
Riverside County
Orange County
LA County
Lancaster
Palmdale
Los Angeles
Santa Ana
San Bernardino
Groundwater Elevation Contours
1915 - Antelope Valley Groundwater Basin
Figure
RMC
Water and Environment
054-001
003
0
4.5
9
Miles
0
5
10
Kilometers
Produced by:
WILDERMUTH ENVIRONMENTAL INC.
Author: MEL
Date: 20060714
File: 20060714_s06GWElev.mxd
Rosamond
Rogers Lake
Lake Los Angeles
Palmdale
Lancaster
Quartz Hill
Antelope Valley
Santa Clarita
San Andreas Fault Zone
San Gabriel Mountains
Sierra Pelona Mountains

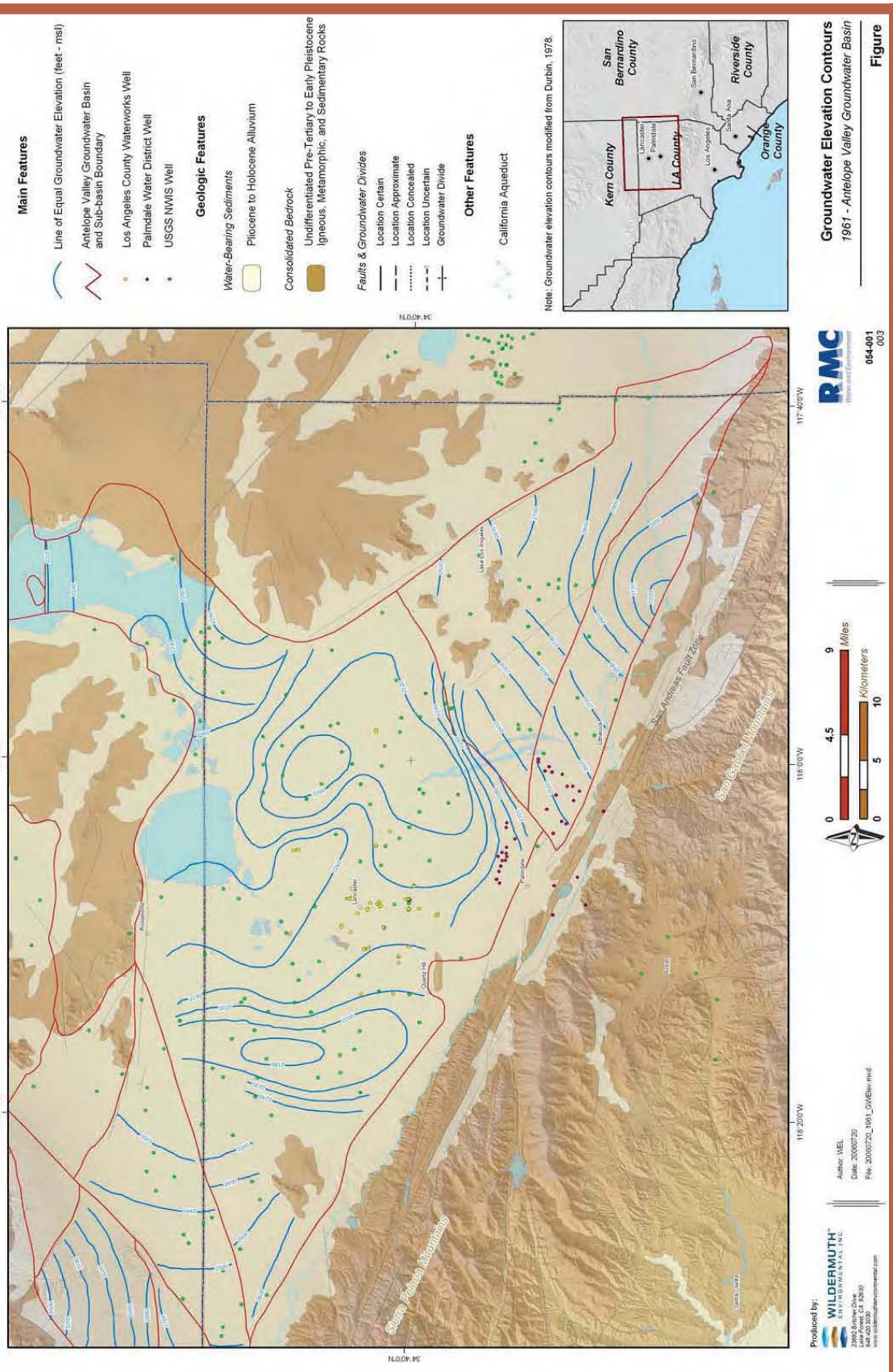


Figure 3-4 1961 Groundwater Level Contour Map of the Antelope Valley Region

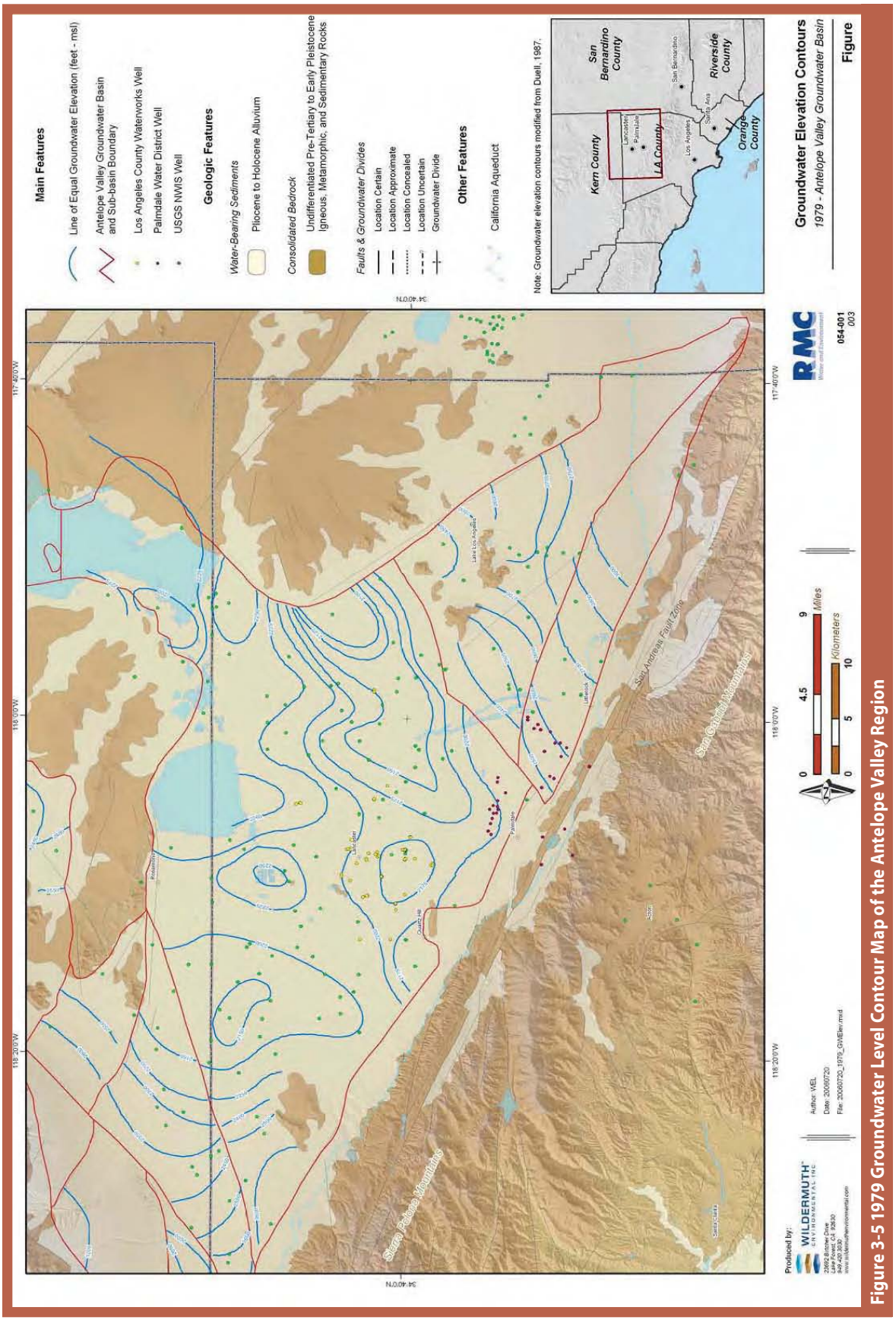


Figure 3-5 1979 Groundwater Level Contour Map of the Antelope Valley Region

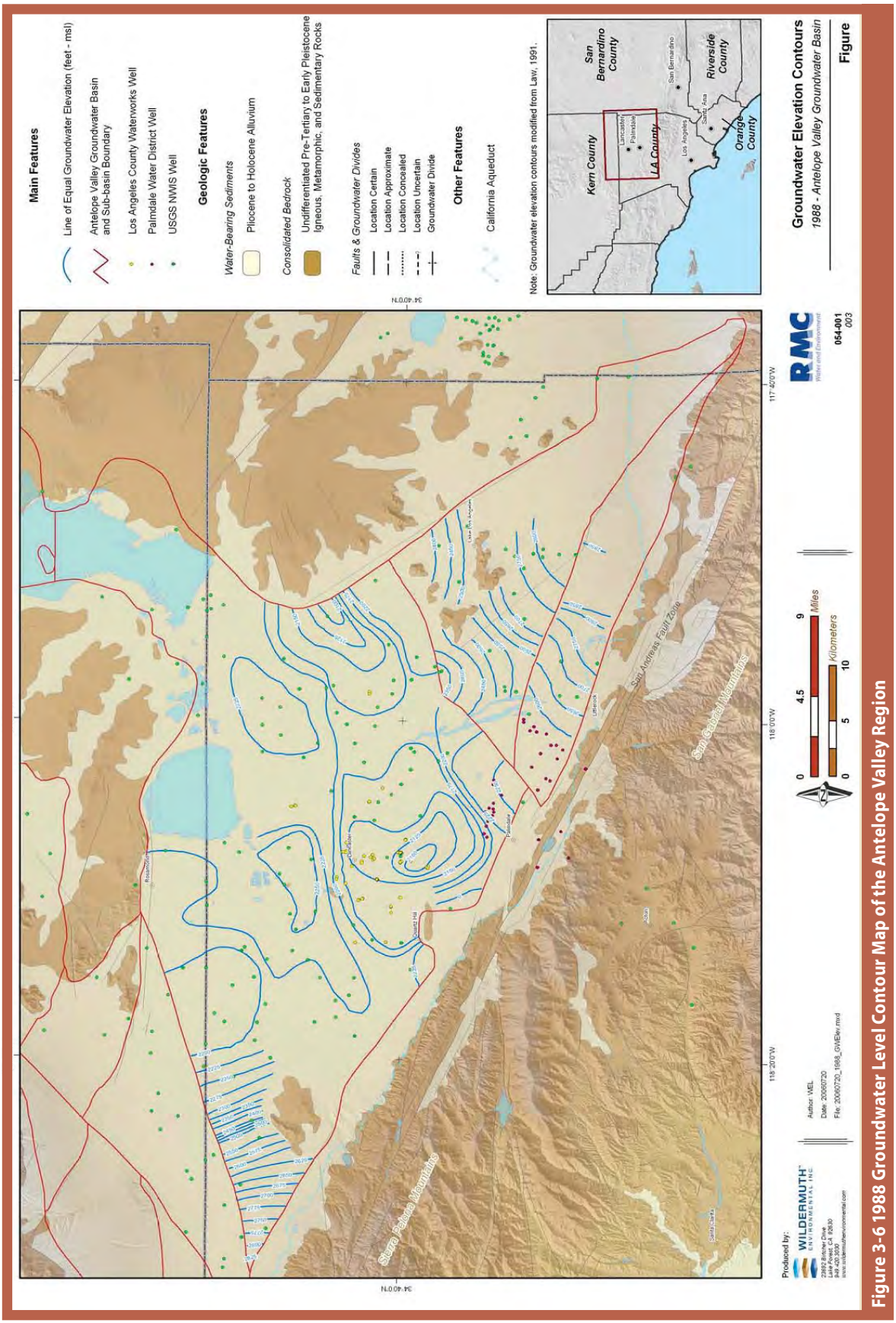


Figure 3-6 1988 Groundwater Level Contour Map of the Antelope Valley Region

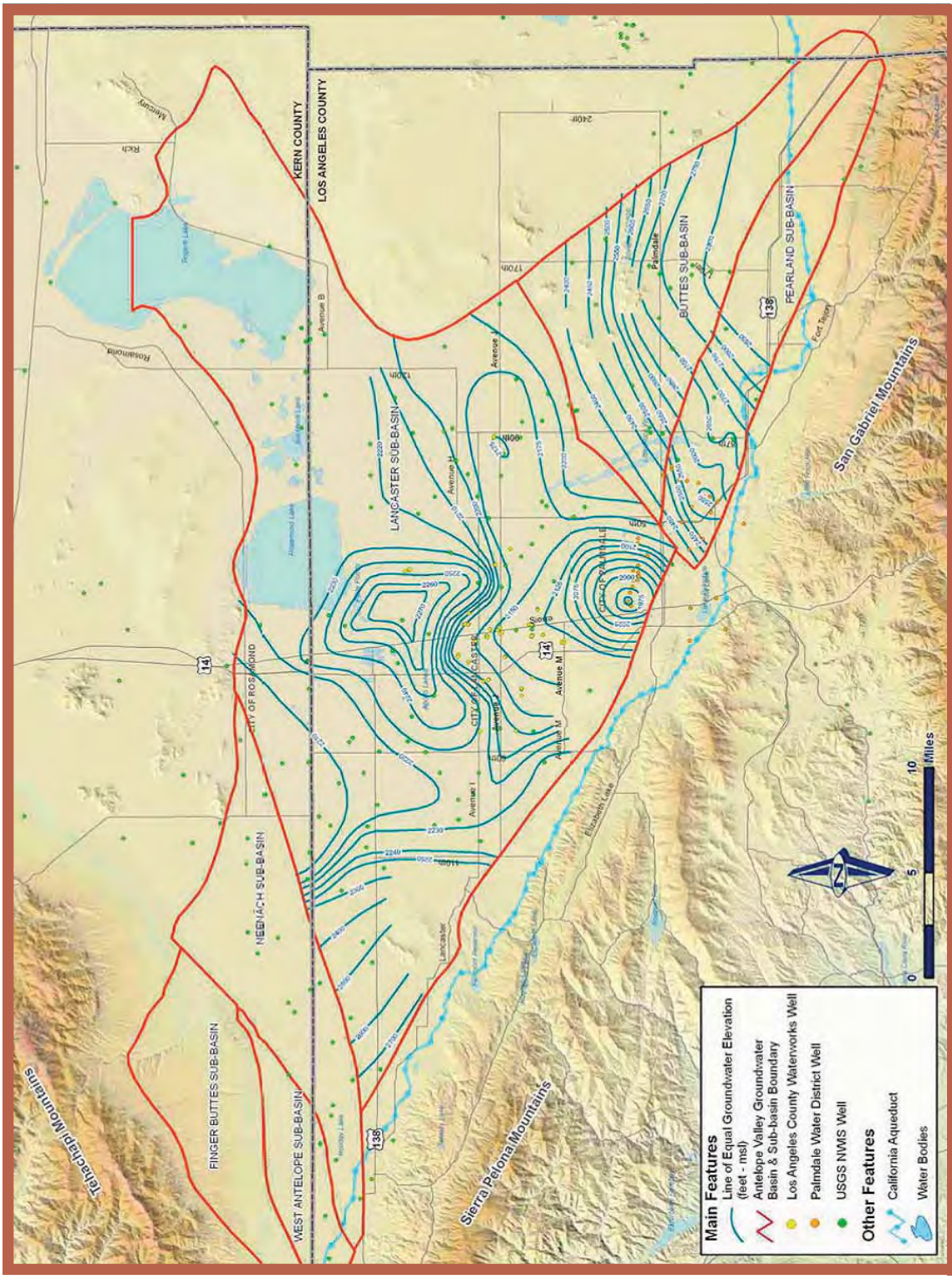


Figure 3-7 2006 Groundwater Level Contour Map of the Antelope Valley Region

However, AVEK is currently unable to beneficially apply its entire Table A amount of SWP water, even during years when the full Table A amount is available. This inability to fully use available supply stems from the variability of demand during winter and summer, and the existing infrastructure to receive, store, and deliver water to users. AVEK currently provides most of their water through direct deliveries to meet current demand. When demand is high during summer months, the aqueduct bringing water to AVEK has a conveyance capacity below the demand for water. During the winter months, demand is much lower than aqueduct capacity. If AVEK had sufficient infrastructure to receive and store the water when it can take delivery during the winter months, it could then deliver that water during higher demands or during times when less SWP water is available.

The maximum amount of Table A water AVEK currently can put to beneficial use in an average water year is approximately 81,750 AFY (assuming 400 gpm deliveries from June 15 to September 31 and 150 gpm deliveries for the rest of the year). However, this conveyance constraint into the Antelope Valley Region does not affect dry year conditions since the availability of SWP water in a dry year is significantly less than the aqueduct capacity. Therefore, for the purposes of this IRWM Plan AVEK's Table A Amounts available for use within the Antelope Valley Region for dry year conditions is calculated to be 137,150 AFY. LCID and PWD have Table A Amounts of 2,300 AFY and 21,300 AFY, respectively. Thus, the total available Table A Amount for the Antelope Valley Region is 105,350 AFY and 160,750 AFY for average and dry year conditions, respectively.

3.1.5 Recycle/Reuse

3.1.5.1 Recycled Water Sources

Currently, the only recycled water in the Antelope Valley Region that is treated to a tertiary level is a small percentage of the wastewater at the Lancaster WRP through additional onsite facilities of the Antelope Valley Tertiary Treatment Plant (TTP). In the future, recycled water may be available from three primary sources: (1) Lancaster, (2) Palmdale WRPs, and (3) the Rosamond Wastewater Treatment Plant (WWTP). Since the RWMG emphasized the need to maximize beneficial use of water supplies within the Antelope Valley Region, the proposed recycled water users served by these WRPs and identified in the "2005 Antelope Valley Water Facilities Planning Report" have been included in the Water Budget estimates for this Plan. This presumes that significant investments will be made to expand and upgrade treatment plants to develop these recycled water supplies (as described in Section 5.2.2). If the necessary investments are not made, the expected future water supplies for the Antelope Valley Region must be reduced by the amounts shown in Table 3-7. Figure 3-8 shows the locations of the proposed facilities and infrastructure necessary to provide the recycled water quantities shown in Table 3-7.

Table 3-7 provides a summary of the projected availability of the recycled water to the Antelope Valley Region through 2035.

3.1.5.1.1 Recycled Water Infrastructure

Distribution Pipeline: As shown in Figure 3-8, the existing recycled water distribution in Lancaster, which serves Apollo Lakes and Nebeker Ranch, will be expanded for urban reuse as part of the Division Corridor Project over the next 10 years. Figure 3-8 also shows the LACWWD 40 Recycled Water Backbone distribution pipeline proposed to expand urban reuse in the Antelope Valley Region. This expansion through out the Antelope Valley Region is a direct result of the substantial coordination and cooperation between Kern and Los Angeles Counties.

Lancaster WRP: The Lancaster WRP, built in 1959 and located north of the City of Lancaster, is owned, operated, and maintained by Los Angeles County Sanitation District No. 14 (LACSD 14). Lancaster WRP, which has a permitted capacity of 16.0 mgd, treated an average flow of 13.3 mgd in 2004 to secondary standards for agricultural irrigation, wildlife habitat, maintenance, and recreation. Additionally, up to 0.5 mgd is currently treated to tertiary standards and used to replace evaporative losses at the Apollo Lakes Regional County Park.

Table 3-7 Potential Availability of Recycled Water (AFY) to Antelope Valley Region

	2005	2015	2035
Lancaster WRP	13,000	21,000	35,000
Palmdale WRP	12,000	18,000	29,000
Rosamond WWTP	0	1,000	1, 000
Total Study Area	25,000	40,000	65,000

Source: LACWWD 40 2006, rounded to nearest 1,000 AFY.

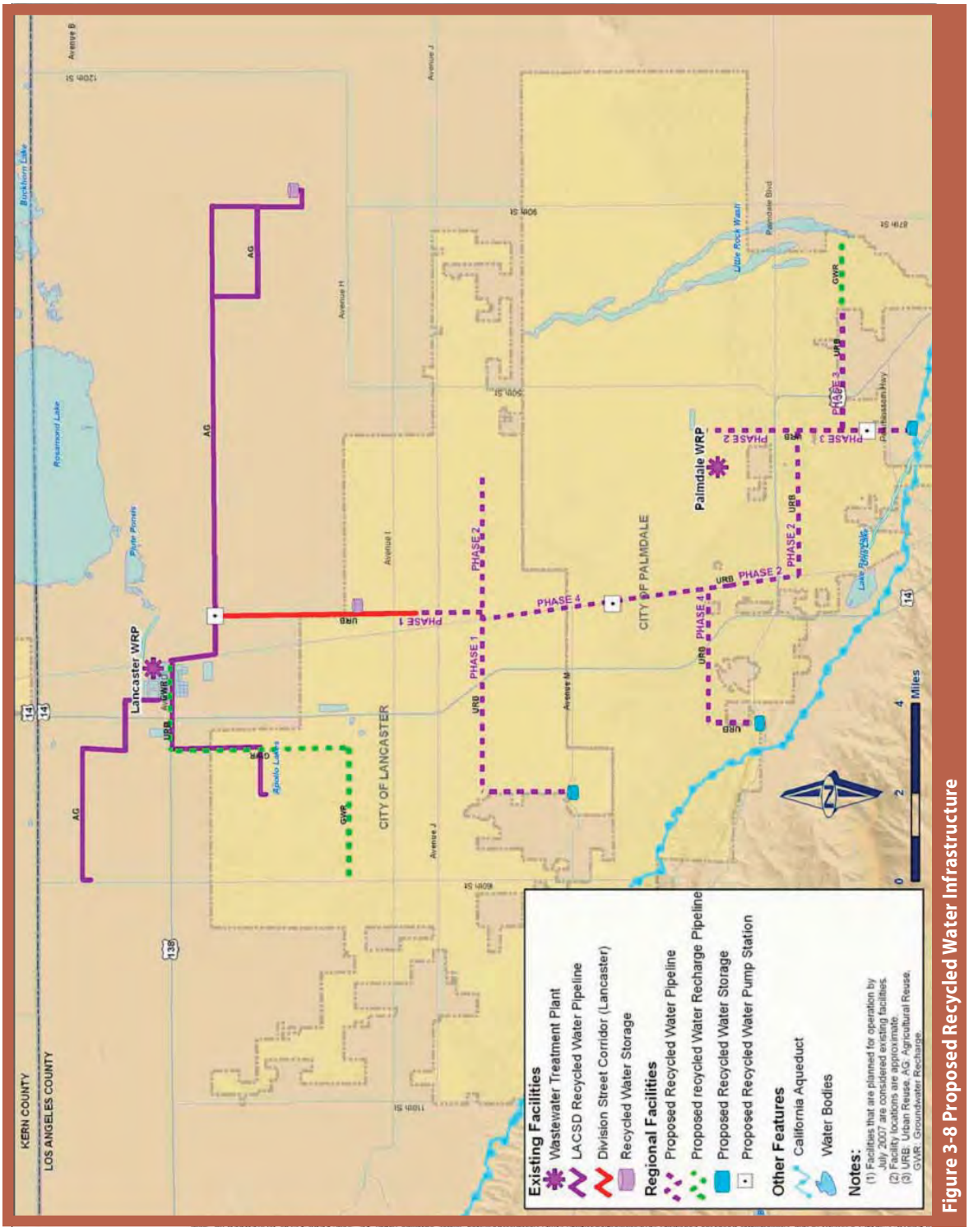


Figure 3-8 Proposed Recycled Water Infrastructure

LACSD 14 plans to upgrade the existing Lancaster WRP to a total capacity of 18 mgd by 2010 with a proposed future upgrade to 21 mgd by 2012. Tertiary treated effluent from the upgraded Lancaster WRP will be available for municipal reuse in addition to the existing uses.

Palmdale WRP: Palmdale WRP, built in 1953 and located on two sites adjacent to the City of Palmdale, is owned, operated, and maintained by LACSD 20. Palmdale WRP, which has a permitted capacity of 15.0 mgd, treated an average flow of 9.4 mgd in 2004 to secondary standards for land application or agricultural irrigation. A recent revision to the Waste Discharge Requirements, due to concerns about nitrate in the groundwater, required LACSD 20 to eliminate their existing practice of land application and agricultural irrigation above agronomic rates of treated effluent by October 15, 2008. By November 15, 2009, LACSD 20 is required to prevent the discharge of nitrogenous compounds to the groundwater at levels that create a condition of pollution or violate the water quality objectives identified in the 1994 Water Quality Control Plan for the Lahontan Region (1994 Basin Plan). In response, Palmdale WRP will be upgraded to 15.0 mgd with full tertiary treatment by 2011. All tertiary treated water is anticipated to be used for agricultural and municipal reuse.

Rosamond WTTP: Rosamond WWTP, located in the City of Rosamond, is owned, operated, and maintained by the RCSD. Rosamond WWTP, which has a permitted capacity of 1.3 mgd, treated an average flow of 1.1 mgd to undisinfected secondary standards for landscape irrigation on-site in 2005. RCSD plans to increase the capacity to 1.8 mgd through the addition of a 0.5 mgd tertiary treatment facility. Thus far, the expansion has been approved for State Revolving Funding and is currently obtaining the necessary permits from the Lahontan Regional Board. Construction on the 0.5 MGD plant expansion is expected to start in November or December, 2007, with completion 16 to 18 months afterwards. Through coordination with LACSD, RCSD also plans on incorporating two connecting points with LACSD tertiary water pipelines on 20th and 60th Streets West, at Avenue A. RCSD is also considering construction of a new WWTP in the western portion of the Antelope Valley Region that will handle the new developments to the west and northwest. Rough calculations indicate it will be a 3.5 mgd plant with tertiary capabilities, with construction potentially around 2012 (personal communication, Claud Seal, RCSD). Once constructed, the plants would provide tertiary treated recycled water for landscape irrigation at median strips, parks, schools, senior complexes and new home developments.

3.1.5.1.2 Reliability

Recycled water is assumed to be 100 percent reliable since it is based on a consistent water supply and is not expected to change for average, single-dry, or multi-dry year water conditions. Usefulness of recycled water as a supply is limited more by recycled water infrastructure and demand for recycled water than reliability of such water as a supply.

3.1.5.2 Recycled Water Demand

Table 3-8 summarizes the existing recycled water demand from existing urban contracts that any of the WRPs or WTPs already have in place. These existing contracts are discussed below:

3.1.5.2.1 Lancaster WRP Existing Contracts for Recycled Water

There are three (3) existing commitments for recycled water from the Lancaster WRP as follows:

1. The Lancaster WRP 2020 Facilities Plan Final Environmental Impact Report (EIR) commits LACSD 14 to maintain Piute Ponds (specifically at a rate sufficient to maintain a minimum of 400 wetted acres of habitat). LACSD 14 staff calculates this to be an average of 2.62 mgd excluding any overflows.

2. The Los Angeles County Parks and Recreation Department has an existing contract with the LACSD 14 to deliver tertiary water to Apollo Park where it is used to for recreational uses. The park's usage averages approximately 0.15 mgd, and peaks to 0.5 mgd during summer months.

Table 3-8 Summary of Projected Recycled Water (AFY) to Antelope Valley Region

	Reliability	2010	2015	2020	2025	2030	2035
Average Water Year	100%	3,400	3,400	3,400	3,400	3,400	3,400
Single-Dry Water Year	100%	3,400	3,400	3,400	3,400	3,400	3,400
Multi-Dry Water Year	100%	3,400	3,400	3,400	3,400	3,400	3,400

Notes: All numbers rounded to nearest 100 AF.

3. There is a Memorandum of Agreement (MOA) between LACSD 14 and Edwards Air Force Base (AFB) for discharge to a series of shallow impoundments south of Piute Ponds for recreational duck hunting. The effluent is discharged between November 1 and April 15 and averages approximately 0.26 mgd.

Items 1 through 3 above total 3.03 mgd (or 3,400 AFY) of recycled water that is already contracted to users from Lancaster WRP and is thus assumed as the Antelope Valley Region's recycled water demand.

3.1.5.2.2 Palmdale WRP Existing Contracts for Recycled Water

There are two (2) existing commitments for recycled water from the Palmdale WRP as follows:

1. LACSD 20 entered into a 20-year lease agreement with LAWA in 2002 for a 2,680 acre effluent management site on the WRP property. As part of the lease agreement, the LAWA has first right of refusal for any tertiary treated water that comes from the WRP.

2. There is one (1) existing contract with Harrington Farms, a pistachio grower, which expires in 2008, for secondary effluent. This contract expires before tertiary effluent is available in 2010. The contract with Harrington Farms for secondary effluent states that the farmer is NOT guaranteed use of the tertiary treated water if another user wants to buy the tertiary water. Therefore, this contract is not included for future commitments of recycled water from the Palmdale WRP.

Although there is the potential to provide 65,000 AFY of recycled water, this is not an accurate estimate of future recycled water supply since distributions systems and end users are required to make use of that supply. Thus it is more accurate to estimate future recycled water supply by the anticipated demand. Demand estimates tend to be less than available supply due to limitations of infrastructure, willingness to use recycled water, and seasonal variations in demand. Thus Table 3-8 provides the anticipated future recycled water demand to be served by the proposed backbone system developed in the LACWWD 40 2006 "Antelope Valley Facilities Planning Report." Additionally, at this time, no recycled water users have been identified for Rosamond and thus recycled water demand for this area was assumed to be zero. The Facilities Report only provides estimates of M&I demand and therefore it does not include any potential recycled water use for agriculture or for recharge. In order to serve the users identified in the Facilities Report (approximately 13,300 AFY), the necessary treatment plant upgrades at the two WRPs and regional recycled water distribution system would need to be implemented as described in Section 5.2.2. Additionally, this section describes the City of Lancaster's pilot project aimed at using recycled water for groundwater recharge.

Additionally, the City of Palmdale is considering the development of a power plant that would provide power for local residents and businesses in the greater Antelope Valley Region area. According to a Draft 2006 "Palmdale Power Plant: Overview of Water Supply Issues" report, the hybrid Power Plant includes a 525 megawatt (MW) combined cycle process unit with a 50 MW solar system for a total capacity of 575 MW. Startup is expected in 2010.

The cooling water demands of the Power Plant are expected to be approximately 3,400 AFY and would vary depending on the time of year and Power Plant operation. Using recycled water produced by the Palmdale WRP is considered to be the preferred source for cooling water.

3.1.6 Water Demands

The following subsection discusses the historical, current and projected water demands for the Antelope Valley Region. The demands are presented with urban demand (based on per capita estimates) and two agricultural scenarios (average and dry year estimates). Projected water demands for the Antelope Valley Region are presented in Table 3-9 and graphically presented in Figures 3-9 and 3-10.

3.1.6.1 Urban (Municipal and Industrial) Demand

Urban water demands were developed from the population projections presented in Table 2-3 (in Section 2) and assume a regional water use per capita estimate of 243 gallons per day (gpd) per person (or 0.273 AFY per person). This per capita water use estimate was determined using a weighted average of total per capita water use estimates for the major water supply agencies in the Antelope Valley Region as shown by Table 3-10. As discussed in Section 2, growth rates within an agency are consistent and thus an average per capita water use is an appropriate estimate of demand. The rate of water use in areas provided by other urban water suppliers were assumed to have minimal impact on the average and therefore were not included in this average water use determination.

The per capita water use values could be reduced in the future with the implementation of more robust demand management measures, which could reduce the average use per person.

Table 3-9 Water Demand Projections (AF) for the Antelope Valley Region

	2010	2015	2020	2025	2030	2035
Urban Demand						
Boron	1,000	1,000	1,000	1,000	1,000	1,000
California City	3,000	3,000	4,000	4,000	5,000	6,000
Edwards AFB(a)	2,000	3,000	3,000	3,000	4,000	4,000
Mojave	2,000	2,000	3,000	3,000	3,000	4,000
Rosamond	8,000	10,000	14,000	20,000	27,000	37,000
Unincorporated Kern County	6,000	8,000	11,000	15,000	20,000	28,000
Lancaster	46,000	52,000	59,000	65,000	71,000	77,000
Palmdale	48,000	60,000	71,000	82,000	92,000	104,000
Unincorporated LA County	31,000	35,000	40,000	45,000	52,000	59,000
Subtotal Urban Demand	147,000	175,000	205,000	239,000	276,000	320,000
Agricultural Demand						
Agricultural Demand Dry Year	136,000	136,000	136,000	136,000	136,000	136,000
Agricultural Demand Average Year	127,000	127,000	127,000	127,000	127,000	127,000
Total Region Dry Year Demand	**274,000**	**302,000**	**332,000**	**366,000**	**403,000**	**447,000**
Total Region Average Year Demand	**283,000**	**311,000**	**341,000**	**375,000**	**412,000**	**456,000**
Average Year Percent Urban	54	58	62	65	68	72
Average Year Percent Agricultural	46	42	38	35	32	28
Dry Year Percent Urban	52	56	60	64	67	70
Dry Year Percent Agricultural	48	44	40	36	33	30

Notes: All numbers rounded to nearest 1,000 AF.
(a) Projections subject to review and update by Edwards AFB.

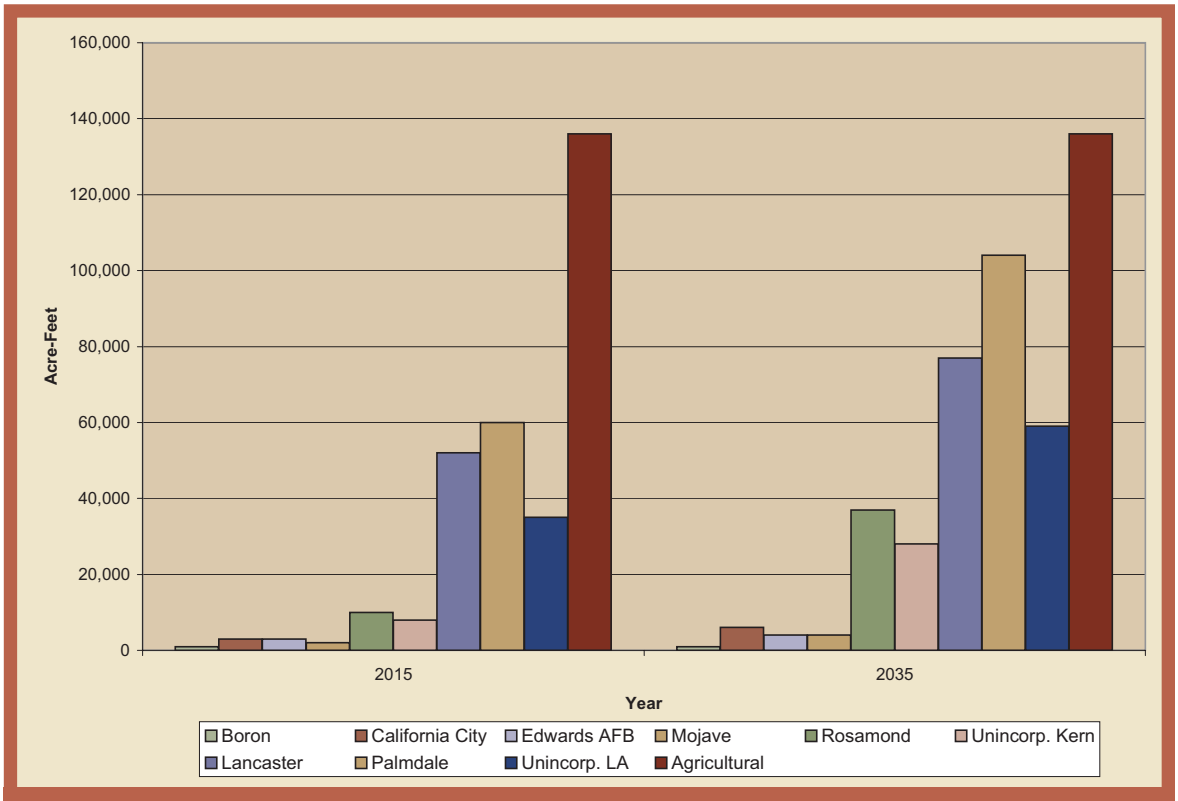


Figure 3-9 Regional Dry Year Water Demand

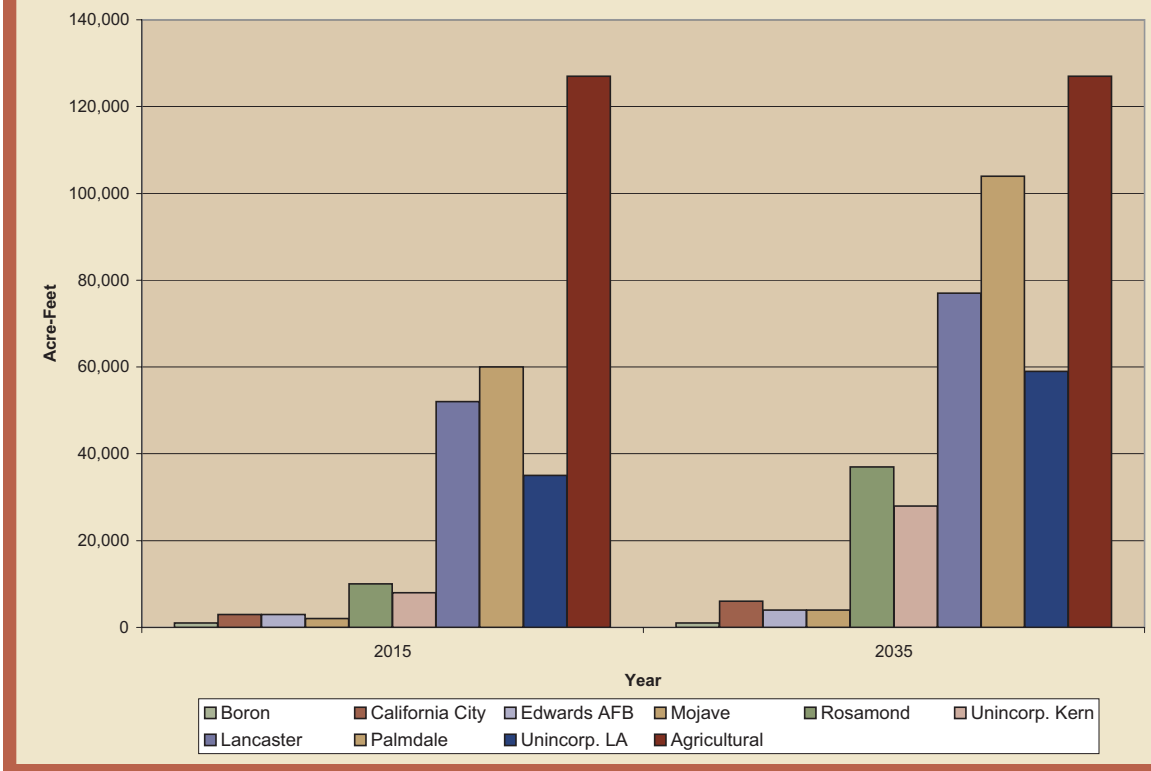


Figure 3-10 Regional Average Year Water Demand

Table 3-10 Per Capita Urban Water Use in the Antelope Valley Region

Agency	Average Per Capita Urban Water Use (AFY/person)	2005 Population	Average Urban Water Demand (AFY)(e)
AVEK(a)	0.101	98,000	10,000
LCID(b)	0.367	2,900	1,000
LACWWD 40(c)	0.373	157,000	59,000
PWD(d)	0.280	106,000	30,000
QHWD(c)	0.353	16,000	5,000
RCSD(c)	0.191	16,000	3,000
Total	---	**394,000**	**107,000**
Region Average Per Capita Water Use(f) (AFY/person)			0.273

Notes: All numbers rounded to the nearest 1,000.

(a) As determined from data in the AVEK's 2005 Urban Water Management Plan (UWMP). Values exclude Los Angeles County Waterworks District 40 (LACWWD 40), QHWD, and RCSD population and demand from AVEK totals. Per capita use was calculated from the 2005 population and urban water demand from the table.

(b) Values exclude Littlerock Creek Irrigation District (LCID) agricultural demand.

(c) Based on values provided in the Antelope Valley 2005 Integrated UWMP.

(d) Per capita water use based on 12-month running average of PWD demands and data from PWD's 2005 UWMP.

(e) Demand determined by multiplying per capita water use by the current population.

(f) Antelope Valley Region per capita water use determined by divided total water demand by total population.

For comparison, a total urban water demand based on the number of households in the Antelope Valley Region was calculated. For this calculation, LACWWD 40 per capita demand was multiplied by 3.14 people per household to yield household demand of 1.18 AFY/household, which is similar to the 1.2 AFY/household typically assumed for the Antelope Valley Region. The 3.14 people per household was determined from the 2000 Census data (345,973 people/110,053 households). The resulting urban water demand of 441,000 AFY in 2035 represents an approximately 27 percent increase in the per capita demand estimate. This was expected since the household demand estimate was based on the per capita demand for LACWWD 40, which is approximately 27 percent higher than the region average per capita use. The LACWWD 40 per capita estimate was used for this calculation since LACWWD 40 represented the highest percent population in Table 3-10 as well as the highest per capita water use. Therefore, this value provides an estimate of the maximum urban demand for the Antelope Valley Region and is not an accurate representation of average water demand for the Antelope Valley Region. Thus, the per capita estimate of water demand is assumed for the remainder of this report. The Region average per capita water use of 0.273 AFY/person results in a household demand of 0.86 AFY/household.

3.1.6.2 Private Pumping/Small Mutual Water Demand

Water demand from private pumping and from small mutual water companies in the Antelope Valley Region are difficult to quantify as accurate data is not always available. Although, water demand from these minor water users was not used in the average water use calculation, their water demand was accounted for in Table 3-9 since people served by private wells and by small mutual water companies were included in the population estimates. The Antelope Valley Region average per capita water use was assumed for these populations.

3.1.6.3 Agricultural Water Demand

Historical total applied agricultural water demand (1972 to 1995) for the Antelope Valley Region is summarized in Table 3-11. Historical agricultural demand was determined by multiplying estimated crop water requirements from the County Farm Advisors by the crop acreages provided by the Los Angeles and Kern County Agricultural Commissioners Inspection Reports. Please note that these crop water requirements are currently undergoing review by the University of California Cooperative Extension (UCCE) but have already been agreed upon by the County Farm Bureaus. The crop water requirements are discussed in more detail below.

Prior to 2000, an accounting of the agricultural acreage within the Kern County portion of the Antelope Valley Region was not available. Historically, it has been assumed that Kern County agricultural groundwater demand was 18 percent of Los Angeles County agricultural groundwater demand. The 18 percent was determined by the USGS in 2003 from land-use maps and agricultural pumpage data for Los Angeles County in 1961 and 1987. The ratio of pumpage per acre of agricultural land was then applied to agricultural land-use data for Kern County to estimate agricultural pumpage for the Kern County part of the Antelope Valley Region for those years. In both 1961 and 1987, agricultural pumpage in the Kern County part of the Antelope Valley Region was about 18 percent of the annual agricultural pumpage in the Los Angeles County part of the Antelope Valley Region. However, from the recent Kern County Crop Inspection Reports, it is evident that the Kern County portion total agricultural demand is closer to 35 percent of the total agricultural water demand of the Los Angeles County portion. This is due to increased carrot and potato farming in the Kern County portion.

Table 3-11 Historical Agricultural Water Use in the Antelope Valley Region

Year	Los Angeles County Ag Demand (AF)	Kern County Ag Demand (AF)	Total Ag Demand (AF)
1999	97,000	35,000	132,000
2000	109,000	36,000	145,000
2001	101,000	37,000	138,000
2002	105,000	39,000	144,000
2003	110,000	34,000	144,000
2004	104,000	27,000	131,000
2005	98,000	29,000	127,000

Note: Numbers rounded to the nearest 1,000 AF and assume average water year crop requirements.

3.1.6.3.1 Crop Water Requirements

Crop water use in the Antelope Valley Region can vary significantly from State-wide averages due to the unique requirements presented by the Antelope Valley Region's climate and physical characteristics, including low rainfall, sandy soils, and heavy winds. Thus, it is appropriate to develop crop water requirements specific to the Antelope Valley Region. It is anticipated that a similar approach will be used in the adjudication process.

Crop water requirements have been developed, in a draft report that is currently undergoing review, by the Los Angeles County Agricultural Commissioner in collaboration with UCCE. These estimates are roughly two times larger than the State-wide averages.

The first step in determining the crop water requirements involves determining the evapotransipiration for each crop (ETc) using the following equation:

$$ETc = Kc \times ETo$$

Where Kc is the crop coefficient and ETo is the reference evapotranspiration.

An estimate of the ETo for Lancaster was developed based on data from the California Irrigation Management Information System (CIMIS) weather station in Victorville, CA and historical water use ETo values for Palmdale. The Kc varies with the crop, its stage of development and the frequency of irrigation, but is independent of the location. Crop coefficients were adapted from a variety of published reports. The crop coefficients are presented in Table 3-12. Table 3-13 provides the ETc estimates for the Antelope Valley Region.

The ETc is an estimate of the net water requirements for a crop (i.e., the amount of water) that is required for proper plant growth. Additionally, there are net water requirements for the crop which occur outside of the growing season. These include water applied to prepare the soil for planting, fumigation, and to prevent wind erosion. The sum of the ETc and these non-growing water requirements consist of the overall net crop requirement. The net water requirement does not account for water losses from inefficient irrigation systems, deep percolation, or runoff. In order to determine the gross water requirement, or the total amount of water which must be applied to the crop, the following calculation is used:

$$\text{Gross Water Requirement} = \frac{\text{Net Water Requirement}}{\text{Irrigation System Efficiency}}$$

The irrigation system efficiency used in this study, 75 percent, was developed from field observations by the University of California researchers and the Natural Resources Conservation Service (NRCS). Irrigation efficiency is the ratio of irrigation water used in evapotranspiration to the water applied or delivered to a field or farm.

A summary of the crop water requirements is presented in Table 3-14. The crop water requirements for a single dry year and multi-dry years are the same. It is assumed that approximately 3 inches of net water requirement would be met by rainfall for average water years and thus average year water requirements include a reduction in the total net water requirements.

3.1.6.3.2 Crop Acreages

Data regarding crop acreages in the Antelope Valley Region were available from a variety of sources as discussed below. Table 3-15 provides a comparison of the acreages from these sources.

Agricultural Commissioner Crop Reports: Each year, the Los Angeles County Agricultural Commissioner issues crop reports for the Los Angeles County portion of Antelope Valley Region. The benefit of these reports is that they are published and available for public review. The disadvantage is they tend to group crops with varying water use requirements together, making an accurate estimate of agricultural demand difficult.

Agricultural Inspection Reports: Another more detailed source of crop acreages are the Pesticide Inspection Reports from the Agricultural Farm Advisors. The benefit is that the data is crop-specific and based on actual visits to the various farms in both Los Angeles and Kern County portions of the Antelope Valley Region. The disadvantage is that this data is not generally available and limited to farms that use pesticides. However, the data for the Los Angeles County portion of the Antelope Valley Region was consistent with the Agricultural Commissioner Crop Reports, with a difference of only 2 to 3 percent. Therefore, crop acreages from the agricultural inspection reports are used to project demand since they have the added benefit of consisting of Kern County data as well as being crop-specific.

AVEK Agricultural Data: The third source of agricultural acreage available for the Antelope Valley Region are AVEK records. Acreages were determined from satellite imagery from the Landsat program by Dr. Hong-lie Qui California State University. Acreages of irrigated fields within the AVEK service area were determined for summer and winter periods. A composite acreage was also determined from

Table 3-12 Crop Coefficient (Kc) Estimates

Date	Alfalfa(a)	Sudan(b)	Sod	Onions	Melons	Peas/ Beans	Deciduous Fruit Trees(c)	Carrots	Potatoes
1-Jan	0.40		0.87						
15-Jan	0.40		1.07						
1-Feb	1.00		1.19					0.31	
15-Feb	1.15		1.45					0.31	
1-Mar	1.15		2.08	0.30	0.18		0.25	0.31	0.55
15-Mar	1.05		2.54	0.30	0.18	0.14	0.54	0.55	0.61
1-Apr	1.05		2.80	0.30	0.34	0.14	0.60	0.82	0.88
15-Apr	1.05		3.20	0.53	0.72	0.46	0.66	1.03	1.16
1-May	1.05		3.60	0.83	1.11	1.11	0.72	1.11	1.21
15-May	1.05		4.01	1.14	1.11	1.15	0.79	1.13	1.19
1-Jun	1.05		4.25	1.14	1.11	1.15	0.84	1.05	0.87
15-Jun	1.05	0.3	4.52	1.14	0.78	0.93	0.86	1.00	0.55
1-Jul	1.05	0.85	4.85	1.04	0.29	0.49	0.92		
15-Jul	1.05	1.10	4.83	0.92			0.94		
1-Aug	1.05	0.85	4.50	0.80			0.94		
15-Aug	1.05	1.10	4.28	0.68			0.94		
1-Sep	1.05	0.85	3.75				0.94		
15-Sep	1.05	1.00	3.27				0.91		
1-Oct	1.05	1.10	2.90				0.85		
15-Oct	1.05	1.10	2.48				0.79		
1-Nov	1.05		1.70				0.70		
15-Nov	0.40		1.07						
1-Dec	0.40		0.97						
15-Dec	0.40		0.90						

Sources:

Hansen, B.R.; Shwannkl, L.; and Fulton, A. "Scheduling Irrigation: When and How much Water to Apply," Water Management Series Publication Number 3396, Department of Land, Air & Water Resources, University of California, Davis.

Pruitt, W.O.; Fereres, E.; Kelta, K.; and Snyder, R.L., "Reference Evapotranspiration (ETo) for California," UC Bull. 1922.

Notes:

(a) Kc of 1.05 takes into account reduced ETo during the cuttings throughout the season.

(b) Sudan was cut on 7/1, 8/16, and 10/16. ETo reduced for 1 to 2 weeks after cutting.

(c) Deciduous Fruit Tree Crop Coefficient were adapted from Orloff, S.B., "Deciduous Orchard Water Use: Clean Cultivated Trees for a Normal Year in Littlerock," Local Extension Publication.

at least two images of different seasons to represent areas that were cultivated at least once in that year. The benefit of this data is that it includes acreages for both Los Angeles and Kern County portions of the Antelope Valley Region. The disadvantage of this data is that it is limited to the AVEK service area and thus does not provide estimates for the Antelope Valley Region as a whole. Furthermore, agricultural data is from satellite imagery and therefore, the exact crop grown is difficult to identify and multiple cropping patterns are difficult to ascertain because the imagery is not done frequently enough. However, total estimates of acreage are consistent with the other sources of acreage data, given that AVEK's service area is smaller than the Regional boundaries.

3.1.6.3.3 Projected Agricultural Demand

Projected water year agricultural demand is summarized in Table 3-16. Projections assume that crop acreages will remain approximately the same as in 2005 with the understanding that some shifting of acreages between crops may occur.

Table 3-16 provides the estimates of agricultural water use for average and dry water years.

3.1.7 Water Leaving

The final component to the Water Budget is water leaving the Antelope Valley Region. This includes water lost

Table 3-13 Crop Evapotranspiration (ETC) Estimates for the Antelope Valley Region

Date	Pasture/ Sod ETo(a)	Alfalfa	Sudan	Sod	Onions	Melons	Peas/ Beans	Deciduous Fruit Trees	Carrots	Potatoes
1-Jan	0.87	0.35	0.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00
15-Jan	1.07	0.43	0.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00
1-Feb	1.19	1.19	0.00	1.19	0.00	0.00	0.00	0.00	0.37	0.00
15-Feb	1.45	1.67	0.00	1.45	0.00	0.00	0.00	0.00	0.45	0.00
1-Mar	2.08	2.39	0.00	2.08	0.62	0.37	0.00	0.52	0.64	1.14
15-Mar	2.54	2.41	0.00	2.54	0.76	0.46	0.36	1.37	1.40	1.55
1-Apr	2.80	2.94	0.00	2.80	0.84	0.95	0.39	1.68	2.30	2.46
15-Apr	3.20	3.36	0.00	3.20	1.70	2.30	1.47	2.11	3.30	3.71
1-May	3.60	3.78	0.00	3.60	2.99	4.00	4.00	2.59	4.00	4.36
15-May	4.01	4.21	0.00	4.01	4.57	4.45	4.61	3.17	4.53	4.77
1-Jun	4.25	4.46	0.00	4.25	4.85	4.72	4.89	3.57	4.46	3.70
15-Jun	4.52	4.75	1.36	4.52	5.15	3.53	4.20	3.89	4.52	2.49
1-Jul	4.85	5.09	4.12	4.85	5.04	1.41	2.38	4.46	0.00	0.00
15-Jul	4.83	5.07	5.31	4.83	4.44	0.00	0.00	4.54	0.00	0.00
1-Aug	4.50	4.73	3.83	4.50	3.60	0.00	0.00	4.23	0.00	0.00
15-Aug	4.28	4.49	4.71	4.28	2.91	0.00	0.00	4.02	0.00	0.00
1-Sep	3.75	3.94	3.19	3.75	0.00	0.00	0.00	3.53	0.00	0.00
15-Sep	3.27	3.43	3.27	3.27	0.00	0.00	0.00	2.98	0.00	0.00
1-Oct	2.90	3.05	3.19	2.90	0.00	0.00	0.00	2.47	0.00	0.00
15-Oct	2.48	2.60	2.73	2.48	0.00	0.00	0.00	1.96	0.00	0.00
1-Nov	1.70	1.79	0.00	1.70	0.00	0.00	0.00	1.19	0.00	0.00
15-Nov	1.07	0.43	0.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00
1-Dec	0.97	0.39	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00
15-Dec	0.90	0.36	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL (inches)	**67.08**	**66.88**	**31.70**	**67.08**	**37.48**	**22.18**	**22.29**	**48.27**	**25.96**	**24.18**

Note: (a) Pasture ETo was drafted by B.L. Sanden, Kern County Farm Advisor 2002 and modified by G.L. Poole, Los Angeles County Farm Advisor 2004.

Table 3-14 Crop Water Requirements for the Antelope Valley Region

Water Requirements	Pasture	Alfalfa	Sudan	Sod	Onions	Melons	Peas/ Beans	Deciduous Fruit Trees	Carrots	Potatoes
Net ETo	67.08	66.88	31.70	67.08	37.48	24.01	22.29	48.27	25.96	24.18
Net Soil					3.54				4.46	
Net Non-Growing	0.00	6.00(a)	4.00	4.00	6.00(b)	4.00	4.00	0.00	6.50(b)	4.00
Total Net Dry Years (in.)	67.08	72.88	35.70	71.08	47.02	28.01	26.29	48.27	36.92	28.18
Total Net Average Years (in.)	64.08	69.88	32.70	68.08	44.02	25.01	23.29	45.27	33.92	25.18
Irrigation Efficiency (%)	75	75	75	75	75	75	75	75	75	75
Total Gross for Dry Years (in.)	89.44	97.17	47.60	94.77	62.69	37.35	35.06	64.36	49.23	37.57
Total Gross for Dry Years (AF)	7.45	8.10	3.97	7.90	5.22	3.11	2.92	5.36	4.10	3.13
Total Gross for Average Years (in.)	85.44	93.17	43.60	90.77	58.69	33.35	31.06	60.36	45.23	33.57
Total Gross for Average Years (AF)	7.12	7.76	3.63	7.56	4.89	2.78	2.59	5.03	3.77	2.80

Notes:

(a) Assumes a 5-year life of an alfalfa stand. Includes the water requirement for pre-irrigation before field preparation and planning, and irrigation before and after application of herbicides.

(b) Includes water requirements for pre-irrigation before field preparation, fumigation, and "water capping" after fumigation.

Table 3-15 Comparison of Estimates of Crop Acreages

	1999	2000	2001	2002	2003	2004	2005
LA Ag Commissioner(a)							
Field Crops	NA	NA	11,592	11,234	11,305	10,624	11,975
Vegetable/Root Crops	NA	NA	12,282	15,804	14,763	13,312	10,760
Fruits/Nut/Grapes Crops	NA	NA	2,866	1,947	1,955	1,920	2,117
Misc Nursery	NA	NA	621	617	599	608	675
Antelope Valley Region Total	----	----	**27,361**	**29,602**	**28,622**	**26,464**	**25,526**
Farm Advisor Inspection Reports							
Field Crops	10,840	11,718	12,055	10,960	10,420	10,063	10,645
Vegetable/Root Crops	11,387	13,727	11,996	16,096	16,300	13,501	12,015
Fruits/Nut/Grapes Crops	1,943	2,133	2,197	1,541	1,647	1,618	1,638
Misc Nursery	375	300	325	321	375	413	450
Antelope Valley Region Total	**24,545**	**27,878**	**26,573**	**28,918**	**28,742**	**25,594**	**24,748**
AVEK Satellite Imagery(b)							
AVEK Composite Total	**23,424**	**18,543**	**24,726**	**23,288**	**28,943**	**23,452**	**21,109**

Notes:

(a) Acreages for Kern County were estimated using the ratios of LA County Ag to Kern County Ag from the Inspection Reports.

(b) Acreages listed here are for the AVEK service area only and thus should be less than Antelope Valley Region Totals.

Table 3-16 Agricultural Water Use in the Antelope Valley Region

		Average Water Year		Dry Water Years	
Crop	**Acreage(a)**	**Gross Crop Water Requirements (AF/acre)(b)**	**Gross Water Demand (AFY)(c)**	**Gross Crop Water Requirements (AF/acre)(b)**	**Gross Water Demand (AFY)(c)**
Field Crops					
Alfalfa Hay	6,720	7.76	51,100	8.10	54,400
Grain Hay	3,455	3.63	12,500	3.97	13,700
Sudan Hay	220	3.63	800	3.97	900
Irrigated Pasture	250	7.12	1,800	7.45	1,900
Vegetable Crops					
Onions	3,125	4.89	15,300	5.22	16,300
Melons & Pumpkins	60	2.78	200	3.11	200
Fruits/Nuts/Grapes	1,638	5.03	8,200	5.36	8,800
Root Crops	8,830	3.77	33,300	4.10	36,200
Misc. Nursery (mostly SOD)	450	7.12	3,200	7.45	3,400
Total Projected Ag Demand (AFY)	**24,748**		**127,000**		**136,000**

Notes: Totals rounded to the nearest 1,000 AF.

(a) Data from Farm Advisors Inspection Reports.

(b) From Farm Advisor gross crop water requirements specific to Antelope Valley Region.

(c) Acreage multiplied by crop water requirements.

(either to evaporation or from subsurface flow) and water consumed. Total losses in the Antelope Valley Region have been estimated at approximately 10,000 AFY (USGS 1993). This estimate includes losses attributed to streambed wetting, riparian evapotranspiration, surface and soil evaporation, and diversions. However, further investigation and study is needed to more accurately determine the water losses in the Antelope Valley Region.

3.1.8 Water Budget Comparisons

3.1.8.1 Average Water Year

Table 3-17 and Figure 3-11 provide a comparison of the supply and demand for the Antelope Valley Region for an average water year. As shown by the comparison, future demand exceeds the existing and planned water supplies through 2035. From the information in Table 3-17, projected reserves needed in an average year were determined and are summarized in Figure 3-14. It is assumed that average year required reserves equal the average year mismatch. A range for the required reserves was determined from the maximum and minimum of the individual year reserves. For an average water year the range of required reserves is 73,600 AFY to 236,800 AFY.[3] Additional projects and management actions to remedy these supply deficits are discussed in Section 5, Water Management Strategies, and Section 6, Project Integration and Objectives Assessment.

3.1.8.2 Single-Dry Water Year

Table 3-18 and Figure 3-12 provide a comparison of the supply and demand for the Antelope Valley Region for a single-dry water year. As shown by the comparison, future demand exceeds the existing and planned water supplies through 2035. From the information in Table 3-18, projected reserves needed in a single dry year were determined and are summarized in Figure 3-15. It is assumed that single dry year required reserves equal the single dry year mismatch plus the average year reserve. A range for the required reserves was determined from the maximum and minimum of the individual year reserves. For a single dry water year the range of required reserves is 50,600 AFY to 57,400 AFY. Additional projects and management actions to remedy these supply deficits are discussed in Section 5, Water Management Strategies, and Section 6, Project Integration and Objectives Assessment.

3 During the analysis for this IRWM Plan, the RWMG was aware that a separate analysis of water supplies (including revised estimates of natural recharge) was being conducted by a TAC to the adjudication. The range of possible natural recharge provided in the IRWM Plan is strictly for long-term planning purposes and has not been conducted to answer the questions being addressed within the adjudication. Once the detailed analysis of historic water use and available groundwater are completed within the adjudication, the supply numbers for the IRWM Plan will need to be updated.

Table 3-17 Water Budget Comparison for an Average Water Year

	2010	2015	2020	2025	2030	2035
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	0	0	0	0	0	0
Return Flows						
Ag RF	23,200	21,500	19,900	18,300	16,600	14,900
Urban RF	18,800	20,800	22,400	24,100	25,300	26,300
WW RF	2,300	3,100	3,900	4,700	5,500	5,500
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries(a)	66,900	70,100	72,200	74,300	74,300	74,300
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	4,400	4,400	4,400	4,400	4,400	4,400
Total Supply	**200,400**	**204,700**	**207,600**	**210,600**	**210,900**	**210,200**
Demands(b)						
Urban Demand	(147,000)	(175,000)	(205,000)	(239,000)	(276,000)	(320,000)
Ag Demand	(127,000)	(127,000)	(127,000)	(127,000)	(127,000)	(127,000)
Total Demand	**(274,000)**	**(302,000)**	**(332,000)**	**(366,000)**	**(403,000)**	**(447,000)**
Supply and Demand Mismatch	**(73,600)**	**(97,300)**	**(124,400)**	**(155,400)**	**(192,100)**	**(236,800)**

Notes:

(a) Direct Deliveries consist of the total SWP water available as shown in Table 3-6 minus the 6,800 AFY of SWP water that is banked to ASR in average water years and is thus not available to meet demand.

(b) Demand includes groundwater extractions.

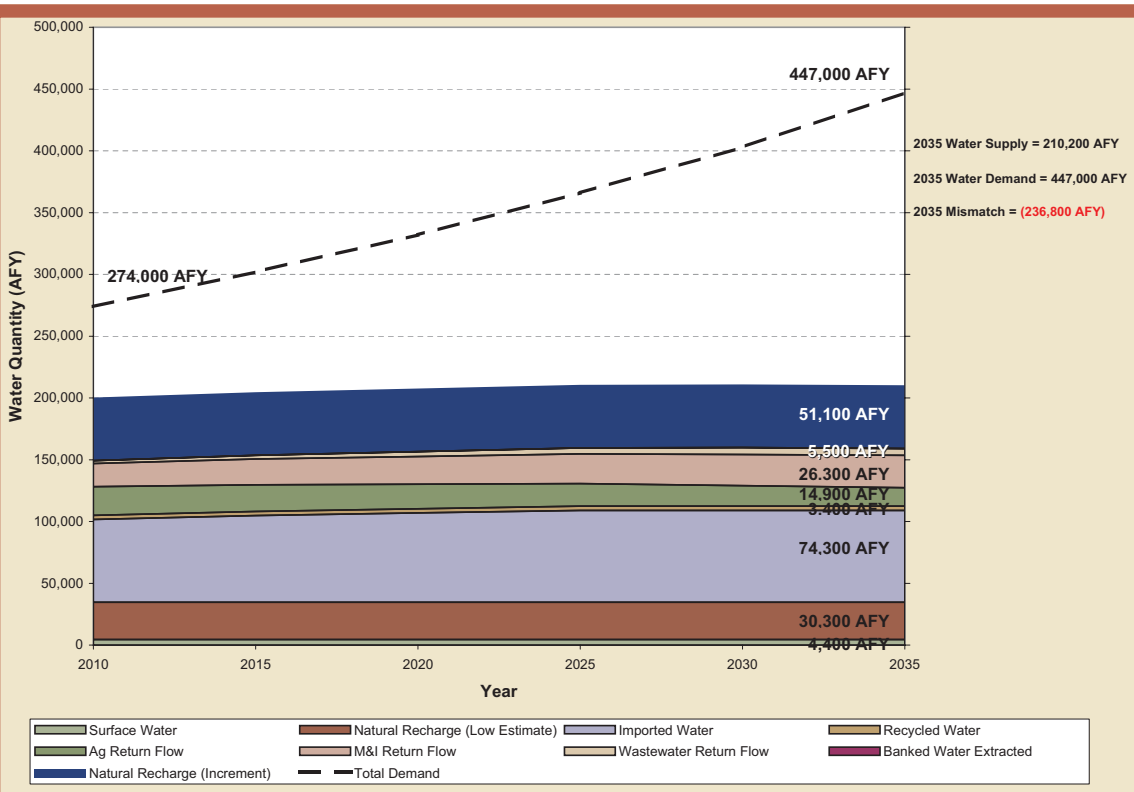


Figure 3-11 Water Supply Summary for an Average Water Year

Table 3-18 Water Budget Comparison for a Single-Dry Water Year

	2010	2015	2020	2025	2030	2035
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	29,000	31,600	31,600	31,600	31,600	31,600
Return Flows						
Ag RF	19,100	17,400	15,900	14,700	13,400	12,100
Urban RF	14,500	15,700	16,800	18,100	19,100	19,900
WW RF	2,300	3,100	3,900	4,700	5,500	5,500
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	6,400	6,400	6,400	8,000	8,000	8,000
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	300	300	300	300	300	300
Total Supply	**156,400**	**159,300**	**159,700**	**162,200**	**162,700**	**162,200**
Demands(a)						
Urban Demand	(147,000)	(175,000)	(205,000)	(239,000)	(276,000)	(320,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(283,000)**	**(311,000)**	**(341,000)**	**(375,000)**	**(412,000)**	**(456,000)**
Supply and Demand Mismatch	**(126,600)**	**(151,700)**	**(181,300)**	**(212,800)**	**(249,300)**	**(293,800)**

Note: (a) Demand includes groundwater extractions.

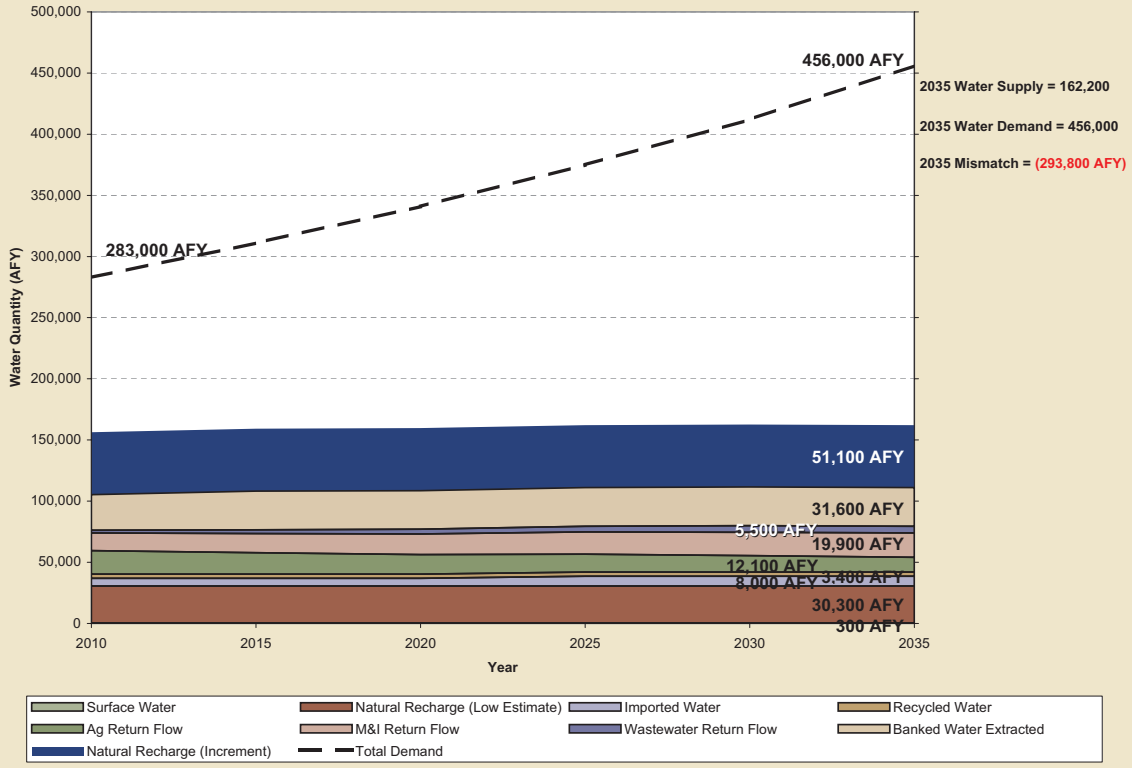


Figure 3-12 Water Supply Summary for a Single Dry Water Year

3.1.8.3 Multi-Dry Water Year

Figure 3-13 provides a comparison of the supply and demand for the Antelope Valley Region for a multiple-dry water year. Tables 3-19 through 3-24 provide a comparison of the supply and demand for the Antelope Valley Region for a multi-dry water year in 5-year increments. As shown by the comparisons, future demand exceeds the existing and planned water supplies through 2035. From supply and demand projections, projected reserves needed in a 4-year multi dry year were determined and are summarized in Figure 3-16. It is assumed that multi-dry year required reserves equal the multi-dry year mismatch plus the average year reserves for the same 4-year period. A range for the required reserves was determined from the maximum and minimum of the 4-year reserves. For multi-dry water years the range of required reserves is 0 AFY to 62,000 AFY. Additional projects and management actions to remedy these supply deficits are discussed in Section 5, Water Management Strategies, and Section 6, Project Integration and Objectives Assessment.

3.1.9 Regional Water Supply Issues, Needs, Challenges, and Priorities

The key issues, needs, challenges, and priorities for the Antelope Valley Region with respect to water supplies include the following, which are discussed in greater detail below:

- Regional reliance on imported water;
- Groundwater use is not managed;
- Existing facilities have limitations;
- Land subsidence effects; and
- Global warming effects.

3.1.9.1 Reliance on Imported Water

As shown from the supply and demand comparison, the Antelope Valley Region depends on SWP for approximately 65 percent of its total supply in an average year, approximately 35 percent of its total supply in a multi-dry year, and less than 10 percent of its total supply in a single-dry year.

The availability of SWP supply is known to be variable. It fluctuates from year to year depending on precipitation, regulatory restrictions, legislative restrictions, and operational conditions, and is particularly unreliable during

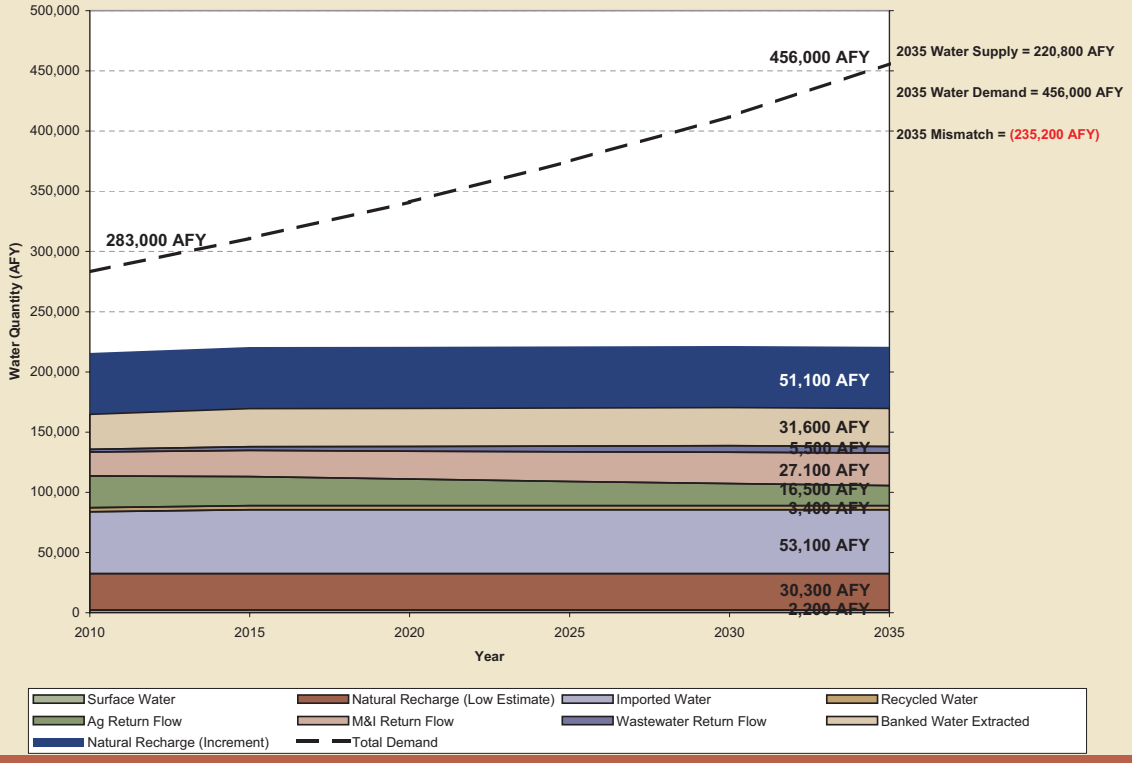


Figure 3-13 Water Supply Summary for a Multi-Dry Water Year

Table 3-19 Water Supply and Demand Comparison for a Multi-Dry Water Year, Years 2010 to 2035

	2010	2015	2020	2025	2030	2035
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	29,000	31,600	31,600	31,600	31,600	31,600
Return Flows						
Ag RF	26,200	24,100	22,000	20,000	18,300	16,500
Urban RF	19,900	21,700	23,200	24,700	26,000	27,100
WW RF	2,300	3,100	3,900	4,700	5,500	5,500
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	51,400	53,100	53,100	53,100	53,100	53,100
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	2,200	2,200	2,200	2,200	2,200	2,200
Total Supply	**215,800**	**220,600**	**220,800**	**221,100**	**221,500**	**220,800**
Demands(a)						
Urban Demand	(147,000)	(175,000)	(205,000)	(239,000)	(276,000)	(320,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(283,000)**	**(311,000)**	**(341,000)**	**(375,000)**	**(412,000)**	**(456,000)**
Supply and Demand Mismatch	**(67,200)**	**(90,400)**	**(120,200)**	**(153,900)**	**(190,500)**	**(235,200)**

Notes: Values assume 4-year dry period begins in the year shown.

(a) Demand includes groundwater extractions.

Table 3-20 Water Supply and Demand Comparison for a Multi-Dry Water Year, Years 2010 to 2015						
	2010	2011	2012	2013	2014	2015
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	29,000	0	0	0	0	0
Return Flows						
Ag RF	26,200	25,800	25,400	25,000	24,600	24,100
Urban RF	19,900	20,300	20,700	21,100	21,500	21,700
WW RF	2,300	2,500	2,700	2,900	3,100	3,100
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	51,400	51,400	51,400	51,400	51,400	53,100
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	2,200	2,200	2,200	2,200	2,200	2,200
Total Supply	**215,800**	**187,000**	**187,200**	**187,400**	**187,600**	**189,000**
Demands(a)						
Urban Demand	(147,000)	(152,600)	(158,200)	(163,800)	(169,400)	(175,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(283,000)**	**(288,600)**	**(294,200)**	**(299,800)**	**(305,400)**	**(311,000)**
Supply and Demand Mismatch	**(67,200)**	**(101,600)**	**(107,000)**	**(112,400)**	**(117,800)**	**(122,000)**

(a) Demand includes groundwater extractions.

Table 3-21 Water Supply and Demand Comparison for a Multi-Dry Water Year, Years 2015 to 2020						
	2015	2016	2017	2018	2019	2020
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	31,600	31,400	0	0	0	0
Return Flows						
Ag RF	24,100	23,700	23,300	22,900	22,500	22,000
Urban RF	21,700	22,000	22,300	22,600	22,900	23,200
WW RF	3,100	3,300	3,500	3,700	3,900	3,900
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	53,100	53,100	53,100	53,100	53,100	53,100
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	2,200	2,200	2,200	2,200	2,200	2,200
Total Supply	**220,600**	**220,500**	**189,200**	**189,300**	**189,400**	**189,200**
Demands(a)						
Urban Demand	(175,000)	(181,000)	(187,000)	(193,000)	(199,000)	(205,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(311,000)**	**(317,000)**	**(323,000)**	**(329,000)**	**(335,000)**	**(341,000)**
Supply and Demand Mismatch	**(90,400)**	**(96,500)**	**(133,800)**	**(139,700)**	**(145,600)**	**(151,800)**

(a) Demand includes groundwater extractions.

Table 3-22 Water Supply and Demand Comparison for a Multi-Dry Water Year, Years 2020 to 2025

	2020	2021	2022	2023	2024	2025
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	31,600	31,600	31,600	2,200	0	0
Return Flows						
Ag RF	22,000	21,600	21,200	20,800	20,400	20,000
Urban RF	23,200	23,500	23,800	24,100	24,400	24,700
WW RF	3,900	4,100	4,300	4,500	4,700	4,700
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	53,100	53,100	53,100	53,100	53,100	53,100
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	2,200	2,200	2,200	2,200	2,200	2,200
Total Supply	**220,800**	**220,900**	**221,000**	**191,700**	**189,600**	**189,500**
Demands(a)						
Urban Demand	(205,000)	(211,800)	(218,600)	(225,400)	(232,200)	(239,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(341,000)**	**(347,800)**	**(354,600)**	**(361,400)**	**(368,200)**	**(375,000)**
Supply and Demand Mismatch	**(120,200)**	**(126,900)**	**(133,600)**	**(169,700)**	**(178,600)**	**(185,500)**

(a) Demand includes groundwater extractions.

Table 3-23 Water Supply and Demand Comparison for a Multi-Dry Water Year, Years 2025 to 2030

	2025	2026	2027	2028	2029	2030
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	31,600	31,600	31,600	31,600	4,600	0
Return Flows						
Ag RF	20,000	19,700	19,400	19,100	18,800	18,300
Urban RF	24,700	25,000	25,300	25,600	25,900	26,000
WW RF	4,700	4,900	5,100	5,300	5,500	5,500
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	53,100	53,100	53,100	53,100	53,100	53,100
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	2,200	2,200	2,200	2,200	2,200	2,200
Total Supply	**221,100**	**221,300**	**221,500**	**221,700**	**194,900**	**189,900**
Demands(a)						
Urban Demand	(239,000)	(246,400)	(253,800)	(261,200)	(268,600)	(276,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(375,000)**	**(382,400)**	**(389,800)**	**(397,200)**	**(404,600)**	**(412,000)**
Supply and Demand Mismatch	**(153,900)**	**(161,100)**	**(168,300)**	**(175,500)**	**(209,700)**	**(222,100)**

(a) Demand includes groundwater extractions.

Table 3-24 Water Supply and Demand Comparison for a Multi-Dry Water Year, Years 2030 to 2035

	2030	2031	2032	2033	2034	2035
Groundwater Storage						
Natural Recharge (Low Estimate)	30,300	30,300	30,300	30,300	30,300	30,300
Natural Recharge (Increment)	51,100	51,100	51,100	51,100	51,100	51,100
Banked ASR Water Extracted	31,600	31,600	31,600	31,600	31,600	7,000
Return Flows						
Ag RF	18,300	17,900	17,500	17,100	16,700	16,500
Urban RF	26,000	26,200	26,400	26,600	26,800	27,100
WW RF	5,500	5,500	5,500	5,500	5,500	5,500
Subsurface Flow Loss	0	0	0	0	0	0
Direct Deliveries	53,100	53,100	53,100	53,100	53,100	53,100
Recycle/Reuse	3,400	3,400	3,400	3,400	3,400	3,400
Surface Storage						
Surface Deliveries	2,200	2,200	2,200	2,200	2,200	2,200
Total Supply	**221,500**	**221,300**	**221,100**	**220,900**	**220,700**	**196,200**
Demands(a)						
Urban Demand	(276,000)	(284,800)	(293,600)	(302,400)	(311,200)	(320,000)
Ag Demand	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)	(136,000)
Total Demand	**(412,000)**	**(420,800)**	**(429,600)**	**(438,400)**	**(447,200)**	**(456,000)**
Supply and Demand Mismatch	**(190,500)**	**(199,500)**	**(208,500)**	**(217,500)**	**(226,500)**	**(259,800)**

(a) Demand includes groundwater extractions.

Figure 3-14 Average Water Year Reserves

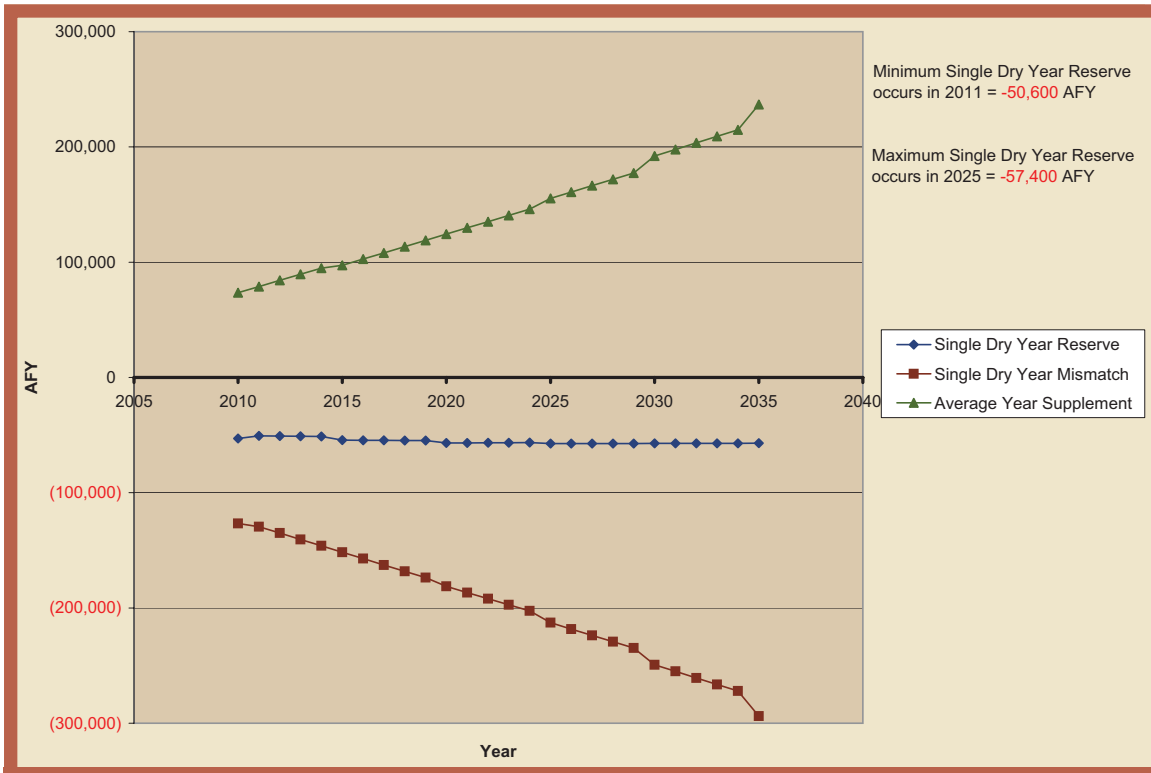


Figure 3-15 Single Dry Water Year Reserves

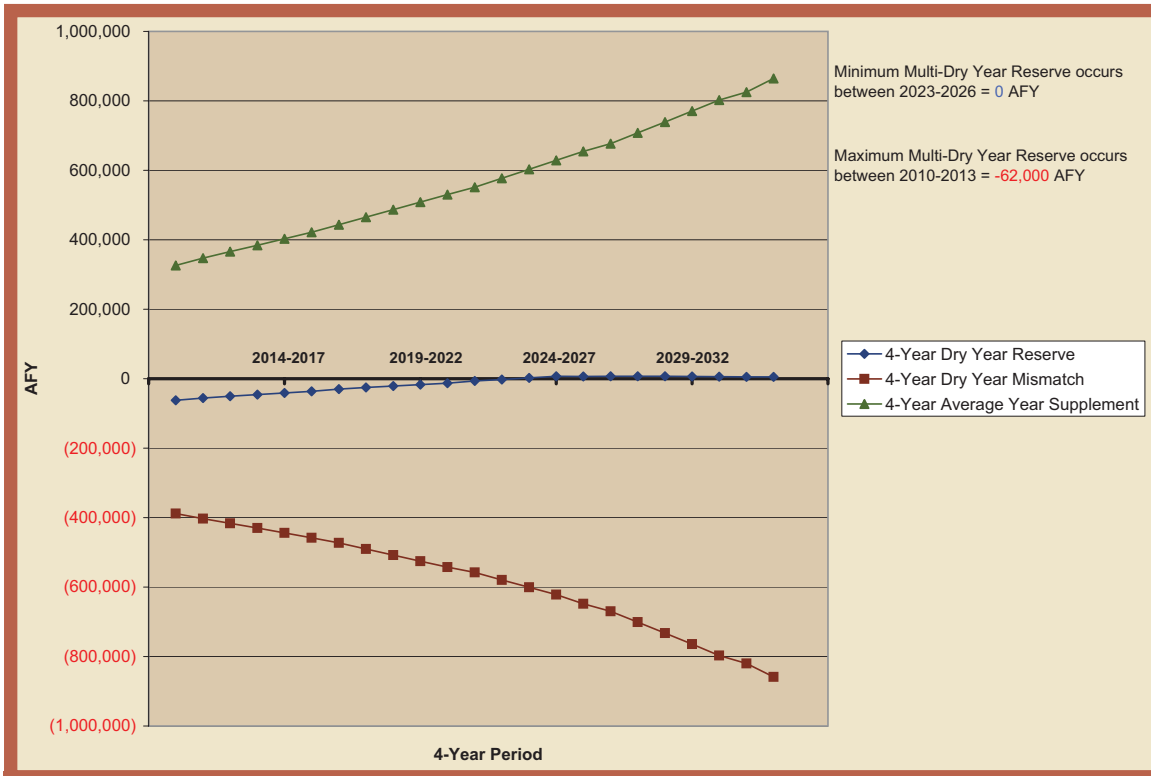


Figure 3-16 Multi-Dry Water Year Reserves

dry years. The DWR Reliability Report (2005b) anticipates a minimum delivery of 4 percent of full Table A Amounts for 2005 demand conditions and 5 percent of full Table A Amounts for 2025 demand conditions. The Antelope Valley Region likely cannot meet expected demands without imported water, and the variable nature of the supply presents management challenges to ensure flexibility.

3.1.9.2 Groundwater is Not Managed

One of the more prevalent concerns in the Antelope Valley Region relates to management of the Antelope Valley Groundwater Basin. Groundwater has and continues to be an important resource within the Antelope Valley Region. As discussed in Section 2, groundwater has provided between 50 and 90 percent of the total water supply in the Antelope Valley Region since 1972 (USGS 2003). Projected urban growth, coupled with limits on the available local and imported water supply, are likely to continue to increase the reliance on groundwater. If the groundwater basin is not managed wisely, the basin can become overdrafted and reduce the long-term viability of the groundwater supply.

The following Assembly Bill (AB) 3030 elements are also associated with groundwater supply management within the Antelope Valley Region. A discussion of how these elements are addressed in this IRWM Plan is provided below.

Mitigation of Conditions of Overdraft. Although the groundwater basin is not currently adjudicated, an adjudication process has begun and is in the early stages. Although there are no existing restrictions on pumping, water rights may be assigned as part of the adjudication process. The groundwater adjudication process is a management action discussed in this IRWM Plan.

Replenishment of Groundwater Extracted by Water Producers. Several groundwater recharge and banking projects are being considered and evaluated as part of this IRWM Plan. Additionally, Edwards AFB has been actively involved in projects aimed at refilling the depleted aquifers. The goals of these projects are to recharge/bank sufficient groundwater supply in wet years for use during dry years, thereby minimizing long-term impacts to groundwater levels.

Monitoring of Groundwater Levels and Storage. Groundwater level and storage monitoring is a direct indicator of the groundwater supply. The Water Supply Management Strategy (WSMS) (provided in Section 5) will include management and compilation of existing water levels and water quality monitoring data to facilitate analysis of current conditions, and to help plan for the future.

Facilitating Conjunctive Use Operations. Conjunctive use operations relate to the combined use of surface water and groundwater to optimize resources and minimize adverse effects of using a single source. Conjunctive use will be facilitated as part of this IRWM Plan through many of the water supply management projects in the WSMS described in more detail in Section 5. Conjunctive use opportunities with native water is limited, however, due to the relatively small amount of native surface and groundwater available. Thus, the success of conjunctive use operations will depend heavily on the ability to import water from outside of the Antelope Valley Region.

3.1.9.3 Limitations of Existing Supply

The Antelope Valley Region water agencies have typically relied on imported water and/or groundwater for their water supply needs. Currently, these water supplies are limited by SWP supply fluctuations, groundwater basin overdraft and the need for facility improvements. The water agencies and municipalities are pursuing various alternatives, such as recycled water and recharge programs, to decrease their reliance on imported water and groundwater sources.

SWP water reliability is a function of hydrologic conditions, state and federal water quality standards, protection of endangered species and water delivery requirements. Though the SWP contracts contain maximum Table A Amounts for each contractor, this is not a guarantee of how much imported water will be available for delivery each year.

Water agencies in the Antelope Valley Region cannot entirely rely on groundwater pumping either, because excessive pumping for many years has stressed the basin. According to the USGS, groundwater pumping in the Antelope Valley Region has exceeded the recharge rate every year since the early 1920s (USGS 2003). This approach to groundwater pumping will change in the future, as the adjudication process for establishing groundwater rights in the Antelope Valley Region began in 2005.

Additionally, as detailed below in Section 3.5, "Land Use Management Assessment" water is a limiting factor of the Antelope Valley Region's growth rate. In order to accommodate this projected growth the supply of water in the Antelope Valley Region must be increased.

3.1.9.4 Limitations of Existing Facilities

In order to address the deficiency in supply, the water supply agencies in the Antelope Valley Region will need to modify existing infrastructure to accommodate an increase in delivery capacity for the new supply.

AVEK's Quartz Hill WTP will require an expansion to approximately 97 mgd to treat LACWWD 40's projected demands (LACWWD 40 1999). Furthermore, as previously mentioned, AVEK has capacity constraints in the summer and limited demand for water during the winter months. Thus, additional storage or recharge in the winter months is required in order for them to beneficially use their full Table A amount.

LACWWD 40's facilities improvements will include new wells, reservoirs and pipelines throughout its system to meet current and projected water supply requirements. Additional connections with AVEK will be needed to maximize use of available imported water. LACWWD 40 is pursuing the use of recycled water as an alternative source for irrigation and recharge purposes. LACWWD 40 has also started the Lancaster ASR Project in an effort to recharge treated SWP water for extraction at a later time (LACWWD 40 1999).

PWD's plan for improvements and expansion of its existing infrastructure is currently being developed in its 2006 Water System Master Plan Update. According to PWD's 2006 Strategic Plan, PWD is identifying additional water sources by investigating the potential to increase the yield from Littlerock Reservoir, water conservation, recycled water (urban irrigation and groundwater recharge), additional Table A SWP water, and water transfers. The 2006 Master Plan Update will also provide a plan for infrastructure upgrades, which includes development of an existing system hydraulic model and identifying improvements needed to mitigate existing deficiencies.

QHWD plans to enlarge existing wells or drill new wells to meet additional demands. There are no plans for QHWD to invest in recycled water in the near future because tertiary treatment and recycled water pipelines are too costly. QHWD does intend to recharge local aquifers when excess surface water is available and is currently equipping new wells with appropriate piping (QHWD 2002).

RCSD will need new wells, a reservoir, and additional transmission mains to meet projected demands (RCSD 2004).

Furthermore, the current planned regional recycled water distribution system would only deliver water to M&I users. Additional infrastructure would be required to deliver recycled water to any potential agricultural users other than the LACSD effluent management sites or adjacent users.

3.1.9.5 Effects of Land Subsidence

Groundwater use in the Antelope Valley Region was at its highest in the 1950s and 1960s as a result of agricultural demands (USGS 1994a). According to USGS, land subsidence in Antelope Valley Region was first reported by Lewis and Miller in the 1950s (USGS 1992). Since then, studies have shown subsidence levels of up to 7 feet occurring in some areas of Antelope Valley Region (see Figure 3-17). Conversations held with various agencies and companies indicate that within the Antelope Valley Region, the Lancaster and Edwards AFB areas are currently experiencing problems or damages that appear to be related to land subsidence (see Figure 3-18). Edwards AFB has been actively involved in projects aimed at preventing future land subsidence.

Land subsidence results in the following impacts:

- Development of cracks, fissures, sink-like depressions and soft spots.
- Change in natural drainage patterns often resulting in increased areas of flooding or increased erosion.
- Degradation of groundwater quality.
- Permanent reduction in groundwater storage capacity.
- Change in gradient in gravity pipelines (sanitary and storm sewers) or canals often resulting in lost capacity.
- Damage to well casings, pipelines, buildings, roads, railroads, bridges, levees, etc.
- Costs associated with repairs and rebuilding.
- Costs associated with construction of new facilities such as pumping stations for gradient changes.
- Reduction in land value.
- Lawsuits.
- Increased pumping costs.

Table 3-25 lists land subsidence problems identified in Antelope Valley Region.

The following paragraphs present brief discussions on several studies done on land subsidence in Antelope Valley Region.

USGS Report 92-4035. USGS (1992) reported that as much as 2 feet of land subsidence had affected Antelope Valley Region by 1967 and was causing surface deformations at Edwards AFB. Fissures, cracks and depressions on Rogers Lake were affecting the use of the lakebed as a runway for airplanes and space shuttles. In addition, depressions,

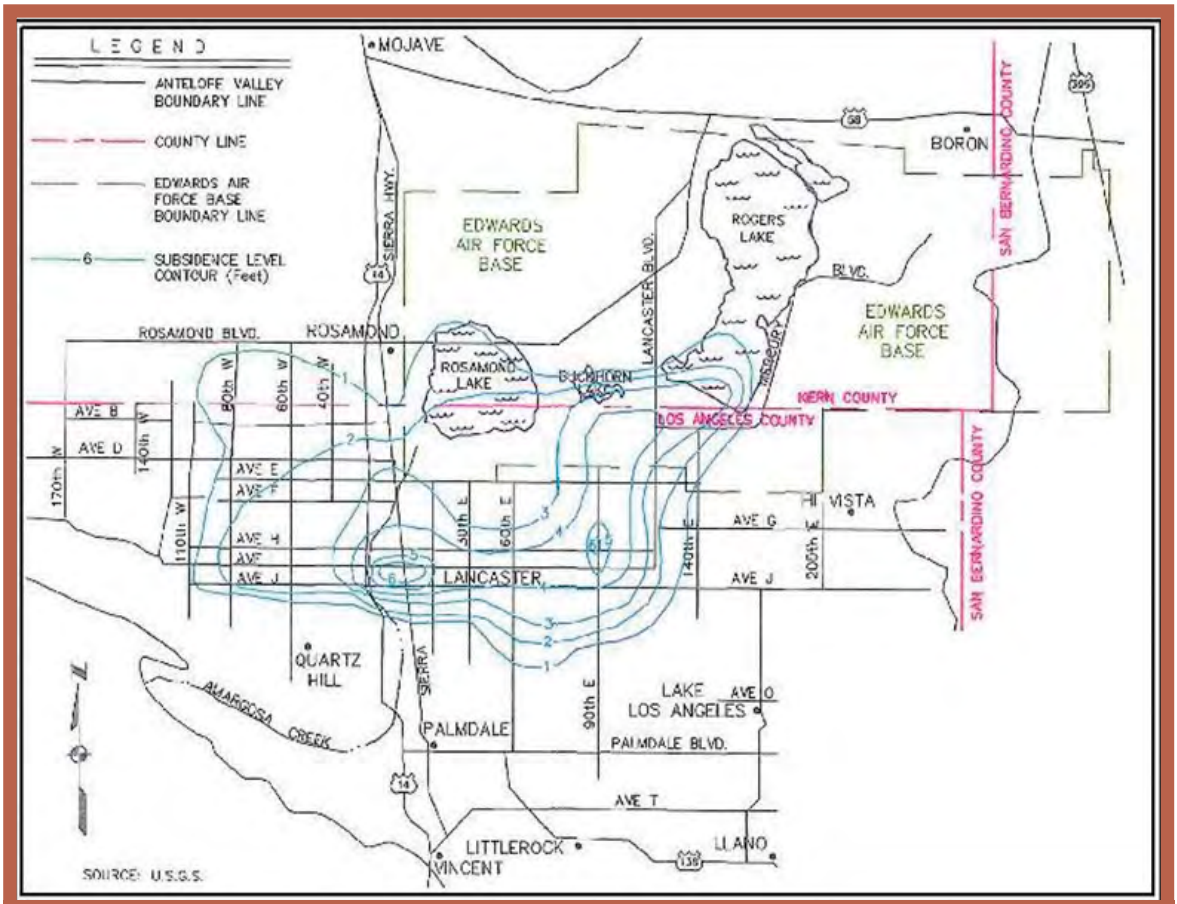


Figure 3-17 Subsidence Levels in the Antelope Valley

fissures and cracks on the lakebed may not be detected until aircraft or space shuttles exceed the load capacity of the soil. Another concern was potential contamination of the water table through fissures which can provide direct access for toxic materials.

To determine the significance of land subsidence conditions, bench marks were surveyed using a Global Positioning System (GPS) in 1989. Differential levels were surveyed for 65 bench marks from 1989 to 1991. It was discovered that total land subsidence ranged from 0.3 to 3.0 feet.

USGS Report 93-4114. USGS (1993b), reported that land subsidence effects had been noted on Rogers Lake in the form of depressions, fissures and cracks. The report identified pumping of groundwater as the cause of the land subsidence. As much as 90 feet of groundwater level decline has occurred in the South Base well field, and an average annual compaction rate of 5.57 × 10-2 feet was measured at the Holly site near the South Track well field (see Location 3 on Figure 3-18).

USGS 1994 Draft Report. USGS (1994) revealed that land subsidence throughout Antelope Valley Region has reached nearly 7 feet. As shown on Figure 3-18, USGS indicated that subsidence levels of 6.6 feet have occurred near Avenue I and Division Street, and Avenue H and 90th Street East. The draft report stated that there was a general correlation between groundwater level declines and the distribution and rate of subsidence. In addition, the report estimated a conservative loss of approximately 50,000 AF of storage in the groundwater subbasin in the area that has been affected by 1 foot or more of land subsidence.

Geolabs, February 1991. A study done by Geolabs - Westlake Village (1991) studied a 10 square mile area in Lancaster identified to have fissures and sink-like depressions (see Location 2 on Figure 3-18). The report identified fissures ranging in width from one inch to slightly over one foot. The lengths of the fissures ranged mainly between 50 to 200 feet, with the longest continuous fissures in the 600-700 foot range. Sinkholes ranged mainly between one to five feet deep and less than four feet in diameter. One sinkhole measured 20 feet long and 15 feet wide. The report concluded that the fissures were due to tensional

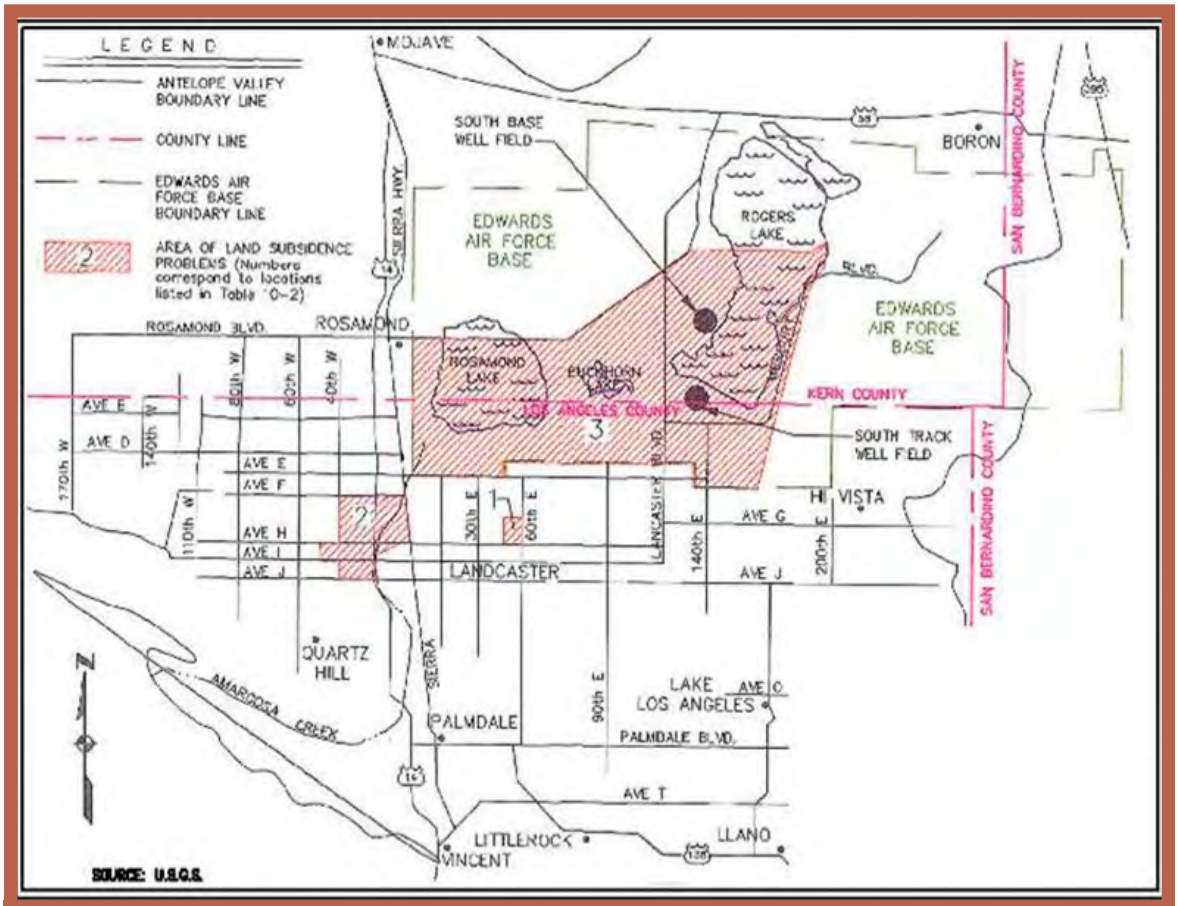


Figure 3-18 Areas of Potential Land Subsidence in the Antelope Valley

forces created by subsidence, which may be related to groundwater withdrawal due to the correlation between areas of significant subsidence and areas of pronounced groundwater level decline. Areas of concern identified in the report are included in Table 3-25.

1995 Water Resource Study. In addition to reviewing the reports summarized above, companies and agencies within the Antelope Valley Region were surveyed regarding potential damages attributable to groundwater level declines and field visits of affected areas were conducted. Companies and agencies surveyed include the following:

- AVEK
- CALNEV Pipelines
- Lancaster, Redevelopment Center
- Lancaster, Road Maintenance Department
- Palmdale, Engineering Department
- Palmdale, Road Maintenance Department
- LACSD
- Edwards AFB
- Kern County Flood Plain Management Section
- Los Angeles County Waterworks District, Sewer Department
- RCSD
- Southern California Gas Company
- Southern Pacific Railroad
- State Fire Marshall, Pipeline Safety Division

Other than those damages identified in the reports summarized above, structural damage to the wastewater treatment plant building on Edwards AFB was the only other potentially significant damage identified and may or may not be attributable to land subsidence. Other minor existing damage that may or may not be attributable to groundwater level declines includes cracked sidewalks and pavement. To assess existing and potential degradation to the groundwater supply, an attempt was made to correlate typical stormwater runoff constituents and similar constituents in the groundwater supply. The hypothesis was that areas of fissuring should show higher degrees of contamination if runoff was reaching the aquifers through the fissures.

Table 3-25 Land Subsidence Concerns for the Antelope Valley Region

Location	Description	Maximum Subsidence (ft)	Problems/Damages/Concerns
1	Area bounded by 50th and 60th Streets east and Avenues G and H (T7N-R11W-S3)	3-4	• Development of cracks and fissures
2	Northwest portion of Lancaster	4-5	• Development of cracks and fissures in the following areas of concern: » In the vicinity of KAVL and KBVM radio towers near the proposed site for High Desert Hospital complex » East of a residential project at the southeast corner of 30th St. West and Ave. "I" » In the vicinity of LA County Detention Facility south of Ave. "I" » The "H" Street Bridge over Amargosa Creek where up to 4" of lateral separation is present across the central expansion joint(a).
3	Edwards AFB	3.3	• Failure of several well casings. • Increase in area subject to flooding. • Structural damage to wastewater treatment plant building. • Wells protruding above the ground. • Development of cracks, fissures, sinkholes and softspots on Rogers Lakebed, affecting use of the lakebed as a runway for planes and space shuttles.

Note: (a) Geolabs reports that the separation may be due to differential settlement or, may be related to the same mechanism which is causing the fissuring in the area.

The Los Angeles County Watershed Management Division monitors surface water; however it does not monitor typical stormwater constituents, only general minerals. Therefore, it is currently unknown whether groundwater degradation due to subsidence is occurring in Antelope Valley Region. However, should fissuring continue, degradation to the groundwater supply could be a potential problem and should be investigated. Individual water purveyors servicing the area where fissuring is occurring may test for some of the constituents found in stormwater, from which data may be obtained.

In addition to subsidence-related problems, groundwater level declines of up to 200 feet in the Antelope Valley Region have resulted in increased pumping costs. USGS (1994) cites the increased pumping costs as the primary reason for a decline in agricultural production during the 1970s. The LACWWDs adds that attractive land development areas along with increased pumping costs have contributed towards agricultural decline.

It is recommended that monitoring of subsidence levels and groundwater levels continue in the Antelope Valley Region as indicators of future problems due to subsidence and current progress toward balancing groundwater use. Monitoring of groundwater quality for typical stormwater constituents in areas of fissures is recommended as an indicator of the degradation potential due to fissures.

3.1.9.6 Effects of Global Warming

In the recent update of DWR's Water Plan (2005c), an assessment of the impacts of global warming on the State's water supply was conducted using a series of computer models that incorporated decades of scientific research. Model results indicate increased temperatures, a reduction in Sierra Nevada mountain snow depth, early snow melt, and a rise in sea level. These changing hydrological conditions could affect future planning efforts, which are typically based on historic conditions. Difficulties that may arise include:

- Hydrological conditions, variability, and extremes that are different than current water systems were designed to manage;
- Changes occurring too rapidly to allow sufficient time and information to permit managers to respond appropriately; and
- Requiring special efforts or plans to protect against surprises and uncertainties.

DWR will continue to provide updated results from these models as further research is conducted.

In July 2006, DWR issued "Progress on Incorporating Climate Change into Management of California's Water Resources," as required by Executive Order S-3-05, which instituted biennial reports on potential climate change effects on several areas, including water resources. This IRWM Plan describes the progress made in incorporating current climate change data and information into existing water resources planning and management tools and methodologies. The report, whose purpose is to demonstrate how various analytical tools currently used by DWR could be used to address issues related to climate change, focuses on assessment methodologies and preliminary study results from four climate change scenarios.

Potential impacts of climate change are presented for the SWP and for the Sacramento-San Joaquin Delta, both of which are related to the Antelope Valley Region's imported water supplies. Since the Antelope Valley Region is reliant on imported SWP supplies as part of its overall supply mix, any reduction or change in the timing of availability of those supplies could have negative impacts on the water supply of the Antelope Valley Region. Reductions in the quantity of SWP water available would force the Antelope Valley Region to rely more heavily on local groundwater and local surface flows, or other sources of imported water. It is possible that local surface flows could also be reduced by changes in snow pack altitude levels and/or quantity of snow pack in the San Gabriel Mountains from global warming, which would reduce natural recharge, thus exacerbating groundwater availability problems.

The SWP analysis presents potential impacts on SWP operations, including reservoir inflows, delivery reliability, and average annual carryover storage, as well as many other operational parameters. The analysis assumes forecast levels of climate change in year 2050, with 2020 land use levels. Some of the main impacts include changes to south of Delta Table A Amount deliveries (from an increase of about 1 percent in a wetter scenario to about a 10 percent reduction for a drier climate change scenario), increased winter runoff and lower Table A allocations in the three driest climate change scenarios, lower carryover storage in drier scenarios, and higher carryover storage in a wetter scenario.

The Sacramento-San Joaquin Delta analysis of the four climate change scenarios included the operational impacts to the SWP and other water delivery systems, as well as meeting Delta water quality standards. The analysis indicated that meeting these water quality standards will be a "larger challenge" due to climate change. Using assumed climate change scenarios and a sea level increase of one foot, the ability to meet chloride standards for M&I uses would be more difficult and may cause water supply impacts which DWR could not quantify at this time.

In addition, the report presents potential impacts of climate change that could cause increases in ETo rates and crop water use statewide. The analysis of potential impacts of climate change on ETo and crop water use showed that with a rise of 3 degrees Celsius (°C) in air temperature, increases in ETo for a reference crop ranged from 3 to 6 percent. While a small percentage, this volume of water, when summed statewide, would be substantial. DWR assumes that other crops would show similar responses. DWR is developing modeling tools to use in future analyses of crops and other plant species to determine the potential impacts to agriculture. The Antelope Valley Region, while experiencing rapid urbanization, remains an active agricultural area. Global warming may impact water supply availability, but it also increases crop (and residential landscaping) ETo rates. Actual water demand of various crops in the Antelope Valley Region could rise just at a time when water supplies are becoming less available or reliable.

Future studies will include DWR working with other agencies to incorporate climate change information into the management of the state's water resources. Additional climate change scenarios will be developed and analyzed, with the goal of providing them to water resource planners to utilize in making water operations and management decisions. DWR states that the preliminary results in this current report are not sufficient by themselves to make policy decisions regarding water resources.

Assembly Bill 32: Global Warming Solutions Act

A recent legislative development in California is the passing of Assembly Bill (AB) 32, Global Warming Solutions Act. The Global Warming Solutions Act of 2006 has committed California to reducing the state's greenhouse gas emissions to 2000 levels by 2010 (approximately 11percent below business as usual), to 1990 levels by 2020 (approximately 25 percent below business as usual), and to 80 percent below 1990 levels by 2050. The California Air Resources Board (CARB) is charged with developing the appropriate regulations and reporting system to effectively implement the caps on emissions. AB 32 requires that CARB use the following principles to implement the caps: distribute benefits and costs equitably; ensure that there are no direct, indirect, or cumulative increases in air pollution in local communities; protect entities that have reduced their emissions through actions prior to this mandate; and allow

for coordination with other states and countries to reduce emissions.

Counties, cities, water agencies, water purveyors, and water consumers can all expect to be affected by this legislation. As heavily documented by the media in recent months, climate change has large consequences for California's water supply and environment, including reduced snow pack in the Sierra Nevada Mountains, sea level rise, flash floods, drought, reduced supply from the Colorado River, etc. To curb these devastating effects, actions ranging from assessments of one's carbon footprint and carbon trading, to use of alternative energies, to reduction of emissions through direct conservation of both water and energy, for example, will likely be expected of many organizations and even individuals dealing directly and indirectly with water throughout the state.

3.2 WATER QUALITY MANAGEMENT ASSESSMENT

Given the Antelope Valley Region's dependence on its groundwater source, it is vital that the quality of the groundwater be protected. With the increase of groundwater recharge projects, which are essential to ensuring the availability of groundwater and preventing land subsidence, it is crucial to monitor the quality of the injected water and its impacts to the groundwater basin.

Water quality management in the Antelope Valley Region is therefore focused on maintaining and improving existing water quality and preventing future contamination. Recycled water activities have also been included in this discussion since the recharge of the recycled water may impact water quality.

3.2.1 Local Groundwater Quality

Groundwater quality in the Antelope Valley Region is excellent within the principal aquifer but degrades toward the northern portion of the dry lakes areas. The groundwater is typically calcium bicarbonate in character near the surrounding mountains and is sodium bicarbonate or sodium sulfate character in the central part of the basin (Duell 1987 as cited in DWR 2004). Considered to be generally suitable for domestic, agricultural, and industrial uses, the water in the principal aquifer has a total dissolved solids (TDS) concentration ranging from 200 to 800 mg/L. The deep aquifer typically has a higher TDS level. Hardness ranges from 50 to 200 mg/L and high fluoride, boron, and nitrates are a problem in some areas of the basin. The groundwater in the basin is used for both agricultural and M&I purposes.

An emerging contaminant of concern is arsenic. Arsenic is a naturally occurring inorganic contaminant often found in groundwater and occasionally found in surface water. Anthropogenic sources of arsenic include agricultural, industrial and mining activities. In California, there are 763 sources in 404 water systems in 45 counties that show arsenic levels greater than the new federal drinking water standard of 10 parts per billion[4] (ppb) (DHS 2005). Arsenic can be toxic in high concentrations, and is considered a chronic carcinogen when accounting for lifetime exposures.

Arsenic levels above the current MCL of 10 ppb have been observed in the Antelope Valley Region. Approximately 20 LACWWD 40 wells have tested above the Maximum Contaminant Level (MCL), and as a result six (6) wells have been placed on inactive status. Five (5) active wells with high arsenic levels are undergoing a partial abandonment process that would restrict flow from areas containing arsenic and allow pumping in arsenic free zones. PWD has arsenic levels below 2 ppb. QHWD has also observed levels above the MCL in a number of wells, however, it has the ability to blend the water to acceptable levels. Similarly, RCSD has observed levels of arsenic in the range of 11 to 14 ppb in three (3) of its wells. RCSD is utilizing similar methods to LACWWD 40 to manage arsenic levels so that delivered water meets the arsenic MCL. It is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a supply for the Antelope Valley Region.

In addition to arsenic issues, there have also been concerns with nitrate levels above the current MCL of 10 ppb and high TDS levels in portions of the Basin. Groundwater monitoring data from the mid-to-late 1990s indicate nitrate (as N) concentrations periodically exceeding the primary MCL for drinking water of 10 mg/L in two wells located in the southern portion of the groundwater basin near the Palmdale WRP. Agricultural fertilization practices and discharge of treated wastewater has likely contributed to the elevated levels. Actions have already been implemented by LACSD to address these concerns and to minimize any impact from treated wastewater, including, treatment upgrades, a change in effluent management practices, the implementation of a recycled water distribution system, and performing groundwater remediation activities near the Palmdale WRP site. As part of this IRWM Plan, contaminated sites would be identified,

4 The State of California is in the process of developing its own regulation for arsenic in drinking water, which could include a revised, lowered MCL. While by statute, the regulation should have been proposed by 30 June 2004, DPH is still continuing to work on the regulatory process.

mapped, and monitored within the basin to further aid the remediation efforts.

3.2.2 Imported Water Quality

DWR regulates the water quality of the SWP through the following two documents: *Department of Water Resources Water Quality Criteria for Acceptance of Non-Project Water into the State Water Project* (Acceptance Criteria) and *Implementation Procedures for the Review of Water Quality from Non-Project Water Introduced into the State Water Project* (Implementation Procedures). DWR has provided draft criteria that are still undergoing revision. In the interim, between the time of when the criteria were established and the current proposed criteria, new or modified regulations for some additional constituents of concern have been developed.

As of January 2006, the Federal arsenic MCL was revised to 10 micrograms per liter (µg/L) (down from 50 µg/L), which will have significant impacts on water utilities in California that will need to install or modify treatment to remove arsenic. Additionally, this lowering of the standard likely will affect what DWR will establish as the appropriate criteria for arsenic in the SWP system, which is currently set at 4 µg/L.

Another constituent of concern is chromium VI. There is currently no proposed or existing drinking water standard for chromium VI. There are, however, federal and state standards for total chromium in drinking water. The California standard is 50 µg/L (half the federal standard, which is 100 µg/L). According to SB 351 (Ortiz), the California Department of Public Health (DPH) was required to set a drinking water standard specific to chromium VI by January 1, 2004. However, this deadline has been missed due to delays in developing the Public Health Goal. The Office of Environmental Health Hazard Assessment (OEHHA) is currently working on the Public Health Goal (PHG) for chromium VI, which will be used by DPH in setting the standard. There is a PHG for total chromium, which is 2.5 µg/L.

The current water quality criteria for the SWP are compared to current water quality conditions in the California Aqueduct (data taken from Station KA017226, Check 21 near Kettleman City) and to the current federal primary and secondary drinking water standards, and provided in Table 3-26. It is important to note that not all constituents currently in the draft Acceptance Criteria are sampled for by DWR. It is also important to note that while some constituents do not have SWP pumpback criteria and/or an MCL (bromide, total organic carbon, TDS, and chloride) high levels of these constituents can be of concern, especially with regard to potential treatment costs to downstream users.

3.2.2.1 Imported Water Quality Infrastructure

SWP water is treated by PWD's treatment plant for use by PWD and LCID, and by the four AVEK facilities (Quartz Hill WTP, Eastside WTP, Rosamond WTP, and Acton WTP) prior to delivery to the other water purveyors.

PWD's water treatment plant is a conventional design plant using chlorine as the disinfectant, and has a permitted capacity of 28 mgd. Screening and metering are provided at the outlet of Palmdale Lake and head of the plant, followed by treatment chemical addition, flash mixing, three-stage tapered energy flocculation, clarification utilizing plate settlers and sediment removal systems, multi-media filters, and disinfection. Treated water is stored in a 6 million-gallon reservoir, which supplies water into the distribution system. Decanted water from the solids removal process is returned to Palmdale Lake. The plant is currently undergoing a second phase of improvements designed to meet Stage II Disinfection-by-Products regulations. Improvements include additional filters and adding Granulated Activated Carbon contactors to the processes. This will allow the continued use of chlorine as the disinfectant and increase the capacity to 35 mgd.

The Quartz Hill WTP was the first plant built by AVEK. The treatment plant receives water by gravity flow from the California Aqueduct. Screening and metering are provided at the head of the plant, followed by treatment chemical addition, flash mixing, tapered energy flocculation, clarification utilizing traveling bridges for sediment removal, dual media filters, and disinfection. Treated water is stored in a 9.2 million-gallon reservoir which supplies water by gravity into the distribution system. Decanted water from the solids removal process is returned to the plant influent. After the completion of a second expansion in 1989, the Quartz Hill WTP became capable of producing 65 mgd, enough to serve the needs of 280,000 consumers. The Quartz Hill WTP is planning a conversion of its disinfection system from chlorine to ozone/chloramines. This conversion will significantly reduce the levels of trihalomethanes (THMs) from the treated water, which was previously limiting LACWWD 40 from implementing their ASR program.

Expansion of the Eastside WTP located between Littlerock and Pearblossom to 10 mgd was completed in late 1988. It now serves the needs of about 44,000 consumers.

Table 3-26 Comparison of SWP Water Quality Criteria (2004) to SWP Actual Data (All values in µg/L unless otherwise noted)

Constituent	SWP Pumpback Criteria (Max)	SWP Water Quality Data (Sta. KA017226)(a)(b)			Current Drinking Water Standards (2006)
		Max.	Min.	Avg.	
Aluminum	527				50-200[2]
Antimony	5	1	1	1	6
Arsenic	4	3	1	2	10
Barium	680				2,000
Beryllium	1	1	1	1	4
Bromide	540	400	70	180	No standard
Cadmium	5				5
Chromium	110	3	1	1.8	100
Copper	280	3	1	1.9	1,300
Fluoride	550	<100	<100	<100	4,000
Iron	416	40	8	19	300[2]
Manganese	60	5	5	5	50[2]
Mercury	1				2
Nickel	4				No standard
Nitrate as N (mg/L)	9.6	1.5	0.31	0.78	10
Selenium	2	2	1	1.3	50
Silver	5				100[2]
Sulfate (mg/L)	99	72	20	38.2	250[2]
Total Organic Carbon (mg/L)	9.3	6.9	2.6	4.14	No standard
Zinc	210	5	5	5	5,000[2]
TDS (mg/L)	No criteria	368	124	232.9	500[2]
Specific Conductance (µS/cm)	No criteria	620	218	407.6	No standard
Chloride (mg/L)	No criteria	124	24	60.1 l	250[2]

Notes:

(2) a secondary standard.

(a) SWP Water Quality data collected by DWR between 2/01/05 and 2/01/06.

(b) SWP Water Quality data not shown was not sampled by DWR.

The 14 mgd Rosamond WTP was established to support the needs of consumers in southeastern Kern County, an area that includes Rosamond, Mojave, California City, Edwards AFB and Boron. Rosamond WTP is capable of providing water for 60,000 consumers.

The 4 mgd Acton WTP was completed in 1989. Water is pumped from the plant site near Barrell Springs Road, on Sierra Highway, to Vincent Hill Summit. From there it is pumped into a Los Angeles County Waterworks pipeline for transport to the Acton area. The plant's capacity is sufficient to supply the needs of 17,000 consumers. The treated water from these facilities is generally considered to be excellent quality.

3.2.3 Wastewater and Recycled Water Quality

Once the Palmdale and Lancaster WRPs, and the RCSD WWTP are upgraded, as outlined in the Antelope Valley Facilities Planning Report (LACWWD 40 2006), the tertiary treated effluent will be of sufficient quality to meet unrestricted use requirements. It may then be used for irrigating the landscapes of freeways, parks, schools, senior complexes and new home developments. The effluent will also meet all Waste Discharge Requirements (WDRs). Revised WDRs for the Lancaster WRP were issued in spring 2007 and are expected near the end of 2007 for the Palmdale WRP. For recharge of recycled water, blending or additional water quality requirements may be needed.

3.2.4 Local Surface Water and Stormwater Runoff Quality

Littlerock Reservoir, jointly owned by PWD and LCID, is the only developed surface water source in the Antelope Valley Region. This reservoir collects runoff from the San Gabriel Mountains, and has a storage capacity of 3,500 AF (PWD 2001). The reservoir discharges to Lake Palmdale and the water is ultimately treated by PWD's WTP. The quality of the water in Lake Palmdale is considered good.

Draft amendments to the Basin Plan dated August 2007 are currently under public review. These amendments include a specific ammonia objective for Amargosa Creek downstream of the LACSD 14 discharge point, and to the Piute Ponds and associated wetlands based on the USEPA 1999 freshwater criteria for total ammonia. This objective is pH and temperature dependent and shall not exceed the acute and chronic limits more than once every three years, on average. In addition, the highest four-day average concentration for total ammonia in a 30-day period can not exceed 2.5 times the chronic toxicity limit.

3.2.5 Regional Water Quality Issues, Needs, Challenges, and Priorities

The key issues, needs, challenges, and priorities for the Antelope Valley Region with respect to water quality include the following, which are discussed in greater detail below:

- Concern for meeting water quality regulations for groundwater recharge;
- Closed basin with no outfall for discharge;
- Must provide wastewater treatment for growing population;
- Meeting evolving regulations; and
- Handling emerging contaminants.

3.2.5.1 Concern for Meeting Water Quality Regulations for Groundwater Recharge

There are a variety of source waters that could be available for recharge into the groundwater of the Antelope Valley Region. They include, but are not limited to:

State Water Project:

- Treated potable water or
- Untreated raw water direct from the California Aqueduct.

Reclaimed Water (for spreading only or blending):

- Secondary or
- Tertiary treated.

Additional water from outside of the basin (such as imported desalinated water) with water quality such that its use would not compromise the water quality within the basin.

The water quality of the recharged water depends on which supply is used. There are restrictions to the quality of the water recharged as outlined in the Lahontan Regional Water Quality Control Board (RWQCB) Basin Plan. Recharge source water would need to meet these requirements before recharge could occur. Additionally, requirements are stricter for water that is injected versus water that is infiltrated.

The current waiver prevents injection of water that has THM levels greater than 40 ppb. AVEK's current treatment process does not consistently produce water that meets this requirement. However, their planned conversion of disinfection facilities to the use of a combination of ozone and chloramines will achieve the THM levels required for injection. The conversion is currently underway. However, LACWWD 40 continues injection as long as the average THM levels are under 40 ppb for the injection cycle.

3.2.5.2 Closed Basin with No Outfall for Discharge

As described in Section 2, the Antelope Valley Groundwater Basin is a closed topographic basin with no outlet to the ocean. Therefore, any treated effluent (recycled water) generated in the Antelope Valley Region must be percolated, reused, evaporated, or transpired by plants. This places great responsibility on the wastewater treatment providers in the Antelope Valley Region to provide alternative effluent management methods while still being compliant with their WDRs.

3.2.5.3 Must Provide Wastewater Treatment for Growing Population

Population increases in the Antelope Valley Region will result in higher wastewater flow rates and the need to provide additional wastewater treatment and effluent management capacity. As mentioned above, the groundwater basin is a closed basin, so all treated effluent must be managed (e.g., reuse, evaporation, and percolation) and cannot simply be discharged to an ocean outlet. The ability to meet increased wastewater demands is a great concern.

The Lancaster WRP has a current design capacity of 16.0 mgd; it is projected that its wastewater flow rate will be

26.0 mgd in the year 2020 (LACSD 2004). As the volume of wastewater treated at the Lancaster WRP has increased, the effluent volume has exceeded the capacity of the Lancaster WRP's effluent management sites, which results in overflows onto Rosamond Dry Lake, located on Edwards AFB, for up to nine months of the year (LACSD 2004).

The Palmdale WRP is also planning for increased demand, since the current 15.0 mgd capacity of the WRP is projected to be reached by 2013 (LACSD 2005). The Palmdale WRP has a planned capacity of 22.4 mgd by 2025. In the past, Palmdale WRP handled its effluent in three ways: land application, agricultural irrigation above agronomic rates, and agricultural reuse (LACSD 2005). Revised WDRs for the Palmdale WRP in 2000 phased out land application and agricultural irrigation above agronomic rates as effluent management methods caused the WRP to provide for alternative effluent management methods in its 2025 Plan (LACSD 2005).

3.2.5.4 Meeting Evolving Regulations

In response to groundwater quality concerns, the RWQCB Lahontan Region is revising the WDRs for WRPs in the Antelope Valley Region. The ability to comply with these evolving regulations is expected to be both economically and technologically challenging.

3.2.5.5 Emerging Contaminants

Emerging contaminants of concern such as arsenic and nitrate will require water suppliers, WRPs, and WTPs to conduct routine monitoring and sampling of their systems and could impact their treatment methods. The ability to remove these emerging contaminants also has a positive economic impact on the agricultural community since it reduces the damage to crops. It also benefits the WRPs and WTPs striving for compliance with more stringent WDRs.

Additionally, the following AB 3030 elements relate to water quality management within the Antelope Valley Region. A discussion of how these elements are addressed in this IRWM Plan is provided below.

The Control of Saline Water Intrusion. Seawater intrusion is a natural process that occurs in nearly all coastal aquifers, and is a condition of salt water flowing in to freshwater aquifers. Seawater intrusion becomes a problem when excessive pumping of freshwater from an aquifer reduces the water pressure and draws seawater into new areas, degrading the water quality of those new areas. Since the Antelope Valley Region is not a coastal community, this AB 3030 plan element is not applicable. Furthermore, existing evidence suggests that the possibility of saline intrusion from other nearby aquifers is not likely because the basin is a closed basin.

Identification and Management of Wellhead Protection Areas and Recharge Areas. Identification and management of wellhead protection areas and recharge areas are important to both the quality of groundwater within the Antelope Valley Region, and for providing storage of available supplies in underground aquifers. Several groundwater recharge projects are being considered and evaluated as part of this IRWM Plan. The Antelope Valley State Water Contractors Association's (AVSWCA) "Study of Potential Recharge Areas in the Antelope Valley" (2002) evaluated, identified, and ranked potential recharge sites within the Antelope Valley Region. Additionally, AVEK is considering an agricultural in-lieu recharge program, and Lancaster, Palmdale, and PWD are all proposing recharge projects or feasibility studies as part of this IRWM Plan. Each of these projects is discussed in detail in Section 5, Water Management Strategies.

Identification of wellhead protection areas will also be examined in this IRWM Plan.

Regulation of the Migration of Contaminated Groundwater. Groundwater quality within the Antelope Valley Groundwater Basin is excellent within the principal aquifer but degrades toward the north. The main emerging contaminant of concern in the Antelope Valley Region is arsenic. LACWWD 40's Arsenic Mitigation Project, part of this IRWM Plan, is one project under design to mitigate recent arsenic contamination. Other projects proposed to address this management component include recycled water projects that call for the regulation of the discharge of treated effluent into the local groundwater basins.

Administration of a Well Abandonment and Well Destruction Program. The purpose of a well abandonment and well destruction program is to regulate such activities for water, agricultural, or other wells (i.e., industrial, monitoring, observation, etc.) so that groundwater in the Antelope Valley Region will not be contaminated or polluted, and water obtained from wells will be suitable for beneficial use and will not jeopardize the health, safety or welfare of the people of the Antelope Valley Region. Administration of such a program could, for example, come through issuance of a countywide well destruction ordinance. This groundwater management component is considered as a potential management action within Section 6.

Identification of Well Construction Policies. Similar to the program purpose discussed above, a well construction

policy is intended to regulate the construction, reconstruction, or modification of water, agricultural, or other wells (i.e., industrial, monitoring, observation, etc.) so that groundwater in the Antelope Valley Region will not be contaminated or polluted, and water obtained from wells will be suitable for beneficial use and will not jeopardize the health, safety or welfare of the people of the Antelope Valley Region. Administration of such a policy could, for example, come through issuance of a countywide well construction ordinance. This groundwater management component is considered as a potential management action within Section 6.

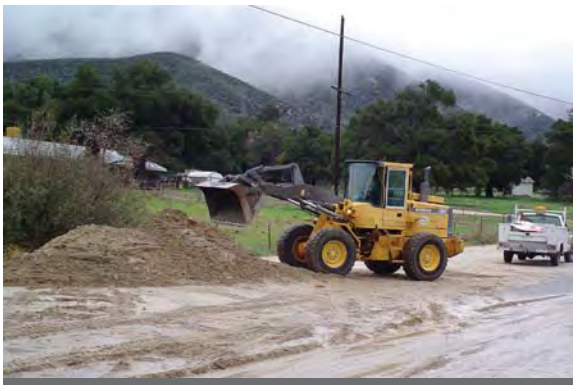
Construction and Operation by Local Agency of Groundwater Contamination Cleanup, Recharge, Storage, Conservation, Water Recycling, and Extraction Projects. This IRWM Plan includes an assessment of potential groundwater contamination clean-up (i.e., Arsenic Mitigation Project), recharge, storage, conservation, and expansion of existing water recycling projects. The potential projects are discussed in Section 5, "Water Management Strategies."

3.3 FLOOD MANAGEMENT ASSESSMENT

The Antelope Valley Groundwater Basin is a closed basin without a natural outlet for storm runoff (LADPW 1987). Numerous streams originating in the mountains surrounding the Antelope Valley Region carry highly erodible soils onto the Antelope Valley Region floor, forming large alluvial river washes. Streams then meander across the alluvial fans in ill-defined paths subject to change. Precipitation ranges on average less than 10 inches per year on the Antelope Valley Region floor, to more than 12 inches in the surrounding mountains (Rantz, 1969 as cited in USGS 1995). Portions of the Antelope Valley Region floor are subject to flooding due to uncontrolled runoff from these nearby foothills (City of Lancaster 1997), and this situation is aggravated by lack of proper drainage facilities and defined flood channels in the Antelope Valley Region. Heavy discharge and flooding is also prevalent along Big Rock Creek, Little Rock Creek, Amargosa Creek, and Anaverde Creek. Heavy rainfall and summer thunderstorms increase the potential for flash floods.

Stormwater runoff that does not percolate into the ground eventually ponds and evaporates in the impermeable dry lake beds at Edwards AFB near the Los Angeles/Kern County line (LADPW 1987). This 60 square mile playa is generally

Portions of the Antelope Valley are subject to heavy flooding due to uncontrolled runoff from nearby foothills and lack proper drainage facilities.



The lack of coordinated flood control is problematic in the Antelope Valley Region.

dry but is likely to be flooded following prolonged precipitation. Fine sediments carried by the stormwater inhibit percolation as does the impermeable nature of the playa soils (LADPW 1987). Surface water can remain on the playa for up to five months, until the water evaporates (LADPW 2006).

Examples of existing flood control facilities include the engineered channels and retention basins on Amargosa Creek. Storms of a 20-year frequency or greater can, however, overflow these facilities (LACSD 2005). There is also a flood retention basin along Anaverde Creek; when this basin is overtopped flooding occurs in the vicinity of 20th Street East, 30th Street East, and Amargosa Creek.

Following severe flooding in the Antelope Valley Region in 1980, 1983, and 1987, the LADPW prepared the "Antelope Valley Comprehensive Plan of Flood Control and Water Conservation." This plan proposed flood plain management in the hillside areas, structural improvements in the urbanizing areas, and non-structural management approaches in the rural areas. In the hillside areas the plan recommended restricting development to areas outside of entrenched watercourses. In the Antelope Valley Region area, much of which is flood-prone, the plan recommended improvements such as open channel conveyance facilities and storm drains through communities, as well as detention and retention basins located at the mouths of the large canyons (LADPW 1987). Both the City of Palmdale and the City of Lancaster have incorporated major elements of the Los Angeles County "Comprehensive Plan of Flood Control and Water Conservation" into their own planning efforts. However, there are no identified funding mechanisms or schedule for major improvements except in the established areas of Palmdale, Lancaster, and along Amargosa Creek (City of Lancaster 1997, LADPW 2004). Cities have annexed portions of Los Angeles County, and this, coupled with a gradual decrease in housing construction since the early 1990s has limited County revenue from developer fees necessary to fund the construction of facilities in the unincorporated areas of Antelope Valley Region.

In 1991, LADPW teamed with the cities and unincorporated communities on a ballot measure whereby the entire Antelope Valley Region would be included within the Los Angeles County Flood Control District or a new Antelope Valley Flood Control District would be formed (LADPW 2004). That measure failed, as did a similar measure in Kern County, and new measures proposed regionally in 2006. The lack of coordinated flood control is problematic and will worsen as urban development and associated impervious surfaces increase the potential amount of runoff and local flooding.

3.3.1 Regional Flood Management Issues, Needs, Challenges, and Priorities

The key issues, needs, challenges, and priorities for the Antelope Valley Region with respect to flood management include the following, which are discussed in greater detail below:

- Lack of coordination throughout Antelope Valley Region;
- Poor water quality of runoff;
- Nuisance water and dry weather runoff;
- Difficulty providing flood control without interfering with groundwater recharge; and,
- Desire of Edwards AFB to receive sediments into the dry lakes to maintain operations area.

3.3.1.1 Flood Management Efforts are not Well Coordinated throughout Antelope Valley Region

Flood management efforts are currently performed by local jurisdictions within their particular area (e.g., City of Palmdale undertakes flood control within its boundaries), but there is not a regional entity that coordinates flood control for the entire Antelope Valley Region. In the past, Los Angeles County prepared a regional plan for flood control, but its implementation has been hindered by a lack of funds. Ballot measures that would result in the creation of regional flood control districts have failed in the Antelope Valley Region.

3.3.1.2 Poor Water Quality of Runoff

Stormwater flow from the mountain areas to the Antelope Valley Region traverse highly erodible soils, which results in significant transport of sediments. On the Antelope

Valley Region floor natural drainage channels are poorly defined and runoff is almost entirely sheet flow. This sheet flow intermixes with the urban environment and picks up contaminants (pesticides, plastics, oil, gasoline, radiator fluid, and animal wastes). The end result is that toxic pollutants are found in stormwater runoff including lead, zinc, copper, arsenic, chromium, cadmium, nickel, cyanide, and asbestos (Lahontan RWQCB 1994). In mountainous areas, runoff containing salt and other de-icing chemicals used on roads and parking lots during the winter is of concern. Stormwater quality also varies with time. During dry periods pollutants accumulate on pavement and then are flushed into surface waters in high concentrations by the first significant rainstorm. Runoff from later storms may have lower pollutant concentrations. Desert flash floods and summer thunderstorms can result in high pollutant loads in stormwater.

Runoff from urban areas is increasing as the Antelope Valley Region develops. The heavy sediment content and urban runoff contaminants make this storm water flow undesirable for many uses. Poorly planned urban development further upsets the natural interactions within a watershed and degrades water quality through the following types of primary impacts: direct impacts, such as filling and excavation of wetlands, riparian areas, drainages, and other waters; generation of pollutants during and after construction; alteration of flow regimes and groundwater recharge by impervious surfaces and stormwater collector systems; and disruption of watershed-level aquatic functions, including pollutant removal, flood water retention, and habitat connectivity. These impacts typically degrade water quality, increase peak flows and flooding, and destabilize stream channels, resulting in engineered solutions to the disrupted flow patterns, and ultimately, near-total loss of natural functions and values in the affected basins. Impacts must be minimized through municipal stormwater programs that require use of Best Management Practices (BMPs) and conditions to be placed on new development proposals.

3.3.1.3 Nuisance Water and Dry Weather Runoff

Stagnant or nuisance water is standing water that ponds and fails to infiltrate even after prolonged periods. In the Antelope Valley Region there are several areas with impervious soils (including the dry lakes at Edwards AFB) and perched clay layers prone to supporting nuisance water.

Dry-weather runoff is defined as urban runoff water that enters the drainage system due to human activities (e.g., car washing, lawn irrigation). Dry-weather runoff can also result from illicit connections to the storm water or sewer systems. Dry-weather runoff concentrates contaminants in urban runoff and can negatively affect the water quality of receiving waters (e.g., groundwater).

3.3.1.4 Difficulty in Providing Flood Management without Interfering with Groundwater Recharge

The Antelope Valley Region is underlain by groundwater, which is a major source of water supply in the area. An aggressive flood management program could slow, limit, or direct groundwater recharge to unfavorable areas. In addition, groundwater recharge focused on recharge of stormwater flows could introduce urban runoff contaminants into the groundwater aquifer. Ideally, excess stormwater could be properly treated and directed to areas that allow recharge of groundwater.

3.3.1.5 Desire of Edwards AFB to Receive Sediments into the Dry Lakes to Maintain Operations Area

Sediment carried by storm flows on Little Rock and Big Rock creeks eventually end up in the dry lake beds at Edwards AFB. Edwards AFB has established runways on these lake beds. Flood waters and the resulting siltation act to "resurface" and naturally restore the elevation of the dry lake beds. It is a challenge to design storm flow facilities that will both control flood flows while maintaining sedimentation at the dry lakes. In 1983, stormwater flows were too great and took the runways out of operation (LADPW 1987).

3.4 ENVIRONMENTAL RESOURCE MANAGEMENT ASSESSMENT

The Antelope Valley Region is part of a subbasin within the Mohave Desert. The climate and physical environment is typical of the high desert with the exception of the southern edge of the Antelope Valley Region which includes a cooler upland area. The area has many unique environmental features and several plant and animal species are endemic to this desert area.

General Habitat Types. The Antelope Valley Region is generally flat and sparsely vegetated, but is interspersed with buttes, mountain ranges, and dry lakes (Bureau of Land Management [BLM] 2005). Rogers Lake is the largest and flattest playa in the world (BLM 2005). Freezing temperatures are limited to a few winter days but in the summer temperatures often exceed 100 degrees

The area has many unique environmental features and several plant and animal species are endemic to this desert area.

Fahrenheit. The Antelope Valley Region is characterized by creosote bush and saltbush plant communities which make up approximately 75 percent of the natural lands in the Western Mojave Desert. A small percentage of natural lands in the area can be characterized as Mojave mixed woody scrub community. A very small percentage of the Antelope Valley Region could be characterized as freshwater or alkali wetlands (BLM 2005). A comprehensive delineation of wetlands in the Antelope Valley Region has not been conducted. However, the Antelope Valley Region is home to numerous desert washes (Little Rock Creek, Big Rock Creek), as well as man-made lakes (Little Rock Creek Reservoir, Lake Palmdale), sag ponds (an enclosed depression formed where active or recent fault movement results in impounded drainage), and areas of rising groundwater. Freshwater marsh and alkaline meadow habitat is found in the vicinity of Piute Ponds. While wetland and riparian areas are limited in the Antelope Valley Region, these areas are important resources to birds migrating along the Pacific Flyway (LACSD 2004).

The unique habitat of Antelope Valley Region means the Antelope Valley Region is also home to several special status species, including plants, reptiles, birds, and mammals. Several regulatory protections and practices for these special status species are in place in the Antelope Valley Region, such as Significant Ecological Area (SEA) designations by Los Angeles County, Desert Wildlife Management Area (DWMA) designations by U.S. Fish and Wildlife Service (USFWS), and development of a Habitat Conservation Plan (HCP) by the (BLM).

Significant Ecological Areas. SEAs are defined by Los Angeles County and generally encompass ecologically important or fragile areas that are valuable as plant or animal communities and often important to the preservation of threatened or endangered species. Preservation of biological diversity is the main objective of the SEA designation. SEAs are neither preserves nor conservation areas, but areas where Los Angeles County requires development to be designed around the existing biological resources (Los Angeles County 2006). Design criteria in SEAs include maintaining watercourses and wildlife corridors in a natural state, set-asides of undisturbed areas, and retaining natural vegetation and open space (Los Angeles County 1986).

Significant Ecological Areas in the Antelope Valley Region include:

- **Edwards AFB (SEA No. 47).** This area contains botanical features unique and limited in distribution, including the Mojave spineflower and the only healthy stands of mesquite in Los Angeles County (Los Angeles County 1986). The Edwards AFB SEA also has an alkali sink community, a plant community adapted to salty soils (Los Angeles County 1986).

- **Big Rock Wash (SEA No. 48) and Little Rock Wash (SEA No. 49).** These areas have been designated as SEAs because desert washes act as wildlife movement corridors, possess a greater diversity than surrounding areas, and are important to the stability of the desert ecosystem. Little Rock wash is the largest wash habitat in Los Angeles County. Scrub habitats and desert riparian plant communities are found within these wash areas. The comparatively dense plant growth found in Big Rock Wash and Little Rock Wash provides nesting habitat for many bird species. The wash banks provide habitat for burrowing mammal species (Los Angeles County 1986).
- **Rosamond Lake (SEA No. 50).** Rosamond Lake is home to both shadescale scrub communities and the Great Basin kangaroo rat; both species are rare in southern California. Rosamond Lake also supports an alkali sink biotic community. The Piute Ponds, which are within this SEA, provide over 300 acres of wetlands and act as important wintering grounds for waterfowl and open water for birds traveling along the Pacific Flyway (Los Angeles County 1986, LACSD 2004).
- **Saddleback Butte State Park (SEA No. 51), Alpine Butte (SEA No. 52), Lovejoy Butte (SEA No. 53), and Piute Butte (SEA No. 54).** Desert butte habitat has increased biological diversity relative to surrounding areas. The steep slopes of buttes act as refuges for many biological resources. Desert buttes provide roosting and nesting areas for birds, as well as den sites for mammals. The butte SEAs include desert wildflower habitat and Joshua tree woodland areas. Saddleback Butte has a desert wash area. The Mojave ground squirrel (listed as "Threatened" under the California Endangered Species Act and "Special Concern" by the federal Endangered Species Act) is known to exist at Saddleback Butte State Park, and suitable habitat for the species is also found at Alpine Butte, Lovejoy Butte, and Piute SEAs.
- **Desert-Montane Transect (SEA No. 55).** The Desert-Montane transect is representative of the transition between the Mojave Desert and the northern slopes of the San Gabriel Mountains. The combination of desert and montane habitats makes this one of the most diverse areas in the County. Beside creosote bush scrub, sagebrush scrub, and Joshua tree woodland found in the desert floor, this area also includes pinyon-juniper woodland, desert chaparral, and mixed conifer forest habitat. While some of these are considered common habitats, the area is valuable because this SEA is the only site where these communities are found in an uninterrupted band (Los Angeles County 1986).
- **Fairmont and Antelope Buttes (SEA No. 57).** These buttes have benefits similar to those described above. However, as these are the westernmost buttes in the Antelope Valley Region, they have a different species composition than other buttes in the Antelope Valley Region (Los Angeles County 1986).

In addition to the existing SEAs, Los Angeles County has proposed an Antelope Valley Region SEA. This proposed SEA would encompass or consolidate many of the existing SEAs in the Antelope Valley Region and as proposed extends from the area south of Palmdale to the area north of Edwards AFB (LACSD 2004).

Ritter Ridge and Portal Ridge/Liebre Mountain SEAs are also described in the Antelope Valley Region Areawide Plan. However, they reside in the Sierra Pelona foothills, which is outside of this IRWM Plan boundary.

West Mojave Plan. The West Mojave Plan is an HCP developed by the BLM with collaboration from multiple other jurisdictions and agencies, including the City of Palmdale, City of Lancaster, Los Angeles County, the California Department of Fish and Game, and the US Fish and Wildlife Service (USFWS). The West Mojave Plan also acts to amend the California Desert Conservation Area Plan. The Planning Area for the West Mohave HCP includes the entire Antelope Valley Region. The objective of the West Mojave HCP is to develop a comprehensive strategy to preserve and protect the desert tortoise, the Mohave ground squirrel, and over 100 other sensitive plants, animals and habitats. The West Mohave HCP would establish additional conservation areas for the desert tortoise and Mohave ground squirrel and alter allowable motorized vehicle routes on BLM managed lands. Jurisdictions that have adopted the West Mojave HCP must follow the selected conservation strategies, but benefit from a streamlined process when permitting activities that may affect endangered species covered by the plan (BLM 2005).

Open Space Areas. The open space and rural character of the Antelope Valley Region is treasured by many of its residents. During a poll conducted as part of its General Plan Update, the City of Lancaster found that "open space," "views," and "desert environment" were commonly cited as key to the area's quality (City of Lancaster 2006). Typical population densities in southern California suburban areas generally range from roughly 2,500 persons per square mile and increase to more than 7,500 persons per square mile in urbanized areas. By comparison, the high desert area (Mohave Desert in general) only averages about 680 persons per square mile (BLM 2005). The Census Bureau utilizes a minimum threshold of 1,000 persons per square mile to denote an urbanized setting. The Antelope Valley Region is characteristic of a large rural environment.

3.4.1 Important Ecological Processes

The ecological integrity of the Antelope Valley Region includes a critical range of variability in its overall biodiversity, important ecological processes and structures, regional and historical context, and sustainable cultural practices. The ability to maintain biodiversity and ecosystem health while accommodating new growth is a challenge in the Antelope Valley Region, which is home to a variety of unique and sensitive species endemic to the area. An overriding consideration becoming more prevalent with the implementation of the West Mojave Plan is the promotion of ecosystem processes that sustain a healthy desert ecosystem. Knowledge to support management decisions will require improved understanding of desert ecology.

We need to understand processes that change ecosystem dynamics because they are the most effective tools available to land managers who are asked to maintain or restore the health of the natural environment. Important ecological processes in the Antelope Valley Region include competition (for nutrients, water, and light), fire, animal damage, nutrient cycling, carbon accumulation and release, and ecological genetics.

Understanding genetic structure is basic knowledge for implementing biologically sound programs dealing with breeding, restoration, or conservation biology, all of which is at the basis of the West Mojave Plan for endangered species in the Region (e.g., desert tortoise and Mohave ground squirrel). Genetic structure also determines responses to changing conditions regardless of whether change is induced by management, lack of management, fluctuating climatic gradients, or global warming.

3.4.2 Regional Environmental Resource Issues, Needs, Challenges, and Priorities

The following is a list of the key issues, needs, challenges, and priorities for environmental management within the Antelope Valley Region, as determined by the stakeholders:

- Conflict between industry, growth, and preserving open space;
- Desire to preserve open space;
- Protecting endangered species (desert tortoise, Mojave ground squirrel, burrowing owl); and
- Removing invasive non-native species from sensitive ecosystems.

3.4.2.1 Conflict between Industry, Growth and Open Space/Desire to Preserve Open Space

As described earlier, because of its proximity to the Los Angeles Area, the Antelope Valley Region is subject to increasing demand for community development, recreation, and resource utilization. As described in Section 2.6, population in the Antelope Valley Region is expected to increase by 121 percent between 2005 and year 2020. Some of this growth will result in conversion of agricultural land but some of this growth will occur in areas that are currently natural areas. Loss of both agricultural acreage and natural areas decreases the amount of open space in the Antelope Valley Region.

3.4.2.2 Threatened and Endangered Species

Pressures for growth and recreational activities in the Antelope Valley Region have been linked to significant declines in desert species. Growth of urban areas results in loss of available or suitable habitat for sensitive species. Studies of the desert tortoise have shown a significant downward decline in the population from 1975 to 2000 (USFWS 2006). Besides loss of habitat, proximity to human development can be harmful to sensitive species. Human development introduces roadway traffic, pesticides, urban runoff, and non-native species, which degrade habitat and food sources for sensitive species. Land use practices, such as cattle and sheep grazing and mining are also considered harmful to many species. Recreational uses, such as off-highway vehicle use are known to conflict with sensitive species habitat. For example, a vehicle traveling over a tortoise burrow could cause a desert tortoise to be trapped inside the burrow or make the burrow unusable when they are needed to escape predation or extreme weather conditions (USFWS 2006). In recreational areas sensitive wildlife may seek shelter in the shade of vehicles and be crushed when those vehicles are subsequently moved. Improper disposal of food wastes and trash by recreational users often attracts predators of the sensitive species, such as common ravens. Dogs brought onto public lands by recreational visitors can also disturb, injure, or kill sensitive species.

3.4.2.3 Non-native Species

Non-native species (such as arundo and tamarisk) are listed as 'A-1' invaders (the most invasive and widespread wildland pest plants) by the California Invasive Plant Council and as noxious weeds by the California Department of Food and Agriculture (CDFA). While the degree and specifics of problems associated with these species vary, general nega-

tive effects associated with the establishment of tamarisk within the Antelope Valley Region include the following:

- **Water Quality:** Reduction in the shading of surface water, thereby resulting in reduction of bank-edge river habitats, higher water temperature, lower dissolved-oxygen content, elevated pH, and conversion of ammonia to toxic unionized ammonia. Tamarisk also increases salinity by depositing its highsalt leaves.
- **Water Supply:** Loss of surface and groundwater through heavy consumption and rapid transpiration.
- **Flooding:** Obstruction of flood flows with associated damage to public facilities, including bridges and culverts, and to private property, such as farmland.
- **Erosion:** Increased erosion of streambanks, associated damage to habitats and farmlands due to channel obstructions, and decreased bank stability associated with shallow-rooted arundo.
- **Fire Hazards:** Substantially increased danger of wildfire occurrences, intensity, and frequency, and a decrease in the value that riparian areas provide as firebreaks or buffers when infested with arundo.
- **Native Habitats:** Displacement of critical riparian habitat through monopolization of soil moisture by dense monocultures of arundo and tamarisk.
- **Native Wildlife:** Reduction in diversity and abundance of riparian-dependent wildlife due to decreased habitat quality, loss of food and cover, and increased water temperatures.
- **Threatened and Endangered Species:** Substantial reductions in suitable habitat available for state and federally listed species such as the least Bell's vireo.

> *"[The Integrated Regional Water Management Plan] will be that final mechanism necessary for us to take action and actually show progress to our community…"*
>
> – Adam Ariki,
> Los Angeles Waterworks District No. 40

In particular, tamarisk is a growing concern in the area near Piute Ponds.

3.5 LAND USE MANAGEMENT ASSESSMENT

Cities and counties (for unincorporated areas) are the regulatory agencies responsible for land use planning within the State of California. Land use regulations and policies such as general plans, zoning ordinances, California Environmental Quality Act (CEQA) compliance, and permit conditions can be valuable policy and implementation tools for effective water management. The California Government Code establishes requirements for the development of General Plans to guide land use decisions, of which water resources play an important role. Water resources is typically not an 'element' of a General Plan, but is discussed within the context of the General Plans required 'elements'; land use, circulation, housing, conservation, open space, noise, and safety.

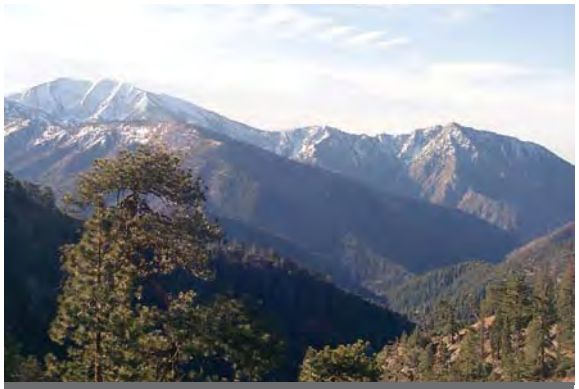
Land uses within the Antelope Valley Region are provided for in local and regional policies and regulations, including the Los Angeles County General Plan (adopted in 1980), the Antelope Valley Areawide General Plan (adopted December 1986), Kern County General Plan (approved June 2004), the City of Palmdale General Plan (last updated 1993) and the City of Lancaster General Plan (last updated 1997). The Los Angeles County General Plan has not been comprehensively updated since its adoption in 1980; the County is currently involved in a multi-year planning effort to update its General Plan.

Recent legislation has also addressed the gap between land use planning and water resource management. In 2001, two water supply planning bills, Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221), were enacted that require greater coordination and more extensive data to be shared between water suppliers and local land use agencies for large development projects and plans. SB 610, codified as Water Code sections 10910 and 10911, requires the public water system that may supply water to a proposed residential development project of more than 500 dwelling units (or a development project with similar water use), to prepare a water supply assessment for use by the lead planning agency in its compliance with the CEQA. Such a water supply assessment (WSA) is performed in conjunction with the land use approval process associated with the project and must include an evaluation of the sufficiency of the water supplies available to the water supplier to meet existing and anticipated future demands. SB 221 requires projects which include tentative tract maps for over 500 dwelling units to obtain verification from the water system operator that will supply the project with water, that it has a sufficient water supply to serve the proposed project and all other existing and planned future uses, including agricultural and industrial uses, in its area over a 20-year period, even in multiple dry years. SB 221 is intended as a "fail safe" mechanism to ensure that collaboration on finding the needed water supplies to serve a new large subdivision occurs before construction begins.

As growth in the Antelope Valley Region is rapidly increasing, and larger development projects are being proposed, the preparation of WSAs or written verifications pursuant to these Bills is becoming increasingly more common, forcing water purveyors in the area to question their ability to provide service to these developments. If water supplies are deemed not available, developers in the Antelope Valley Region will be required to find water outside the Antelope Valley Region in sufficient quantities to serve their projects.

3.5.1 Recreation

The Antelope Valley Region offers many recreational opportunities. The Antelope Valley Region has over 410 acres of developed park land including 21 parks, 18 lighted softball fields, two baseball fields, 15 soccer fields and 17 tennis courts. In addition there are over 3,000 acres of natural park land. Antelope Valley Region is also home to the 1,700 acre California Poppy Reserve and the Arthur B. Ripley Desert Woodland State Park. A portion of the Sierra Highway between Avenue H and the Kern County line is designated as a bikeway in the Antelope Valley Areawide Plan. Many recreational activities take place in the eastern, less populated areas of the Antelope Valley Region. BLM has identified the following types of recreational activities in the high desert: motorcycle activities, four wheel drive exploring, sight seeing, target shooting, hunting, experimental vehicles/aircraft, model rocketry, dry land wind sailing, endurance equestrian rides, hiking, mountain biking, bird watching, botany, rockhounding, camping, and picnicking.



The Tehachapi Mountains provide a scenic northern border in the Antelope Region.

3.5.2 Regional Land Use Issues, Needs, Challenges, and Priorities

The key issues, needs, challenges, and priorities for the Antelope Valley Region with respect to land use management include the following, which are discussed in greater detail below:

- Growing public demand for recreational opportunities;
- Tremendous pressure for growth in the Antelope Valley Region; and
- Loss of local culture and values.

3.5.2.1 Growing Public Demand for Recreational Opportunities

The Antelope Valley Region is located only 90 miles from downtown Los Angeles; the proximity allows residents to utilize the Antelope Valley Region as their "recreational backyard." The high desert Antelope Valley Region has attracted nearly 2 million visitor-trips a year for off-highway vehicle recreation and nearly 1.5 million visitors to State and National Parks in the area (BLM 2005). BLM estimates that 85 percent of recreational visitors to the high desert are from the urban areas of Southern California. Demand for recreational resources in the Antelope Valley Region is particularly acute due to the lack of other similar resources near these urban areas and due to a decrease in recreational opportunities elsewhere. For example, since 1980 the number of acres of off-highway vehicle recreation areas has decreased by 48 percent in California. In the same time period off-highway vehicle registrations in California increased by 108 percent (BLM 2005). As population increases in Southern California and the Antelope Valley Region, there will be increasing pressure to maintain and expand the Antelope Valley Region's recreational opportunities.

3.5.2.2 Tremendous Pressure for Growth in the Antelope Valley Region

Historically, land uses within the Antelope Valley Region have focused primarily on agriculture. This is partly dependent on the types of soils found in the area, the majority of which have been classified by the U.S. Soil Conservation Service as prime soils, which are best for agricultural production. Coupled with lower water costs and favorable climactic conditions, productivity has been maintained throughout the years, although pressures for developable land have also increased (Los Angeles County 1993). Approximately 73,000 acres of land in the Antelope Valley Region was in agricultural production in the early 1950s (USGS 1995). There was a surge in irrigated acreage when AVEK introduced SWP water to the western Antelope Valley Region in 1972 at prices competitive with the costs of pumping ground water (LADPW 1989). However, the overall trend for agricultural land use continued to decrease through the 1980s and 1990s. DWR predicts that agricultural land use will continue to decrease to approximately 900 acres in 2020 (DWR as cited in USGS 1995). This prediction does not however, account for the approximately 5,500 acres for carrot production that was developed in the Antelope Valley Region between 1995 and 2000. During the late 1980s, carrot farmers in the San Joaquin Valley undertook marketing efforts to assess the acceptability of a potential new product, "baby carrots," to the public. Response was so positive that within only a few years, an entirely new market was created. Demand for these new, smaller carrots was so high, and they were so profitable, that farmers expanded into the Antelope Valley Region and other desert regions in search of additional planting acreage. The profit margin of this crop is such that cost of water is not a limiting factor for carrot farmers.

Currently, land uses within the Antelope Valley Region are in transition as the predominant land use is shifting from agriculture, to residential and industrial. The increase in residential land use is evident from the population growth in the Antelope Valley Region. As presented in Section 2.5, growth in the Antelope Valley Region was slow until 1985, but increased rapidly (approximately 1,000 percent of the average growth rate between the years 1956 to 1985) as these land uses shifted. Population projections for the Antelope Valley Region indicate that approximately 1.26 million people will reside in the Antelope Valley Region by the year 2035, an increase of approximately 149 percent from the 2005 population (refer to Section 2.6.2 for population projections analysis). The two most populous cities in the Valley Region are Lancaster and Palmdale. As residential development continues to grow within the middle of the Antelope Valley Region, the agricultural operations are now found farther to the west and east than in previous decades.

The large migration of people to the Antelope Valley Region is primarily based on economics. With significantly lower home prices than in other portions of Los Angeles County, the Antelope Valley Region has become an attractive and affordable alternative to living in the congested and expensive Los Angeles area. Additionally, it was recognized that the Antelope Valley Region is the last large available open space "opportunity" for development, including residential, commercial/industrial, retail, and agricultural. According to the Antelope Valley Building Industry Association (BIA) (2006), the Antelope Valley Region is expected to continue to grow in population and

sustained "residential growth is necessary for a strong, vibrant economy" (BIA 2006).

3.5.2.3 Local Culture and Values Could be Lost

The Stakeholders of this IRWM Plan have expressed concerns about the changing land use trends in the Antelope Valley Region, and feel that with the tremendous pressure for growth in the Antelope Valley Region, local culture and values could ultimately be lost.

Currently, industrial land use in the Antelope Valley Region consists primarily of manufacturing for the aerospace industry and mining. Edwards AFB and the U.S. Air Force Flight Production Center (Plant 42) provide a strong aviation and military presence in the Antelope Valley Region. Reductions or realignments in the defense industry could adversely affect this presence. Mining operations also contribute to the Antelope Valley Region's industrial land uses. However, gold is no longer mined at Tropico in the Rosamond Hills, and the mining area is now operated as a tourist attraction. Borax is actively mined near Kramer. Rock and gravel quarrying is conducted in the southeastern part of the Antelope Valley Region along the mountain front. Clay used for drilling mud formerly was mined from Rosamond and Rogers Dry Lakes.

Land use shifts increase the demand for water supply and higher quality water, thereby increasing the competition for available water supplies. This change in land use and increase in supply competition affects the dependence on imported SWP and groundwater supply, affects fluctuations in groundwater levels, and heightens concerns over the potential for contamination and reliability of these sources. The ability to continue to meet the water demands of the Antelope Valley Region, while not losing focus of the local culture and values, will be a challenge for the Antelope Valley Region.

Increasing development pressures in the 1980s were in part driven by the continuing appeal of the Antelope Valley Region's high desert climate, land values lower than those in the Los Angeles metropolitan area. As the Los Angeles population rapidly expanded into the Antelope Valley Region, bringing with it the desire for more cultural amenities and new skills and resources, the Antelope Valley Region became more metropolitan in character. The increase in population and development of tract housing, retail centers and business parks has altered the formerly low density, rural and agrarian character of many local communities.

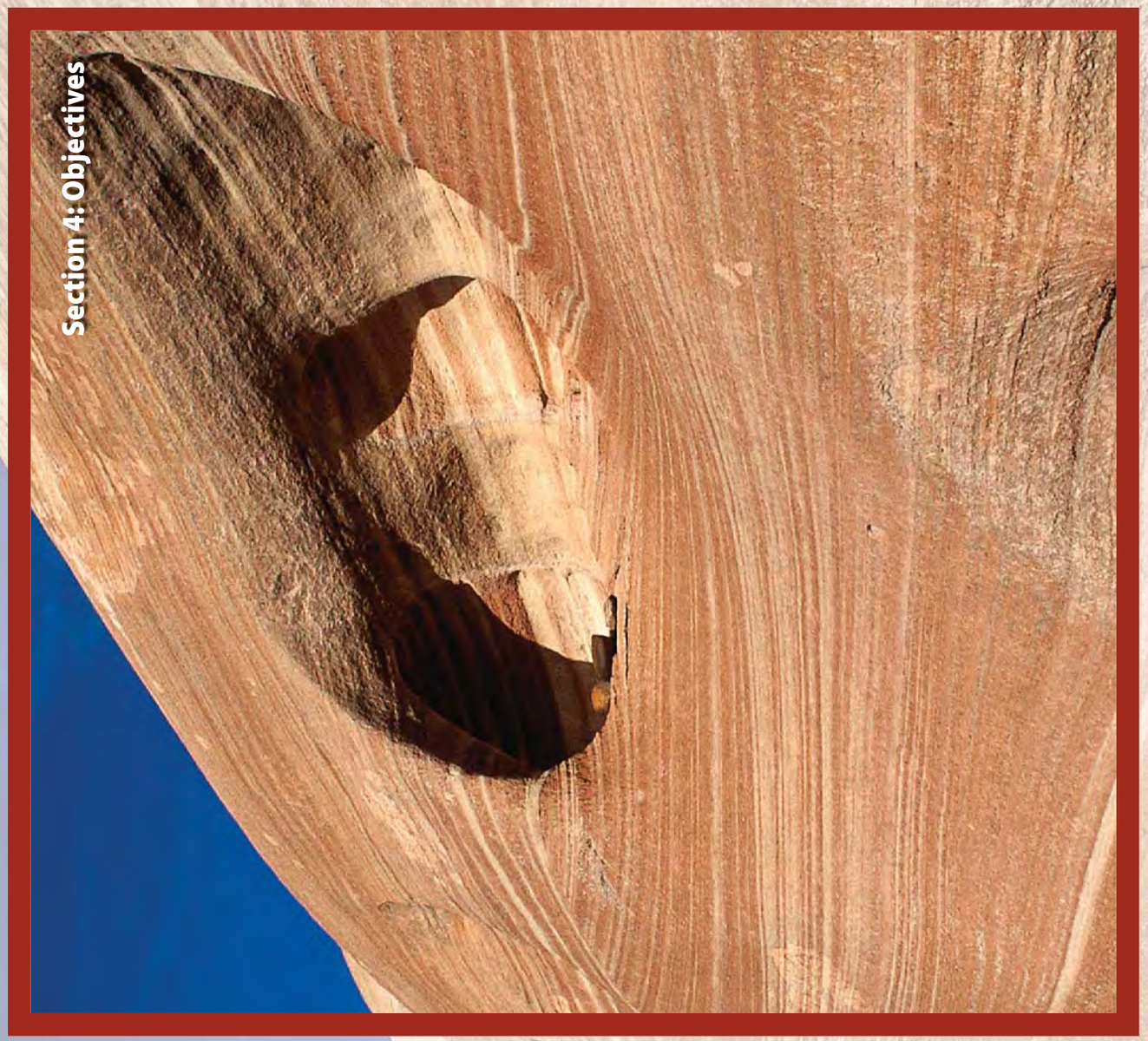
Today, competing demands are placed on limited available resources. Many of these competing demands stem from the range of local cultural values that characterize the Antelope Valley Region. Decisions regarding future land use and the dedication of water resources will need to weigh varying agricultural, metropolitan, and industrial needs as they continue to develop and as the balance between these interests continues to change.

Stakeholders commonly expressed the need to develop a balance of resources, while preserving the area's natural environment and rural history. Despite the need to ensure economic vitality and longevity by bringing new industry and employment opportunities to the Antelope Valley Region, residents of the Antelope Valley Region believe preserving a hometown feel and developing a strong sense of neighborhood stability are critical to strengthening the identity of the community and, in turn, that of the Antelope Valley Region. The preservation of existing natural open space, achieved in part through a development strategy focused on infill and parcel redevelopment combined with environmental conservation, are key components of preserving the Antelope Valley Region's rural character and strengthening the health, vitality and security of growing urban areas.

Additionally, the following AB 3030 elements also concern land use planning within the Antelope Valley Region. A discussion of how these elements are addressed in this IRWM Plan is provided below.

Development of Relationships with State and Federal Regulatory Agencies. As discussed in Section 1.2.1, several State regulatory agencies have participated in the development of this IRWM Plan and thus a relationship with these agencies has been established.

Review of Land Use Plans and Coordination with Land Use Planning Agencies to Assess Activities which Create a Reasonable Risk of Groundwater Contamination. As discussed in Section 1.2.1, several land use planning departments and agencies have participated in the development of this IRWM Plan and thus a level of coordination has been established. Additionally, as part of this IRWM Plan, projects selected for implementation are assessed for water quality and land-use impacts and integration, as well as for consistency with local and regional General Plan documents.


Section 4: Objectives

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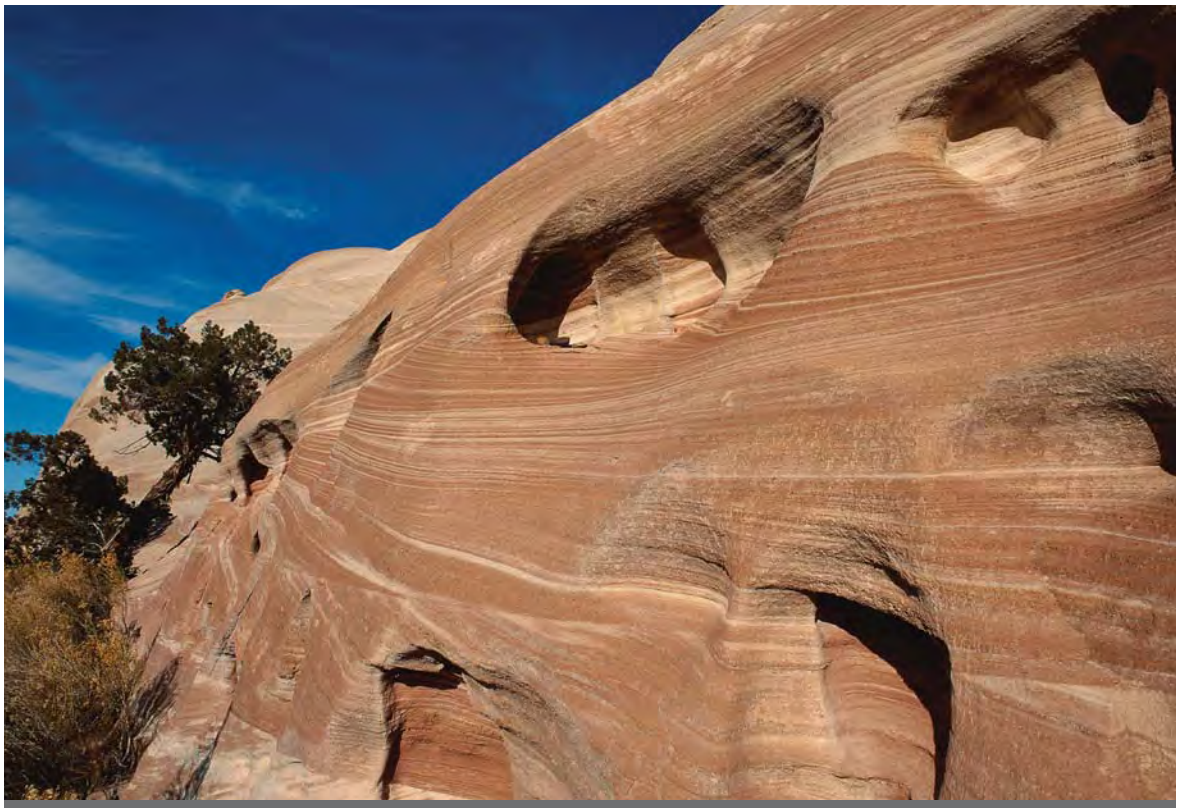


The steep slopes of desert buttes act as refuges for many sensitive and protected biological resources.

Section 4: Objectives

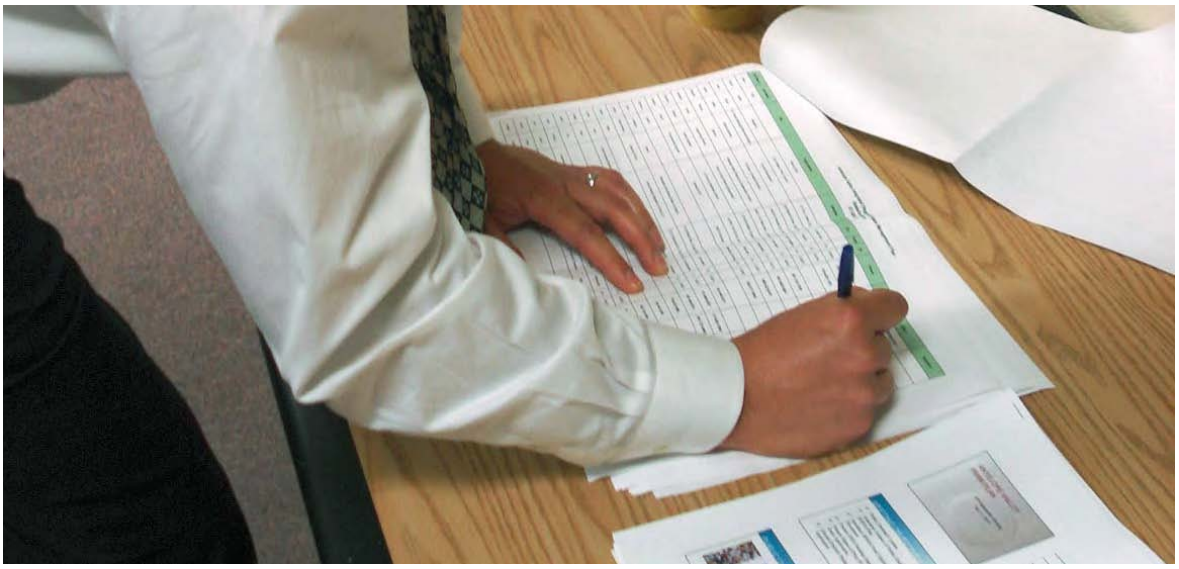
The following section presents the Integrated Regional Water Management (IRWM) Plan objectives and establishes planning targets for the Antelope Valley Region that can be used to gauge success in meeting these objectives. Objectives refer to the general intent for planning within the Antelope Valley Region, whereas the targets refer to specific measurable goals intended to meet the objectives.

4.1 OBJECTIVES DEVELOPMENT

As stated in Section 1, the primary focus of this IRWM Plan is to develop a broadly supported water resource management plan that defines a meaningful course of action to meet the expected demands for water and related resources within the entire Antelope Valley Region between now and 2035. Goals to meet this primary focus include developing a plan that will address:

- How municipal and industrial (M&I) purveyors can reliably provide the quantity and quality of water that will be demanded by a growing population;
- Options to satisfy agricultural users' demand for reliable irrigation water supplies at reasonable cost; and
- Opportunities to protect and enhance current water resources (including groundwater) and the other environmental resources within the Antelope Valley Region.

Early in the development of the IRWM Plan, the Stakeholder group was asked to brainstorm preliminary objectives for the issues and needs of concern for the Antelope Valley Region to meet these broad goals. This list was revised and a draft list of objectives presented to the Stakeholder group in December 2006. At the January 2007 Stakeholder meeting, a



draft list of objectives was discussed amongst the entire group and new stakeholder comments were reviewed and incorporated into the objectives, as appropriate. The list was then finalized and incorporated into the IRWM Plan. By accomplishing these objectives, significant benefits to the Antelope Valley Region can be achieved.

> *"The time for action has arrived, and I believe that the Integrated Regional Water Management Plan provides us the tool."*
>
> – Randy Williams, City of Lancaster

To establish quantified benchmarks for implementation of the IRWM Plan, planning targets have been identified to amplify the objectives and provide more definition to the Antelope Valley Region's major water resource needs over the planning horizon. Although the IRWM Plan is intended to address the Antelope Valley Region's water resource management needs, this document also identifies several open space, recreation, and habitat targets, as the implementation of water supply, flood management, and water quality projects have the potential to contribute towards these other Regional needs. In addition, habitat and open space projects have the potential to generate additional water supply and water quality benefits.

The objectives and planning targets are presented below (and summarized in Table 4-1) and are presented under this IRWM Plan element to which they most closely correspond.

4.2 WATER SUPPLY MANAGEMENT OBJECTIVES AND TARGETS

Water supply management objectives and targets are directly related to addressing the key issues and needs identified in the water supply assessment in Section 3, including water supply and groundwater management issues.

Objective: Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035.

Reliability is defined herein as "how much one can count on a certain amount of water being delivered to a specific place at a specific time," and depends on the availability of water from the source, availability of the means of conveyance, and the level and pattern of water demand at the place of delivery.

Reliability criteria identify the maximum acceptable level of supply shortage an agency is willing to sustain during a drought. For this study, a reliability criterion has been used to evaluate water supply plans. This criterion requires water supply to be sufficient to meet projected demands 95 percent of the time. In the remaining 5 percent of the time, it is assumed that the maximum allowable supply shortage will be 5 percent of the demand. This level is chosen because a 5 percent water demand reduction is anticipated

Table 4-1 Antelope Valley Region Objectives and Planning Targets

Objectives	Planning Targets
Water Supply Management	
Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009. Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.[1] Provide adequate reserves (0 to 62,000 AF/ 4 year period) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.[2]
Establish a contingency plan to meet water supply needs of the Antelope Valley Region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer, by June 2010.
Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10-year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.
Water Quality Management	
Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetics throughout the planning period.
Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period. Map contaminated sites and monitor contaminant movement, by December 2008. Identify contaminated portions of aquifer and prevent migration of contaminants, by June 2009.
Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.
Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to help meet expected demand by 2015, 66% by 2025, and 100% by 2035.
Flood Management	
Reduce negative impacts of stormwater, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.
Environmental Resource Management	
Preserve open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface water and groundwater management by 2015.
Land Use Planning/Management	
Maintain agricultural land use within the Antelope Valley Region.	Preserve 100,000 acres of farmland in rotation[3] through 2035.
Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000[4] acres of recreational space by 2035.
Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.

to be readily attainable by voluntary conservation. Typically when a shortage occurs, water customers increase their awareness of water usage and voluntarily reduce water demands, avoiding water rationing.

As discussed in Section 3, the Antelope Valley Region's expected demand between 2010 and 2035 is approximately 274,000 and 447,000 acre-feet per year (AFY) for an average water year. However, the planned water supply for

an average water year is approximately 200,400 to 210,200 AFY, resulting in a mismatch of approximately 73,600 to 236,800 AFY. Assuming average year supplemental water is equivalent to the average year mismatch, there is an additional mismatch of 50,600 to 57,400 AF for a single dry water year and 0 to 62,000 AF/4-yrs for a 4-year multi-dry year condition. This additional mismatch (or reserve) was determined by taking the drought year mismatch and adding the average year supplement. The range of the reserve is the maximum and minimum reserves. In order to assure a reliable water supply, the following three planning targets have been identified. The targets are based on the assumption of a regional population estimates shown in Table 2-3. However, if actual growth is less than projected or if average annual water use per capita decreases due to conservation efforts, then the overall demand for the Antelope Valley Region would decrease as well. Any reduction in demand would reduce the mismatch. Similarly, this target assumes the supply from only currently planned sources presented in Section 3 and that groundwater extractions are limited to groundwater recharge. Thus, any changes or limitations to the groundwater supply resulting from the pending adjudication could significantly alter the mismatch as well.

Target: Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.

Target: Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.

Target: Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.

1 Dry year reserves determined by taking the dry year mismatch and adding the average year supplement. Assumes that the average year supplement equals the average year mismatch for any given year. Range determined from the maximum and minimum reserves.

2 As with single-dry year, multi-dry year reserves determined by summing the 4-year dry year mismatch and adding the 4-year average year supplement. Assumes that the average year supplement equals the average year mismatch for any given year. Range determined from the maximum and minimum reserves.

3 The phrase "in-rotation" means that not all 100,000 acres will be in agricultural production at one time rather the land will be rotated in cycles to make most efficient use of the land.

4 The City of Palmdale and City of Lancaster's General Plans provide a standard of 5 acres of parkland per 1,000 City residents. The Kern County General Plan provides a standard of 2.5 acres per 1,000 residents. The other local and regional General Plans do not provide a standard for "recreation or parkland" preservation. This planning target assumes a 2035 population of 1.17 million residents in the Antelope Valley Region.

Objective: Establish a contingency plan to meet water supply needs of the Antelope Valley Region during a plausible disruption of SWP water deliveries.

Given the Antelope Valley Region's dependence on State Water Project (SWP) water, as discussed in Section 3, all elements of its reliability should be considered. Fluctuations in SWP deliveries due to climatic changes have already been incorporated in the supply and demand comparisons for average, single-dry, and multi-dry year conditions, as provided in Section 3.However, impacts to the Antelope Valley Region in the event of an outage or disruption of SWP water due to emergency situations (e.g., a flood, earthquake, power outage, or other disaster) also need to be considered and a response planned. In the event of a temporary loss of SWP for 6 months over the summer, the Antelope Valley Region would be short approximately 37,150 AFY from the normal supply (assumes lost of half of average year 2035 expected SWP supply.) The Antelope Valley Region needs to address and identify necessary actions to accommodate for such a loss and to ensure imported water supply; therefore, the following target has been identified.

Target: Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer, by June 2010.

Objective: Stabilize groundwater levels at current conditions.

As previously mentioned, a decrease in groundwater levels has led to incidences of land subsidence within the Antelope Valley Region, which may result in the loss of groundwater storage as well as a possible degradation of groundwater quality. Accordingly, maintaining groundwater levels is a key component to managing the groundwater basin and ensuring its reliability by preventing future land subsidence.

Addressing the following AB 3030 elements for stabilizing groundwater would also assist the Region in achieving this objective and planning target: (a) mitigation of conditions of overdraft; (b) replenishment of groundwater extracted by water producers; and (c) monitoring of groundwater levels and storage. To track and prevent future land subsidence and ensure the reliability of the Region's groundwater supply, the planning target below would monitor and identify changes in groundwater levels to demonstrate that management actions are having a positive impact to the groundwater basin.

It is recognized and acknowledged that the on-going adjudication of the Antelope Valley Ground Water Basin and the

Physical Solution that may be adopted by the Court may require the target set forth below to be modified.

Target: Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0, starting in January 2010.

4.3 WATER QUALITY MANAGEMENT OBJECTIVES AND TARGETS

Addressing the following AB 3030 elements for improving and maintaining water quality would assist the Antelope Valley Region in achieving the water quality objectives and planning targets discussed below: identification and management of wellhead protection areas and recharge areas; regulation of the migration of contaminated groundwater; construction and operation by local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects; development of relationships with State and Federal regulatory agencies; and review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.

Objective: Provide drinking water that meets customer expectations.

As discussed in Section 3.2, water quality is generally good Valley-wide except for the northeast part of the Antelope Valley Region, the borders of the Lancaster subunit, and some shallow wells in north Edwards Air Force Base (AFB) and Boron. Poorer water quality appears to be associated with areas containing hard-rock outcrops and areas underlain by the shallow playa deposits where evaporation has concentrated solutes. In general, the water quality over time has remained relatively unchanged across the entire Antelope Valley Region and generally meets Maximum Contaminant Levels (MCLs). The exceptions to the good groundwater quality are some high concentrations of boron associated with naturally-occurring boron deposits, high nitrates associated with fertilizer use and poultry farming near the areas of Little Rock and Quartz Hill, and high arsenic levels due to recent changes (lowering) of the MCL.

However, in addition to meeting the Federal and State standards for water quality, other secondary standards (such as taste, color, and odor) may also affect a customer's overall satisfaction with the water. Although these constituents do not result in any health effects to the customer, they do impact the customer's desire to drink and use the water. Thus the following planning target has been identified.

Target: Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.

Objective: Protect aquifer from contamination.

Groundwater is a main component of the Antelope Valley Region's water supply. Any loss of supply due to water quality degradation[5] would significantly hinder the Antelope Valley Region's ability to meet anticipated demands. As the Antelope Valley Region begins to reduce its dependence on imported water, utilize more recycled water, and implement recharge and storage projects, protecting the aquifer will become increasingly more important. All of these non-groundwater sources can potentially cause degradation to the existing groundwater supply during recharge. Thus the following planning target has been identified, which will involve monitoring these recharge sources to ensure they have negligible impacts to the groundwater supply.

Target: Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.

Identifying sources of contaminants and taking appropriate measures to reduce or eliminate the potential for contamination is crucial to ensuring a reliable water supply. Where contamination has occurred, programs and projects must be implemented to prevent its migration to other areas of the Basin. In some cases, treatment or remediation may be required to prevent migration. An area of the Basin that has been identified as contaminated is the portion of the aquifer near the Los Angeles World Airport where the spreading of wastewater effluent has contributed to a decline in water quality within to top 50 feet of the aquifer. Other sources of potential contamination are from wells no longer in service that that have not been properly abandoned. These wells are suspected of drawing on water of a lesser quality from the deep aquifer to intermix with the water of the upper aquifer, degrading its quality. These areas and others not yet identified should be identified, mapped, and monitored to prevent any future migration. The mapped information should include constituent concentrations in areas of concern that exceed 50 percent of drinking water quality standards. Mapping contami-

5 For the purposes of this IRWM Plan, any increase in constituent levels over naturally occurring levels is considered degradation; any increase in constituent levels over the State or Federal standards is considered contamination.

nant concentrations within geographic areas of concern exceeding 50 percent of the drinking water standard will allow resource managers to monitor areas that may be moving toward contaminated status. Accordingly, the following planning targets have been identified.

Target: Map contaminated sites and monitor contaminant movement, by December 2008.

Target: Identify contaminated portions of the aquifer and prevent migration of contaminants, by June 2009.

Objective: Protect natural streams and recharge areas from contamination.

In addition to protecting the aquifer, it is also important to protect the surface water areas of the Antelope Valley Region from contamination. Natural streams feed the Littlerock Creek Reservoir as well as recharge areas in the Antelope Valley Region. Thus, any degradation in water quality in the streams could result in the loss of this surface water supply as well as degradation in the recharge areas. Thus the following planning target has been identified.

Target: Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.

Objective: Maximize beneficial use of recycled water.

As discussed in Section 3, approximately 65,000 AFY of recycled water will be available for use by 2035, assuming treatment plant upgrades and distribution system development occur as planned. However, currently only 16,700 AFY are planned to be utilized by 2035 for M&I users, through the planned projects. Beneficial use of the remaining 48,300 AFY would require additional infrastructure to treat and deliver the recycled water, as well as development of policies to encourage or require recycled water use for irrigation for existing beneficial uses or for groundwater recharge. The Los Angeles County and Antelope Valley Areawide General Plans currently identify general goals and policies to promote water conservation and protection of water quality through encouraging groundwater recharge, reuse of storm and reclaimed water, and development of water conservation programs. The development of this infrastructure and time to implement such policies is likely to occur in phases as resources are made avail-

Urban runoff is a large contributor to wasteful water use and can be easily rectified with current technologies and better management.

able. Therefore, the following planning target has been identified.

Target: Increase infrastructure and establish policies to use 33 percent of recycled water to help meet expected demand by 2015, 66 percent by 2025, and 100 percent by 2035.

4.4 FLOOD MANAGEMENT OBJECTIVES AND TARGETS

Objective: Reduce negative impacts of stormwater, urban runoff, and nuisance water.

As described in Section 3.3, the Antelope Valley is prone to flash flooding, and this situation is aggravated by the lack of a coordinated and comprehensive drainage infrastructure system for managing stormwater and urban runoff. Stormwater tends to be of poor quality and high in sediment, and is further degraded by urban runoff. In some areas of the Valley, underlying impervious soils will cause stormwater to pool and become nuisance water until it eventually evaporates.

Extensive growth in the Antelope Valley has occurred in both cities as well as unincorporated County areas. This growth both increases the amount of impervious surfaces in the Valley and the number of homes and businesses subject to the negative impacts of flooding and in need of flood protection. Natural communities and wildlife habitat may also suffer as a result of flooding. Conversely, flood waters can also have positive impacts. For example, flood waters can result in siltation that acts to "resurface" and naturally restore the elevation of the dry lake beds.

To adequately address any desires to maintain flood effects, and to limit flood damage in a cost-effective manner, flood management efforts should take place on a regional scale and should be coordinated across jurisdictions. This scope and level coordination would also provide some consistency both in costs associated with flood prevention and mitigation and in permitting requirements for Antelope Valley residents, businesses and developers. With the Antelope Valley Region having a great water need there is the added incentive for the flood management systems to convey waters of suitable quality to rechargeable systems for the benefit of multiple communities.

Furthermore, urban development and revitalization efforts implemented on a regional scale that can protect natural and man-made amenities, while avoiding severe hazard areas such as flood prone areas, would be consistent with the goals and policies of the Los Angeles County and the Antelope Valley Areawide General Plans. New development is currently encouraged to protect drainage courses in as natural a state as possible, while minimizing modification of the natural carrying capacity or production of excessive siltation.

Flood Plain Management Areas are identified within the Antelope Valley Areawide General Plan, and include areas that are subject to a high risk flooding during storm events such as Amargosa Creek, Anaverde Creek, Big Rock Creek, Little Rock Creek, the frontal canyons on the north slope of the San Gabriel Mountains, drainages from the north face of Portal Ridge, and the upper reaches of the Santa Clara River through Acton. Development is regulated within these areas by either not permitting (due to extreme hazard) or limiting new development to adhere to special performance requirements in the flood fringe areas adjacent to a waterway, to ensure the hazard of inundation can be mitigated without increasing the hazard to adjacent properties.

The Antelope Valley is in need of both short- and long-term solutions to the various flood management needs presented in Section 3.3. Such solutions can best be designed and implemented through coordination of a regional flood management plan, which has been identified as a planning target for integrated regional water management. Important goals under the plan include reducing flood damage, maximizing groundwater recharge, controlling stormwater runoff and curbing nuisance water runoff (for example by educating residents or installing proper sprinkler heads and timers), and managing sediment transport by 2010.

In addition to these goals, a regional plan that provides a multi-objective management approach would aim towards ecosystem restoration and the protection of farmland and natural habitat. The flood management plan and its resulting projects should be flexible enough to adjust to future changes in the Antelope Valley Region, including changes in population and resource needs, as well as changes in the climate and landscape.

A flood management plan for the Antelope Valley should include a comprehensive set of strategies that seek both to preventively reduce flood hazards and to respond effectively to direct and indirect threats associated with flooding. First, it should outline a strategic plan to improve and update mapping and technology necessary to meet planning objectives. Since many flood maps used by public agencies and the public do not reflect the most accurate information available, land use decisions in California are in some cases based on poor or outdated information regarding the seriousness of the flood threat. This leads to

much of the State's new development occurring in areas that are especially prone to flooding.

Most water quality impacts of urban development are best avoided by directing the location, pattern, and design of the development rather than through traditional regulation of discharges. A flood mitigation plan that addresses the level of risk associated with flood-prone areas within the Antelope Valley Region should be a central component of the flood management plan. Such a plan should prompt investigation of the feasibility of mitigation activities such as the relocation, redevelopment or modification of structures existing within areas especially at risk; an assessment of existing and needed flood management infrastructure to redirect stormwater and control flooding; and zoning and other regulatory measures that address the need for regulation of development patterns and improved site design and building practices. The plan should promote the establishment of land use ordinances that restrict development within hazardous floodplain areas and establish buffers to allow the natural hydrologic function within remaining natural or restored floodplains to occur.

In addition to spurring formal changes in land use policy, the plan should contain regional design guidelines and best management practices for flood prevention and on-site stormwater management, and a public outreach and education program related to stormwater quality and urban runoff. The plan should also include regional and local contingency plans and communication plans, prepared so that regional and local authorities have the means to coordinate responses to different flood events.

The local and regional General Plan policies pertaining to flood management within the Antelope Valley Region can be found in Table 8-2 in Section 8.

The Mojave Desert supports animal life that is unique and intimately connected to the future of biodiversity in the Antelope Valley.

Target: Coordinate a regional flood management plan and policy mechanism by the year 2010.

4.5 ENVIRONMENTAL RESOURCE MANAGEMENT OBJECTIVES AND TARGETS

Objective: Preserve open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region.

As described earlier, due to its proximity to the Los Angeles Area, the Antelope Valley is subject to increasing demand for community development, recreation, and resource utilization. Population in the Antelope Valley is expected to increase by 121 percent between 2005 and year 2020. Some of this growth will result in the conversion of agricultural land, while some of this growth will occur in areas that are currently natural and undeveloped areas. Loss of both agricultural acreage and natural areas decreases the amount of open space in the Valley. Open space can mean natural open space, passive and active recreation which may or may not be compatible with natural habitats or natural open space preservation. As an example, open space can mean soccer fields, playgrounds, etc and should not be considered as natural habitat. This growth and the associated loss of open space could adversely affect local water resources through the loss of wetland areas and the watershed functions these areas provide (filtration of surface water, stormwater detention), and the loss of groundwater recharge areas.

Also of concern is the negative effect of urban growth on the unique biological resources of the Antelope Valley. Besides a direct loss of habitat, increasing proximity to urban development is harmful to the sensitive desert species, several of which are found only in the Antelope Valley Region.

Thus, the following planning target has been identified to preserve open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region.

Target: Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.

This planning target needs to be consistent with local planning objectives such as those identified in the Antelope Valley Areawide General Plan, the Kern County

General Plan, and other management plans approved for the Antelope Valley Region, some of which are discussed below. This target is not limited to 2,000 acres, and conservation of acreages greater than 2,000 acres is encouraged.

Policies within the Antelope Valley Areawide General Plan implement Los Angeles County's General Plan (anticipated completion summer 2008), and further specify objectives and goals specific to that Antelope Valley Region. The Antelope Valley Areawide General Plan identified several priority areas for habitat acquisition and preservation including the Santa Clara River, Fairmount/Antelope Buttes, steeper butte areas in the eastern Antelope Valley, and riparian areas within Little-rock Wash, Big Rock Wash, Portal Ridge-Liebre Mountain and Tehachapi Foothills and other Significant Ecological Areas (SEAs). Educational, observational, and light recreational uses could be allowed in these preserves and the preserves would also act as open space areas, enhancing the rural character of the Antelope Valley.

Through the identification and designation of SEAs within the Los Angeles County General Plan and the Antelope Valley Areawide General Plan, new urban growth or encroaching uses and activities would be conditioned to ensure protection of ecological resources and habitat areas by regulating and establishing compatible land uses, and requiring design and performance criteria to be met. Although SEAs are neither preserves nor conservation areas, requiring development to be designed around the existing biological resources (Los Angeles County 2006) would help to ensure protection of sensitive species and their habitats as well as helping to make the location and size of the preserved area scientifically defensible.

The Kern County General Plan does not identify specific open space or habitat areas to be preserved (Kern County 2004). The Kern County General Plan does, however, state that "The County will seek cooperative efforts with local, state, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands."

The West Mojave Plan covers 9.3 million acres in the western portion of the Mojave Desert, including portions of Los Angeles and Kern counties. This habitat conservation plan and federal land use plan amendment presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel and over 100 other sensitive plants and animals and the natural communities of which they are a part. The Plan accomplishes such by: designating 14 new Areas of Critical Environmental Concern (ACEC), adjusting four existing ACEC boundaries, and establishing other special management areas specifically designed to promote species conservation; designating allowed routes of travel on public lands to reduce species mortality from off-road vehicles; and, establishing other management prescriptions to guide grazing, mineral exploration and development, recreation, and other public land uses (BLM 2006). The West Mojave Plan is consistent with the existing conservation plans in the area, and would further the preservation of important species and their habitats that protect and enhance the Antelope Valley Region's watershed.

Conservation and protection of the desert tortoise, the Mohave ground squirrel and over 100 other sensitive plants and animals and the natural communities of which they are a part, as described within the West Mojave Plan,[6] would help the area meet this planning target (BLM 2006). The Plan is consistent with conservation plans and local policies for furthering habitat protection by prescribing appropriate uses within protected ACEC areas that limit human and non-native animal interaction with sensitive species to reduce mortality and habitat degradation.

Preservation lands in other areas could also be targeted, based on qualities that maintain and enhance the watershed and aquifer.

4.6 LAND USE MANAGEMENT OBJECTIVES AND TARGETS

Objective: Maintain agricultural land use within the Antelope Valley Region.

As discussed in Section 3, there is an estimated 24,700 acres of irrigated crop land in the Antelope Valley Region. Agriculture is an important industry for the Antelope Valley area. In addition to direct production of food and fiber, secondary employment is created by the agricultural production, including transportation and food manufacturing. In Kern County it is estimated that one out of every four jobs is tied to the agricultural industry (Kern County Agricultural Commissioner 2007). In addition, agriculture plays an important role in community identity. The types of crops grown in an area may be unique to that place. Community festivals are often planned around the commodities unique to a place, or for which a community is known. The physical landscape of a place can be defined

6 "While many of the general conservation concepts and species accounts are valid in the West Mohave Plan the Plan relies heavily upon habitat protection within BLM lands as mitigation for impacted habitats from development occurring elsewhere, perhaps many miles away . . . the Department of Fish and Game did not endorse the WMP as a habitat protection planning document (personal communication, S. Harris, Department of Fish and Game.)"

by its agriculture as the crops create a distinct color mosaic and pattern. Residents also can take advantage of the open space and views allowed by nearby agriculture. In addition, some agricultural crops may provide wildlife habitat (nesting, temporary foraging).

> *"The preservation of natural lands is good for nature, but the prime beneficiary is human beings."*
>
> – Wendy Reed,
> Antelope Valley Conservancy

As described in earlier sections of this IRWM Plan, demand for urban development is resulting in a conversion of agricultural land, and is introducing conflicts between agricultural and residential development. As a result, agricultural land is increasingly found only on the urban fringes. There is a desire to preserve agriculture as an industry and as a cultural asset. Both Los Angeles County and Kern County have adopted policies intended to preserve agricultural resources. These policies include right-to-farm ordinances, reduced property tax programs for farm businesses, and policies discouraging provision of urban services in agricultural areas. The Los Angeles County General Plan and the Antelope Valley Areawide Plan have designated "Agricultural Opportunity Areas," or prime agricultural land that has been identified for preservation and protection from the intrusion of incompatible uses that would conflict with or preclude viable agricultural activity. This is intended to be accomplished through use of incentives that establish a voluntary agricultural preserve. To encourage the retention and expansion of agricultural use both within and outside a potential agricultural preserve, the policies promote compatible land use arrangements and offer technical assistance in support of farming interests. In addition, expansion of agricultural into underutilized lands, such as utility rights-of-way and flood prone areas is encouraged. The following planning target, which furthers these existing goals and policies, has been identified to maintain agricultural land use within in the Antelope Valley Region.

Target: Preserve 100,000 acres of farmland in rotation[7] through 2035.

Objective: Meet growing demand for recreational space.

Demands for recreational space are similar to the demands for biological habitat and agricultural land. These demands for land uses are competing with one another due to an increasing population. Growth in the Antelope Valley threatens recreational lands and increases demands for recreational opportunities. However, population increases in Southern California as a whole also add to the pressure to maintain and expand the Antelope Valley Region's recreational opportunities, particularly since recreational resources found in the Antelope Valley, such as off-highway vehicle (OHV) use areas, are not found anywhere else in near proximity to Southern California population centers. Optimally, recreational resources could be preserved in a way that does not conflict with other land uses or resource protection.

Currently, recreation resources in the Antelope Valley are provided by multiple jurisdictions. Often recreational facilities are dedicated as part of a specific local development project or fees are paid in-lieu of providing recreational facilities. However, most local jurisdictions have policies in place that would encourage cooperation to develop, expand, or enhance regional recreation facilities. For example, several goals and policies within Los Angeles County's General Plan identify the need for development of community parks and recreational amenities within areas deficient in such resources, and suggest such could be accomplished through preserving large natural and scenic areas while focusing new urban growth into areas with suitable land. To achieve such a balance between increased intensity of development and the capacity of needed facilities to serve the population, the General Plan encourages use of open space easements and dedications, or recycling of "brownfield" sites (e.g., abandoned mineral extraction sites, remediated industrial or commercial areas, etc.) as a means of achieving recreational, open space and scenic needs.

Development of new regulatory controls, similar to those in place for SEAs to ensure compatibility of development adjacent to or within major public open space and recreational areas, including the Angeles and Los Padres National Forests are also encouraged.

Thus the following planning target has been identified to meet the growing demand for recreational resources in the Antelope Valley Region.

Target: Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.

Objective: Improve integrated land use planning to support water management.

Coordination between land use planning agencies and water management agencies is crucial to implementation of a successful IRWM Plan. A regional land use management plan to guide the Antelope Valley Region's physical development would be a key step towards improving coordination and identifying future water needs throughout the Antelope Valley Region. Growth management, the protection of various land uses and the efficient use of natural resources such as land, water and energy are three of the principal goals of regional land use planning. A regional land use management plan that directs the Antelope Valley Region's growth towards existing centers will not only encourage natural resource efficiency and the preservation of surrounding agricultural land uses and recreational open space, but it will also improve the efficient use of economic resources dedicated towards utilities infrastructure improvements and expansions.

A regional land use management plan would identify the actions necessary in order to gauge success on meeting the land use management objectives. Ideally, a regional land use plan would serve as a master plan for the Antelope Valley Region's physical development. As such, it could provide the opportunity to conduct design studies to test the physical capacity of the Antelope Valley Region's urban areas and centers of development. Such a focus on physical design can help regional agencies to understand and visualize the impact of new structures on the natural and built environment, and thus to better understand the consequences of planning policy. Consideration of building codes, zoning laws, and other regulations affecting development should also be a central component of the regional land use plan. The plan should provide for the periodic review of its major elements, in order to remain a useful tool as the Antelope Valley Region undergoes various changes.

Accordingly, the following planning target has been identified.

Target: Coordinate a regional land use management plan by the year 2010.

7 The phrase "in-rotation" means that not all 100,000 acres will be in agricultural production at one time rather the land will be rotated in cycles to make most efficient use of the land.

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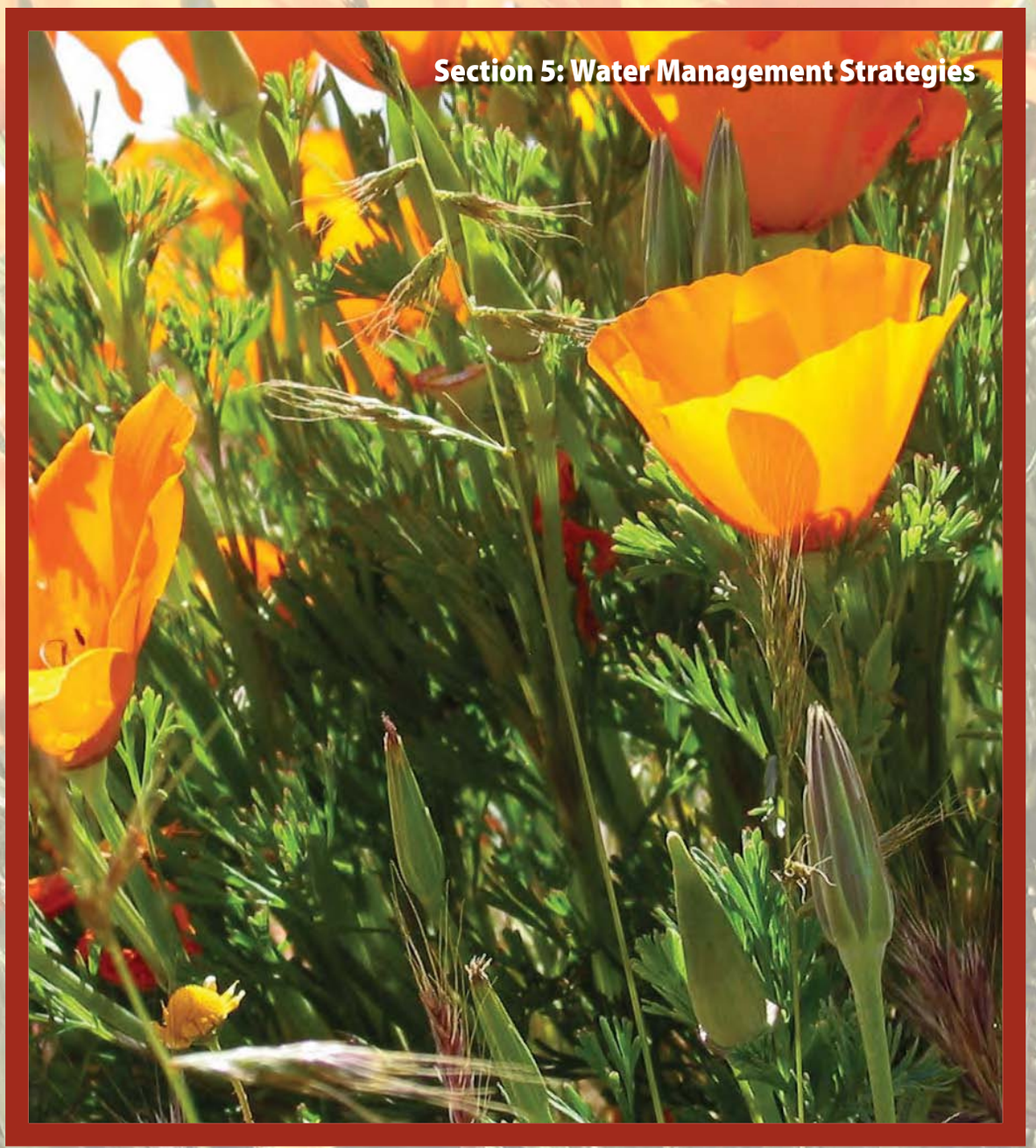
Section 5: Water Management Strategies

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Without water management strategies put into action, the beauty of the California poppy may be lost by the Antelope Valley region.

Section 5: Water Management Strategies

5.1 INTRODUCTION

The following section introduces a diverse menu of water management strategies available to meet the water management objectives for the Antelope Valley Region. The State of California, through the Proposition 50, Chapter 8 Integrated Regional Water Management (IRWM) Plan Grant Program Guidelines (Guidelines), has identified 20 different water management strategies that are required for discussion to improve regional water resource management (11 are required for discussion). The IRWM Plan discusses the following 11 required water management strategies:

- *Water supply reliability*
- *Groundwater management*
- *Water quality protection and improvement*
- *Water recycling*
- *Water conservation*
- *Stormwater capture and management*
- *Flood management*
- *Recreation and public access*
- *Ecosystem restoration*
- *Wetlands enhancement and creation*
- *Environmental and habitat protection and improvement*

Additionally, the Regional Water Management Group (RWMG) evaluated the 9 additional management strategies identified in the State IRWM Plan Guidelines (CWC §§ 79562.5 and 79564) within the IRWM Plan, and not just those that are required to be considered. Therefore, the following strategies were also addressed:

- Conjunctive use
- Desalination
- Imported water
- Land use planning
- NPS pollution control
- Surface storage
- Watershed planning
- Water and wastewater treatment
- Water transfers

Additionally, Proposition 84 has suggested that IRWM Plans also consider those resource management strategies identified in the California Water Plan. In this report, we have aggregated the 20 different management strategies identified in the IRWM Plan Guidelines with those identified in the California Water Plan, into five water management strategy areas, as shown in Table 5-1. Descriptions of these water management strategies are provided below in Section 5.1.1. The five water management strategies are: Water Supply Management, Water Quality Management, Flood Management, Environmental Resource Management, and Land Use Management. For each management strategy, the actions and activities that are either underway or proposed for implementation in order to meet the objectives identified in Section 4 are described.

Many of the water management strategies described in the IRWM Plan Guidelines are currently being utilized in the management of water resources in the Antelope Valley Region. Strategies already practiced include: imported water, water and wastewater treatment, water quality protection and improvement, wetlands enhancement and creation, environmental and habitat protection and improvement, and stormwater capture and management.

The following water management strategies are being implemented in the Antelope Valley Region, but their application may not be widespread, and opportunities exist to expand and better integrate these strategies: flood management, groundwater management, conjunctive use, non-point source (NPS) pollution control, surface storage, water conservation, water recycling, watershed planning, and water supply reliability.

The following water management strategies are not currently utilized in the Antelope Valley Region because they are either infeasible (i.e., desalination), or underfunded: ecosystem restoration, recreation and public access, land use planning, and water transfers. Expanded utilization of these strategies could be implemented to enhance water supplies and improve water supply reliability.

5.1.1 Water Management Strategy Descriptions

Water Supply Management

Water supply reliability: Reliability is defined in this IRWM Plan as "how much one can count on a certain amount of water being delivered to a specific place at a specific time," and depends on the availability of water from the source, availability of the means of conveyance, and the level and pattern of water demand at the place of delivery. Opportunities for increased supply reliability in the Antelope Valley Region include the establishment of groundwater recharge basins, the implementation of conjunctive use projects utilizing recycled water and storm runoff, and the development of natural treatment systems, such as constructed habitat or open space area, to improve both water quality and storage capability.

Groundwater management: Groundwater has historically provided the majority of the total water supply in the Antelope Valley Region. Projected urban growth coupled with limits on the available local and imported water supply is likely to continue to increase the reliance on groundwater. Issues concerning water quality are also likely to influence how groundwater is managed in the Antelope Valley Region. Opportunities for management of the basin include reductions in impervious surfaces to increase infiltration, creation of recharge areas and spreading basins, management of stormwater flows and appurtenant water capture and conveyance systems. Future groundwater Basin management will depend on the pending adjudication.

Water conservation: Water conservation is a demand management measure which stresses the efficient utilization of water resources. Minimizing the use of water where possible through water efficiency measures helps to combat the inherent variability in the heavily relied upon imported and local supplies. Opportunities to expand water conservation in the Antelope Valley Region include, but are not limited to, implementation of Best Management Practices (BMPs), establishment of water efficiency ordinances, and development of evapotranspiration (ET) controllers for more efficient irrigation.

Table 5-1 Water Management Strategy Matrix

Proposition 50 IRWMP Strategies Note: (a) Those strategies that must be considered to meet the minimum IRWM Plan Standards.	California Water Plan Strategies																					
	Agricultural lands stewardship	Agricultural water use efficiency	Conjunctive management and groundwater storage	Conveyance	Desalination	Drinking Water Treatment and Distribution	Economic incentives	Ecosystem restoration	Floodplain management	GW/aquifer remediation	Matching water quality to water use	Pollution prevention	Precipitation enhancement	Recharge areas protection	Recycled municipal water	Surface storage – CALFED	Surface storage – regional/local	System reoperation	Urban land use management	Urban runoff management	Urban water use efficiency	Water transfers	Water-dependent recreation	Watershed management
Water Supply Management																								
Water supply reliability(a)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Groundwater management**			■						■	■		■		■	■				■	■		■		■
Water conservation(a)		■					■								■				■		■			■
Water recycling(a)			■							■	■				■				■		■			■
Conjunctive use			■							■				■								■		■
Surface storage				■												■	■	■						■
Water transfers			■	■						■				■								■		■
Desalination					■																			
Imported water						■										■	■	■				■		■
Water Quality Management																								
Water quality protection and improvement(a)						■			■	■	■	■		■	■				■	■				■
Water and wastewater treatment					■	■				■	■				■									■
Non-point source pollution control								■	■		■	■		■					■	■				■
Flood Management																								
Flood management(a)									■					■					■	■				■
Environmental Resource Management																								
Storm water capture and management(a)								■	■			■		■					■	■				■
Ecosystem restoration(a)								■				■												■
Env. and habitat protection and improvement(a)								■						■										■
Recreation and public access(a)																	■						■	■
Wetlands enhancement and creation(a)								■	■	■				■					■					■
Land Use Management																								
Land use planning	■	■	■	■			■	■	■	■	■	■		■	■		■		■	■	■		■	■
Watershed planning	■	■	■	■		■	■	■	■	■	■	■	■	■	■		■	■	■	■	■		■	■

Water recycling: Recycled water is defined in the California Water Code to mean "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur." Water recycling is a term which encompasses the process of treating wastewater, storing, distributing, and using the recycled water. The uses to which recycled water can be applied (e.g., landscape and agricultural irrigation, cooling, etc.) depend upon the quality of the treated water and the quality required for subsequent uses. Currently the only recycled water in the Antelope Valley Region that is treated to a tertiary level is a small percentage of the wastewater at the Lancaster Water Reclamation Plant (WRP). This IRWM Plan includes a number of current and planned management actions to increase recycled water use in the Antelope Valley Region.

Conjunctive use: Conjunctive use refers to the coordination of surface water and groundwater resources to maximize the utility of an area's collective water resources. Conjunctive use involves using surplus surface water when available (e.g., storm runoff, surplus surface water flows, or recycled water) to recharge the groundwater basin containing adequate storage capacity. Groundwater banking is a form of conjunctive use wherein surplus surface water or other available waters are injected or recharged for storage in the aquifer, and then extracted at a later time when surface water supplies are limited.

Surface storage: Surface storage is the use of reservoirs, whether on-stream or off-stream, or storage tanks, to collect water for later release and use. Surface water in the Antelope Valley Region is stored mainly in Littlerock Creek Reservoir and Lake Palmdale. Opportunities to enhance surface storage in the Antelope Valley Region include modification of these local reservoirs to increase storage capacity and operational flexibility, as well as the creation of new surface impoundments for recycled water and/or treated stormwater runoff.

Water transfers: A water transfer is defined in the California Water Code as "a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights." Transferring water supplies, or water rights, from one area to another is an important tool for water management in California, particularly agricultural to urban transfers. There is an opportunity in the Antelope Valley Region to integrate conjunctive use programs with water transfer projects.

Desalination: Desalination is a water treatment process for the removal of dissolved salts from water for beneficial use. Desalination is used on brackish (high-salinity) water as well as seawater. Due to the fact that groundwater within the Antelope Valley Region is not high in total dissolved solids (TDS), and that the basin is geographically distant from the ocean, desalination as a water management strategy is of low priority in the Antelope Valley Region. However, it could become a source of future imported water supply through inter-jurisdictional agreements.

Imported water: Imported water as a management strategy generally refers to bringing in, or importing, water from other areas. The largest source of imported water in California is the State Water Project (SWP). This strategy can be applied in three ways; by reducing dependence on imported water, by increasing use of imported water from new or existing sources, or by using imported water more efficiently. Imported water to the Antelope Valley Region is contracted through the Antelope Valley-East Kern Water Agency (AVEK), Littlerock Creek Irrigation District (LCID), and Palmdale Water District (PWD). Currently AVEK does not have enough storage available for its imported water, and therefore is unable to utilize its full Table A amount.

Water Quality Management

Water quality protection and improvement: This strategy regards the quality of potable water, the quality of the groundwater, and the quality of stormwater and urban runoff. The focus of water quality management in the Antelope Valley Region is on maintaining and improving the existing water quality and preventing future contamination. Opportunities for water quality protection and improvement include creation of water capture, conveyance, and recharge basins, which act as natural treatment systems, identification and mapping of potential contaminant areas, and upgrading treatment processes at existing WRPs and water treatment plants.

Water and wastewater treatment: As previously stated, the principle sources of water supply in the Antelope Valley Region are imported water and groundwater. Water treatment facilities in the Antelope Valley Region that treat this water are designed to treat raw water and produce drinking water that is safe for human consumption, which meets all regulatory State and Federal standards. Wastewater treatment facilities are designed to treat water that is discarded by a community to a point that it becomes safe to return back to the environment or for reuse. Opportunities exist for recycled water through tertiary treatment of existing supplies.

Non-point source (NPS) pollution control: NPS pollution may come from a variety of sources; one specific point cannot usually be identified. NPS pollution primarily occurs when rainfall, snowmelt, or irrigation runs over land or

through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into groundwater. The runoff can pick up both naturally-occurring and human-deposited pollutants and transport them to waterbodies. NPS control in the Antelope Valley Region is needed to address dry weather and nuisance water runoff.

Flood Management

Flood management: Flood management includes minimizing impacts of floods on buildings and farmland, removing obstacles in the floodplain, voluntarily or with compensation, preventing interference with the safe operation of flood management systems, preserving or restoring natural floodplain processes, educating the public about avoiding flood risks and about planning for emergencies, and reducing flooding risks to humans. Opportunities exist in the Antelope Valley Region for regional coordination of flood management activities.

Environmental Resource Management

Stormwater and urban runoff capture and management: Stormwater capture and management is linked to flood management. Stormwater capture involves inlets and conveyances that will deliver flows to detention and/or retention (recharge) basins. Any attempts to recharge flows should not worsen existing drainage conditions. There is an opportunity to address urban runoff and improve water quality utilizing the same stormwater infrastructure. Challenges include short duration/high intensity storm events, sedimentation, contaminants in the stormwater, and urban runnoff. Opportunities exist for regional coordination of stormwater, urban runoff and flood management activities.

Ecosystem restoration: The California Water Plan defines ecosystem restoration as "improving the condition of modified natural landscapes and biotic communities to provide for the sustainability and for the use and enjoyment of those ecosystems by current and future generations." The benefits of ecosystem restoration in the Antelope Valley Region are numerous, and depending on the type of ecosystem restored, they can include: capturing and storing stormwater, groundwater recharge, flood protection, increasing water supply reliability, wildlife habitat creation, restoration and enhancement, water quality enhancement, flood management, and recreation.

Environmental and habitat protection and improvement: Risks to the environment and habitat in the Antelope Valley Region include pressures from growth and development, the loss of open space, invasive species, channelization, incompatible land uses, and other common problems associated with urbanization and pollution. Restoration, improvement, and protection of the Antelope Valley Region's environmental resources have the potential to provide benefits related to water supply and water quality of the local surface and groundwater.

Recreation and public access: Open space used for recreation and public access has the potential to enhance water supply by preserving or enhancing groundwater recharge and thereby improving water supply reliability. Opportunities exist in the Antelope Valley Region for protecting and/or creating new recreational areas or open space that can provide multiple benefits to other strategies including groundwater management, improvements in stormwater or urban runoff management, and to enhance flood management.

Wetlands enhancement and creation: The Antelope Valley Region does not have a significant amount of wetlands, and for this reason this scarce resource should be protected. Wetland and riparian projects can provide water quality, groundwater recharge, flood management and recreational opportunities. Thus, there may be opportunities in the future for the creation of wetland areas in the Antelope Valley Region to provide these additional benefits.

Land Use Management

Land use planning: Land use planning as a strategy generally refers to actions that can be taken by agencies with land use decision-making authority (i.e., cities, counties) to further the objectives set out in this IRWM Plan to better manage and protect local water and related environmental resources. Land use strategies can include long-range planning goals, objectives, general plan policies, ordinances, regulations, education and outreach programs, etc. Opportunities exist in the Antelope Valley Region for increased land use planning efforts such as the addition of water resource elements in the Antelope Valley Areawide General Plan, and the enactment of natural resource protection and efficiency ordinances. Other mechanisms for increased land use planning efforts can include the cities and counties providing incentives for private development that promotes features to improve water quality, enhance groundwater recharge, and reduce water demand.

Watershed planning: The California Water Plan defines watershed management as "the process of evaluating, planning, managing, restoring and organizing land and other resource use within an area of land that has a single common drainage point." The Antelope Valley Region is a good example of a geographical watershed. Managing the

water and environmental resources within the Antelope Valley Region, as is being investigated through this IRWM Plan, is a means of watershed management.

5.1.2 Call for Projects

To identify the many potential projects in the Antelope Valley Region and to assess the collective contribution of these projects towards meeting the IRWM Plan objectives and planning targets, development of this IRWM Plan included a "Call for Projects" which gave stakeholders the opportunity to directly submit their projects and project concepts for consideration. Stakeholders could submit projects at any stage of development, including ideas about projects or project concepts. Avenues available for participating in the Call for Projects included the submission of projects via a project identification form, either submitted via electronic mail, by facsimile, or directly on-line via this IRWM Plan website (www.avwaterplan.org). Additionally, to increase participation and awareness in this IRWM Plan, a Call for Projects "Road Show" was conducted, in which the IRWM Plan consultant team visited one-on-one with many members of the Antelope Valley Regional Water Management Group (RWMG) to discuss project ideas. As of June 2007, approximately 50 projects were submitted for inclusion in this IRWM Plan.

While many of the projects lack detailed supporting information, the Call for Projects provided a mechanism to engage stakeholders in the process of sharing project information and discussing the issues related to the integration of projects. Many of the projects discussed in this section provide multiple benefits, spanning more than one strategy. Therefore, some assumptions were made with regard to what water management strategy a particular project would benefit the most, to begin the initial organization of the projects. For example, a groundwater recharge project generally was assumed to provide water supply benefits, with a secondary benefit of addressing water quality needs. Section 6, Water Management Strategy Integration, will delve into this issue further, by examining in more detail how these projects can be integrated to provide multiple benefits.

The information provided herein represents the outcome of the initial step in a process of bringing individual projects into the collaborative process implied by this IRWM Plan. Additional projects are likely to be added to the database, and it is expected that stakeholders will revise and update information on projects submitted.

5.2 WATER MANAGEMENT STRATEGIES

In the following sections, each of the five water management strategies are described generally; their objectives and planning targets are presented in Table 5-2; and current and planned activities and actions to meet those objectives are listed along with new project ideas and concepts submitted during the Call for Projects.

Table 5-2 Water Supply Objectives

Objective	Planning Target
Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035.	Reduce (73,600 to 236,800 acre-feet per year [AFY]) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009. Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single dry year conditions, starting 2009. Provide adequate reserves (0 to 62,000 acre-feet [AF]/4-yr period) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.
Establish contingency plan to meet water supply needs of Antelope Valley Region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer, by June 2010.
Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.

5.2.1 Water Supply Management Strategy

The water supply management strategy must include projects and actions that meet the water supply issues and needs of the Antelope Valley Region as discussed in Section 3. The key issues are: regional reliance on imported water; unmanaged groundwater use; limitations of existing facilities; and global warming effects. In order to gauge success in addressing these issues, the water supply management strategy must meet the following objectives as defined in Section 4.

5.2.1.1 Completed (Recent) Water Supply Management Activities/Actions

A number of recent activities have been conducted to investigate the water supply situation in the Antelope Valley Region. These activities have helped to identify the issues and needs of the Antelope Valley Region, and are the framework for the development of many of the supply management actions and activities that are listed in below.

Plans and Studies

Antelope Valley Integrated Urban Water Management Plan	
Project Sponsor:	Los Angeles County Department of Public Works (LADPW), Rosamond Community Services District (RCSD), Quartz Hill Water District (QHWD), Los Angeles County Sanitation Districts (LACSD)
Goals and Project Description:	The goal of the Integrated Urban Water Management Plan (UWMP) was to coordinate water resource planning throughout the Antelope Valley Region. The California Urban Water Planning Act requires urban water suppliers to describe and evaluate sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs. This information is used by the urban water supplier for development of an urban water management plan (UWMP) which is submitted to the Department of Water Resources (DWR) every five years. The Final Integrated UWMP was submitted to DWR in December 2005.
Antelope Valley Water Resource Study	
Project Sponsor:	The Antelope Valley Water Group (AVWG) is the Study's lead and sponsor. AVWG members include the Cities of Palmdale and Lancaster, Edwards Air Force Base (AFB), AVEK, Antelope Valley United Water Purveyors Association, Los Angeles County Waterworks Districts (LACWWDs), PWD, RCSD, and LACSD. The City of Palmdale was the contracting agency for the Study.
Goals and Project Description:	AVWG was formed in 1991 to provide a means of communication for the Antelope Valley Region agencies with an interest in water. In an attempt to prepare a water resource study with a regional focus, rather than an individual focus, the AVWG initiated the Antelope Valley Water Resource Study. The primary objective of the AVWG's water resource study was to develop consensus on a water resource management plan that addresses the need of the municipal and industrial purveyors to reliably provide the quantity and quality of water necessary to serve the growth projected by the planning agencies while concurrently addressing the need of agricultural users to have adequate supplies of reasonable cost irrigation water. The Study, which was completed in 1995, provides an assessment of the water resources in the Antelope Valley Region, develops a water conservation program for the Antelope Valley Region, evaluates the feasibility of recycled water use, evaluates the feasibility of aquifer storage and recovery, discusses the effects of changes in groundwater levels, and provides a water resource protection plan.

AVEK Urban Water Management Plan	
Project Sponsor:	AVEK
Goals and Project Description:	The goal of the UWMP was to assess the current and projected water supplies for AVEK's service area. The California Urban Water Planning Act requires urban water suppliers to describe and evaluate sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs. This information is used by the urban water supplier for development of an UWMP which is submitted to DWR every five years. The AVEK UWMP was submitted to DWR in December 2005.
Palmdale Water District Final Master Plan Update	
Project Sponsor:	PWD
Goals and Project Description:	The goal of the Final Master Plan Update, completed in 2001, was to evaluate the District's existing water distribution system and to determine system improvements over the next ten years, covering only the District's main system.
Final Facilities Planning Study, Antelope Valley Recycled Water Project	
Project Sponsor:	LACWWD 40
Goals and Project Description:	The Antelope Valley Facilities Planning Study evaluated recycled water opportunities for the Antelope Valley Region and recommended a plan for delivering recycled water to the area. This project is discussed below as the North Los Angeles/Kern County Regional Recycled Water System. Project benefits include: Saving a significant amount of potable water currently provided either by local groundwater, local surface water or from imported SWP; Potential to provide water for recharging the Antelope Valley Region's groundwater basin; Saving money that is currently being spent for potable water; Providing a valuable alternative for effluent management; and Promoting the State's policies of beneficial reuse of recycled water to replace potable water where possible.
Palmdale Water District Urban Water Management Plan	
Project Sponsor:	PWD
Goals and Project Description:	The goal of the UWMP was to assess the current and projected water supplies for PWD's service area. The California Urban Water Planning Act requires urban water suppliers to describe and evaluate sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs. This information is used by the urban water supplier for development of an UWMP which is submitted to DWR every five years.
Study of Potential Recharge Sites in the Antelope Valley	
Project Sponsor:	Antelope Valley State Water Contractors Association (AVSWCA)
Goals and Project Description:	This report was commissioned by the AVSWCA, to evaluate potential recharge and ground-water banking sites in the Antelope Valley Region, with the goal of increasing SWP water supply reliability. Several viable sites were identified that could recharge surplus SWP water for later use. Sites that ranked high in the evaluation process were sites on Amargosa Creek, Littlerock Creek, Big Rock Creek, and in the Kings Canyon/Myrick Canyon area. Big Rock Creek ranked highest.

Groundwater Recharge/Banking

LACWWD 40 Aquifer Storage and Recover (ASR) Project	
Project Sponsor:	LACWWD 40
Goals and Project Description:	This past winter ('05-'06), LACWWD 40 used 4 wells to store approximately 1,500 AF in the groundwater basin (personal communication, David Pedersen, LACWWD 40). LACWWD 40 started the 2006 ASR program in November with 6 wells in operation, with a combined injection rate of 2,500 to 3,000 gallons per minute (gpm) (personal communication, David Pedersen, LACWWD 40). As proposed by the LACWWD 40, this project in the future could involve the expansion of the existing ASR project to include 15 injection wells to allow for the maximum injection rate.

5.2.1.2 Current Water Supply Management Activities/Actions

Current strategies being used to address the water supply issues include development of plans and studies, court action, investigations into groundwater recharge and groundwater banking programs, use of recycled water, demand management through conservation and water use efficiency, and efficiency upgrades through infrastructure improvements. These projects submitted are grouped into these categories, as shown below.

Plans and Studies

Antelope Valley Integrated Regional Water Management Plan	
Project Sponsor:	As required under the Guidelines, the IRWM Plan must be prepared by a Regional Water Management Group (RWMG) which consists of at least three agencies with water related responsibilities for the Antelope Valley Region. The RWMG includes AVEK, AVSWCA, Lancaster, Palmdale, LCID, LACSD 14 and 20, LACWWD 40, PWD, QHWD, and RCSD.
Goals and Project Description:	The Antelope Valley IRWM Plan would allow for a more efficient management of the water resources for the Antelope Valley Region by encouraging coordination of all affected agencies within the Antelope Valley Region. Through the IRWM Plan process, agencies will work together to identify solutions to key water management issues for the Antelope Valley Region and thereby facilitate the implementation of necessary projects to reach the Antelope Valley Regions objectives. The IRWM Plan will also meet the requirements for the Assembly Bill (AB) 3030 plan.
City of Lancaster Groundwater Recharge Feasibility Study	
Project Sponsor:	City of Lancaster
Goals and Project Description:	The purpose of this project was to investigate the feasibility of utilizing recycled water to recharge the groundwater within the Antelope Valley Region. The groundwater recharge feasibility study was initiated in March 2006, and a draft released in January 2007. The study area for the report encompasses the Lancaster, Buttes and Pearland hydrogeologic subunits of the Antelope Valley groundwater basin. Potential recycled water sources in the study area include the Lancaster WRP, the Palmdale WRP and the Rosamond Wastewater Treatment Plant (WWTP). This study assessed institutional, regulatory, technical, and financial opportunities and challenges of groundwater recharge. These opportunities and challenges were studied in sufficient detail to provide local officials with the basis for decision on if and how the Antelope Valley Region should move forward with groundwater recharge. The draft report found that groundwater recharge using recycled water could provide up to 30,000 AFY of new water supply to the Antelope Valley Region by 2025.

Palmdale Water District Reconnaissance Level Feasibility and Scoping Study for Recycled Water Recharge	
Project Sponsor:	PWD
Goals and Project Description:	PWD's intent for this study is to build on prior work and identify potential projects to provide the planned use of recycled and other water sources for groundwater recharge and banking in the southeast portion of the Antelope Valley Region. It will also identify regulatory requirements, possible obstacles for permitting, and strategies for addressing them.
Palmdale Water District 2006 Water System Master Plan Update	
Project Sponsor:	PWD
Goals and Project Description:	PWD's plan for improvements and expansion of its existing infrastructure is currently being developed in its 2006 Water System Master Plan Update. According to PWD's 2006 Strategic Plan, PWD is identifying additional water sources by investigating increasing the yield from Littlerock Reservoir, water conservation, recycled water (urban irrigation and groundwater recharge), additional Table A SWP water, and water transfers. The 2006 Update will also provide a plan for infrastructure upgrades, which include development of a hydraulic model for the existing system and identifying improvements needed to mitigate existing deficiencies.

Court Actions

Adjudication of the Groundwater Basin	
Project Sponsor:	Involves multiple agencies, land owners, and stakeholder interests in the Antelope Valley Region
Goals and Project Description:	The Antelope Valley Groundwater Basin is currently in the early stages of adjudication. The adjudication will provide a means to effectively manage the basin to prevent future overdraft. A general adjudication has begun in the Los Angeles County Superior Court and the case is in the early stages (Antelope Valley Groundwater Cases, Judicial Council Coordination Proceeding No. 4408). One of the issues in the adjudication is whether the Antelope Valley Groundwater Basin, particularly the Lancaster Sub-Basin, may be in "overdraft," meaning that current pumping rates exceed the sustainable yield.

Groundwater Recharge/Banking

Antelope Valley Water Agencies' Water Bank	
Project Sponsor:	RCSD, LCID, QHWD, AVEK
Goals and Project Description:	This water banking option would be similar to that proposed by Western Development and Storage below, with the exception that the three water purveyors and potentially AVEK would own and operate the water bank themselves. Potential advantages include reduced costs, more control, and an abbreviated schedule. Disadvantages include the need to conduct further study and the lack of an experienced agency with water banking experience. Furthermore, the water purveyors would be responsible for conducting the necessary technical studies, environmental documentation, and all capital costs.
Tejon Ranch Water Bank	
Project Sponsor:	Tejon Ranch
Goals and Project Description:	In 2006, Tejon Ranch constructed and is operating a groundwater bank on its property. The bank is located less than 1 mile north of the East branch of the California Aqueduct. The recharge area of the bank currently includes nine basins and covers 120 acres. Thus far, Tejon Ranch has banked over 4,000 acre-feet of water imported into the Antelope Valley from the State Water Project. The approximate storage capacity of this bank in its current configuration is roughly 60,000 acre-feet. Tejon Ranch is willing to negotiate cooperative arrangements with public agencies and private parties who want to store and/or withdraw water from this water bank. Interested parties may contact Dennis Atkinson at Tejon Ranch (661-663-4240).

Water Infrastructure Improvements

Expansion of Treatment Facilities	
Project Sponsor:	RWMG
Goals and Project Description:	Expansion of the treatment facilities in the Antelope Valley Region would allow for the utilization of all the available SWP water from AVEK, PWD, and LCID for water banking or ASR. Additional water from AVEK is a key element in the majority of the water supply strategies available to the Antelope Valley Region. AVEK's current treatment capacity to LACWWD 40 is 65 million gallons per day (mgd) (73,000 AFY). However, in order for the LACWWD 40 to utilize all of AVEK's additional water for water banking or ASR they would need to receive around 98,000 AFY. Thus, there is a significant need for expansion of the Quartz Hill Water Treatment Plant to meet the LACWWD 40's needs. It is anticipated that an expansion to 97 mgd should be sufficient to meet LACWWD 40 future demand (LACWWD 40 1999). Planned LACWWD 40 facility improvements include new wells, reservoirs and pipelines throughout its system to meet current and projected water supply requirements. Additional connections with AVEK will be needed to maximize use of available imported water. PWD also plans to expand its existing treatment plant to 35 mgd and is in the preliminary design stage for a new 10 mgd treatment plant. QHWD plans to enlarge existing wells or drill new wells to meet additional demands. This will become increasingly more important as QHWD utilizes more groundwater to meet projected demands. RCSD has expressed a need for new wells, a reservoir and additional transmission mains to meet projected demands (RCSD 2004). Additionally, RCSD will need to expand their imported water facilities to account for their significant increase in the use of SWP water.

Water Conservation/Water Use Efficiency

Best Management Practices	
Project Sponsor:	LACWWD 40, AVEK, PWD, QHWD, RCSD
Goals and Project Description:	Currently, all water agencies in the Antelope Valley Region utilize water conservation methods as a means to reduce demand during drought conditions. Additionally, LACWWD 40 is a member of the California Urban Water Conservation Council (CUWCC) and a signatory of the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). Signatories pledge to develop and implement the 14 Best Management Practices (BMPs) that are intended to reduce long-term urban water demands. These BMPs are functionally-equivalent to the demand management measures (DMMs) in CWC §10631(f)(1) and are as listed below. DMM 1. Water survey programs for single-family residential and multi-family residential customers. DMM 2. Residential plumbing retrofit. DMM 3. System water audits, lead detection, and repair. DMM 4. Metering with commodity rates for all new connections and retrofit of existing connections. DMM 5. Large landscape conservation programs and incentives. DMM 6. High-efficiency washing machine rebate programs. DMM 7. Public information programs. DMM 8. School education programs. DMM 9. Conservation programs for commercial, industrial, and institutional accounts. DMM 10. Wholesale agency programs. DMM 11. Conservation pricing. DMM 12. Water conservation coordinator. DMM 13. Water waste prohibition. DMM 14. Residential ultra-low-flush toilet replacement programs. AVEK is not a signatory to the CUWCC MOU and is not a member of CUWCC. The only DMM that applies directly to a wholesaler is DMM 10, which AVEK currently implements. Additionally AVEK implements the following DMMs: 3, 4, 7, 8, and 12. AVEK also supports and encourages its retailers to implement the remaining DMMs. LACWWD 40 has been a signatory to the CUWCC MOU since April 1996. LACWWD 40 has implemented or plans to implement 11 of the 14 DMMs as early as 2005. DMM 6 and DMM 14 are not planned for implementation since neither DMM is cost effective at this time. DMM 10 does not apply to water retailers. PWD is not a signatory to the CUWCC MOU and is not a member of CUWCC. However, PWD currently implements or plans to implement 13 of the 14 DMMs as early as 2005. DMM 10 does not apply to water retailers. QHWD is not a signatory to the CUWCC MOU and is not a member of CUWCC. However, QHWD currently implements or plans to implement 13 of the 14 DMMs as early as 2005. DMM 10 does not apply to water retailers. RCSD is not a signatory to the CUWCC MOU and is not a member of CUWCC. However, RCSD currently implements or plans to implement 13 of the 14 DMMs as early as 2005. DMM 10 does not apply to water retailers.

5.2.1.3 Planned Water Supply Management Activities/Actions

The following projects were submitted during the "Call for Projects" to address the water supply management needs of the Antelope Valley Region. Strategies to address the water supply issues include groundwater recharge and groundwater banking, use of recycled water, demand management through conservation and water use efficiency, and efficiency upgrades through infrastructure improvements. These projects submitted are grouped into these categories, as shown below.

Groundwater Recharge/Banking

Upper Amargosa Creek Recharge and Channelization Project	
Project Sponsor:	City of Palmdale
Project Goals and Purposes:	This project will increase the Antelope Valley Region's water supply, increase the amount of protected natural habitat and provide improved flood prevention within the Amargosa Creek watershed.
Project Description:	Proposed project improvements include: expanding the size and capacity of the spreading ground of the natural recharge area; developing and preserving an ephemeral stream habitat; and channelization of Amargosa Creek (soft bottom) and providing a grade separation of 20th Street West over Amargosa Creek.
Quantifiable Benefits:	5,000 to 10,000 AFY; 15 acres open space/habitat; 20 acres flood protection.
Amargosa Water Banking and Storm Water Retention Project	
Project Sponsor:	Submitted on behalf of John Goit, Sundale Mutual Water
Project Goals and Purposes:	The purpose of the project is to restore depressed water table levels in addition to providing stormwater, flood control, and open space benefits.
Project Description:	The Amargosa Water Banking and Storm Water Retention (Amargosa) Project involves banking water to restore the depressed water table to 250 to 335 feet below ground, thereby saving pumping costs. Additionally, the Amargosa Project may include the addition of check dams and holding basins to facilitate stormwater capture and improve flood control. These sites may double as open space/recreation areas.
Quantifiable Benefits:	Restoration of the depressed water table through water recharge could save approximately $450,000 annually in pumping costs.
Antelope Valley Water Bank	
Project Sponsor:	Western Development and Storage (WDS)
Project Goals and Purposes:	Increase water supply reliability in the Antelope Valley Region by providing storage through development of a water bank.
Project Description:	The Antelope Valley Water Bank will provide 500,000 AF of storage in the Neenach Subbasin of the Antelope Valley Basin and the ability to recharge and recover 100,000 AFY. This storage could be used to regulate supplies on a seasonal and year-to-year basis by storing water when it is plentiful for later use when needed. The project is strategically located near imported water supply wheeling infrastructure (1 mile from AVEK West Feeder and 8 miles from East Branch of the SWP California Aqueduct) providing a geographically logical means to store and regulate supplies.
Quantifiable Benefits:	Recharge and recover 100,000 AFY; 1,630 acres open space/habitat

Aquifer Storage and Recovery Project: Injection Well Development	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	This project would improve the reliability of the AVEK water supply.
Project Description:	The project involves the construction of ten new well sites in a groundwater depression area of the Antelope Valley Region to improve water supply reliability. The additional wells would be available for water injection during wet years and for water extraction during dry years.
Quantifiable Benefits:	12,000 AFY
Aquifer Storage and Recovery Project: Additional Storage Capacity	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	This project would improve the efficiency of the AVEK water supply.
Project Description:	This project would increase the District's turnout capacity from AVEK through improvements made to existing infrastructure. Four older, smaller turnout pipelines would be replaced with larger ones to supply water to ASR wells.
Quantifiable Benefits:	More information required to quantify benefit.
Deep wells to Recapture Banked Water	
Project Sponsor:	RCSD
Project Goals and Purposes:	To provide a way to capture banked groundwater when needed.
Project Description:	Drill and equip 6 deep wells between Avenue A and Rosamond Boulevard, 70th to 140th Street West.
Quantifiable Benefits:	More information required to quantify benefit.
Gaskell Road Pipeline	
Project Sponsor:	RCSD
Project Goals and Purposes:	To provide a way to capture banked groundwater when needed.
Project Description:	Construct and operate a 30-inch diameter potable water pipeline on Gaskell Road, in Southeast Kern County, from 60th Street West to 140th Street West, with pumps, valves, meters, telemetry and remote controls from a centralized SCADA control point in Rosamond Community Services District's Operational Center.
Quantifiable Benefits:	100 to 1,000 AF
Groundwater Banking	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Increase water supply reliability through creation of a groundwater banking program.
Project Description:	The project would establish a groundwater bank to include 63,500 AF extraction capacity during dry years and 170,000 AF storage capacity.
Quantifiable Benefits:	63,500 AF
LCID East-Side Groundwater Recharge Project[1]	
Project Sponsor:	Littlerock Creek Irrigation District
Project Goals and Purposes:	Increase imported water supply reliability in the Antelope Valley Region by developing storage and allowing for recharge.
Project Description:	The project is a groundwater recharge project on approximately 120 to 160 acres of Los Angeles County owned land on the east-side of the Valley at 117 and T. There are currently nonproductive County wells that could be used to recharge SWP water. LCID has wells on the property that could be used to facilitate the recharge operations.
Quantifiable Benefits:	More information required to quantify benefit.

Purchasing Spreading Basin Land	
Project Sponsor:	RCSD
Project Goals and Purposes:	To provide land to spread water for percolation and water banking for other entities.
Project Description:	Purchase water spreading basins land in West Kern County from Avenue A to Rosamond B.
Quantifiable Benefits:	More information required to quantify benefit.
Water Supply Stabilization Project – Westside Project	
Project Sponsor:	AVEK, AVSWCA
Project Goals and Purposes:	Increase imported water supply reliability in the Antelope Valley Region by developing storage and allowing for recharge.
Project Description:	Imported water stabilization program that utilizes SWP water delivered to the Antelope Valley Region's westside for groundwater recharge and supplemental supply required for the Antelope Valley Region during summer peaking demand and anticipated dry years. This project includes additional facilities necessary for the delivery of untreated water for direct recharge (percolation basins) or indirect (in-lieu) recharge and for wells and pipeline for treated water conveyance.
Quantifiable Benefits:	5,000 AFY to 10,000 AFY; 15 acres open space; 20 acres flood management
Water Supply Stabilization Project – Eastside Project	
Project Sponsor:	AVEK, AVSWCA
Project Goals and Purposes:	Increase imported water supply reliability in the Antelope Valley Region by developing storage and allowing for recharge.
Project Description:	This project is similar to AVEK's Westside Project, but is meant for the eastside of the Antelope Valley Region.
Quantifiable Benefits:	More than 1,000 AFY

Recycled Water

Groundwater Recharge Using Recycled Water Pilot Project	
Project Sponsor:	City of Lancaster (LADPW, AVEK, LACSD 14)
Project Goals and Purposes:	Increase water supply reliability through use of recharged recycled water.
Project Description:	The Pilot Project would assess maximization of available recycled water by utilizing this valuable source to recharge the local over-draft groundwater basin, increasing the Antelope Valley Region's overall water resources. This project would recharge a blend of recycled water from the 1 mgd membrane bioreactor (MBR) plant at the Lancaster WRP with storm water and/or treated imported water at the City of Lancaster-proposed 100-acre storm water basin at 60th Street West and Avenue F. The Pilot project would allow of extraction of 2,500 AFY and create 100 acres of open space. Ultimately, this recharge project would recharge 50,000 AFY of blend water, with blend water consisting of 40,000 AFY of imported SWP water and 10,000 AFY of recycled water from Lancaster WRP. The baseline project would extract 48,000 AFY of recharged water, on average, via a new well field and deliver the water to wholesaler/retailer distribution system(s) and private agricultural users.
Quantifiable Benefits:	2,500 AFY and 100 acres open space; ultimately 48,000 AFY and 1,000 acres of open space.

1 This project was not submitted in time to be evaluated against the Plan objectives, water management strategies, AB 3030 guidelines, and IRWM Plan Preferences and shown in the Section 6 tables. It will evaluated in this manner along with any other project ideas that are submitted after the final plan is adopted in the first plan update.

Groundwater Recharge - Recycled Water Project	
Project Sponsor:	PWD
Project Goals and Purposes:	Increase water supply reliability through stabilizing the groundwater supply and by using recycled water for recharge purposes whereas potable water would have been used otherwise.
Project Description:	This project involves groundwater recharge using recycled water from the Palmdale WRP. This project is anticipated to be similar to the Lancaster groundwater recharge project described below and have similar blending and extraction numbers (e.g., a blend of 10,000 AFY of recycled water and 40,000 AFY of SWP water). In order to have 40,000 AFY of SWP water to blend, this project would most likely end up being an AVSWCA project (or at least a joint venture type project with AVEK and/or LCID).
Quantifiable Benefits:	48,000 AFY
KC and LAC Interconnection Pipeline	
Project Sponsor:	RCSD (LACSD as joint partner)
Project Goals and Purposes:	To carry recycled water from/to LA County Tertiary Treatment Plant into Kern County to LA County.
Project Description:	Place 36-inch piping between RCSD and Los Angeles County at Avenue A at 20th and 60th Streets West. Place piping north and south on 20th Street and 60th Street to existing recycled water pipelines.
Quantifiable Benefits:	More information required to quantify benefit.
North Los Angeles/Kern County Regional Recycled Water Project	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	The overall goal of this project is to provide recycled water to the Antelope Valley Region, thereby reducing the Antelope Valley Region's dependence on SWP water.
Project Description:	The Los Angeles/Kern County Regional Recycled Water Project outlines the foundation of a regional recycled water system in the Antelope Valley Region. The proposed system would distribute recycled water throughout the service area and provide a backbone system that could accommodate minimum and maximum demands and allow significant deliveries of recycled water to recharge areas. The recommended plan's placement of the system components is based on an analysis of the service area demands, topography, and desired operating pressures. Specifically, the proposed system components of the recommended plan consist of: recycled water supply, a main pump station, booster pump stations, storage reservoirs, and distribution system. The construction of the recycled water supply system would be phased overtime and it is anticipated that all phases of construction would be completed by 2011. Recycled water users would include municipal medians, agriculture, commercial, golf courses, school yards, and parks as allowed by California Department of Health Services, Division 4, Title 22 (Title 22).
Quantifiable Benefits:	Quantifiable benefits include the increased use of approximately 64,780 AFY of recycled water by 2025.
Palmdale Power Project	
Project Sponsor:	City of Palmdale
Project Goals and Purposes:	Construct a power generating facility that utilizes available recycled water.
Project Description:	Construction of a 570 Mega-Watt (MW) electricity generating facility. The Palmdale Power Project will be a hybrid design, utilizing natural gas combined cycle technology and solar thermal technology. The Palmdale Power Project would be a customer and end user of 3,200 AFY of reclaimed water.
Quantifiable Benefits:	Identified users of approximately 3,200 AFY of recycled water.

Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H	
Project Sponsor:	City of Lancaster
Project Goals and Purposes:	The proposed project would create a demand for utilizing tertiary treated recycled water from the Lancaster WRP and provide a reliable means to dispose of recycled water.
Project Description:	This project involves the construction of a 12-inch lateral pipeline off the Regional Backbone at/near Ave M conveying tertiary treated water to a point approximately one mile west and designed to deliver recycled water into the Amargosa Creek channel. Tertiary treated water would travel northerly within the Amargosa Creek roughly 4.7 miles, creating incidental recharge en route until collecting at Lake Lancaster (retention basin north of Ave H). Here, it would be available for irrigation and dust control at the Antelope Valley Fair Grounds and extended use to the west side of Lancaster and surrounding Antelope Valley Region.
Quantifiable Benefits:	100 to 1,000 AFY

Water Conservation & Water Use Efficiency

ET-Based Controller Program	
Project Sponsor:	PWD
Project Goals and Purposes:	Improve water use efficiency on landscaped areas.
Project Description:	This project involves the installation of ET-based irrigation controllers for landscaped areas. This project can assist water purveyors in the Antelope Valley Region in meeting BMPs for water use efficiency and will reduce runoff from over watering of landscaped areas.
Quantifiable Benefits:	Approximately 240 AFY if used on 14 large landscape users in PWD's service area.
Implement Evapotranspiration (ET) Controller Program	
Project Sponsor:	LACWWD 40 (potential joint partners: City of Lancaster, City of Palmdale, PWD, AVEK, Building Industry Association [BIA], Antelope Valley Water Conservation Coalition [AVWCC], and home-owner associations).
Project Goals and Purposes:	Improve water use efficiency on landscaped areas.
Project Description:	Develop and implement an ET controller pilot program in the Antelope Valley Region that can be used as a model to a future mandatory program for new development. The pilot program will include the purchase and installation of (estimated) two weather stations in a selected residential development and replace (approximately) 300 manually adjusted irrigation controllers with weather-sensitive irrigation controllers for the District's qualified customers.
Quantifiable Benefits:	100 to 1,000 AFY
Precision Irrigation Control System	
Project Sponsor:	Leona Valley Town Council
Project Goals and Purposes:	Improve water use efficiency on landscaped areas.
Project Description:	The project is a proposed irrigation control system using electronic sensor probes at root level. Sensors relay data to a computer which controls irrigation valves, delivering a precise amount of water and effectively eliminating over-irrigation.
Quantifiable Benefits:	More than 150 AFY

Ultra Low Flush Toilet (ULFT) Change Out Program	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Improve urban water use efficiency.
Project Description:	The ULFT Change Out Program would distribute ULFTs to customers through one-day Saturday toilet distributions. The one-day distributions provide single-family residents with up to two free ULFTs. This proposal provides one annual one-day distribution events over a three-year duration. Each one-day event will include up to 1,500 ULFTs for District No. 40 per year. This proposal is consistent with BMP No. 14, Residential ULFT Replacement Programs to replace existing high-water-using toilets with ultra-low flush (1.6 gallons or less) toilets for residential customers.
Quantifiable Benefits:	1 to 100 AFY
Water Conservation Demonstration Garden	
Project Sponsor:	PWD
Project Goals and Purposes:	Demonstrate savings from water efficient gardens.
Project Description:	This project involves the construction of a water conservation demonstration garden that will educate the public on water use efficiency practices.
Quantifiable Benefits:	Approximately 86,000 AF savings over a 20 year period.
Water Conservation School Education Program	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Promote water conservation awareness and encourage stewardship in the Antelope Valley Region.
Project Description:	Develop and implement a school education program to promote water conservation awareness and encourage stewardship among school-age children (kindergarten through twelfth grade). This program is consistent with BMP No. 8, School Education Program to promote water conservation and water conservation related benefits, including working with school districts and private schools with within the District's service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed.
Quantifiable Benefits:	More information required to quantify benefit.
Water Waste Ordinance	
Project Sponsor:	LACWWD 40 (potential joint partners: City of Lancaster, City of Palmdale, Los Angeles County for unincorporated areas, water suppliers, etc.)
Project Goals and Purposes:	Reduce water demand during drought years through enforceable ordinances requiring more efficient use of water.
Project Description:	Develop a year-round conservation program as an enforceable ordinance to reduce the impacts of water demand during drought years. May include watering schedule ordinance, water waste ordinance, and landscape ordinance for new development.
Quantifiable Benefits:	More information required to quantify benefit.

Water Infrastructure Improvements

Avenue K Transmission Main, Phases I-IV	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Increase supply reliability through increases in infrastructure capacity and flexibility.
Project Description:	The project consists of four phases for a total of approximately 32,000 linear feet of 30-inch and 36-inch diameter steel transmission main. The proposed transmission main will have interconnections to the existing distribution system and will increase the capacity of the water system to meet the existing domestic and fire protection requirements.
Quantifiable Benefits:	Firms up existing supply
Avenue M and 60th Street West Tanks	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	This project would provide the necessary system pressure, if the water from AVEK was diminished or not available. Thus providing for greater water supply reliability.
Project Description:	This project would include the design and construction of four (4) 3 mgd water storage tanks.
Quantifiable Benefits:	More information required to quantify benefit.
Littlerock Dam Sediment Removal Project	
Project Sponsor:	PWD
Project Goals and Purposes:	Increase capacity and reliability of surface water storage in Littlerock Reservoir.
Project Description:	This project will remove up to 540,000 cubic yards of sediment that has been accumulated from runoff into Littlerock Reservoir, and up to 40,000 cubic yards on an annual basis after the initial sediment is removed. The project may include a grade control structure that will protect the identified habitat of the arroyo toad.
Quantifiable Benefits:	More than 1,000 AFY
Place Valves and Turnouts on Reclaimed Water Pipeline	
Project Sponsor:	RCSD
Project Goals and Purposes:	To provide valving and controls to direct water to various pipelines for use by RCSD, AVEK, LACWWDs, etc.
Project Description:	Place various required turnouts, remove controlled valves, treatment stations, other control features to move water around.
Quantifiable Benefits:	100 to 1,000 AFY
RCSD's Wastewater Pipeline	
Project Sponsor:	RCSD
Project Goals and Purposes:	This project would provide for a possible expansion of RCSD's recycled water services beyond the 0.5 mgd expansion in order to provide more recycled water in a quicker period of time. Bringing excess waste water from LAC would provide the inflow.
Project Description:	This project would include placing a 36-inch wastewater pipeline from LACSD to RCSD's WWTP. The total distance would be approximately 15 miles.
Quantifiable Benefits:	Increases potential users of recycled water

Other projects that could provide Water Supply Management benefits, as secondary to their main benefits include the following:

- 45th Street East Flood Control Basin (Q-East Basin)
- Avenue Q and 20th Street East Basin (Q-West Basin)
- Hunt Canyon Groundwater Recharge and Flood Control Basin (PWD)
- Stormwater Harvesting (Leona Valley Town Council)
- Lancaster WRP Stage V (LACSD)

- Lancaster WRP Stage VI (LACSD)
- Lancaster WRP Proposed Effluent Management Sites (LACSD)
- Palmdale WRP Existing Effluent Management Sites (LACSD)
- Palmdale WRP Stage V (LACSD)
- Palmdale WRP Stage VI (LACSD)
- Palmdale WRP Proposed Effluent Management Sites (LACSD)
- Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (LACWWD 40)
- Tropico Park Pipeline Project (RCSD)

5.2.2 Water Quality Management Strategy

The water quality management strategy must include projects and actions that meet the water quality issues and needs as discussed in Section 3. The key issues and needs are: meeting water quality regulations for groundwater recharge; needing to provide wastewater treatment for a growing population; being able to meet evolving regulations; and being able to handle emerging contaminants. In order to gauge success in addressing these issues, the water quality management strategy must meet the following objectives shown in Table 5-3 and as defined in Section 4.

Table 5-3 Water Quality Objectives

Objective	Planning Target
Provide drinking water that meets customer expectations.	Continue to meet Federal and State standards as well as customer standards for taste and aesthetic.
Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.
	Map contaminated sites and monitor contaminant movement by December 2008.
	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.
Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.
Maximize beneficial use of recycled water.	Increase infrastructure and policies to use 33% of recycled water to help meet expected demand by 2015, 66% by 2025, and 100% by 2035.

5.2.2.1 Completed (Recent) Water Quality Management Activities/Actions

A number of recent plans and studies have been conducted to investigate water quality issues within the Antelope Valley Region, as shown below.

Plans and Studies

Final Lancaster WRP 2020 Facilities Plan and Environmental Impact Report	
Project Sponsor:	LACSD14
Goals and Project Description:	The intent of the Lancaster WRP 2020 Plan is as follows: Provide wastewater treatment and effluent management capacity adequate to meet the needs of LACSD 14 through the year 2020 in an environmentally sound and cost-effective manner., Eliminate unauthorized effluent-induced overflows from Piute Ponds to Rosamond Dry Lake in the most expeditious manner possible and in consideration of the Regional Water Quality Control Board (RWQCB), Lahontan Region, in order to avoid any threatened nuisance condition as determined by Edwards AFB; Ensure recycled water of sufficient quality and quantity is available to satisfy emerging municipal reuse needs; and Comply with the requirements to maintain Piute Ponds. The Lancaster WRP 2020 Plan project, 26 mgd Conventional Activated Sludge Tertiary Treatment, Agricultural Reuse, and Storage Reservoirs, addresses the aims listed above.
Final Palmdale WRP 2025 Facilities Plan and Environmental Impact Report	
Project Sponsor:	LACSD 20
Goals and Project Description:	The overall intent of the Palmdale WRP 2025 Plan is to identify a project that meets the wastewater treatment and effluent management needs of LACSD 20 through year 2025 in a cost-effective and environmentally sound manner. Specifically: Provide wastewater treatment capacity adequate to meet the needs of LACSD 20 through the year 2025; Provide effluent management capacity adequate to meet the needs of LACSD 20 through the year 2025; Provide a long-term solution for meeting water quality requirements set forth by regulatory agencies; and Provide a wastewater treatment and effluent management program that accommodates emerging recycled water reuse opportunities. The major components of the project are wastewater treatment facilities, effluent management facilities, and municipal reuse. Some processes of the wastewater treatment and effluent management facilities will be constructed to upgrade the treatment and effluent management level currently provided at the Palmdale WRP. For other processes, facilities will be expanded from 15.0 mgd to 22.4 mgd. These changes will be performed in stages.

Palmdale Water Reclamation Concept Study	
Project Sponsor:	City of Palmdale, PWD, LACWWD 40, LACSD 20
Goals and Project Description:	The purpose of the Water Reclamation Concept Study was to evaluate three potential conceptual uses of recycled water produced by the Palmdale WRP, owned and operated by LACSD. The concepts considered included the following: Discharge of effluent into existing sand and gravel pits located in the eastern portion of the City of Palmdale to create a recreational facility. Recharge of local groundwater basins with highly treated effluent. Discharge of highly treated effluent into Lake Palmdale, which serves as the forebay for the PWD WRP. Each of these alternatives was evaluated at the conceptual level in an effort to identify feasibility and preliminary costs. The findings of the Study indicated that utilizing effluent for recreational purposes within gravel pits would not result in the utilization of a significant quantity of effluent. With this finding, such use was found not to be feasible unless combined with another alternative. The introduction of highly treated effluent into Lake Palmdale was not considered feasible as such discharge would not comply with the preliminary requirements established by the California Department of Public Health (DPH) for a similar proposal developed by the City of San Diego. The third alternative, discharge of highly treated effluent into local groundwater basins, was found to be technically feasible and would have costs similar to alternative water supplies available within the Antelope Valley Region. Implementing a groundwater recharge program would require resolution of a number of key regulatory issues, the outcome of which could greatly impact the cost of the program.

5.2.2.2 Current Water Quality Management Activities/Actions

Current strategies being used to address the water quality issues focus on the use of recycled water within the Antelope Valley Region, as shown below.

Water Infrastructure Improvements

Chloramines Conversion Project	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Prevent deterioration of water quality due to differing treatment methods between purveyors.
Project Description:	This project involves the system-wide conversion from chlorine disinfection methods to chloramines disinfection techniques. This allows for the system to be compatible with AVEK's disinfection method and prevent the deterioration of water quality in the distribution system.
Quantifiable Benefits:	Improved water quality.

RCSD Recycled Water Project/Treatment Plant Expansion	
Project Sponsor:	RCSD
Project Goals and Purposes:	The overall goal of the project is to provide approximately 1.5 mgd of recycled water to the RCSD service area, thereby reducing the dependence on SWP water.
Project Description:	Rosamond Wastewater Treatment Plant (WWTP), located in the City of Rosamond, is owned, operated, and maintained by the RCSD. Rosamond WWTP, which has a permitted capacity of 1.3 mgd treated an average flow of 1.1 mgd to undisinfected secondary standards for landscape irrigation on-site. RCSD planned to increase the capacity to 1.8 mgd in 2006 through the addition of 0.5 mgd tertiary treatment facility. The tertiary treatment facility will then be upgraded to 1.0 mgd in 2010. Design for the proposed treatment plant improvements is complete and has been approved by the State of California. Construction was delayed due to lack of funding. Once constructed, the plant would provide tertiary treated recycled water for landscape irrigation at median strips, parks, schools, senior complexes and new home developments.
Quantifiable Benefits:	The quantifiable benefits include the increased use of approximately 1.5 mgd of recycled water to the RCSD service area, thereby reducing dependence on SWP water.

Groundwater Management

Update of Antelope Valley Groundwater Basin Model	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Evaluate how quickly the groundwater basin is being replenished by both natural and artificial recharge sources.
Project Description:	The County is partnering with the USGS to produce an updated groundwater flow model for Antelope Valley that can be used to better manage the basin's groundwater resources.
Quantifiable Benefits:	Development of a tool to help local water managers more effectively manage their water resources, both in quality and quantity.

5.2.2.3 Planned Water Quality Management Activities/Actions

The following planned activities and actions have been identified to improve water quality in the Antelope Valley Region by providing drinking water that meets customer expectations, protecting the aquifer from contamination, identifying and preventing future contaminant migration, and maximizing the beneficial reuse of wastewater. These projects were submitted by the stakeholders during the Call for Projects.

Recycled Water

42nd Street East, Sewer Installation	
Project Sponsor:	City of Palmdale
Project Goals and Purposes:	This project would reduce groundwater pollution by eliminating septic tanks currently in use by homes in the vicinity of 42nd Street East.
Project Description:	The City proposes to construct new sewer lines, and will require homes in the vicinity of 42nd Street East to connect to the system, thereby eliminating the use of septic tanks and the potential for groundwater pollution due to leaks and spills.
Quantifiable Benefits:	Groundwater quality would be improved and future contamination reduced through elimination of existing septic tanks.
Lancaster WRP Stage V	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades will help to maximize the beneficial use of recycled water to agricultural and other end users.

Project Description:	The project involves construction and design of a new pump station, storage reservoirs, and other ancillary facilities needed to increase effluent storage capacity to 21 mgd. The project also includes land acquisition needed for site development.
Quantifiable Benefits:	Providing recycled water to the 16,700 AFY of users included in the Section 3 water budget analysis. Water Quality benefits are not quantifiable at this time.
Lancaster WRP Stage VI	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades will help to maximize the beneficial use of recycled water to agricultural and other end users.
Project Description:	This next phase of project development includes the design and construction of a recycled water pump station, storage reservoir, and other ancillary facilities to increase capacity from 21 mgd to 26 mgd.
Quantifiable Benefits:	Providing recycled water to the 16,700 AFY of users included in the Section 3 water budget analysis. Water Quality benefits are not quantifiable at this time.
Lancaster WRP Proposed Effluent Management Sites	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades to the effluent management sites will help to maximize the beneficial reuse of wastewater to agricultural and other end users.
Project Description:	This project includes the following series of activities at proposed new effluent management sites: land acquisition, purchase and installation of irrigation equipment, development of an area-wide farm management plan, site development, completion of associated studies and permits, soil sampling, and well investigation of proposed effluent management sites.
Quantifiable Benefits:	Reduces further elevation of nitrate levels at management sites
Palmdale WRP Existing Effluent Management Sites	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades to the Palmdale WRP existing effluent management sites will improve overall water quality in the Antelope Valley Region and maximize the beneficial reuse of wastewater to agricultural and other end users.
Project Description:	This project includes monitoring, purchase and installation of irrigation equipment, and completion of other capital cost projects associated with the existing effluent management sites.
Quantifiable Benefits:	Reduces further elevation of nitrate levels at management sites
Palmdale WRP Stage V	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades will help to maximize the beneficial reuse of wastewater to agricultural and other end users.
Project Description:	This phase of the upgrade project includes the following series of activities: construction of an effluent pump station, force main, agricultural recycled water pump station, and an agricultural recycled water storage tank and reservoir; development of the new reservoir site and installation of monitoring wells; and design and construction of secondary/tertiary treatment facilities.
Quantifiable Benefits:	Providing recycled water to the 16,700 AFY of users included in the Section 3 water budget analysis. Water Quality benefits are not quantifiable at this time.
Palmdale WRP Stage VI	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades will help to maximize the beneficial reuse of wastewater to agricultural and other end users.
Project Description:	This project includes the design and construction of another agricultural recycled water force main, effluent pump station, and storage reservoir. In addition, a treatment plant expansion of 5 mgd is proposed at this stage.
Quantifiable Benefits:	Providing recycled water to the 16,700 AFY of users included in the Section 3 water budget analysis. Water Quality benefits are not quantifiable at this time.

Palmdale WRP Proposed Effluent Management Sites	
Project Sponsor:	LACSD
Project Goals and Purposes:	The proposed upgrades to the Palmdale WRP proposed effluent management sites will improve overall water quality in the Antelope Valley Region and maximize the beneficial reuse of wastewater to agricultural and other end users.
Project Description:	This project includes the following series of activities at proposed new effluent management sites: land acquisition, purchase and installation of irrigation equipment, development of an area-wide farm management plan, site development, completion of associated studies and permits, groundwater monitoring, and well abandonment.
Quantifiable Benefits:	Reduces further elevation of nitrate levels at management sites

Water Infrastructure Improvements

Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation	
Project Sponsor:	LACWWD 40
Project Goals and Purposes:	Remediate groundwater contaminated by arsenic in a cost-effective manner.
Project Description:	This project proposes arsenic mitigation of five groundwater wells using a proven and cost-effective non-treatment alternative to expensive treatment methods.
Quantifiable Benefits:	Prevents loss of groundwater pumping and existing supply and ensures water quality that meets MCL requirements.
PWD New Treatment Plant	
Project Sponsor:	PWD
Project Goals and Purposes:	The proposed new treatment plant is intended to provide additional water treatment capacity for imported water, thereby improving water quality in the area and providing for additional supply.
Project Description:	This project involves the construction of a new water treatment plant at 47th Street East and the California Aqueduct, for the treatment of SWP and Littlerock Reservoir water. The initial capacity of the plant will be 10 mgd.
Quantifiable Benefits:	The new plant would be capable of treating up to 10 mgd of water.
QHWD Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation	
Project Sponsor:	Quartz Hill Water District (QHWD)
Project Goals and Purposes:	This project will decrease arsenic levels and thus will help QHWD reach compliance with EPA's new legal standard for arsenic (January 2006), This project will benefit several lower income regions of the district due to the location of the well.
Project Description:	This project will pull the pump from the well located on West Avenue L in Lancaster and "micro-grout" the region of strata that contains higher levels of arsenic. Doing so will localize these regions of strata using a cost-effective, non-treatment method.
Quantifiable Benefits:	Prevents loss of groundwater pumping and existing supply and ensures water quality that meets MCL requirements.

Other projects that could provide Water Quality Management benefits, as secondary to their main benefits include the following:

- Antelope Valley Water Bank (WDS)
- Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)
- Groundwater Recharge - Recycled Water Project (PWD)
- North Los Angeles/Kern County Regional Recycled Water Project (LACWWD 40)
- RCSD Recycled Water Project/Treatment Plant Expansion (RCSD)
- Tertiary Treated Water Conveyance and Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H (Lancaster)

- Water Supply Stabilization Project – Westside Project (AVEK)
- Water Supply Stabilization Project – Eastside Project (AVEK)

5.2.3 Flood Management Strategy

The flood management strategy must include projects and actions that meet the flood issues and needs as discussed in Section 3. The key issues and needs are: lack of coordinated flood system or planning efforts throughout the Antelope Valley Region; poor water quality of runoff; nuisance water and dry weather runoff; difficulty providing flood management without interfering with groundwater recharge; incorporating water conservation where feasible; and desire of Edwards AFB to maintain operations on the dry lake beds. In order to gauge success in addressing these issues, the flood management strategy must meet the following objectives as defined in Section 4 and summarized in Table 5-4.

Table 5-4 Flood Management Objectives

Objective	Planning Target
Reduce negative impacts of stormwater, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.

5.2.3.1 Completed (Recent) Flood Management Activities/Actions

The following are previous studies regarding flood and stormwater management and capture activities in the Antelope Valley Region.

Plans and Studies

Antelope Valley Comprehensive Plan of Flood Control and Water Conservation	
Project Sponsor:	LADPW
Project Goals and Description:	This 1987 plan depicts proposed locations for flood control and water conservation, which are intended to provide a regional flood management system consisting of floodplain management and a drainage infrastructure "backbone" system. The plan was not intended for land use regulation; the plan is meant to be a prerequisite to the collection of fees from future subdividers. The plan proposes floodplain management in the hillside areas, structural improvements in the urbanizing area, and nonstructural management approaches in the rural areas. Structural improvements include detention and retention facilities, groundwater recharge basins, storm channels, and stormdrain infrastructure.
QHWD Stormwater Evaluation Study	
Project Sponsor:	QHWD
Project Goals and Description:	The intent of the Study was to define the amount of stormwater flow into the basin, determine the amount lost to evaporation and percolation, evaluate the water quality, and estimate treatment costs. The study concentrated on a 15-acre stormwater basin within the district. Results from the study, if favorable, could lead to an expanded study of the Antelope Valley Region as a whole. Actual volumes of potential supply and associated operation costs have yet to be determined.
RCSD Master Control Plan	
Project Sponsor:	RCSD
Project Goals and Description:	RCSD plans to work with Kern County, LA County and property owners to develop a master control plan to capture stormwater runoff for beneficial purposes. The system would be designed to minimize property damage.

5.2.3.2 Current Flood Management Activities/Actions

No current flood management activities or actions have been identified at this time.

5.2.3.3 Planned Flood Management Activities/Actions

The following planned activities and actions have been identified to reduce the negative impacts of flood water, improve the quality of water runoff, and/or reduce the extent of nuisance water. These projects were submitted by the stakeholders during the Call for Projects.

Plans and Studies

45th Street East Flood Control Basin (Q-East Basin)	
Project Sponsor:	PWD
Project Goals and Purposes:	This project will integrate with the construction of the 45th Street East and Avenue P-8 detention basin for flood control, provide a possible groundwater recharge area, and provide for natural habitat preservation.
Project Description:	The project includes the construction of a new, approximately 2,083 AF drainage basin near 45th Street East and Avenue P-8, on property currently owned by the City of Los Angeles' Department of Airports.
Quantifiable Benefits:	Approximately 208 acres of new wildlife habitat would be created by this project. Water quality would also be expected to improve as a result of reduced contaminated stormwater runoff and capture of up to 2,083 AF.
Anaverde Detention Basin, Dam and Spillway at Pelona Vista Park	
Project Sponsor:	City of Palmdale
Project Goals and Purposes:	This project would provide a new multipurpose flood control basin that would result in the creation of new wildlife habitat, meet conservation efforts, capture stormwater runoff and reduce nuisance water.
Project Description:	The City proposes to construct the Pelona Vista Dam located along Tierra Subida between Avenue S and Rayburn Road, including all necessary and associated grading, inlet/outlet structures, spillway, and storm drain piping as part of its stormwater collection and conveyance system.
Quantifiable Benefits:	The project has the ability to provide for wildlife habitat, conservation, and stormwater capture.
Avenue Q and 20th Street East Basin (Q-West Basin)	
Project Sponsor:	PWD
Project Goals and Purposes:	Similar to the Q-East Basin described above, this project will integrate with the construction of the Avenue Q and 20th Street East detention basin for flood control, provide a possible groundwater recharge area, and provide for natural habitat preservation.
Project Description:	The project entails the acquisition and construction of an approximately 1,612 AF detention basin located between Avenue P-12 and Avenue Q, from 20th Street East to 30th Street East. (Conversely, and depending on site acquisition feasibility, the detention basin could be located on Los Angeles World Airport's property from Avenue P-8 to Avenue P-12.)
Quantifiable Benefits:	Approximately 161 acres of new wildlife habitat would be created by this project. Water quality would also be expected to improve as a result of reduced contaminated stormwater runoff and capture of up to 1,612 AF.

Barrel Springs Detention Basin and Wetlands	
Project Sponsor:	City of Palmdale
Project Goals and Purposes:	This project will provide flood control for the City of Palmdale and provide for wetland enhancement and habitat protection.
Project Description:	Construction of an 878 AF detention basin in the Barrell Springs area upstream of Old Harold Road and 25th Street East, on a 40-acre, City-owned property.
Quantifiable Benefits:	The project would provide flood control for the City of Palmdale, and provide approximately 40 acres of wetland enhancement and habitat protection.
Hunt Canyon Groundwater Recharge and Flood Control Basin	
Project Sponsor:	PWD
Project Goals and Purposes:	This project is intended to alleviate flooding concerns in the Antelope Valley Region through detention of excess stormwater runoff during severe storms. The basin would also provide new recharge area for raw aqueduct water.
Project Description:	The project entails construction of a new 3,000 AF detention/ recharge basin, located south of Pearblossom Highway at 57th Street East. The basin would be used to store aqueduct water to allow recharge into the aquifer, and would act as a detention basin during severe storms.
Quantifiable Benefits:	Approximately 300 acres of new wildlife habitat would be created by construction of this project. Water quality would be expected to improve as a result of reduced contaminated stormwater runoff and capture of up to 3,000 AF.
Quartz Hill Storm Drain	
Project Sponsor:	Los Angeles Department of Public Works
Project Goals and Purposes:	The project consists of the design and construction of a reinforced concrete pipe storm drain to provide stormwater collection and conveyance within the unincorporated Los Angeles area of Quartz Hill. The proposed project would alleviate local flooding and have the potential to provide water conservation and improved water quality.
Project Description:	As such, the project proposes construction of a storm drain, including several lateral connections and catch basins, to provide stormwater collection and conveyance. The project would connect to existing and new drainage facilities, with the improvements located mainly along 50th Street, from Avenue M-8 to Avenue K-8.
Quantifiable Benefits:	Flood protection of 95 acres of County street right-of-way, and 1,108 acres of private property.
Stormwater Harvesting	
Project Sponsor:	Leona Valley Town Council
Project Goals and Purposes:	Agriculture operations throughout the Leona Valley are an important economic and natural resource that requires a consistent and reliable source of irrigation water at reasonable cost. The collection and conveyance of stormwater for use as irrigation water would result in water conservation benefits, improved water supply, and reduced localized flooding.
Project Description:	This project includes the construction of stormwater collection of conveyance facilities, water filtration devices, and cisterns and collection tanks. Through advanced filtration methods, this project can also be expanded to create potable water for residential uses.
Quantifiable Benefits:	Once fully implemented, it is estimated that water conservation of up to 25 AFY could be realized. Expansion of the project to include the creation of potable harvested water for residential uses would further this benefit.

Other projects that could provide Flood Management benefits, as secondary to their main benefits include the following:

- 42nd Street East, Sewer Installation (Palmdale)
- Amargosa Creek Pathways Project (Lancaster)
- Amargosa Creek Recharge and Channelization Project (Palmdale)
- Amargosa Water Banking and Storm Water Retention Project (Goit)
- Groundwater Banking (LACWWD 40)
- Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)

- Water Supply Stabilization Project – Westside Project (AVEK)
- Water Supply Stabilization Project – Eastside Project (AVEK)

5.2.4 Environmental Resource Management Strategy

The environmental resource management strategy must include projects and actions that meet the environmental issues and needs as discussed in Section 3. The key issues and needs are: growing public demand for recreational opportunities; conflict between industry, growth, and preserving open space; and protecting threatened and endangered species. In order to gauge success in addressing these issues, the environmental resource management strategy must meet the following objectives as defined in Section 4 and summarized in Table 5-5.

Table 5-5 Environmental Management Objectives

Objective	Planning Target
Preserve open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.

5.2.4.1 Completed (Recent) Environmental Resource Management Activities/Actions

There is one completed (recent) environmental resource management activity identified at this time.

Plans and Studies

Integrated Natural Resources Management Plan (INRMP) for Edwards Air Force Base (AFB), California	
Project Sponsor:	Air Force Flight Test Center Environmental Management Office
Project Goals and Purposes:	The purpose of this plan is to help integrate environmental stewardship into the Base's military mission and to guide on-the-ground management of the installation's natural resources.
Project Description:	The final draft of Edwards AFB INRMP was completed in October 2002 to meet the requirements under the Sikes Improvement Act of 1997. The INRMP is based on ecosystem management principles and includes management plans for threatened and endangered species, fish and wildlife, forestry, grazing and cropland, pest management and land and outdoor recreation (Air Force 2002).
Quantifiable Benefits:	Identifies management principles to protect environmental habitat.

5.2.4.2 Current Environmental Resource Management Activities/Actions

The following presents two strategies currently being used to manage environmental resources in the Antelope Valley Region.

Plans and Studies

LA County General Plan Significant Ecological Areas (SEAs)	
Project Sponsor:	Los Angeles County
Project Goals and Purposes:	Preservation of diversity is the main objective of the SEA designation, and connectivity between important natural habitats plays an important role in maintaining biotic communities.
Project Description:	SEAs are ecologically important or vulnerable land and water areas that are valuable as plant or animal communities and often important to the preservation of threatened or endangered species. Cumulatively, the SEAs contain resources that represent the biodiversity of Los Angeles County. SEAs are neither preserves nor conservation areas; they do not prohibit a reasonable use of property, although new development must be designed and built to accommodate the existing biological resources in a functioning condition.
Quantifiable Benefits:	Protection and preservation of environmental habitat.

Recycled Water

Piute Ponds Reuse Sites	
Project Sponsor:	LACSD
Project Goals and Purposes:	This project proivdes reuse water to create and maintain wetlands for environmental habitat.
Project Description:	This project involves reusing tertiary treated effluent on the 400 acres at Piute Ponds and approximately 90 acres in three impoundment areas within Edwards AFB
Quantifiable Benefits:	Maintains approximately 490 acres of wetlands.

5.2.4.3 Planned Environmental Management Activities/Actions

The following planned activities and actions have been identified to preserve existing open space and protect endangered species through habitat protection. These projects were submitted by the stakeholders during the Call for Projects.

Habitat Restoration

Ecosystem and Riparian Habitat Restoration of Amargosa Creek: Avenue J to Avenue H	
Project Sponsor:	City of Lancaster
Project Goals and Purposes:	This project provides better land use and natural area connectivity by establishing a riparian corridor that combines ecosystem restoration, habitat protection, acoustic and visual buffers, and wetlands creation and enhancement.
Project Description:	This project establishes riparian habitat along the eastern edge of the Amargosa Creek in elongated segments and sections resulting in a "Riparian Curtain" approximately extending from Ave J north to Ave H. This project requires site reconnaissance, coordination with California Department of Fish and Game (CDFG), various bio-assessments and planting plans prior to implementation and creation. Restoration projects such as this are holistic and enhance the environment, providing physical buffers and off-sets to impacts on the overall ecosystem of ephemeral and riparian habitat associated with Amargosa Creek.
Quantifiable Benefits:	100 to 1,000 AF of open space created

Recycled Water

Tropico Park Pipeline Project	
Project Sponsor:	RCSD
Project Goals and Purposes:	This project will provide a way of using tertiary water to develop and water a regional park north to Tropico Hill.
Project Description:	Place 16-inch recycled water pipeline from Gaskell Road north to Tropico regional Park area.
Quantifiable Benefits:	100 to 1,000 AF of open space created

Other projects that could provide Environmental Management benefits, as secondary to their main benefits include the following:

- 45th Street East Flood Control Basin (Q-East Basin)
- Amargosa Creek Recharge and Channelization Project (Palmdale)
- Amargosa Creek Pathways Project (Lancaster)
- Amargosa Water Banking and Storm Water Retention Project (None)
- Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park (Palmdale)
- Antelope-Fremont Watershed Assessment and Plan (Antelope Valley Conservancy)
- Avenue Q and 20th Street East Basin (Q-West Basin)
- Barrel Springs Detention Basin and Wetlands (Palmdale)
- Hunt Canyon Groundwater Recharge and Flood Control Basin (PWD)
- Littlerock Dam Sediment Removal Project (PWD)
- Pelona Vista Project (PWD)

5.2.5 Land Use Management Strategy

The land use management strategy must include projects and actions that meet the land use issues and needs as discussed in Section 3. The key issues and needs are: tremendous pressure for growth in the Antelope Valley Region; and loss of local culture and values. In order to gauge success in addressing these issues, the environmental resource management strategy must meet the following objectives as defined in Section 4 and summarized in Table 5-6.

Table 5-6 Land Use Management Objectives

Objective	Planning Target
Maintain agricultural land use within the Antelope Valley Region.	Preserve 100,000 acres of farmland in rotation through 2035.
Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of parkland by 2035.
Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.

5.2.5.1 Completed (Recent) Land Use Management Activities/Actions

No completed (recent) land use management activities have been identified at this time.

5.2.5.2 Current Land Use Management Activities/Actions

Identified current activities to manage land uses in the Antelope Valley Region are the regional general plans as shown below.

Plans and Studies

Antelope Valley Regional Conservation Roundtable	
Project Sponsor:	Antelope Valley Conservancy
Project Goals and Purposes:	Facilitate consensus for regional approach to natural lands conservation.
Project Description:	Participants include City of Lancaster, City of Palmdale, County of Los Angeles, CDFG, Southern California Association of Governments (SCAG), California State Parks, County of Los Angeles Parks and Recreation, and project sponsor Antelope Valley Conservancy.
Quantifiable Benefits:	Preservation of natural lands.
Update Los Angeles County General Plan	
Project Sponsor:	County of Los Angeles
Project Goals and Purposes:	Manage and preserve existing land uses and community character, including agricultural, residential, open space, etc. within the growing Los Angeles County, which includes the Antelope Valley Region, while providing for new recreational opportunities and infrastructure to support the population's needs.
Project Description:	Project includes updating the existing Los Angeles County General Plan.
Quantifiable Benefits:	Improved land use designations.

Recycled Water

Apollo Lakes Reuse Project	
Project Sponsor:	LACSD
Project Goals and Purposes:	Project goals include maintaining Apollo Lake for recreation uses.
Project Description:	This project involves using tertiary treated effluent to maintain Apollo Lakes for recreational uses.
Quantifiable Benefits:	Maintenance of recreational space.

5.2.5.3 Planned Land Use Management Activities/Actions

Two projects were submitted for inclusion in the IRWM Plan through the Call for Projects that provide direct benefits associated with land use management. Additional activities and actions that can be taken to preserve the existing agricultural uses in the Antelope Valley Region and to meet the growing demand for recreational area could include projects such as: expansion of agricultural lands, land acquisition for agricultural or recreational purposes, updates of regional specific plans that include preservation of agricultural and recreational lands, etc.

Plans and Studies

Antelope-Fremont Watershed Assessment and Plan	
Project Sponsor:	Antelope Valley Conservancy
Project Goals and Purposes:	To facilitate a holistic, watershed-wide approach to land use planning that will help to ensure that watershed, conservation, and recreational assets creation will be equitably distributed and prudently planned throughout the Antelope Valley Region community.
Project Description:	The proposed project is the coordination and preparation of the Antelope-Fremont Watershed Assessment and Plan, a regional land use plan with emphasis on the preservation and restoration of sensitive natural systems of the Antelope-Fremont Watershed. Because this assessment and plan applies a systems approach -- the CalFed Approach -- to watershed stewardship, it will enhance capacity building of storage, aquifer recharge, and runoff treatment, reducing reliance on State Water supplies and enhancing water quality. It will inform regional projects and create land management plans to satisfy trustee agencies for regional conservation lands. Therefore, this project exponentially benefits all Antelope Valley Region projects' watershed habitat components, maximizing capacity building and integrating watershed stewardship in the community.
Quantifiable Benefits:	2,000 acres open space/habitat/conservation lands.

Recreation

Amargosa Creek Pathways Project	
Project Sponsor:	Lancaster
Project Goals and Purposes:	To construct a pathway in harmony with established riparian habitat within a flood control management basin, which captures stormwater and nuisance water runoff that sustains riparian habitat.
Project Description:	This project includes development of a top of bank trail or paseo along the eastern side of Lake Lancaster, and construction of a foot-bridge structure crossing the lake and connecting under Hwy 14 to link to the existing trailhead at the Antelope Valley Fairgrounds. The project integrates stormwater/flood control with natural riparian habitat enhancement and preservation, open/recreational space and land use management.
Quantifiable Benefits:	1 to 100 AF of open space

Other projects that could provide Land Use Management benefits, secondary to their main benefits include the following:

- Upper Amargosa Creek Recharge and Channelization Project (Palmdale)
- Antelope Valley Water Bank (WDS)
- North Los Angeles/Kern County Regional Recycled Water Project (LACWWD 40)
- Lancaster WRP Stage V (LACSD)
- Lancaster WRP Stage VI (LACSD)
- Lancaster WRP Proposed Effluent Management Sites (LACSD)
- Palmdale WRP Stage V (LACSD)
- Palmdale WRP Stage VI (LACSD)
- Palmdale WRP Existing Effluent Management Sites (LACSD)
- Palmdale WRP Proposed Effluent Management Sites (LACSD)
- Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)
- Water Supply Stabilization Project – Westside Project (AVEK)
- Water Supply Stabilization Project – Eastside Project (AVEK)
- Ecosystem And Riparian Habitat Restoration of Amargosa Creek: Ave J to Ave. H (Lancaster)
- Piute Ponds Reuse Sites (LACSD)

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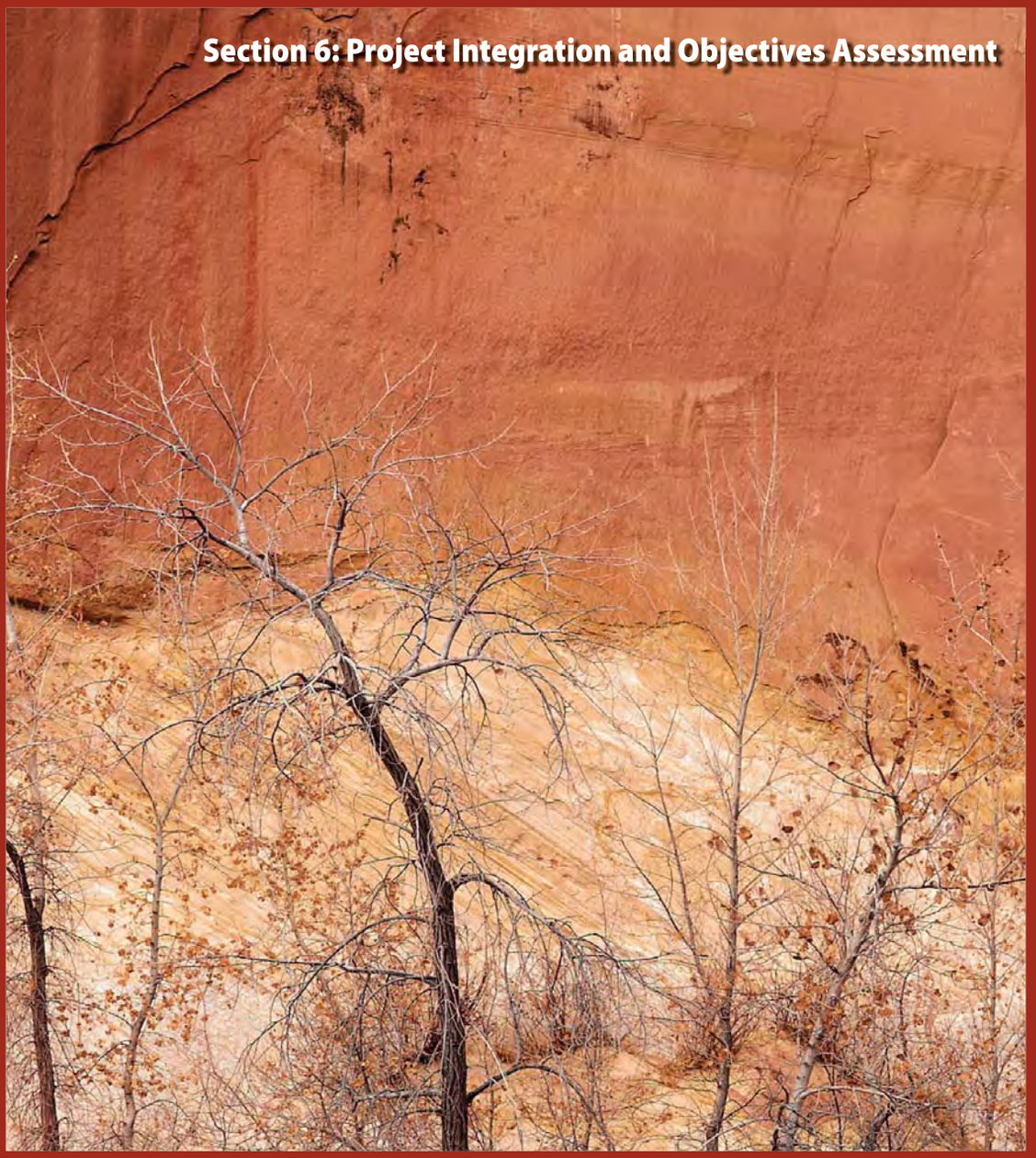
Section 6: Project Integration and Objectives Assessment



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Desert butte habitat fosters biological diversity relative to surrounding areas, and maintaining its integrity is important to the preservation of threatened or endangered species.

Section 6: Project Integration & Objectives Assessment

Water management strategy integration is a process to design water management strategy alternatives to maximize regional benefits by identifying potential synergies, linkages, and gaps between the projects, actions and studies identified in Section 5, as well as within and across the water management strategy areas. The aim of this section is to assess whether the projects identified in Section 5 are sufficient to meet the needs of the Antelope Valley Region, and if not, to identify future planning actions in order to meet this purpose. Integration of the water management strategies (WMS) could occur in several ways:

- Integration "within" a water management strategy area (WMSA), wherein the identified current and planned projects, and project concepts, actions, and studies, are evaluated against their specific WMSA objectives (i.e., projects benefiting water supply are compared to the water supply objectives); and
- Integration "across" each WMSA, wherein the identified current and planned projects, and project concepts, actions and studies are evaluated against ALL the water management strategy area objectives identified in Section 4 (i.e., projects benefiting water supply may also benefit flood management, or water quality objectives). Integration "across" each WMSA will also include the following:
  - » Geographical integration, wherein the areas benefited by the water management strategies are mapped to determine if any geographic overlaps or gaps exist, and then opportunities are identified to take advantage of being in the same geographical location and thus potentially provide multiple benefits, and

» Comparison of each of the identified current and planned projects, and project concepts, actions, and studies to the Integrated Regional Water Management (IRWM) Guideline Strategies (presented in Section 5), the Assembly Bill (AB) 3030 Groundwater Management Guidelines objectives, the Integrated Regional Water Management (IRWM) Plan Guidelines Program Preferences, and the California Department of Water Resources (DWR) Statewide Priorities.

6.1 INTEGRATION AND OBJECTIVES ASSESSMENT "WITHIN" A WMSA

Tables 6-1 and 6-2 illustrate whether the IRWM Plan objectives, for each WMSA, are met by a particular project, current or proposed, respectively. These tables allow for an evaluation of the projects within each WMSA; but also allows for an evaluation across the WMSAs, as described in more detail in Section 6.2 below.

Gaps are areas where the suite of current and proposed projects identified in Section 5 fail to meet or contribute to the IRWM Plan objectives. In order to address these gaps, alternative project concepts and ideas are presented and a preliminary evaluation of the pros and cons, as well as costs and benefits of the alternatives, are provided when available.

It was important to the Stakeholder group to identify objectives that were SMART,[1] and one way to be Measurable is to be quantifiable. Therefore, the objectives in Section 4 include quantifiable planning targets to help gauge whether a particular objective has been met. For those projects that were far enough along in the planning stages to quantify the benefit, their benefit could be evaluated against its respective planning target. However, many of the projects submitted identified a 'benefit category' to a particular WMSA (e.g., water supply, water quality), but because they may have been conceptual projects or in the initial stages of planning their 'benefit' may not yet be quantified. Thus, these projects were evaluated more qualitatively, as whether they could contribute to the attainment of a particular objective. For example, one project concept submitted for evaluation is the establishment of an evapotranspiration (ET) based-controller program. Because this program was submitted as a concept project, with the number of potential users and other technical details not yet quantified, the amount of savings from this program would have to be determined as the project scope was more clearly defined. However, it is logical to assume that the program would result in some amount of conservation, which would reduce the demand for irrigation water by some percentage, and would therefore go towards meeting the water supply planning target of reducing the mismatch of expected supply and demand and contribute to the objective of providing a reliable water supply to meet demands between now and 2035.

As the AV IRWM Plan is updated and as project scopes are refined opportunities exist to reevaluate these projects, and evaluate whether this IRWM Plan is meeting the issues and needs of the Antelope Valley Region.

6.1.1 Water Supply WMSA

Issues and needs relating to the water supply for the Antelope Valley Region generally regard providing a reliable water supply to meet demands, and protecting the groundwater resource. As detailed in Section 3, the Antelope Valley Region will need either to increase supplies or decrease demands to fill the 236,800 AFY of projected mismatch by 2035, for an average water year. Section 4 presented the following objectives and planning targets identified by the Stakeholder group in order to address this deficit and these concerns:

Water Supply Objective 1. Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035.

- **Target:** Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.
- **Target:** Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.
- **Target:** Provide adequate reserves (0 to 62,000 AF/4-year period) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.

Most of the water supply projects proposed by the stakeholders regard the establishment of recharge areas, water banking programs, and aquifer storage and recovery (ASR) programs. These projects demonstrate that the stakeholders view conjunctive use operations as essential in order to meet the water supply needs in the Antelope Valley Region, and lessen the gap between supply and demand currently and out into the future.

1 A SMART objective is one that is Specific, Measurable, Attainable, Relevant, and Time-Based.

Table 6-1 Current Projects vs. IRWM Plan Objectives and Planning Targets

"Current Project/ Program Types and Activities"	Water Supply Management								Water Quality Management										Flood Management		Environmental Management		Land Use Management						Contributes to Multiple Objectives
	Provide reliable water supply to meet the Region's expected demand between now and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (57,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to help meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 100,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.	
WATER SUPPLY MANAGEMENT																													
Plans & Studies																													
Antelope Valley Integrated Regional Water Management Plan																													
City of Lancaster Groundwater Recharge Feasibility Study (Lancaster)	X	X	X	X			X	X			X	X			X	X	X	X	X		X								WS, WQ, FM, EM
Palmdale Water District Reconnaissance Level Feasibility and Scoping Study for Recycled Water Recharge (PWD)	X																X	X			X	X							WS, WQ, EM
Palmdale Water District 2006 Water System Master Plan Update (PWD)	X	X	X	X			X	X	X	X							X	X											WS, WQ
Court Action																													
Adjudication of the Groundwater Basin							X	X			X	X	X	X	X	X													WS, WQ
Groundwater Recharge/Banking																													
Antelope Valley Water Agencies' Water Bank (AVEK, LCID, QHWD, RCSD)	X	X	X	X			X	X													X	X				X			WS, EM
Tejon Ranch Water Bank (Tejon Ranch Water Company)	X	X	X	X			X	X													X	X							WS, WQ, EM
Water Infrastructure Improvements																													
Expansion of Treatment Facilities (RWMG)	X	X	X	X					X	X							X	X											WS, WQ
Water Conservation/Water Use Efficiency																													
Best Management Practices (AVEK, LACWWD40, PWD, QHWD, RCSD)	X	X	X	X	X	X																							WS
WATER QUALITY MANAGEMENT																													
Water Infrastructure Improvements																													
Chloramines Conversion Project (LACWWD40)									X	X	X	X	X		X	X													WQ
RCSD Recycled Water Project/Treatment Plant Expansion (RCSD)	X	X	X	X													X	X								X			WS, WQ
FLOOD MANAGEMENT																													
None identified at this time																													
ENVIRONMENTAL MANAGEMENT																													
Plans & Studies																													
LA County General Plan Significant Ecological Areas (SEAs)																					X					X			FM
Recycled Water																													
Piute Ponds Reuse Sites																					X	X			X				EM, LM
LAND USE MANAGEMENT																													
Plans & Studies																													
Antelope Valley Regional Conservation Roundtable (AV Conservancy)																					X		X		X	X	X	X	EM, LM
Update Los Angeles County General Plan																					X		X		X		X		EM, LM
Recycled Water																													
Apollo Lakes Reuse Project																									X	X			LM
SUMMARY	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**		**X**	**X**	**X**	**X**	

Legend

WS = Water Supply Management FM = Flood Management EM = Environmental Resources Management

WQ = Water Quality Management LM = Land Use Management

Table 6-2 Planned Projects vs. IRWM Plan Objectives and Planning Targets

Planned Project/ Program Types and Activities	Water Supply Management								Water Quality Management										Flood Management		Environmental Management		Land Use Management						Contributes to Multiple Objectives
	Provide reliable water supply to meet the Region's expected demand between now and 2035.	Reduce (73,600 to 263,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic.	Protect aquifer from contamination.	Prevent unacceptable degradation of a aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to help meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 100,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.	
WATER SUPPLY MANAGEMENT																													
Groundwater Recharge/Banking																													
Amargosa Creek Recharge and Channelization Project (Palmdale)	X	X	X	X			X	X											X		X	X					X		WS, FM, EM
Amargosa Water Banking and Storm Water Retention Project (No financial sponsor identified)	X	X	X	X			X	X											X		X	X			X	X	X		WS, FM, EM
Antelope Valley Water Bank (WDS)	X	X	X	X		X	X	X			X	X			X	X					X	X	X	X			X		WS, WQ, EM
Aquifer Storage and Recovery Project: Injection Well Development (LACWWD40)	X	X	X	X			X	X																					WS
Aquifer Storage and Recovery Project: Additional Storage Capacity (LACWWD40)	X																												WS
Deep wells to Recapture Banked Water (RCSD)	X	X	X	X			X	X																					WS
Gaskell Road Pipeline (RCSD)	X	X	X	X																									WS
Groundwater Banking (LACWWD40)	X	X	X	X		X	X	X											X		X	X					X		WS, FM, EM
Purchasing Spreading Basin Land (RCSD)																					X	X					X		EM
Water Supply Stabilization Project – Westside Project (AVEK, AVSWCA)	X	X	X	X	X	X	X	X			X	X			X	X					X	X	X	X			X		WS, EM, LM
Water Supply Stabilization Project – Eastside Project (AVEK, AVSWCA)	X	X	X	X	X	X	X	X			X	X			X	X					X	X	X	X			X		WS, EM, LM
Recycled Water																													
Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)	X	X	X	X			X	X									X	X	X		X	X					X		WS, WQ, FM, EM
Groundwater Recharge - Recycled Water Project (PWD)	X	X	X	X			X	X									X	X	X		X	X					X		WS, WQ,FM, EM
KC & LAC Interconnection Pipeline (RCSD)																	X	X											WQ
North Los Angeles/Kern County Regional Recycled Water Project (LACWWD40)	X	X	X	X													X	X									X		WS, WQ
Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H (Lancaster)							X	X									X	X									X		WS, WQ
Water Conservation/Water Use Efficiency																													
ET-Based Controller Program (PWD)	X	X																	X								X		WS, FM
Implement Evapotranspiration (ET) Controller Program (LACWWD40)	X	X																	X								X		WS, FM
Precision Irrigation Control System (Leona Valley Town Council)	X	X															X	X	X	X			X				X		WS, WQ, FM, LM
Ultra Low Flush Toilet (ULFT) Change Out Program (LACWWD40)	X	X																											WS
Water Conservation Demonstration Garden (PWD)	X	X																	X								X		WS, FM, EM
Water Conservation School Education Program (LACWWD40)	X	X																	X										WS, FM, EM
Water Waste Ordinance (LACWWD40)	X	X																	X								X		WS, FM
Water Infrastructure Improvements																													
Avenue K Transmission Main, Phases I-V (LACWWD40)	X																												WS
Avenue M and 60th Street West Tanks (LACWWD40)	X				X	X																							WS
Littlerock Dam Sediment Removal Project (PWD)	X	X																			X								WS, EM
Place Valves and Turnouts on Reclaimed Water Pipeline (RCSD)	X																X	X											WS, WQ
RCSD's Wastewater Pipeline (RCSD)	X																X	X											WS, WQ
WATER QUALITY MANAGEMENT																													
Recycled Water																													

Table 6-2 Planned Projects vs. IRWM Plan Objectives and Planning Targets (continued)

Planned Project/ Program Types and Activities	Water Supply Management								Water Quality Management										Flood Management		Environmental Management		Land Use Management						Contributes to Multiple Objectives
	Provide reliable water supply to meet the Region's expected demand between now and 2035.	Reduce (73,600 to 263,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic.	Protect aquifer from contamination.	Prevent unacceptable degradation of a aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to help meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 100,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.	
42nd Street East, Sewer Installation (Palmdale)											X	X	X		X	X											X		WQ
Lancaster WRP Stage V (LACSD)	X	X															X	X			X		X	X			X		WQ, LM
Lancaster WRP Stage VI (LACSD)	X	X															X	X			X		X	X			X		WQ, LM
Lancaster WRP Proposed Effluent Management Sites (LACSD)																	X	X					X	X			X		WQ, LM
Palmdale Power Project (Palmdale)																	X	X											WQ
Palmdale WRP Existing Effluent Management Sites (LACSD)											X	X	X	X			X	X					X	X			X		WQ, LM
Palmdale WRP Stage V (LACSD)	X	X									X	X	X	X			X	X					X	X			X		WQ, LM
Palmdale WRP Stage VI (LACSD)	X	X									X	X	X	X			X	X					X	X			X		WQ, LM
Palmdale WRP Proposed Effluent Management Sites (LACSD)											X	X	X	X			X	X					X	X			X		WQ, LM
Water Infrastructure Improvements																													
Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (LACWWD40)											X	X	X		X	X													WQ
PWD New Treatment Plant (PWD)	X	X	X	X					X	X																			WS, WQ
QHWD Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (QHWD)											X	X	X		X	X													WQ
FLOOD MANAGEMENT																													
Water Infrastructure Improvements																													
45th Street East Flood Control Basin (Q-East Basin) (Palmdale)							X	X											X		X	X					X		WS, FM, EM
Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park (Palmdale)	X	X																	X		X	X					X		WS, FM, EM
Avenue Q and 20th Street East Basin (Q-West Basin) (Palmdale)	X	X																	X		X	X					X		WS, FM, EM
Barrel Springs Detention Basin and Wetlands (Palmdale)	X	X																	X		X	X					X		WS, FM, EM
Hunt Canyon Groundwater Recharge and Flood Control Basin (Palmdale)	X	X																	X		X	X					X		WS, FM, EM
Quartz Hill Storm Drain (LAFCD)																			X								X		FM
Stormwater Harvesting (Leona Valley Town Council)		X	X	X													X	X	X	X			X	X			X		WS, WQ, FM, LM
ENVIRONMENTAL MANAGEMENT																													
Habitat Restoration																													
Ecosystem & Riparian Habitat Restoration of Amargosa Creek: Avenue L to Avenue G (Lancaster)											X	X			X	X			X		X	X					X		EM, FM, LM
Recycled Water																													
Tropico Park Pipeline Project (RCSD)																	X	X							X	X	X		WQ, LM
LAND USE MANAGEMENT																													
Plans and Studies																													
Antelope-Fremont Watershed Assessment and Plan (Antelope Valley Conservancy)											X	X			X	X			X		X	X			X	X	X		LM, EM, FM
Recreation																													
Amargosa Creek Pathways: Phase II (Lancaster)							X				X				X		X		X	X	X	X			X	X	X	X	LM, EM
SUMMARY	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	

Legend

WS = Water Supply Management FM = Flood Management EM = Environmental Resources Management

WQ = Water Quality Management LM = Land Use Management

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A number of water conservation projects were also submitted by the stakeholder group. These projects aim to reduce the gap between supply and demand by managing the demand side of the water balance equation. Thus, integration of those projects that manage the supply side with those that manage the demand side have the potential to maximize the quantifiable benefits even further.

As discussed in more detail in Tables 6-9 and 6-10 below, the water supply projects submitted by the Stakeholders show a range of new supply benefits, from 1 AFY to 48,000 AFY to meet demands during an average year, and between 12,000 to 100,000 AFY for a dry/multi-dry year.

Water Supply Objective 2. Establish a contingency plan to meet water supply needs of the Antelope Valley Region during a plausible disruption of State Water Project (SWP) water deliveries.

- **Target:** Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.

Water Supply Objective 2 was more difficult to evaluate in terms of whether the proposed projects adequately met this objective without the physical creation of a contingency plan. In order to meet this objective, the Antelope Valley Region would be required to rely on groundwater, recycled water, and demand management measures to provide sufficient supply. Given that many of the projects proposed were recharge programs, some of which have quantifiable benefits as mentioned above, it is likely that this IRWM Plan will contribute towards meeting this objective. Additionally, each water purveyor in the Antelope Valley Region has already developed their own Contingency Plans to address emergency situations in general as discussed in their Urban Water Management Plans.

Water Supply Objective 3. Stabilize groundwater levels at current conditions.

- **Target:** Manage groundwater levels throughout the basin such that a 10-year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.

As mentioned above, many of the projects proposed by the stakeholders are groundwater recharge projects and water banking programs. These projects and programs will require monitoring to identify which regions of the aquifer are best suited for these activities, and will require continued monitoring to ensure they are operating effectively. Monitoring and data collection are the first step in managing groundwater levels throughout the basin.

Furthermore, this IRWM Plan limited groundwater extraction to the sum of natural recharge, artificial recharge, and return flow in the Water Budget analysis conducted in Section 3 to ensure future pumping in the Basin would not impact groundwater levels.

6.1.1.1 Future Planning Efforts and Actions to Fill the Identified Water Supply Management Gaps

Because it is difficult at this stage in the IRWM Plan process to quantify the potential benefits of all the projects, it is difficult to sufficiently assess whether the water supply projects adequately meet this IRWM Plan objectives. However, given the projected supply deficits, the uncertainty regarding the pending adjudication and the identified need for more data, the following future planning efforts and actions are options to better meet, or contribute towards meeting, the objectives identified for this strategy in addition to the proposed projects described in Section 5.

Aggressive Conservation. Implementing an aggressive water conservation program could conserve an average of 54,600 AFY in the Antelope Valley Region, assuming a 20 percent reduction in urban water demand by 2035. A determination would need to be made as to whether the amount of conservation that is required under this alternative would be achievable or insufficient.

As discussed in Section 5, all water agencies in the Antelope Valley Region currently utilize water conservation methods as a means to reduce demand during drought conditions. However, only Los Angeles County Waterworks District 40 (LACWWD 40) is a member of the California Urban Water Conservation Council (CUWCC) and a signatory of the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). Antelope Valley East Kern County Water Agency (AVEK), Palmdale Water District (PWD), Quartz Hill Water District (QHWD), and Rosamond Community Service District (RCSD) are not signatories to the CUWCC MOU and are not members of CUWCC; however, they each implement or plan to implement their own conservation methods.

An aggressive water conservation program would also include agricultural water conservation. On-farm water use can be reduced substantially without decreasing productivity through improved irrigation technologies and efficient water management practices.

The 1995 Antelope Valley Water Resource Study (Kennedy/Jenks 1995) estimated that full development of an identified water conservation program involving the City of

Palmdale, City of Lancaster, Community of Rosamond, and an agricultural mobile lab program could save an estimated nearly 500,000 AF over the 1994 through 2020 planning period.

Develop Further Conjunctive Use Management. The number of water banking and ASR projects proposed by the Stakeholders are an indication of how important conjunctive use operations will be in order to meet the water supply needs in the Antelope Valley Region. Even more benefit can be seen from these conjunctive use types of projects by expanding their realm to include imported water, surface water, stormwater, and treated groundwater.

The first option is to increase the amount of imported SWP water into the Antelope Valley Region for injection, either directly after treatment, or through blending with other supplies such as recycled water. The main issues associated with increasing use of imported SWP for conjunctive uses include cost, availability, and quality of SWP water (generally high in Total Dissolved Solids [TDS]).

The capture and recharge of surface water is another conjunctive use method available to the Antelope Valley Region. Most of the runoff into the Antelope Valley Region originates in the surrounding mountains. Rainfall records indicate that runoff sometimes may be available that could be retained and used for artificial groundwater recharge (USGS 1995). Surface water recharge could be increased by limiting development in key recharge areas of the Antelope Valley Region as well as by establishing effective methods to capture surface water. Surface water capture and recharge would need to be evaluated for feasibility prior to implementation to identify recharge areas, as discussed in Section 6.1.3.

Opportunities for expansion of stormwater capture and management include development of local and regional facilities to capture and treat urban runoff and stormwater. This could include package treatment plants to remove contaminants, filtration systems, or natural treatment systems such as constructed wetlands. Water cleansed by such facilities could either be recharged to groundwater, or stored for delivery to local uses, such as landscape irrigation. Stormwater capture and recharge would also need to be evaluated for feasibility prior to implementation to identify recharge areas.

Lastly, conjunctive uses could be expanded to the treatment of poor quality groundwater which could be extracted, treated, and then reinjected into the aquifer. The extraction would be accomplished through the increased use of existing wells and by the installation of additional wells, pumps, and wellhead treatment facilities. Existing or new distribution facilities such as pipelines and pumping stations would be used to transport this water to existing and planned treated water distribution facilities. Pumps and treatment facilities would use electrical power. A detailed geohydrologic investigation would be necessary prior to drilling on a site-by-site basis. Field studies and groundwater modeling activities would be needed to hydraulically evaluate where in the aquifer the additional extraction should come from and if the basin could handle increased pumping without negatively affecting groundwater levels. The pending adjudication would determine the feasibility of this alternative, and to what extent it could be implemented in the Antelope Valley Region.

Participate in Water Banks Outside of the Antelope Valley Region. Another potential water supply option is to participate in water banking programs outside of the Antelope Valley Region to bring water into the Antelope Valley Region. Such additional banks could include Wheeler Ridge Maricopa Water Storage District White-Wolf Ridge, the Chino Basin Groundwater Basin Storage and Recovery Program, the Semitropic Water Banking and Exchange Program, Calleguas Municipal Water District (CMWD) and Metropolitan Water District of Southern California (MWD), Los Posas ASR, and the Rosedale-Rio Bravo Water Storage District. It should be noted that while water banks operating outside of Antelope Valley Region are possibilities for the Antelope Valley Region, the feasibility of utilizing each still needs to be determined. Benefits to the Antelope Valley Region from utilization of these banks would be to increase water supply reliability for the Antelope Valley Region by increasing the number and mix of sites potentially available in which to bank water for later withdrawal and use. This would provide redundancy, and thus, protection of banked supplies from the possibility of infrastructure outages or contamination events. For example, if all banked supplies were located within the Antelope Valley Region and they subsequently became contaminated by an unwanted constituent, those supplies might become unavailable for use. Having supplies banked in other areas would allow them to be transported to the Antelope Valley Region in such an event. Likewise, the impacts of an infrastructure outage (such as an earthquake event along the California Aqueduct) could be mitigated if some portion of banked supplies were located outside the Antelope Valley Region.

The cost to participate in banking programs outside of the Antelope Valley Region vary according to the particular banking program, water right contract terms, geographic location and access to infrastructure, and other negotiation costs. The Buena Vista Water Storage District/Rosedale-Rio Bravo Water Storage District Water Banking and Recovery Program, located west of Bakersfield in Kern County, is an example of an outside banking program. The Castaic Lake

Water Agency (CLWA) participates in the program by paying a basic unit price of $448/AF for 11,000 AF, paid annually, with an averaged 10-year "look-in" escalator tied to the Southern California consumer price index and Kern County Water Agency's SWP costs, whichever is higher (Kennedy/ Jenks Consultants 2007).

Another example of a banking program outside of the Antelope Valley Region is the Semitropic Water Storage District (Semitropic) groundwater storage program. Several participants in the Semitropic program may wish to sell all or part of their banked supplies. These participants include Vidler Water Company, the Newhall Land and Farming Company and various SWP contractors including MWD and Santa Clara Valley Water District (Kennedy/ Jenks 2007). These banked supplies represent either Table A Amount banked "in-lieu" by overlying pumpers within Semitropic, or previously stored groundwater supplies that were purchased in-place. The amounts of water stored and attendant costs vary for this program based on the contribution to capital and operations and maintenance (O&M) negotiated by the participants at the time they join the Semitropic program. There is also a "second priority" program that requires no capital or O&M contribution and has lower up front costs and participation fees, but which also has lower delivery priority during periods in which other, higher priority participants may be taking delivery of their previously banked supplies. One such higher-priority participant is MWD. MWD has a reserved storage capacity of 350,000 AF in the Semitropic program. According to MWD's 2006/2007 Budget (MWD 2007), $3.4 million dollars is budgeted for the 2006/2007 participation in the program, which equates to approximately $971/AF. This cost per AF would include the required annual fee, the injection and extraction costs, and any other miscellaneous costs not expressly stated. Lower priority participants, like CLWA, pay a reduced cost per AF, which for CLWA is on the order of $52/AF not including actual energy costs and transmission fees (Boschman, W. 2002).

Create Regional Database for Groundwater Pumping. The analysis in Section 3 helped to identify a number of issues regarding the availability of accurate water resource data for the Antelope Valley Region. Municipal and Industrial (M&I) and major agricultural pumpers generally measure their groundwater extractions and submit this information to DWR. The pumpers that do not measure groundwater extractions are anticipated to be agricultural and small

As the number of people living and working in the Antelope Valley Region increases, the competition for water supply increases, and the challenge of maintaining good water quality and managing the interconnected water cycle becomes more challenging.

domestic water users. The existing databases do not have broad agreement for pumping within the same areas and it is thought that pumping is generally underreported (USGS 1995). Furthermore, there is a significant lack of groundwater pumping data available for the Kern County portion of the Antelope Valley Region and for the smaller mutuals in the Antelope Valley Region. By creating a regional database for groundwater pumping and a methodology for its management, this sort of data can be regularly obtained and made available for research studies such as this IRWM Plan and contribute to meeting the objective of stabilizing groundwater at current conditions. It is recommended that these data be regularly collected and compiled. For pumpers that do not monitor groundwater extractions, indirect methods, such as estimates based on power or consumption use, can be utilized for groundwater management purposes.

Use Alternative Sources of Water. Groundwater and imported SWP water make up the majority of the water supplies in the Antelope Valley Region, with groundwater historically providing between 50 and 90 percent of overall supply. The pending adjudication and variability of SWP in light of global climate change conditions calls into question the reliability of these sources. Another solution is to use alternative sources of water to meet demands. These other sources could include water from the Central Valley of California (Central Valley Project [CVP] water) transfers from other water rights holders in the Sacramento Valley, water from other water supply systems (Los Angeles Department of Water and Power [LA DWP]), Article 21 water, treated stormwater captured and recharged into the ground, and desalinated water. In addition, alternative imported water sources from SWP contractors other than the Antelope Valley-East Kern Water Agency (AVEK) could be considered. There are a number of issues involved with the use of these other sources. The use of water from the CVP water would be transported to AVEK via SWP facilities, and as non-SWP water, its transmission by these facilities would have low priority. Therefore, the water supply would be less reliable than that of water that AVEK currently supplies, which would not meet Project objectives. Additionally, the permanent conveyance of this water through the Bay-Delta could result in economic and social impacts associated with transferring water from agricultural use to urban use. Water transfers from CVP contractors also would not likely be feasible because their water already has been allocated for other uses, including environmental restoration projects, and is not available for long-term, reliable sale or exchange. According to the Bureau of Reclamation website, annual payments shall be allocated so as not to exceed $6.00 per AF (October 1992 price levels) for agricultural water sold and delivered by the CVP, and $12.00 per AF (October 1992 price levels) for M&I water sold and delivered by the CVP (Section 3407[d][2][a] Restoration Fund).

Preservation of open space and natural habitat linkages is vital to ensuring long term viability of sensitive biological resources.

Various SWP contractors (or their member agencies) hold contractual SWP Table A Amounts in excess of their demands. Due to the high annual fixed costs of SWP Table A Amounts, these agencies may wish to sell this excess to another contractor. Such Table A Amounts would be subject to the SWP annual allocation and SWP delivery reliability constraints. Potential sellers include the County of Butte and Kern County Water Agency (from its member agencies). The financial terms are variable, but recent "face value" costs range from $1,500/AF to over $3,000/AF (Kennedy/Jenks 2007). The buyer assumes all prospective SWP Transportation Minimum, Capital, O&M and variable power cost payments to DWR from the time the Table A sale is effective, through the life of the SWP contract.

Article 21 water refers to the SWP contract provision defining this supply as water that may be made available by DWR when excess flows are available in the Delta (i.e., when Delta outflow requirements have been met, SWP storage south of the Delta is full, and conveyance capacity is available beyond that being used for SWP operations and delivery of allocated and scheduled Table A supplies). Article 21 water is made available on an unscheduled and interruptible basis and is typically available only in average to wet years, generally only for a limited time in the late winter. Due to the short duration of its availability and capacity constraints at Edmonston Pumping Plant, Article 21 water is generally delivered most readily to agricultural contractors and to San Joaquin Valley banking programs. Therefore, Article 21 water is not considered a long-term reliable supply for the Antelope Valley Region. The basic rate for Article 21 water is the current SWP variable transmission rate which is generally between $10 to $20/AF. However, this amount can fluctuate depending on the distance to move the water from the Delta to where it is to

be delivered, and the current conditions of the California energy market.

The SWP Contractors Authority (Authority) Dry-year Water Purchase Program allows for the purchase of water from many agents within the California water system on a one-time or short-term basis. Participants could increase reliability during drought years by participating in this program to supplement supplies. This program has historically operated only in years when the SWP allocation is below 50 percent, or when a potentially dry hydrologic season is combined with expected low SWP carryover storage; it thus provides a contingency supplemental water supply. Typical water costs include an option payment (to hold water); the call price (actual purchase price); and loss of water due to movement through the Sacramento/San Joaquin Delta, in addition to SWP transmission costs. In 2005, the initial sign-up deposits of $15/AF were collected with the execution of a participation agreement. Of the initial deposit, $5/AF were held by the Authority to cover administrative costs for Authority operations and for 50 percent of the sellers' incurred regulatory documentation costs, with the condition that any unused portions of the administrative cost would be refunded to the buyer at the end of the Dry-year Program. The remaining $10/AF of the deposit would be paid to the seller as an option payment within 30 days of signing a buyer-seller agreement. The $10/AF option payment would guarantee the requested quantity of water would be available for a "call" on April 1 for a total price of $125/AF (including the $10 option). Individual Agreements were established with each of the sellers and were signed by each of the buyers. Basic terms of the agreements included: A $125/AF price (including a $10/AF non-refundable option fee which was sent within 30 days of the contract signature) for an April 1 call date. Call dates for the options could be extended to mid-April for an additional $10/AF ($135/AF total), or to May 2 for an additional $20/AF ($145/AF total) (the additional expenses for option extensions would offset farming preparation costs that would be invested in early April and would therefore be sacrificed when the land was fallowed as part of the provision to provide the transfer water).

Water storage capabilities, such as tanks, are a key asset in a region where valuable water is lost daily due to a lack of available infrastructure.

Turnback Pools are a means in which SWP contractors with excess Table A Amount in a given hydrologic year may sell that excess to other contractors. This is included in a provision in the SWP water supply contracts. This provision is available in all year types, but is most in demand during dry periods, when Table A allocations are low and almost all contractors are seeking additional supplies. Of course, in those year types, less water is made available to the Turnback Pools. The program is administered by DWR and requires selling and buying contractors to adhere to a specific schedule by which options to water must be exercised. The total amount of water placed into the pools by the selling contractors is allocated to the participating buying contractors based on their contractual Table A Amounts. The water supply contract provides for Turnback Pools in a given water year. Pool "A," which must be purchased by March 1, is priced at 50 percent of the current SWP Delta water rate and the later Pool "B," which must be purchased by April 1, is priced at 25 percent of the current Delta water rate. In 2006, the Delta water rate was approximately $13/AF.

All of the above mentioned supply alternatives have issues related to capacity and delivery priority in the California Aqueduct and other SWP facilities. SWP contractors, via their water supply contracts with DWR, are allocated specified shares of "reach repayment" capacity in various reaches of the SWP system, starting at Banks Pumping Plant in the Delta and proceeding through the main stem of the Aqueduct and the Aqueduct branches to each contractor's delivery turnout(s). This share of capacity pertains to SWP supplies only, and provides each contractor with delivery priority for its SWP supplies. The water supply contracts also provide for the delivery of non-SWP supplies through the SWP system, provided that other contractors are not coincidentally utilizing all available capacity; these non-SWP supplies are delivered at a lower priority than SWP supplies.

Reach repayment capacity is often less than the actual constructed physical capacity of SWP facilities. Depending on location within the SWP system, some areas have ample capacity to move both full SWP Table A Amounts (including all of MWD's Table A Amount plus other contractors full Table A Amounts) plus other non-SWP supplies. Other points in the system, notably the Edmonston Pumping Plant and the East Branch, have considerable physical capacity limitations.

It is generally accepted among the SWP contractors that, based on future demand forecasts for all contractors, wet years (which tend to lower service area demands), will result in ample capacity in the southerly reaches of the SWP system, even though Table A allocations are high (i.e., not all water will be needed in the contactors' service areas, and much of it will be banked in other locations or sold into the SWP Turnback Pools). Dry years (which tend to cause higher service area demands), will cause capacity constraints as southern contractors take water from the various banking programs in the San Joaquin Valley or from various dry year supply programs and attempt to deliver them within the same window of time (i.e., peak demand periods), even though Table A allocations are low. It is also generally accepted that all contractors in a given repayment reach will work cooperatively with DWR and each other to attempt delivery of all requested supplies, whether SWP or non-SWP. As additional contractors obtain additional supplies through time, this cooperative arrangement will be tested.

Utilization of desalinated water is also an alternate source of water that could be made available in the Antelope Valley Region. It is not likely that a desalination plant would be constructed in the Antelope Valley Region due to the distance from the ocean and the associated construction and operation costs. However, it is plausible to obtain desalinated water by exchange. For example, in this situation, AVEK could contribute a portion of the funds needed by another agency to develop a seawater desalination facility along the southern California coast, and water produced by this facility would be exchanged with AVEK for SWP water. A likely partner in such an arrangement could be The Metropolitan Water District of Southern California (MWD). If both parties agreed, AVEK would enter into a contract with MWD indicating that a portion of MWD's annual SWP Table A Amount would be delivered to AVEK in exchange for AVEK's contribution to a desalination facility to be constructed by MWD. AVEK would treat and distribute SWP water in existing AVEK facilities, and MWD would use water from the desalination facility in lieu of the SWP water exchanged with AVEK. All of these options present challenges in terms of conveyance, water quality, and cost. In general, the cost to desalinate seawater can cost anywhere from $500 to $2,000/AF (DWR 2005c).

Make Further Use of Recycled. Many of the Stakeholder-identified projects involve the use of recycled water, whether it be for injection in conjunctive use projects, for effluent management, or otherwise. Increasing this amount beyond what is already planned could help to further reduce the gap between future supply and demand. Since the use of recycled water is limited to landscaping and other non-potable uses, it would be important to identify uses for the water beyond those for which its uses are currently dedicated or planned. Other potential uses of

Recycled water used on agricultural lands is a necessary alternative water source that helps to close the gap between water supply and demand.

recycled water include groundwater recharge. Particular concern should be paid to salinity concentrations in using recycled water. Numerous factors contribute to salinity in recycled water, including imported potable water sources and salts entering with each cycle of urban use for residential, commercial, or industrial purposes. Management of the salt imbalance is key because as salinity increases, irrigation water use increases to flush out salts that accumulate in the root zone, increasing overall water demand. Furthermore, industrial users incur extra costs for cooling towers, boilers, and manufacturing processes to deal with the high salinity water. This is especially important in a closed basin like the Antelope Valley Region. In addition, groundwater recharge can also be affected when source water quality does not satisfy regulatory requirements (i.e., Basin Plan Objectives). The annual cost to provide recycled water to the Antelope Valley Region is currently estimated at $860/AF (LACWWD 40 2006).

Inability to Approve Further Development. The inability to approve further development assumes that the local retail water purveyors within the Antelope Valley Region decide there is insufficient water to issue "will serve" letters to supply development, and that local land use agencies respond by imposing a moratorium on new development in the Antelope Valley Region. The inability to approve new developments could result in considerable economic and social impacts to residential, commercial, industrial, and public/governmental users in the Antelope Valley Region if water deliveries were cut back or rationing occurred. Reduced deliveries could affect the ability of public and private property owners to water lawns, parks, golf courses, landscaping and open space areas, and could result in these areas dying off with resulting economic loss. Businesses that use high volumes of water may be forced to cut back production or close. Prohibitions on new development would result in a delay or failure to meet County of Los Angeles and the Cities of Lancaster and Palmdale's General Plan population, housing, and job projections for which local governments have planned and/or constructed infrastructure and expended funds. Disallowing new development would have potential economic consequences related to increased costs of housing in an already expensive southern California housing market, and developers with approved or recorded and unbuilt projects may experience economic loss if projects are delayed or cannot be completed. In addition, businesses considering relocating or expanding in the Antelope Valley Region may be reluctant to invest capital because of uncertainties related to water supplies, lack of affordable housing for employees, and stagnant local markets for goods and services. From 2002 to 2005, retail sales in the Antelope Valley Region[2] grew from $2.5 billion to $3.5 billion and over the same

In the Antelope Valley, improvements such as channels, storm drains, and detention and retention basins are needed to control flood-prone areas in the region

time period the number of new housing units grew by over 300 percent[3] (Greater Antelope Valley Economic Alliance 2007 Economic Roundtable Report). Should a moratorium on development be enforced in 2010, this increase in revenue growth will likely flatten or even decrease.

6.1.2 Water Quality WMSA

The issues and needs for water quality management in the Antelope Valley Region generally regard the desire to provide drinking water that meets current and future standards, protecting existing and future water sources from potential contamination, and making beneficial use of tertiary treated wastewaters for recycled water applications. The objectives and planning targets identified for this WMSA are:

Water Quality Objective 1. Provide drinking water that meets customer expectations.

- **Target:** Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.

Projects that would help to meet this first water quality objective included the LACWWD 40's chloramines conversion project, which aims to prevent deterioration of water quality due to differing treatment methods between purveyors, and PWD's proposed new treatment plant and expansion of AVEK's treatment plants which would increase the Antelope Valley Region's potable treatment capabilities. If the Antelope Valley Region is going to continue to meet this objective, these treatment facilities must be able to continue to meet current and emerging water quality standards.

2 Includes data for the Cities of Palmdale and Lancaster only.

3 Includes data for the Cities of Palmdale and Lancaster only.

Water Quality Objective 2. Protect aquifer from contamination.

- **Target:** Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.
- **Target:** Map contaminated sites and monitor contaminant movement by December 2008.
- **Target:** Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.

As with the 2nd water supply objective mentioned above, many of the projects proposed by the stakeholders are groundwater recharge projects and water banking programs. These projects and programs will require monitoring to identify which regions of the aquifer are best suited for these activities, and will require continued monitoring to ensure they are operating effectively. Monitoring and data collection are the first steps in protecting the aquifer from contamination. Additional projects submitted that meet these objectives are LACWWD 40's arsenic mitigation project to remediate arsenic groundwater contamination, Los Angeles County Sanitation District's (LACSD's) projects to monitor the potential for contamination from effluent management practices, and the City of Palmdale's sewer elimination project which would reduce groundwater pollution by eliminating septic tanks currently in use by homes in the vicinity of 42nd Street East.

Water Quality Objective 3. Protect natural streams and recharge areas from contamination.

- **Target:** Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.

Projects proposed by the stakeholders to address this objective include groundwater recharge projects, retention and detention basin projects, and flood control projects. These projects and programs will require monitoring to identify which locations best suited for these activities, and will require continued monitoring to ensure they are operating effectively. Monitoring and data collection are the first steps in protecting the natural streams and recharge areas from contamination.

Water Quality Objective 4. Maximize beneficial use of recycled water.

- **Target:** Increase infrastructure and establish policies to use 33 percent of recycled water to help meet expected demand by 2015, 66 percent by 2025, and 100 percent by 2035.

LACSD submitted a number of projects involving enhancements to their treatment facilities, helping to meet the increased infrastructure targets. Additionally, a number of the stakeholder-identified projects specify the use of recycled water for irrigation, effluent management, and recharge projects; many of which benefit not only water quality objectives, but also water supply and land use management objectives. There are a number of opportunities for integration between water quality projects, including a proposed recharge basin that uses effluent from the Palmdale or Lancaster Water Reclamation Plants (WRPs) as a source of recharge water.

6.1.2.1 Future Planning Efforts and Actions to Fill the Identified Water Quality Management Gaps

Where this WMSA falls short in terms of meeting the water quality objectives is in protecting the groundwater aquifer from contamination, which includes identifying and mapping the contaminated portions of the aquifer and identifying potential future sources of contamination. Therefore, the following future planning efforts and actions are suggested to better meet the objectives identified for this strategy.

Identify Contaminated Portions of the Aquifer. The planning target, which is provided in order to gauge success on meeting the water quality management objectives, is to identify and prevent migration of contaminated portions of the aquifer. As this planning target was not directly met (it was considered indirectly met by those projects that have the potential to help meet this objective, i.e., projects that included groundwater monitoring wells) by the projects proposed in this IRWM Plan, it is being suggested as a future planning effort for the Antelope Valley Region.

Map Contaminated Portions of Aquifer by December 2008. The planning target, which is provided in order to gauge success on meeting the water quality manage-

Protection of natural streams and recharge areas that originate in the surrounding mountain ranges from contamination is a key objective of Plan implementation.

ment objectives, is to map the contaminated portions of the aquifer and monitor contaminant movement. As this planning target was not directly met (it was considered indirectly met by those projects that have the potential to help meet this objective, i.e., projects which included groundwater monitoring wells) by the projects proposed in this IRWM Plan, it is being suggested as a future planning effort for the Antelope Valley Region.

Establish a Well Abandonment Ordinance. Abandoned wells in the Antelope Valley Region present water quality problems in that they act as conduits for surface and subsurface pollutants. The establishment of a well abandonment ordinance would provide the policing authority to enforce the timely destruction of abandoned wells. The ordinance could provide the authority to require well destruction or rehabilitation as a condition upon sale of property, change of ownership or change of use. The ordinance could also require that new well applications be processed only after the applicant has demonstrated that all existing wells on all property they own are not in violation of the well ordinance.

Develop and Implement a Regional Groundwater Wellhead Protection Program. A Wellhead Protection Program (WPP) is a pollution prevention and management program used to protect underground sources of drinking water. A national WPP was established in 1986 by the Federal Safe Drinking Water Act. Some of the elements of these types of programs include the identification of recharge areas, zones of influence, groundwater flow directions, and potential contamination sources. This information is then compiled into a management plan, based on the assessment of alternatives for addressing potential sources of contamination, describing the local ordinances, zoning requirements, monitoring program and other local initiatives. The development of a regional WPP could additionally promote smart land use practices, including prohibiting new industrial, commercial and residential development in areas of sensitive groundwater recharge.

Develop Management Program for Nitrate and TDS. TDS and nitrate are of particular concern with regard to water quality in the Antelope Valley Region. TDS is concentrated in the groundwater over prolonged recharge of SWP water, especially since the Antelope Valley Region is a closed basin. Nitrates result from irrigation practices and effluent management. Development of a management program for these pollutants of concern, as well as for other emerging contaminants as they are identified, would contribute to meeting the objective of protecting the aquifer from contamination.

Vegetation native to the Antelope Valley Region are typical of the high desert and include Joshua trees, saltbush, mesquite, sagebrush, and creosote bush.

Expand the Water Quality Monitoring Program. Monitoring activities in the Antelope Valley Region include groundwater levels, groundwater quality, land surface subsidence, aquifer compaction, and streamflow. According to the DWR Bulletin 118 (2004), the United States Geologic Survey (USGS) actively monitors 262 wells for groundwater levels, 10 wells for miscellaneous water quality, and the Department of Health Services and cooperators monitor 248 wells in the Antelope Valley Region for Title 22 water quality compliance. Expansion of the existing water quality monitoring efforts would allow for more current data collection to better assess the state of the Antelope Valley Region's water quality and other groundwater parameters. These groundwater quality monitoring programs need to be continued in order to capture the effects of changes in management practices. As Phillips states in his 1993 USGS report, "the need for an ongoing monitoring program transcends the importance of the selection of management alternatives." Further, in order for a water quality monitoring program to be successful in the Antelope Valley Region, the information collected needs to be shared regionally (i.e., by establishing a clearinghouse) in order to integrate and synthesize the data.

As mentioned above, both TDS and nitrate are problems in the Antelope Valley Region. It would particularly be important to continue to monitor discharger's actions to reduce impact of discharge on groundwater and remedial measures.

6.1.3 Flood Management WMSA

Flood management issues in the Antelope Valley Region generally relate to management of stormwater flows of variable water quality, and the management of nuisance

Historically, water supplies within the Antelope Valley Region were used primarily for agriculture, the predominant land use of the area. Photo courtesy of the Los Angeles County Farm Bureau.

water (dry weather runoff). The objectives and planning targets identified for this WMSA are:

Flood Management Objectives. Reduce negative impacts of stormwater, urban runoff, and nuisance water.

- **Target:** Coordinate a regional flood management plan and policy mechanism by the year 2010.

Stakeholder-identified projects proposed to address flood management needs in the Antelope Valley Region include recharge, retention, and detention basins to control storm-water flows, and new storm drains to route storm flows and flood flows to such basins. Many of these projects meet the flood management objectives. For example, the City of Palmdale's detention/recharge basin projects control flood water, thereby meeting the objective of reducing the negative impacts of flood water. By allowing the flood water to recharge into the underlying aquifer, which can act as a preliminary treatment method, the water quality of the runoff water is improved, thereby meeting the second objective of improving water quality of runoff. Lastly, if detention/retention basins are constructed in a manner that links them to strategically placed storm drain channels and outlets, the extent of nuisance water can be lessened, thereby meeting the third objective.

There are many opportunities for integration between flood management projects. Flood control basins can also be used to store raw aqueduct water, increasing ground-water recharge as well as supply reliability in the Antelope Valley Region. A debris basin can provide storage for silt, sand, gravel, or other debris from runoff. They can also be designated as open spaces, habitat and recreational areas or act as natural treatment areas for poor quality runoff.

Tables 6-1 and 6-2, however, indicate that there is an apparent gap in coordinating these flood management efforts throughout the Antelope Valley Region.

6.1.3.1 Future Planning Efforts and Actions to Fill the Identified Flood Management Gaps

To better meet the objectives identified for this strategy, the following future planning efforts and actions are suggested.

Coordinate a Flood Management Plan by 2010. The planning target, which is provided in order to gauge success on meeting the flood management objectives, is to coordinate a regional flood management plan and mechanism by the year 2010. As this planning target was not met by the proj-

ects proposed in this IRWM Plan, it is being suggested as a future planning effort for the Antelope Valley Region.

Stormwater Capture/Recovery Feasibility Study. Development of a regional stormwater capture/recovery feasibility study allows for a regional view of the existing stormwater management facilities (retention/detention basins, storm drains, etc.) to see how they can be better interconnected to provide a more comprehensive management system for the Antelope Valley Region. This type of planning effort would also identify opportunities for linkages to existing or planned recharge basins, open space, and habitat areas.

Increase small-scale flood management projects. Small-scale flood management projects could include modification of existing culverts and bridges, installation or modification of floodgates, stabilization of stream banks, and creation of small debris or flood/storm water retention basins throughout the Antelope Valley Region where needed. These minor physical flood mitigation projects wouldn't duplicate the more regional flood-prevention activities; rather, they would work to enhance them at a local level.

Encourage Low Impact Development (LID). LID is a relatively new concept for stormwater management. The objective of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. Techniques are based on the premise that storm water management should not be seen as stormwater disposal. Instead of conveying and managing/treating stormwater in large, costly end-of-pipe facilities located at the bottom of drainage areas, LID addresses stormwater through small, cost-effective landscape features located at the lot level.

6.1.4 Environmental Resource WMSA

The main issues of concern regarding environmental resource management in the Antelope Valley Region are protection and preservation of open space and protection of endangered species. The following objectives and planning targets were identified to address these concerns:

Environmental Resource Objective 1. Preserve open space and natural habitats that protect and enhance water resources and species in the Antelope Valley Region.

- **Target:** Contribute to the preservation of an additional 2,000 acres of open space and natural habitat to integrate and maximize surface and groundwater management by 2015.

Two projects submitted for inclusion in the IRWM Plan had environmental resource management as their main benefit: Lancaster's Ecosystem and Riparian Habitat Restoration of Amargosa Creek: Avenue J to Avenue H, and RCSD's Tropico Park Pipeline Project. However, some of the projects that propose groundwater recharge areas designate such areas as open space (approximately 2,500 acres), which would help to meet the objectives for this strategy. Ongoing efforts to update the LA County General Plan, which include Significant Ecological Areas (SEAs) designated to protect sensitive species, as well the other planning documents approved for the Antelope Valley Region (e.g., the West Mojave Habitat Conservation Plan [HCP], the Kern County General Plan) will help to identify and then meet the environmental resource needs in the Antelope Valley Region.

6.1.4.1 Future Planning Efforts and Actions to Fill the Identified Environmental Resource Management Gaps

To better meet the objectives identified for this strategy, the following future planning efforts and actions are suggested.

Preserve 2,000 Acres of Open Space and Natural Habitat. The planning target, which is provided in order to gauge success on meeting the environmental management objectives, is to preserve 2,000 additional acres of habitat consistent with adopted regional plans. As this planning target was not met by the projects proposed in this IRWM Plan, it is being suggested as a future planning effort for the Antelope Valley Region. One potential way of preserving 2,000 acres of habitat is for the local conservancies to either purchase and/or establish conservation easements through land acquisitions. Implementation of LID techniques where feasible are recommended.

Enhancement of unique habitat areas throughout the Antelope Valley Region benefits the natural environment and increases recreational opportunities for a growing population.

Develop a HCP for the Antelope Valley Region. HCPs are developed to outline what steps must be taken to minimize and mitigate the impact of a permitted "take" on a threatened or endangered species. Many HCPs designate open space or habitat as mitigations of "take." Therefore, an HCP is a tool that could be used in the Antelope Valley Region for preserving and protecting open space and habitat.

Promote Land Conservation Projects that Enhance Flood Control, Aquifer Recharge, and Watershed and Open Space Preservation. Promotion of conservation projects could be done through the adoption of a Memorandum of Understanding (MOU) with municipalities in the Antelope Valley Region to elicit and promote compliance with plans approved for the Antelope Valley Region including the area General Plans and the Mojave HCP.

6.1.5 Land Use Management WMSA

The main issues of concern regarding land use management in the Antelope Valley Region relate to the preservation of agricultural land, which includes a recognition of the historical relationship to the land and a support of a right to farm as well as the private property rights of all owners to economic benefits from their property, and the ability to provide recreational opportunities for a growing population. The following objectives and planning targets were identified to address these concerns:

Land Use Management Objective 1. Maintain agricultural land use within the Antelope Valley Region.

- **Target:** Preserve 100,000 acres of farmland in rotation through 2035.

Land Use Management Objective 2. Meet growing demand for recreational space.

- **Target:** Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.

Land Use Management Objective 3. Improve integrated land use planning to support water management.

- **Target:** Coordinate a regional land use management plan by the year 2010.

Two projects were submitted for inclusion in the AV IRWM Plan through the Call for Projects that provide direct benefits associated with land use management; Amargosa Creek Pathways Project Phase II and the Antelope-Fremont Watershed Assessment and Plan. A number of the projects proposed by the Stakeholders identify agricultural lands for effluent management, and agricultural and recreational lands are likely to be addressed through the update of local general planning documents. These types of projects indirectly benefit land use management, but do not directly meet the objectives identified for the Antelope Valley Region. Employing land use planning as a strategy provides a way to better manage and protect local water supplies. Programs can be made available to assist in water conservation, protect and improve water quality, address stormwater capture and flooding, protect and enhance environmental habitat areas and recreational opportunities. Thus, implementing land use planning strategies can assist in achieving not only the land use management objectives, but also the overall AV IRWM Plan objectives.

6.1.5.1 Future Planning Efforts and Actions to Fill the Identified Land Use Management Gaps

Below are additional future planning efforts and actions that have been identified in order to better meet the land use management objectives.

Preserve Farmland. The planning target, which is provided in order to gauge success in meeting the land use management objectives, is to preserve 100,000 acres of farmland in rotation through 2035. This means that at any given time, approximately 25,000 acres of farmland are actively being farmed in the Antelope Valley Region. While some of the proposed projects include farmland as a component that would contribute to this target, such as the Lancaster and Palmdale Effluent Management Sites which would effectively preserve approximately 12,000 acres of agricultural land, it is still being suggested as a future planning effort for the Antelope Valley Region because the planning target was not entirely met.

Build Public Parks and Recreational Amenities. The planning target, which is provided in order to gauge success in meeting the land use management objectives, is to increase public parks and recreational amenities by providing 5,000 acres of recreational space by 2035. As this planning target was not met by the projects proposed in this IRWM Plan, it is being suggested as a future planning effort for the Antelope Valley Region. As part of this planning effort, an Antelope Valley Region-wide inventory of existing water-related recreational opportunities could be developed that would aid in providing a needs assessment for future opportunities. Implementation of LID techniques where feasible are recommended.

Create a Watershed Management Plan. There is currently no watershed management plan for the Antelope Valley Region. Watershed management plans are similar to this

IRWM Plan in that they bring together a wide range of stakeholders, including city and county staff, resource managers and policy officials, and community organizations to protect and restore the aesthetic and function of the watershed where needed. Watershed management plans focus on the 'function' of a watershed, and thereby assess the health and value of watershed components.

Create Incentives for Landowners to Protect/Restore/Preserve Open Space. Land use agencies have the ability to create incentives and/or eliminate disincentives for landowners to protect and restore open spaces and habitat on their property. Technical assistance and financial incentives have proven effective in protecting and restoring privately held natural areas, which in turn helps to meet regional water quality, flood management and environmental management objectives. Implementation of LID techniques where feasible are recommended.

Coordinate a Regional Land Use Management Plan by the Year 2010. Traditionally, cities and counties have the responsibility for land use planning, much of which is continued in the local and regional General Plans. These planning documents to some extent address water and environmental resources in the context of land use planning. However, through the coordination of a regional land use plan, these efforts can be combined to better manage and protect local water supplies, to improve water quality, reduce flooding, restore habitats and ecosystems, and provide recreational, educational, and access opportunities to the public for a potentially greater regional benefit.

6.2 ASSESS PROJECTS FOR MULTIPLE BENEFITS "ACROSS" WSMAS

Tables 6-1 and 6-2 also show whether or not a particular project contributes to more than one WMSA objective, which is an indication of the potential to provide multiple benefits. To provide an indication of the current level of integration of stakeholder projects, this integration is also summarized in Table 6-3, which identifies the number of projects within each type of possible benefit combination.

Opportunities for maximizing the integration of water supply and water quality projects and simultaneously generating benefits for open space, habitat, and recreational uses can be accomplished with the projects proposed for the Antelope Valley Region, even if the identified stakeholder projects do not meet the planning targets. For example, a groundwater recharge project, which generally benefits water supply, can also benefit environmental resources by designating the recharge area as open space or habitat. Natural treatment systems can be integrated with storm drain systems to provide both flood management benefits and water quality improvements. If integrated with open space and habitat, natural treatment systems could also provide environmental benefits.

6.2.1 Geographic Integration

Geographic integration allows for further integration between the water management strategies. Proposed projects that could take advantage of being in the same geographical location could provide multiple benefits. In an Antelope Valley Region of over 2,400 square miles, opportunities for geographical integration are numerous. Figure 6-1 illustrates the location of the projects and management actions discussed in Section 5, and show the locations of

Table 6-3 Benefit Combination Groups

Single Benefit Type	Number of Projects	Two Benefit Types	Number of Projects	Three or More Benefit Types	Number of Projects
WS	8	WS/WQ	9	WS/FM/EM	10
WQ	6	WS/FM	3	WS/WQ/EM	3
FM	2	WS/EM	2	WS/EM/LM	2
EM	1	WQ/LM	8	EM/FM/LM	2
LM	0	LM/EM	3	WS/WQ/FM/EM	3
				WS/WQ/FM/LM	2
Total	**17**		**25**		**22**

Note: Each project is only represented once in the group that describes its benefits. For example, a project submitted with water supply and water quality benefits is only represented once as a WS/WQ project.
WS = Water Supply, WQ = Water Quality, FM = Flood Management, EM = Environmental Management, LM = Land Use Management

the areas benefited by the water management strategies. Table 6-4 provides a key to Figure 6-1. Geographic integration was considered in the evaluation and prioritization of the projects (discussed in Section 7) as well as in the packaging implementation approach discussed in Section 8.

Table 6-4 Project Reference Points

Project Number	Project Name	Sponsor
Water Supply Management		
23	Upper Amargosa Creek Recharge and Channelization Project	City of Palmdale
24	Amargosa Water Banking & Stormwater Retention Project	J. Goit/Sundale Mutual
25	Antelope Valley Water Bank	Western Development and Storage
26	Aquifer Storage and Recovery Project: Injection Well Development	LACWWD 40
27	Aquifer Storage and Recovery Project: Additional Storage Capacity	LACWWD 40
28	Deep wells to Recapture Banked Water	RCSD
29	Gaskell Road Pipeline	RCSD
30	Groundwater Banking	LACWWD 40
31	LCID East-Side Groundwater Recharge Project	LCID
32	Purchasing Spreading Basin Land	RCSD
33	Water Supply Stabilization Project – Westside Project	AVEK
34	Water Supply Stabilization Project – Eastside Project	AVEK
35	Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project	City of Lancaster
36	Groundwater Recharge Recycled Water Project	PWD
37	KC & LAC Interconnection Pipeline	RCSD
38	North Los Angeles/Kern County Regional Recycled Water Project	LACWWD 40
39	Palmdale Power Project	City of Palmdale
40	Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H	City of Lancaster
41	ET Based Controller Program	PWD
42	Implement ET Controller Program	LACWWD 40
43	Precision Irrigation Control System	Leona Valley Town Council
44	Ultra-Low Flush Toilet Change-out Program	LACWWD 40
45	Water Conservation Garden	PWD
46	Water Conservation School Education Program	LACWWD 40
47	Waste Water Ordinance	LACWWD 40
48	Avenue K Transmission Main, Phases I-V	LACWWD 40
49	Avenue M and 60th Street West Tanks	LACWWD 40
50	Littlerock Dam Sediment Removal	PWD
51	Place Values and Turnouts on Reclaimed Water Pipeline	RCSD
52	RCSD Wastewater Pipeline	RCSD
Water Quality Management		
12	42nd Street East, Sewer Installation	City of Palmdale
13	Lancaster WRP Stage V	LACSD
14	Lancaster WRP Stage VI	LACSD
15	Lancaster WRP Proposed Effluent Management Sites	LACSD
16	Palmdale WRP Proposed Effluent Management Sites	LACSD
17	Palmdale WRP Stage V	LACSD
18	Palmdale WRP Stage VI	LACSD
19	Palmdale WRP Existing Effluent Management Sites	LACSD

Table 6-4 Project Reference Points (continued)		
Project Number	**Project Name**	**Sponsor**
20	Partial Well Abanondment of Groundwater Wells for Arsenic Mitigation	LACWWD 40
21	New PWD Treatment Plant	PWD
22	QHWD Partial Well Abanondment of Groundwater Wells for Arsenic Mitigation	QHWD
Flood Management		
5	45th Street East Flood Control Basin (Q-East Basin)	City of Palmdale
6	Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park	City of Palmdale
7	Avenue Q and 20th Street East Basin (Q-West Basin)	City of Palmdale
8	Barrel Springs Detention Basin and Wetlands	City of Palmdale
9	Hunt Canyon Groundwater Recharge and Flood Control Basin	City of Palmdale
10	Quartz Hill Storm Drain	LADPW
11	Stormwater Harvesting	Leona Valley Town Council
Environmental Management		
1	Ecosystem and Riparian Habitat Restoration of Amargosa Creek Ave J to Ave H	City of Lancaster
2	Tropico Park Pipeline Project	RCSD
Land Use Management		
3	Antelope-Fremont Watershed Assessment Plan	Antelope Valley Conservancy
4	Amargosa Creek Pathways Project	City of Lancaster

6.2.2 Compliance with, and Objectives Assessment for the IRWM Plan Guideline Strategies, AB 3030, IRWM Plan Guidelines Program Preferences, and Statewide Priorities

Tables 6-5 and 6-6 show how the Proposition 50 IRWM Guideline Strategies (which were correlated with the California Water Plan strategies in Table 5-1), the AB 3030 Groundwater Management Guidelines, the IRWM Plan Guideline Program Preferences, and the Statewide Priorities are met by each project, and project concept, action and study identified in Section 5, for current and planned projects, respectively.

Tables 6-7 and 6-8 additionally demonstrate how the identified future planning efforts, or "gap" projects, contribute to meeting these other objectives and priorities, as well as the IRWM Plan objectives.

The Proposition 50 IRWM Guideline Strategies were defined in Section 5.1.1, and the AB 3030 Guidelines defined throughout Section 3.

The IRWM Plan Guidelines include the following program preferences:

- Include integrated projects with multiple benefits. Support and improve local and regional water supply reliability.
- Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.
- Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.
- Include safe drinking water and water quality projects that serve disadvantaged communities.
- Include groundwater management and recharge projects that are located (1) in San Bernardino or Riverside counties; (2) outside of the service area of the Metropolitan Water District of Southern California; or (3) within one mile of established residential and commercial development.

The following statewide priorities were established by the Department of Water Resources (DWR) and the State Water Resources Control Board (SWRCB):

- Reduce conflict between water users or resolve water rights.
- Implementation of Total Maximum Daily Loads (TMDLs) that are established or under development.
- Implementation of Regional Water Quality Control Board (RWQCB) Watershed Management Initiative chapters, plans, and policies.

  The Lahontan RWQCB Watershed Management Initiative includes the following regional priorities and targeted projects: monitor discharger actions to reduce adverse

impacts to Edwards AFB operations and develop requirements for new disposal options; use Basin Plan amendment process to prescribe site-specific objectives for Piute Ponds; pollution and degradation of groundwater by nitrate and TDS; continue to monitor discharger's actions to reduce impact of discharge on groundwater and remedial measures; develop IRWM Plans; implement irrigation management measures; evaluate impacts from large-scale development and integration of sustainable land uses and landscape designs; identify conflicts between water supply and water quality; investigate loading contributions from residential and urban activities; mitigate groundwater overdraft; investigate nitrogen and salt loading contributions to ground and surface water; demonstrate water reuse projects to lower demand on supply; and implement citizen monitoring.

- Implementation of the SWRCB's Nonpoint Source Pollution Plan.

  The Nonpoint Source Pollution Plan adopts a number of management measures as goals for six Nonpoint Source Pollution categories (agriculture, forestry, urban areas, marinas and recreational boating, hydromodification, and wetlands/riparian areas/vegetated treatment systems).

- Assist in meeting Delta Water Quality Objectives.

  Decision 1641 is an action by the SWRCB to establish water quality objectives for water users in the Delta. The Bay/Delta Water Quality Control Plan was developed as a means to attain these water quality objectives and includes the following components: implementation of flow objectives for specific water quality criteria in the Bay-Delta Estuary; a petition to change the point of diversion for the CVP and SWP in the southern Delta; and a petition to change 'in place of use' and 'purpose of use' of the CVP. Generally it was determined that projects within the Antelope Valley Region that increase the reliability of local supplies reduce the need for additional water supplies from the Bay-Delta region. Therefore, there is additional supply in the Bay-Delta available to contribute towards meeting Delta water quality objectives.

- Implementation of recommendations of the floodplain management task force, desalination task force, recycling task force or State species recovery plan.

  Recommendations of the floodplain management task force include, but are not limited to, floodplain mapping, land use planning in areas affected by flooding, alluvial floodplain management, and flood warning and local community flood response programs. Recommendations of the desalination task force were assumed not applicable due to it not being economical and environmentally appropriate in the Antelope Valley Region. Recommendations from the recycling task force include local agencies actively participating with the public in planning water recycling projects; creating recycled water ordinances; increasing public awareness to ensure a safe recycled water supply and encouraging economic and fiscal analyses for water recycling projects to provide true costs and benefits of such projects.

- Address environmental justice concerns.

  Projects that would benefit disadvantaged communities would go toward meeting this objective.

- Assist in achieving one or more goals of the CALFED Bay-Delta Program.

  The CALFED Bay-Delta Program objectives focus on water quality, ecosystem quality, water supply reliability, and levee system integrity in the Bay-Delta area. The potential for actions within the Antelope Valley Region to assist in achieving these goals is through the increase in the reliability of local water supplies, thereby reducing the need for additional imported water supplies from the Bay-Delta region.

6.3 ADDED BENEFITS OF INTEGRATION

Integration of the water management strategies may provide additional benefits, as compared to implementing stand alone alternatives. These added benefits may include:

- facilitating cost sharing among agencies (economy of scale) and organizations,
- resolving potentially conflicting water management needs,
- avoiding duplication of planning, design, compliance, or implementation efforts,
- identifying and resolving jurisdictional, legal, regulatory, administrative, or water rights issues,
- enhancing efficiency of monitoring (e.g., combining monitoring efforts and reducing monitoring duplication) and data management,
- increasing public awareness, public education and outreach, and stakeholder involvement, and
- providing synergistic effects to optimize attainment of IRWM Plan objectives.

6.4 CONCLUSIONS

This IRWM Plan identifies projects and management actions that can be used to implement the projects in an integrated fashion to meet the AV IRWM Plan objectives and

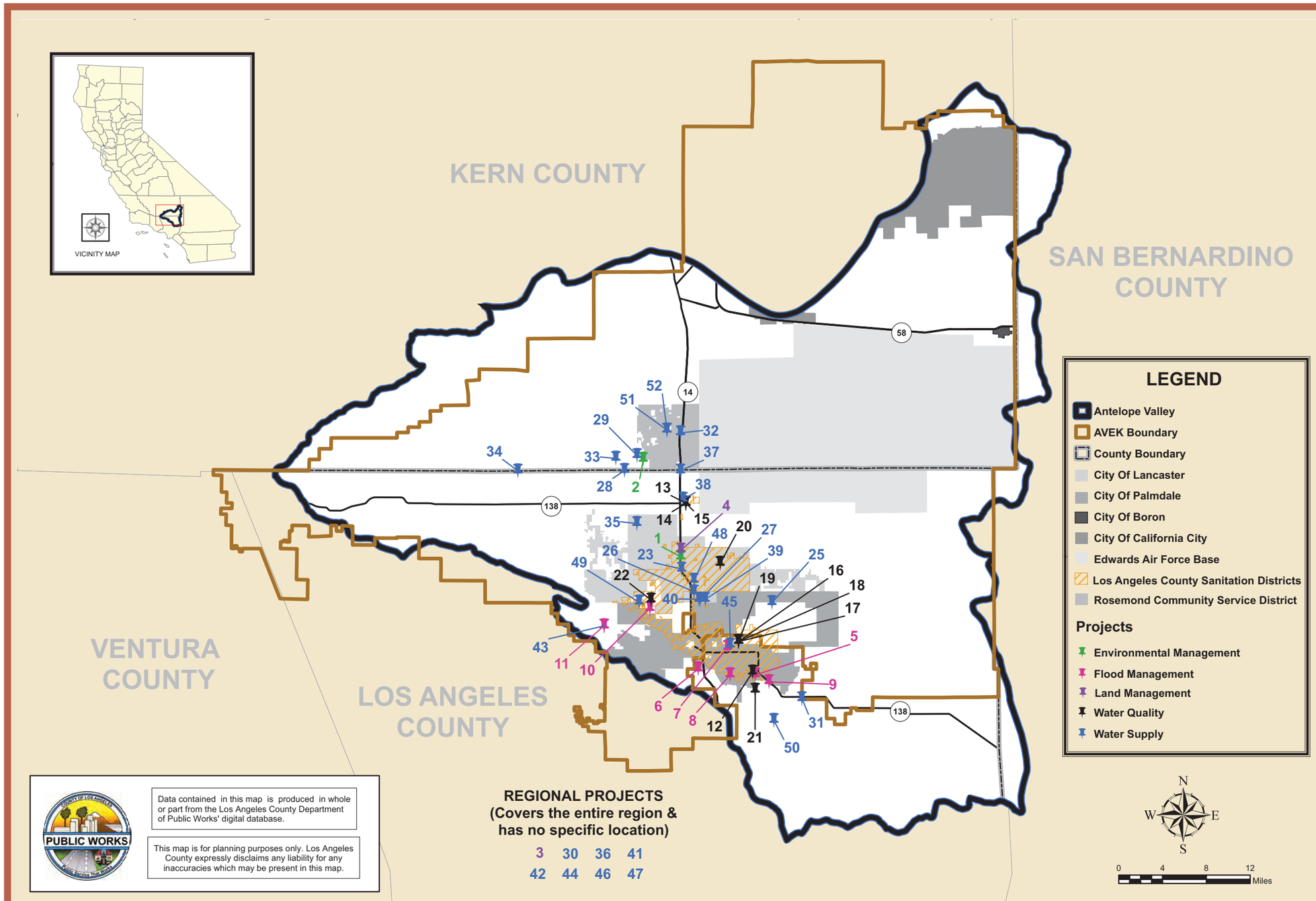

Figure 6-1 Antelope Valley IRWM Plan Project Locations

Table 6-5 Current Projects vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities

Current Project/Program Types and Activities	Water Supply									Water Quality			Flood Mngt.		Environmental Resource Management				Land Use Mngt.		AB 3030 Guidelines														IRWM Plan Program Preferences						Statewide Priorities							
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination ask force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
WATER SUPPLY MANAGEMENT																																												
Plans & Studies																																												
Antelope Valley Integrated Regional Water Management Plan	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	NA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
City of Lancaster Groundwater Recharge Feasibility Study (Lancaster)	X	X		X	X						X	X									NA	X			X	X	X	X		X					X	X			X			X	X		X
Palmdale Water District Reconnaissance Level Feasibility and Scoping Study for Recycled Water Recharge (PWD)	X	X		X	X																NA	X			X	X		X		X					X	X			X			X			X
Palmdale Water District 2006 Water System Master Plan Update (PWD)	X		X	X			X	X													NA	X						X		X					X	X			X			X			X
Court Action																																												
Adjudication of the Groundwater Basin		X																			NA				X	X	X	X				X	X								X			X			
Groundwater Recharge/Banking																																												
Antelope Valley Water Agencies' Water Bank (AVEK, LCID, QHWD, RCSD)	X	X			X	X		X													NA	X			X	X	X	X		X					X	X						X			X
Tejon Ranch Water Bank (Tejon Ranch Water Company)	X	X			X	X															NA	X			X	X	X	X		X					X	X						X			X
Water Infrastructure Improvements																																												
Expansion of Treatment Facilities (RWMG)	X			X							X										NA													X	X	X		X			X	X	X	X	X	X
Water Conservation/Water Use Efficiency																																												
Best Management Practices (AVEK, LACWWD40, PWD, QHWD, RCSD)	X		X																		NA				X					X			X	X							X		X	X	X	X
WATER QUALITY MANAGEMENT																																												
Water Infrastructure Improvements																																												
Chloramines Conversion Project (LACWWD40)	X									X											NA													X	X	X	X	X					X			X
RCSD Recycled Water Project/Treatment Plant Expansion (RCSD)	X			X		X					X										NA				X					X			X	X	X		X			X		X	X		X
FLOOD MANAGEMENT																																												
None identified at this time																																												
ENVIRONMENTAL MANAGEMENT																																												
Plans & Studies																																												
LA County General Plan Significant Ecological Areas (SEAs)															X	X	X	X	X	X	NA													X			X					X			
Recycled Water																																												
Piute Ponds Reuse Sites															X	X	X	X																											
LAND USE MANAGEMENT																																												
Plans & Studies																																												
Antelope Valley Regional Conservation Roundtable (Antelope Valley Conservancy)	X		X												X	X	X	X	X	X	NA										X	X	X	X							X		X		X
Update Los Angeles County General Plan															X	X	X	X	X	X	NA											X		X									X		
Recycled Water																																												
Apollo Lakes Reuse Project																X		X																											
SUMMARY	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**NA**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

Legend

WS = Water Supply Management FM = Flood Management EM = Environmental Resources Management

WQ = Water Quality Management LM = Land Use Management

Table 6-6 Planned Projects vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities

Current Project/Program Types and Activities	Water Supply								Water Quality			Flood Mngt.		Environmental Resource Management				Land Use Mngt.		AB 3030 Guidelines											IRWM Plan Program Preferences						Statewide Priorities							
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination ask force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
WATER SUPPLY MANAGEMENT																																										
Groundwater Recharge/Banking																																										
Amargosa Creek Recharge and Channelization Project (Palmdale)	X	X			X								X	X		X		X	X	X	NA	X			X	X		X		X			X	X					X	X			X
Amargosa Water Banking and Storm Water Retention Project (No financial sponsor identified)	X	X			X								X	X		X		X	X	X	NA	X			X	X		X		X			X	X					X	X			X
Antelope Valley Water Bank (WDS)	X	X			X	X		X		X			X	X					X	X	NA	X			X	X	X	X		X			X	X					X				X
Aquifer Storage and Recovery Project: Injection Well Development (LACWWD40)	X	X			X	X															NA	X			X	X		X	X	X			X	X					X				X
Aquifer Storage and Recovery Project: Additional Storage Capacity (LACWWD40)	X	X			X	X															NA				X	X		X		X			X	X					X				X
Deep wells to Recapture Banked Water (RCSD)	X	X			X																NA	X						X	X	X			X	X					X				X
Gaskell Road Pipeline (RCSD)	X				X																NA							X		X			X	X					X				X
Groundwater Banking (LACWWD40)	X	X			X	X													X	X	NA	X			X	X	X	X		X			X	X					X				X
Purchasing Spreading Basin Land (RCSD)	X	X			X														X	X	NA							X			X		X	X					X				X
Water Supply Stabilization Project – Westside Project (AVEK, AVSWCA)	X	X			X	X		X		X			X	X					X	X	NA	X			X	X	X	X		X			X	X					X				X
Water Supply Stabilization Project – Eastside Project (AVEK, AVSWCA)	X	X			X	X		X		X			X	X					X	X	NA	X			X	X	X	X		X			X	X					X				X
Recycled Water																																										
Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)	X	X		X	X							X							X	X	NA	X			X	X		X		X			X	X					X	X			X
Groundwater Recharge - Recycled Water Project (PWD)	X	X		X	X							X							X	X	NA	X			X	X		X		X			X	X					X	X			X
KC & LAC Interconnection Pipeline (RCSD)	X			X																	NA									X			X	X					X	X			X
North Los Angeles/Kern County Regional Recycled Water Project (LACWWD40)	X	X		X	X	X						X							X	X	NA	X			X	X		X		X			X	X					X	X			X
Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H (Lancaster)	X	X		X	X							X									NA	X			X	X		X		X			X	X					X	X			X
Water Conservation/Water Use Efficiency																																										
ET-Based Controller Program (PWD)	X		X	X										X					X	X	NA				X					X	X									X				X
Implement Evapotranspiration (ET) Controller Program (LACWWD40)	X		X	X															X	X	NA				X					X	X									X				X
Precision Irrigation Control System (Leona Valley Town Council)	X		X	X										X					X	X	NA				X			X		X	X					X				X	X			X
Ultra Low Flush Toilet (ULFT) Change Out Program (LACWWD40)	X		X																		NA				X					X	X									X				X
Water Conservation Demonstration Garden (PWD)	X		X																X	X	NA				X					X	X									X				X
Water Conservation School Education Program (LACWWD40)	X		X																X	X	NA				X					X	X									X				X
Water Waste Ordinance (LACWWD40)	X		X									X							X	X	NA				X					X	X									X				X
Water Infrastructure Improvements																																										
Avenue K Transmission Main, Phases I-V (LACWWD40)	X					X															NA				X					X	X									X				X
Avenue M and 60th Street West Tanks (LACWWD40)	X					X															NA				X					X	X									X				X
Littlerock Dam Sediment Removal Project (PWD)	X														X						NA				X					X	X									X				X
Place Valves and Turnouts on Reclaimed Water Pipeline (RCSD)	X			X																	NA				X					X	X									X	X			X
RCSD's Wastewater Pipeline (RCSD)	X			X								X									NA				X					X	X									X	X			X
WATER QUALITY MANAGEMENT																																										
Recycled Water																																										

Table 6-6 Planned Projects vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

Current Project/Program Types and Activities	Water Supply									Water Quality			Flood Mngt.		Environmental Resource Management				Land Use Mngt.		AB 3030 Guidelines													IRWM Plan Program Preferences						Statewide Priorities								
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination ask force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
42nd Street East, Sewer Installation (Palmdale)	X	X								X	X										NA		X						X												X		X
Lancaster WRP Stage V (LACSD)	X			X	X		X										X	X			NA												X	X	X		X						X		X
Lancaster WRP Stage VI (LACSD)	X			X	X		X					X					X	X	X		NA												X	X	X								X		X
Lancaster WRP Proposed Effluent Management Sites (LACSD)	X	X		X								X							X		NA	X	X			X	X	X	X		X			X	X	X								X		X
Palmdale Power Project (Palmdale)	X			X								X									NA												X	X											X		X
Palmdale WRP Existing Effluent Management Sites (LACSD)	X	X		X								X							X		NA	X	X			X	X	X	X		X			X	X	X								X		X
Palmdale WRP Stage V (LACSD)	X	X		X		X						X							X		NA						X							X	X	X								X		X
Palmdale WRP Stage VI (LACSD)	X	X		X		X						X							X		NA													X	X	X								X		X
Palmdale WRP Proposed Effluent Management Sites (LACSD)	X	X		X								X							X		NA	X	X			X	X	X	X		X			X	X	X								X		X
Water Infrastructure Improvements																																															
Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (LACWWD40)		X								X		X									NA		X						X					X	X	X	X							X		X
PWD New Treatment Plant (PWD)	X									X											NA				X									X	X	X		X						X		X
QHWD Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation Project (QHWD)		X								X		X									NA		X						X					X	X	X	X							X		X
FLOOD MANAGEMENT																																														
Water Infrastructure Improvements																																														
"45th Street East Flood Control Basin (Q-East Basin) (Palmdale)"	X	X	X		X						X				X	X					NA	X					X		X					X	X				X					X	X		X
Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park (Palmdale)	X		X								X				X	X					NA	X					X		X					X	X									X	X		X
"Avenue Q and 20th Street East Basin (Q-West Basin) (Palmdale)"	X	X	X		X						X				X	X					NA	X					X		X					X	X				X					X	X		X
Barrel Springs Detention Basin and Wetlands (Palmdale)	X	X	X		X					X	X				X	X	X		X		NA	X			X		X		X					X	X				X					X	X		X
Hunt Canyon Groundwater Recharge and Flood Control Basin (Palmdale)	X	X	X		X					X	X				X	X					NA	X			X	X	X		X					X	X				X					X	X		X
Quartz Hill Storm Drain (LAFCD)	X		X							X	X				X	X					NA						X							X	X									X	X		X
Stormwater Harvesting (Leona Valley Town Council)	X		X	X	X		X	X							X	X					NA					X			X					X	X				X					X	X		X
ENVIRONMENTAL MANAGEMENT																																														
Habitat Restoration																																														
Ecosystem & Riparian Habitat Restoration of Amargosa Creek: Avenue J north to Avenue H (Lancaster)										X	X		X	X	X	X		X	X	X	NA													X			X							X	X		X
Recycled Water																																														
Tropico Park Pipeline Project (RCSD)	X			X								X					X	X		X	NA								X					X	X				X					X	X		X
LAND USE MANAGEMENT																																														
Plans and Studies																																														
Antelope-Fremont Watershed Assessment and Plan (Antelope Valley Conservancy)	X		X							X	X		X	X	X	X	X	X	X	X	NA									X	X			X	X	X	X	X						X	X	X	X
Recreation																																														
Amargosa Creek Pathways Project (Lancaster)										X	X		X	X	X	X	X		X	X	NA									X					X										X		X
SUMMARY	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**NA**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**

Legend

WS = Water Supply Management FM = Flood Management EM = Environmental Resources Management

WQ = Water Quality Management LM = Land Use Management

Table 6-7 Alternative "Gap" Projects Vs. IRWM Plan Objectives

Local and Regional Plan Policies	Water Supply Management								Water Quality Management										Flood Management		Environmental Management		Land Use Management					
	Provide reliable water supply to meet the Region's expected demand between now and 2035.	Reduce (73,600 to 263,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0, starting January 2010.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to help meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 100,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
Aggressive conservation	X	X	X	X	X	X																						
Develop further conjunctive use management	X	X	X	X			X	X											X	X	X	X	X	X	X	X	X	
Water Banks Outside of the Antelope Valley	X	X	X	X	X																							
Create regional database for groundwater pumping							X	X			X				X													
Use alternative sources of water	X	X	X	X	X																							
Make further use of recycled water	X	X	X	X													X	X										
Inability to approve further development		X			X																							
Identify contaminated portions of the aquifer											X	X	X	X	X	X												
Map contaminated portions of aquifer by December 2008.											X	X	X	X	X	X												
Establish a well abandonment ordinance											X																	
Develop and implement a regional Groundwater Wellhead Protection Program											X																	
Develop management program for nitrate and TDS											X	X	X	X	X	X												
Expand the water quality monitoring program											X	X	X	X	X	X			X	X								
Coordinate a flood management plan																			X	X							X	
Storm water capture/recovery feasibility study																			X	X								
Increase small-scale flood management projects	X	X	X	X															X		X	X						
Encourage Low Impact Development																	X		X		X						X	
Preserve acres of habitat																					X	X			X	X	X	
Develop a HCP for the Antelope Valley																					X	X			X	X	X	
Promote land conservation projects that enhance flood control, aquifer recharge, and watershed and open space preservation.											X	X			X	X			X		X	X	X	X	X	X	X	
Preserve farmland																							X	X	X		X	
Build public parks and recreational amenities																									X	X	X	
Create a Watershed Management Plan											X	X			X	X			X	X	X		X		X		X	
Create incentives for land owners to protect/restore/preserve open space											X	X			X	X			X		X	X	X	X	X			

Table 6-8 Alternative "Gap" Projects vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, Statewide Priorities, & IRWM Plan Objectives

Current Project/Program Types and Activities	Water Supply									Water Quality			Flood Mngt.		Environmental Resource Management				Land Use Mngt.		AB 3030 Guidelines										IRWM Plan Program Preferences						Statewide Priorities								
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination ask force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
Aggressive conservation	X		X	X			X					X							X						X						X	X								X		X	X
Develop further conjunctive use management	X	X			X		X	X					X	X				X	X	X		X			X	X	X	X			X	X					X			X		X	X
Participated in water banks outside of the Antelope Valley	X	X			X	X	X	X											X							X		X				X	X					X			X		X	X
Create regional database for groundwater pumping	X	X					X																X				X					X	X											X
Use alternative sources of water		X			X	X	X	X	X																X	X		X				X	X					X			X		X	X
Make further use of recycled water	X		X	X						X		X	X	X											X	X		X				X	X	X				X			X		X	X
Inability to approve further development	X										X								X																									
Identify contaminated portions of the aquifer	X	X								X	X											X									X	X	X	X					X		X			X	X
Map contaminated portions of aquifer by December 2008	X	X								X	X											X									X	X	X	X					X		X			X	X
Establish a well abandonment ordinance	X	X								X	X												X	X					X			X	X	X	X					X		X			X	X
Develop and implement a regional Groundwater Wellhead Protection Program	X	X								X	X								X	X		X	X	X					X			X	X	X	X					X		X			X	X
Develop management program for nitrate and TDS	X	X								X	X	X							X	X		X	X								X	X	X	X					X		X			X	X
Expand the water quality monitoring program	X	X			X	X				X	X	X							X	X							X					X	X	X	X					X		X			X	X
Coordinate a flood management plan	X												X	X					X	X								X		X			X	X							X		X	X	X	X
Storm water capture/recovery feasibility study	X												X	X					X	X								X		X			X	X							X		X	X	X	X
Increase small-scale flood management projects	X												X	X					X	X								X		X			X	X							X		X	X	X	X
Encourage Low Impact Development	X												X	X					X	X										X			X	X							X		X	X	X	X
Preserve acres of habitat															X	X	X	X	X	X										X			X												X	
Develop a HCP for the Antelope Valley															X	X	X	X	X	X										X			X												X	
Promote land conservation projects that enhance flood control, aquifer recharge, and watershed and open space preservation.	X	X											X	X	X	X	X	X	X	X	X							X		X			X								X					
Preserve farmland																			X	X										X			X													
Build parks and recreational amenities																	X	X												X			X												X	
Create a Watershed Management Plan	X														X	X	X	X		X										X			X								X					X
Create incentives for land owners to protect/restore/preserve open space	X		X	X									X	X		X	X		X	X										X	X											X					X

associated planning targets by 2035. The initial benefits for those projects far enough along in the planning stages to estimate benefit have been quantified showing that the projects will not provide the level of benefits needed to fully accomplish the Antelope Valley Region's quantified planning targets, particularly relative to the water supply, environmental resource, and land use management WMSAs. This provides the basis for discussion on how stakeholders may begin to contribute progress towards quantifiable targets. Table 6-9 provides a summary of the quantified benefits, for those projects that identified numerical benefits, for each WMSA, and assumes that all the projects proposed for this IRWM Plan were implemented. For example, Table 6-9 provides the projects that included quantifiable water supply benefit information, even if the numbers are very preliminary estimates. Note that some projects are likely to contribute a benefit to supply in one water year scenario more than another. For example, groundwater banking is a water management strategy that provides a dry/multi-dry year benefit, not an average year benefit because of the way that the banks are typically operated. An average water year, surplus water would be injected into the banks, and therefore this injected water would not go towards meeting demand for an average year, thus is not a "benefit" for an average year. During a dry water year, however, water would be extracted from the bank to help meet dry year demand and would then be a "benefit" for a dry year.

Therefore, Table 6-9 groups the projects and their expected benefits into the three water year scenarios; average, dry, and multi-dry.

Table 6-9 Projects that Provide Quantifiable Water Supply Benefits

Projects Organized by Water Year Scenario	Estimated Benefit
Average Year	
PWD's ET-Based Controller Program This project involves the installation of ET-based irrigation controllers for landscaped areas. PWD estimates that greater than 1,000 AFY could be saved through use of these controllers.	> 1,000 AFY** ** Given that these projects overlap one another, their quantified benefits have been combined. However, these estimates are based on conceptual project descriptions and are therefore subject to change as the projects are more clearly defined.
LACWWD 40's ET Controller Program This project involves the installation of ET-based irrigation controllers for landscaped areas. LACWWD 40 anticipates that this project be jointly administered with the City of Palmdale, City of Lancaster, PWD, AVEK, the Building Industry Association, AVWCC, and homeowners associations.	
Leona Valley Town Council's Precision Irrigation Control System This project is a proposed irrigation control system using electronic sensor probes at the root level. Preliminary estimates show a potential savings of more than 150 AFY.	> 150 AFY
LACWWD 40's Ultra Low Flush Toilet (ULFT) Change Out Program This project would distribute ULFT's to customers through one-day Saturday toilet distributions. Estimated savings are between 1 to 100 AFY.	1 to 100 AFY
Leona Valley Town Council's Stormwater Harvesting This project involves the collection and treatment of stormwater for use as irrigation supply. The project estimates that once fully implemented, a savings of 25 AFY could be realized.	25 AFY
PWD's Littlerock Dam Sediment Removal Project This project involves removing accumulated sediment from the Littlerock Reservoir which would increase its storage capacity. PWD estimates that greater than 1,000 AFY could be supplied through this capacity increase.	> 1,000 AFY
Lancaster's Groundwater Recharge Using Recycled Water Pilot Project This Pilot project would recharge 2,500 AFY of blended recycled water and imported/stormwater. Ultimately the project could recharge as much as 50,000 AFY of blend water, with blend water consisting of 40,000 AFY of imported SWP water and 10,000 AFY of recycled water from Lancaster WRP. The baseline project would extract 48,000 AFY of recharged water, on average, via a new well field and deliver the water to wholesaler/retailer distribution system(s) and private agricultural users.	2,500 AFY and 100 acres open space; ultimately 48,000 AFY and 1,000 acres open space

Table 6-9 Projects that Provide Quantifiable Water Supply Benefits (continued)	
Projects Organized by Water Year Scenario	**Estimated Benefit**
PWD's Groundwater Recharge Using Recycled Water This project involves groundwater recharge using recycled water from the Palmdale WRP. This project is anticipated to be similar to the Lancaster groundwater recharge project described above and have similar blending and extraction numbers (e.g., a blend of 10,000 AFY of recycled water and 40,000 AFY of SWP water). In order to have 40,000 AFY of SWP water to blend, this project would most likely end up being an AVSWCA project (or at least a joint venture type project with AVEK and/or LCID).	48,000 AFY *** This project is still in the conceptual phase, however it is anticipated to be similar to the Lancaster project described above. Therefore, the same average annual extraction is assumed.
Palmdale's Amargosa Creek Recharge and Channelization Project This project includes expanding the size and capacity of the spreading grounds for natural recharge; developing and preserving an ephemeral stream habitat; and channelization of Amargosa Creek and providing a grade separation of 20th Street West over Amargosa Creek.	5,000 to 10,000 AFY; 15 acres of open space and 20 acres of flood protection.
Dry Year and Multi-Dry Year	
Western Development & Storage's Antelope Valley Water Bank The Antelope Valley Water Bank is being designed to provide 500,000 AF of storage in the Neenach Subbasin of the Antelope Valley Region and the ability to recharge and recover 100,000 AFY. This project would also create approximately 1,700 acres of agricultural land.	40,400 - 100,000 AFY** ** Although these projects share the same source water (SWP water) and thus their benefits are limited to how much SWP is available to the Antelope Valley Region for recharge, they can be differentiated by the potential extraction capacities. Therefore, a range of the individual project benefits has been provided.
LACWWD 40's Groundwater Banking Project This project would establish a groundwater bank to include 63,500 AF extraction capacity during dry years and 170,000 AF storage capacity.	
AVEK's Water Supply Stabilization Project – Eastside and Westside Projects These projects establish groundwater banks in the Antelope Valley Region used to recharge imported SWP water.	
LACWWD 40's Injection Well Development Project This project involves the construction of 10 new Aquifer Storage and Recharge/Recovery (ASR) well sites. The additional wells would be available for water injection during wet years and for water extraction during dry years.	12,000 AFY

There are additional water supply capacity improvement projects that by themselves do not contribute to adding new supplies to the Antelope Valley Region, but allow for the additional use of existing supplies. These projects include but are not limited to: infrastructure improvements at AVEK's treatment plants, RCSD's Gaskell Road Pipeline project, and RCSD's valves and turnouts projects just to name a few. Refer to Section 5 or to Tables 6-1 and 6-2 for a listing of all the current and proposed projects.

Table 6-10 provides a summary of the projects that provide quantifiable benefits other than water supply.

Because quantified planning targets were not established for the flood management WMSA, that WMSA is not included in Table 6-11 below.

Table 6-12 provides a summary of how the stakeholder-identified projects contribute towards meeting the other evaluation criteria: Proposition 50 IRWM Strategies, AB 3030 Guidelines, IRWM Guideline Program Preferences, and Statewide Priorities. Proposed projects contributed to all but one Proposition 50 IRWM Strategy, desalination. Due to the Antelope Valley Region's distance from the ocean, and the economic cost of constructing a desalination plant and pipeline to the ocean, desalination is not an attractive strategy for the Antelope Valley Region at this time. However, should the Antelope Valley Region consider a future transfer or exchange which has desalinated water as a component, the IRWM Plan's contribution to meeting this objective could be re-evaluated. All of the AB 3030 Guidelines were cumulatively contributed to by the projects proposed in this IRWM Plan. Due to the Antelope Valley Region's distance from the ocean, and the widely-held assumption that it is a closed basin, saltwater intrusion was assumed to not be applicable to the Antelope Valley Region. All of the IRWM Guideline Program Preferences were cumulatively contributed to by the projects proposed

Table 6-10 Projects that Provide Other Quantifiable Benefits	
Projects	**Estimated Benefit**
Antelope Valley Conservancy's Antelope-Fremont Watershed Assessment and Plan This project would integrate with this IRWM Plan and consensus-based Antelope Valley Region Regional Conservation Roundtable, and create habitat management plans for proposed conservation lands.	2,000 acres open space/habitat, conservation lands
Palmdale's Barrel Springs Detention Basin and Wetlands This project would provide flood control, wetland enhancement, and habitat protection for the City of Palmdale.	40 acres of wetland/habitat
PWD's Avenue Q and 20th Street East Basin This project would provide for a possible groundwater recharge area and provide for natural habitat preservation.	160 acres of habitat; 1,600 AFY of stormwater capture
PWD's Hunt Canyon Groundwater Recharge and Flood Control Basin This project is intended to alleviate flooding concerns in the Antelope Valley Region through detention of excess stormwater runoff during severe storms.	300 acres of habitat; 3,000 AFY of stormwater capture
Los Angeles County Public Work's Quartz Hill Storm Drain This project would alleviate flooding and improve water quality in unincorporated areas of Los Angeles County.	1,200 acres of flood protection

Table 6-11 Summary of Quantified Benefits		
WMSA Benefit Type	**Range**	
Water Supply	1 AFY – 48,000 AFY (Avg. Year)	12,000 AFY – 100,000 AFY (Dry Year)
Water Quality	3,200 – 64,780 AFY recycled water demand	
Environmental Management	5,800 acres flood protection/stormwater capture	
Land Use Management	2,500 acres habitat/open space	

Table 6-12 Summary of Projects vs. Proposition 50 Strategies, AB 3030, IRWM Program Preferences, and Statewide Priorities		
Other Evaluation Criteria	**No. of Objectives Contributed to**	**No. of Projects**
IRWM Proposition 50 Strategies	0	0
	1-5	39
	> 5	21
AB 3030 Guidelines	0	8
	1-5	40
	> 5	12
IRWM Program Preferences	0	1
	1-3	53
	> 3	6
Statewide Priorities	0	0
	1-4	55
	> 4	5

in this IRWM Plan. Only one of the Statewide Priorities was not contributed to by the projects in this IRWM Plan: "implementation of TMDLs that are established or under development," because there are no TMDLs currently established for waters within the Antelope Valley Region.

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Section 7: IRWM Plan and Projects Evaluation and Prioritization

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With many residents relying on the California Aqueduct to supply their water, it is a lifeline to the Antelope Valley.

Section 7: IRWM Plan and Projects Evaluation and Prioritization

7.1 INTRODUCTION

This section presents a general discussion of the advantages of planning regionally for water resource management and evaluates the benefits of the Antelope Valley Integrated Regional Water Management (IRWM) Plan, including benefits to local and disadvantaged communities within the Antelope Valley Region, and positive impacts that this effort may have on other natural and community resources. Section 7 also describes the evaluation criteria and process that Stakeholders used to rank and prioritize IRWM projects, and presents those projects that Stakeholders have designated as high priority. High priority projects are those that the Stakeholders want to see implemented within the next two years; their implementation is discussed further in Section 8. Lastly, the benefit and costs of these high priority projects are provided in this section.

7.2 IRWM PLAN IMPACTS AND BENEFITS ASSESSMENT

The discussion below discusses the advantages of preparing a regional plan as opposed to individual local efforts and includes an evaluation of the potential benefits and impacts of Plan implementation within the Antelope Valley Region and in adjacent areas. A description of how this IRWM Plan responds to environmental justice concerns and its potential impacts on disadvantaged communities (DACs) is provided, as well as a preliminary evaluation of the impacts and benefits to other resources, such as air quality and transportation.

7.2.1 Advantages of Preparing a Regional Plan

There are many advantages to preparing a regional plan as opposed to implementing local efforts. Regional planning provides a means to maintain, protect, and restore natural resources within the Antelope Valley Region while also enhancing the quality of life for residents in the Antelope Valley Region. The Antelope Valley IRWM Plan provides a means to support environmental protection, quality of life issues, and economic development using the watershed boundary as the planning framework. This IRWM Plan allows for stakeholders in the community to join together in creating a vision for water resources in the Antelope Valley Region.

In creating the opportunity for collaboration, this IRWM Plan process facilitates the establishment of partnerships between local and state governments, community organizations and any other groups with the common goal of protecting water resources within the Antelope Valley Region. It is through the IRWM Plan process that community efforts can be coordinated to create a regionally focused plan to more efficiently reach the identified objectives and goals. Moreover, preparation of a regional plan allows for the communities to address water supply, water quality, flood management, and environmental and land use issues within the physical boundaries of the watershed rather than political boundaries.

The environmental benefits of preparing this IRWM Plan are clear: enhanced water supply reliability, improvements in water quality, protecting natural habitats and open space areas for their water resource function, controlling flooding and maintaining community cultural and land uses. The community benefits are, however, even more important in the Antelope Valley Region. This is exemplified by the coordination and collaboration of the Regional Water Management Group (RWMG), which was formed for the purposes of carrying out this IRWM Plan. The fact that the RWMG, and all the stakeholders who participated in the planning of this IRWM Plan, have come together to develop an action plan to address their concerns over water resources in the Antelope Valley Region, is a historical feat given the Antelope Valley Region's history.

The RWMG made significant progress by establishing a collaborative forum in the Antelope Valley Region to conduct water management planning, regional objective and planning target design, assembly and prioritization of a comprehensive list of potential implementation projects, and oversight of the planning and implementation grant application process. Establishment of the RWMG has already resulted in substantial benefits by bringing together the numerous disparate water interests within the Antelope Valley Region into a single, unified group with a common purpose and direction.

The implementation of projects and management actions contained in this IRWM Plan designed to improve local resources (whether they be water supply, open space, recreational land, etc.) will be more successful as a result of this high level of cooperation among the agencies that must work together to implement them. This level of achievement and the benefits could not be realized from implementation of just a local agency's projects alone.

7.2.1.1 Potential Adverse Impacts

The IRWM Plan Guidelines require an evaluation of potential negative or adverse impacts within the Antelope Valley Region and in adjacent areas from implementation of the IRWM Plan projects. Each project implemented as part of this IRWM Plan will require evaluation of its impacts pursuant to the California Environmental Quality Act (CEQA). Section 7.2.4 provides a preliminary impact analysis for the resources that could be impacted by the IRWM Plan. Generally, any impacts that would be considered adverse would likely be short-term construction related impacts such as air quality emissions and increases in noise levels from grading activities. It is assumed that any approving entity would comply with CEQA regulations and respond with appropriate mitigation measures to the extent that any significant environmental impacts would result.

7.2.2 Interregional Benefits and Impacts

As detailed in Sections 1 and 2, the drainage basin was chosen as the boundary for this IRWM Plan, not the boundary of the groundwater basin. This decision was made to be consistent with several scientific studies of the

Antelope Valley Region that have used this larger drainage basin boundary so that similar data sets could be utilized, and the boundary also included key agencies dealing with similar water management issues such as increasing populations, limited infrastructure, and increasing pumping costs with shared water resources.

Because the Antelope Valley Region is bound by the San Gabriel Mountains to the south and southwest, and the Tehachapi Mountains to the northwest, coordination with agencies and organizations outside of these ranges, in Los Angeles County and Ventura County, for example, would provide little benefit. However, there exists the potential for interregional benefits and impacts from coordination with agencies and organizations in San Bernardino County which lies to the east, and with the other South Lahontan funding area groups that are beginning their own process of developing an IRWM Plan.

Other IRWM Plan groups in the Antelope Valley Region include Mojave (who already completed their plan), Mono County, Owens Valley, Lake Tahoe, and Alpine County. Implementation of this IRWM Plan includes a provision to identify opportunities as they arise to find synergies with these other regional IRWM Plans so that interregional benefits can be realized.

7.2.3 Benefits to Disadvantaged Communities

A DAC is defined as having an annual median household income that is less than 80 percent of the statewide annual median household income, which is $37,994 using Census 2000 data. The analysis of census tract data (refer to Section 1) determined that approximately 20 percent of the population in the Antelope Valley Region reside in DACs, having a median household income of less than $37,994. These DAC communities include Mojave, portions of the Cities of California City, Palmdale and Lancaster, and some County unincorporated areas.

Projects that have so far been included in this IRWM Plan are not located specifically within these communities but will benefit Palmdale, Lancaster, and County unincorporated area residents directly. Additionally, the RWMG is currently engaged in outreach to develop and include projects within and adjacent to these communities. The RWMG is accepting projects on an ongoing basis and will offer technical assistance to DAC communities when available. All project ideas and concepts can be submitted for consideration to this IRWM Plan, and will undergo the same process for evaluation as the current proposed projects.

The objectives of the IRWM Plan are to provide a reliable water supply to meet demands in the Antelope Valley Region, to meet water quality standards and protect existing supplies from contamination, to manage flood waters and provide adequate flood control, and to protect and preserve open space, habitat, recreational uses, and agricultural lands within the entire Antelope Valley Region. Outreach effort findings suggest that these objectives successfully capture the general desires of most residents in the Antelope Valley Region, and that local projects generally capture the specific expression of these desires.

Meeting these objectives benefits the Antelope Valley Region as a whole, not just in the vicinity of the individual project. DACs in the Antelope Valley Region will benefit from implementation of this IRWM Plan and are expected to play a greater role in developing, proposing, and sponsoring/cosponsoring projects in the near future due to the targeted outreach efforts in these communities.

7.2.4 Resource Specific Impacts

The following discussion provides an evaluation of the impacts and/or benefits to other resources, such as air quality and transportation. These resources are evaluated below for implementation of this IRWM Plan as a whole. Each project will be required to undergo adequate CEQA review prior to project-specific implementation. The CEQA review will provide an evaluation of impacts to these other resources in much greater detail than discussed below.

Aesthetics. The IRWM Plan includes objectives that preserve habitat and open space which would maintain the beneficial visual aspects of these land uses. Projects that include construction activities would likely occur in areas that are already disturbed, or would include mitigation

Through the use of energy saving devices like solar panels, proposed projects attempt to safeguard against both water and energy concerns in the Antelope Valley.

measures that would return disturbed areas to their pre-construction conditions.

Agricultural Resources. One of the objectives of the IRWM Plan is to preserve existing agricultural land and increase the amount of agricultural land used to facilitate conjunctive use operations. Therefore, impacts to agriculture from Plan implementation are likely to be beneficial.

Air Quality. Short-term air quality impacts could result from construction activities from some of the proposed projects. However, through the CEQA process most of these activities would be minimized through mitigation efforts, and no long-term air quality impacts would be expected.

Biological Resources. Short-term biological impacts could result from construction activities from some of the proposed projects. However, through the CEQA process most of these activities would be minimized through mitigation efforts and no long-term biological impacts would be expected. Additionally, the IRWM Plan includes habitat preservation as one of its objectives. Thus, if implemented, impacts to biological resources could be beneficial.

Cultural Resources. Impacts to cultural resources could result from construction activities from some of the proposed projects. However, through the CEQA process most of these activities would be minimized through mitigation efforts and no long-term cultural impacts would be expected.

Geology and Soils. All projects would be required to undergo geological feasibility studies which would specify the appropriate engineering standards the contractor would have to comply with during construction. Compliance with these standards would mitigate project site geological and soil impacts.

Hazards and Hazardous Materials. Hazards and hazardous materials impacts could result from construction activities from some of the proposed projects should a spill occur. However, through the CEQA process most of these activities would be minimized through mitigation efforts and best management practices and no long-term hazards impacts would be expected.

Hydrology and Water Quality. Overall impacts to hydrology and water quality would be beneficial because the majority of the projects in this IRWM Plan would improve water supply reliability and water quality.

A number of projects proposed in this IRWM Plan are water banking programs; some indicate the source of water to be banked, others focus on creation of the bank itself, and not the source of water. For example, AVEK's Eastside and Westside Water Supply Stabilization Projects assume the source of water will be SWP. Alternatively, the Western Development and Storage Banking Program will operate by extending invitations to agencies and other entities to import water into the bank; without specifying the source of the imported water. Concern for meeting water quality regulations for groundwater recharge for the variety of source waters was discussed in Section 3.2.5.1.

Land Use and Planning. The projects proposed in this IRWM Plan were evaluated as to their consistency with local and regional General Plans (see Table 8-2). Therefore, no significant land use changes or inconsistencies with policies are anticipated.

Noise. Noise impacts could result from construction activities from some of the proposed projects. However, through the CEQA process most of these activities would be minimized through mitigation efforts and no long-term noise impacts would be expected.

Population and Housing. No adverse impacts to population and housing would occur. Plan implementation would help to meet the water demands of the existing and current population.

Public Services. Public services would not be adversely impacted by implementation of this IRWM Plan. The increased reliability of local water supplies could benefit fire protection efforts in the Antelope Valley Region.

Recreation. One of the objectives of the IRWM Plan is to meet the growing demand for recreational space. Therefore, impacts to recreation from Plan implementation are likely to be beneficial.

Transportation and Circulation. Transportation and circulation could be temporarily impacted during construction of some of the proposed projects that are located near roadways and main arteries. However, through the CEQA process most of these activities would be minimized through mitigation efforts and no long-term transportation and circulation impacts would be expected.

Utilities and Service Systems. Many of the projects proposed in this IRWM Plan are included to enhance water and wastewater treatment, enhance reliability of water supplies through infrastructure upgrades, and increase stormwater management and flood control operations. These types of projects would benefit the utilities and service systems in the Antelope Valley Region.

7.2.4.1 Impacts to Energy

The Antelope Valley Region has a variety of efforts planned or underway to both reduce water consumption with the corresponding reduction in energy use and to develop local energy supply. These efforts include water conservation, recycled water use, hydropower, and utilization of renewable resources, such as wastewater treatment plant digester gas recovery and solar power. As described in the IRWM Plan, the Antelope Valley Water Conservation Coalition is proposing the Comprehensive Water Conservation/ Water Use Efficiency Program and the Cities of Palmdale and Lancaster are both proposing recycled water projects. The water use efficiency effort, in particular, has a direct impact to reducing the energy used to pump water over the Tehachapis. Recycled waters derive similar benefit by reducing the quantity of potable water that needs to be pumped through the State Water Project system.

The projects included in the AV IRWM Plan also contribute to the production of local energy. The proposed Palmdale Power Project in the City of Palmdale, is a hybrid of natural gas-fired combined cycle generating equipment integrated with solar thermal generating equipment, and will have a net electrical output of 563 megawatts (MW). Critical process cooling water needs for the Plant will be met by the use of recycled water, as described in Section 3, thereby saving valuable potable water. Construction is planned to begin in 2008 and commercial operation planned in late 2010. The Palmdale Power Project is also designed to use solar photovoltaic technology to generate a portion of the project's output and thereby support the State of California's goal of increasing the percentage of renewable energy supplies.

Other examples of renewable energy in the region are the LACSD 14 and LACSD 20 projects. In 2003, the LACSD 14 entered into an agreement with Ingersoll-Rand (IR) to demonstrate their 250 kilowatt (kW) microturbine fueled by digester gas. At full power the microturbine will produce 250 kW of electricity and sufficient hot water to heat the water reclamation plant (WRP) digesters. The completed project will provide economical electricity and hot water to supply the plant's energy needs with a combined electrical and thermal efficiency of up to 51 percent. In the same time period as LACSD 14, LACSD 20 entered into an agreement with Quinn Power Systems to demonstrate a Fuel Cell Energy 250 kW fuel cell on digester gas. This program is the first digester gas application of the 250 kW unit. At full power the fuel cell will produce 250 kW of electricity and sufficient hot water to heat the WRP digesters. The completed project will provide economical electricity and hot water to supply the plant's energy needs with a combined electrical and thermal efficiency of up to 73 percent. Environmental benefits of these facilities include a reduction of greenhouse emissions, air emissions that are less than the gas flares, and the reduction of air emissions associated with less consumption of utility central generating plants. By generating power where it is needed there is also a reduced need for utility transmission and distribution facilities.

Through implementation of these projects and the AV IRWM Plan, there is the potential for an overall benefit to energy resources within the Antelope Valley Region.

7.3 IRWM PROJECTS EVALUATION AND RANKING

The following discussion focuses on the potential benefits associated with the individual projects proposed as part of the plan, as well as how effectively they will work towards plan objectives and the feasibility of their future implementation. The intent of the project evaluation and prioritization process is to identify those projects and management actions the stakeholders would like to pursue first to begin addressing the Antelope Valley Region's issues and needs and to meeting the identified AV IRWM Plan objectives.

As discussed in Section 5 and shown in Tables 6-1 and 6-5, there are a number of current strategies being used to address the Antelope Valley Region's water management issues. These include the development of plans and studies, investigations into groundwater recharge and groundwater banking programs, and others. Many of these current efforts provide the basis for the stakeholder-identified projects. For example, the City of Lancaster's Groundwater Recharge Feasibility Study provided the technical analysis for the development of Lancaster's Groundwater Recharge Using Recycled Water Pilot Project.

Plans and actions currently underway are assumed to continue for the purposes of this IRWM Plan. It is the projects that were submitted by the stakeholders during the Call for Projects that illustrate the breadth of the activities that would be needed for the Antelope Valley Region to meet its water management objectives. However, even if all of the projects proposed in this IRWM Plan were implemented in the Antelope Valley Region (discussed in Section 5 and shown in Table 6-2 and 6-6), there are still gaps that would need to be filled by alternative projects in order to meet the IRWM Plan objectives. Management actions suggested to fill these gaps were discussed in Section 6, and are also considered in the evaluation and prioritization exercise provided in this Section.

Therefore, the evaluation and ranking of the projects is focused mainly on those projects and management actions submitted by the stakeholders and the 'alternative gap' projects discussed in Section 6 that help fill the gaps between strategies. Through numerical ranking and qualitative assessment, each project was given a low, medium, or high priority ranking. Projects were evaluated and ranked according to the criteria listed below, and as shown in Table 7-1. Each evaluation criteria was assigned points, as described in more detail below. Initial scores provided an early indication of the potential final ranking of each project. Table 7-1 also allowed for stakeholder comments, which provided an additional method to evaluate the Projects.

CEQA Completed, or Not Required. Activities funded under Proposition 50 must be in compliance with the CEQA. Projects that have completed CEQA analyses or do not require CEQA review were given a point.

Cost Estimates Prepared (with some detail). As discussed in Section 5, the stakeholders were given the opportunity to directly submit their projects and project concepts for consideration through a "Call for Projects." The cost information provided herein represents the outcome of the initial step in a process of bringing individual projects into the collaborative process implied by this IRWM Plan. It should also be noted that stakeholders were encouraged to submit project concepts and thus the incompleteness of some cost information may be appropriate given that request. While many of the projects lack detailed supporting information, especially with regard to cost estimates, the Call for Projects process identified information that is readily available, needs to be identified, and provides a basis to move forward. Based on that process, a point was given to those projects that were farther along in their estimation of their project costs.

Table 7-1 also identifies the cost estimates if provided, and a description of the associated benefit if quantified. This allowed the Stakeholders to assess the projects cost/benefit ratio, even if just on a very preliminary level. Additionally, if the anticipated funding match source was known, that information was also identified in Table 7-1.

Schedule Prepared. Preference is given to those projects that demonstrate a 'readiness to proceed'. A point was given to those projects that had a schedule for implementation that was consistent with its project description and cost estimate.

The three evaluation criteria above: (1) CEQA, (2) Cost Estimation (including cost/benefit detail if available), and (3) Schedule, collectively gave the Stakeholders an indication of the readiness to proceed for a particular project.

Have Broad Support among AV IRWM Plan Stakeholders. It is ultimately up to the Antelope Valley Region Stakeholders to determine which water management projects and actions they wish to implement to address their issues and needs, and only those projects that are supported by the group are likely to move forward. Therefore, those projects that have broad support amongst the IRWM Plan stakeholders were given a point.

Integrates Easily with Other Projects. A key criterion for prioritization is the ability of a project to integrate with other projects and maximize linkages between projects. Those projects that could be integrated easily with other projects were given a point.

Number of IRWM Plan Objectives and Planning Targets Addressed. The IRWM Plan objectives and planning targets, identified in Section 4, were used to evaluate stakeholder-identified projects in Section 6. Priority was assumed to weigh more heavily on projects that meet more than one IRWM Plan objective. Therefore, for each project, the number of objectives that a project contributed to was tallied as its score for this criterion.

Six or More AB 3030 Elements Addressed. The Assembly Bill (AB) 3030 elements for a Groundwater Management Plan, identified in Section 3, were used to evaluate stakeholder-identified projects in Section 6. Those projects that contributed to six or more AB 3030 elements were given a point.

Six or More Water Management Strategies Addressed. The IRWM Plan water management strategies, identified and correlated with the California Water Plan strategies in Section 5, have been used to evaluate stakeholder-identified projects in Section 6. Those projects that contributed to six or more water management strategies were given a point.

Regional Priorities

Number of Regional Priorities Addressed. Regional priorities are intended to guide development of the IRWM Plan. Using the systemic approach of 'facilitated broad agreement' during one of the Stakeholder meetings, the following Regional priorities were developed. These priorities are inherently integrative to the objectives and planning targets identified in Section 4 that address the Antelope Valley Region's issues and needs. Based on discussions with the RWMG and the greater Stakeholder group,

Table 7-1 Project Evaluat ion Matrix

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
Antelope Valley Water Bank (WDS)	1	1	$170M	100,000 AFY; 1,700 acres of agriculture	Antelope Valley Water Bank Banking Partners	1	1	1	Integrates with other groundwater banking projects in the region.	16	1	1	9	0	0	1	1	34	Source of water to be banked currently undetermined. The project is strategically located near imported water supply wheeling infrastructure (1 mile from AVEK West Feeder and 8 miles from East Branch of the SWP California Aqueduct) providing an excellent means to store and regulate supplies. The land will remain in agricultural production (carrots, onions, wheat, barley) when not being used for surface recharge (approximately 90% of the time) and provide associated habitat.	High
Water Supply Stabilization Project – Eastside Project (AVEK, AVSWCA)	0	0	$200M	It is likely that this project will provide a benefit similar to that of the westside project; therefore in range of 40,000 to 43,000 AFY.	Not specified	0	1	1	Integrates with existing (or proposed) treated water facilities, recycled water recharge, or stormwater collection and reuse.	17	1	1	9	0	0	1	1	32	Establishment of a regional groundwater bank by local entities would ensure that the benefits from implementation, including economic benefits, would remain within the Antelope Valley, thereby benefiting the community.	Medium
Water Supply Stabilization Project – Westside Project (AVEK, AVSWCA)	0	0	$230M	40,400 to 42,600 AFY	Not specified	0	1	1	Integrates with existing (or proposed) treated water facilities, recycled water recharge, or stormwater collection and reuse.	17	1	1	9	0	0	1	1	32	Land currently in escrow. The AVSWCA to issue an RFP for engineering services related to this project. Establishment of a regional groundwater bank by local entities would ensure that the benefits from implementation, including economic benefits, would remain within the Antelope Valley, thereby benefiting the community.	High
Antelope-Fremont Watershed Assessment and Plan (Antelope Valley Conservancy)	1	1	$45K	2,000 acres open space/ habitat, conservation lands	Other grant funding and donations	1	1	0	Integrates existing research, plans, and projects, identifying opportunities and barriers, coordinating them into a consensus-based regional plan, and proposing approaches to identified gaps. The resultant plan will integrate with the Antelope Valley IRWM Plan and the consensus-based AV Regional Conservation Roundtable, and create habitat management plans for proposed conservation lands.	13	0	1	9	1	1	1	1	31	This project proposal would fund the 606 Studio to work with our regional stakeholders to coordinate a regional land use plan with emphasis on the preservation and restoration of sensitive natural systems of the Antelope-Fremont Watershed.	High, combine with the high prioritized regional land use management plan.
Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)	0	1	$6M	2,500 AFY; 100 acres of open space	To be determined as part of the Pilot Project Fatal Flaw Analysis (refer to Project Template form in Appendix E)	1	1	1	Integrates the resources and capabilities of local municipalities, water purveyors and service providers to the benefit of the entire region and dove-tail into current groundwater banking plans, recycled water utilization plans and storm water management endeavors.	12	0	1	9	0	0	1	0	27	Feasibility and technical studies complete. Integrates with the regional recycled water project and LACSD projects.	High
Groundwater Banking (LACWWD40)	0	0	> $100M	It is likely that this project overlaps the other regional water banking programs in the initial concept phase. Therefore, their individually estimated quantified benefits cannot be cumulatively totaled to provide an accurate estimate of future supply.	Not specified	0	1	1	Integrates with the WDS water bank, or a water banking program outside the Region (ex. Semitropic).	11	1	1	9	0	0	1	1	26	This project has great potential to be integrated with recreational, open space, and flood management opportunities.	Removed as a separate project/ linked to other banking projects
Amargosa Water Banking and Storm Water Retention Project (No current sponsor)	0	0	$100K - $1M		Not specified	0	1	1	Integrates with several other types of projects including, but not limited to, other water banking programs, future recycled water recharge programs, water conservation programs, flood control programs, watershed management, and habitat/open space/recreation programs. Potential for integration with the City of Palmdale's Amargosa project.	12	0	1	9	0	0	1	0	25	Provides multiple benefits including stormwater capture, flood control, and open space areas.	Medium
Groundwater Recharge - Recycled Water Project (PWD)	0	0	> $10M	This project is still in the conceptual phase, however it is anticipated to be similar to the Lancaster project described above. Therefore, the same average annual extraction, 48,000 AFY, is assumed.	Not specified	0	1	1	Integrates with LACSD's Palmdale WRP projects. Could also integrate with recharge projects on the east side using SWP water.	12	0	1	9	0	0	1	0	25	The District hired Wildermuth Environmental to perform a reconnaissance-level study on doing groundwater recharge with recycled water from the Palmdale WRP.	Medium
Palmdale WRP Stage V (LACSD)	1	1	$95M	increase availability of recycled water to 16,800 AFY from Palmdale WRP when users identified.	Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	Integrates with other projects with a recycled water demand by providing tertiary treated recycled water.	11	0	1	6	0	0	1	1	25	Includes design and construction of secondary/tertiary treatment facilities. Augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	High

Table 7-1 Project Evaluat ion Matrix (continued)

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
Palmdale WRP Stage VI (LACSD)	1	1	~$62.4M (remaining cost starting 01/08)	increase availability of recycled water to 22,400 AFY from Palmdale WRP when users identified.	Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	The project augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	11	0	1	6	0	0	1	1	25	Includes design and construction of agricultural recycled water force main and treatment plant expansion.	Medium
Amargosa Creek Recharge and Channelization Project (Palmdale)	0	0	$13.5M	5,000 - 10,000 AFY; 15 acres open space/habitat, 20 acres flood protection	$3M from Prop 50, $3.5M City of Palmdale, $2M State Water Contractors, $5M LACWWD40	0	1	1	Integrates with the construction of the 20th Street West bridge over the Amargosa Creek, the channelization of Amargosa Creek between 25th Street West and 20th Street West, and the natural habitat preservation, and with existing upstream and downstream Amargosa Creek improvements.	10	0	1	9	0	0	1	0	23	Provides multiple benefits including flood control and open space areas. The AVSWCA intends to issue an RFP for engineering services related to this project.	High/slightly modified project description to integrate with more project. Refer to project template in Appendix E.
Palmdale WRP Existing Effluent Management Sites (LACSD)	1	1	$5.2M	improved water quality and effluent management.	Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	Integrates with water banking, groundwater recharge, habitat preservation and recreational space projects by supplying tertiary-treated recycled water.	9	1	0	6	0	0	1	1	23	Includes monitoring, irrigation equipment and misc capital costs associated with existing effluent management sites. Augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	High
Aquifer Storage and Recovery Project: Injection Well Development (LACWWD40)	1	1	$10M	12,000 AFY	75% from LACWWD40	1	1	1	Integrates with the well development project that increases our groundwater extraction capacity during the peak session.	6	1	0	8	0	0	1	1	22	Project includes 5 replacement wells, 6 wells currently in-design, and 4-5 conceptual wells north of Lancaster.	High
Lancaster WRP Stage V (LACSD)	1	1	$75M	increase availability of recycled water to 23,500 AFY from Lancaster WRP when users identified.	Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	Integrates with water banking, groundwater recharge, habitat preservation and recreational space projects by supplying tertiary-treated recycled water.	8	0	1	6	0	0	1	1	22	Increases effluent storage capacity to 21 MGD. Augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	High
Lancaster WRP Stage VI (LACSD)	1	1	~$51M (remaining cost starting 01/08)	increase availability of recycled water to 29,100 AFY from Lancaster WRP when users identified.	Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	Integrates with water banking, groundwater recharge, habitat preservation and recreational space projects by supplying tertiary-treated recycled water.	8	0	1	6	0	0	1	1	22	Increases effluent storage capacity from 21 MGD to 26 MGD. Augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	Medium
Amargosa Creek Pathways Project (Lancaster)	1	1	$10M	1-100 AFY	Not specified	1	1	1	Integrates flood control, stormwater management, open space management and recreational/land use management with environmental synergy and conserva-tion. A foot-bridge would connect existing trailheads and allow for pedestrian movement to and from the AV Fairgrounds.	10	0	1	4	0	0	1	1	22	Proactive environmental management, design based on habitat enhancement, ecosystem protection and wetlands creation that utilizes storm and municipal nuisance water, a natural effect of resulting riparian habitat on flood control & storm surge dissipation, as well as water quality via natural attenuation & incidental charge to ground-water aquifer.	High
North Los Angeles/ Kern County Regional Recycled Water System (LACWWD40)	0	0	> $10M	Quantifiable benefits include the increased use of approximately 64,780 AFY of recycled water by 2025.	Not specified	1	1	1	Integrates with other planned recycled water projects such as the City of Lancaster's groundwater recharge with recycled water project, and will provide the infrastructure and recycled water for the City of Palmdale's Power Plant.	7	0	1	9	0	0	1	1	22	Provides the backbone system for recycled water throughout the Antelope Valley. CEQA has been initiated.	Broken down into Phases 1, 2, 3, 4. High priority given to Regional Recycled Water Project Phase 2. Medium priority given to Phases 3, and 4.
Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (LACWWD40)	1	1	$1.5M	0 AFY; prevents loss of groundwater pumping and existing supply	Not specified	1	1	1		5	0	0	7	1	0	1	1	20	5 wells successfully remediated. This project would remediate 3-5 additional wells.	High

Table 7-1 Project Evaluat ion Matrix (continued)

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
QHWD Partial Well Abandonment of Groundwater Wells for Arsenic (QHWD)	1	1	$48K	0 AFY; prevents loss of groundwater pumping and existing supply	Not specified	1	1	1	LACWWD40 is currently investigating using this method to remedy higher arsenic levels in five additional well sites. QHWD plans to put this project out to bid during the same time and complete the proposed work concurrently.	5	0	0	7	1	0	1	1	20	This has proven to be a cost-effective non-treatment method for dealing with higher levels of arsenic located in one level of strata. The project will be beneficial to several lower income regions due to the location of the well.	High, combine with the high prioritized LACWWD40 arsenic project. Refer to project template in Appendix E.
Ecosystem & Riparian Habitat Restoration of Amargosa Creek: Avenue J north to Avenue H (Lancaster)	1	1	$10M	100-1,000 AFY	Not specified	1	1	1	Integrates with other projects sited within or adjacent the Amargosa Creek to provide better land use and environmentally proactivity by establishing a riparian corridor that combines ecosystem restoration, habitat protection, acoustic and visual buffers, and wetlands creation and enhancement.	8	0	1	4	0	0	1	1	20	Restoration projects such as this are holistic and enhance the environment, providing physical buffers and off-sets to impacts on the overall ecosystem of ephemeral and riparian habitat associated with Amargosa Creek.	High
Palmdale WRP Proposed Effluent Management Sites (LACSD)	1	1	~$9.7M (remaining cost starting 01/08)		Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	Integrates with water banking, groundwater recharge, habitat preservation and recreational space projects by supplying tertiary-treated recycled water.	5	1	0	6	0	0	1	1	19	Includes groundwater monitoring, well abandonment, land acquisition, planning, permitting, site development, etc. for agricultural effluent sites. Augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	Medium
Lancaster WRP Proposed Effluent Management Sites (LACSD)	1	1	~$9.7M (remaining cost starting 01/08)		Bonds, state revolving fund loans, and even-tual ratepayer fee increases	1	1	1	Integrates with water banking, groundwater recharge, habitat preservation and recreational space projects by supplying tertiary-treated recycled water.	5	1	0	6	0	0	1	1	19	Includes land acquisition, irrigation equipment, farm management plan, site development, etc. for proposed effluent management sites. Augments water supply by providing recycled water in lieu of potable for landscape irrigation, dust control, construction, and industrial process water.	Medium
Stormwater Harvesting (Leona Valley Town Council)	0	0	$100K - $1M	150 AFY	Not specified	0	1	1	Integrates with Leona Valley "Precision Sensor" project in regard to furthering water conservation, as well as assistance in achieving goals of any regional conservation plan.	10	0	1	5	0	0	1	0	19	Would collect and treat stormwater for irrigation, helping to maintain agricultural operations in Leona Valley. Leona Valley	Low
Barrel Springs Detention Basin and Wetlands (Palmdale)	0	0	> $10M	40 acres open space/habitat	Not specified	0	1	1		6	0	1	7	0	1	1	0	18	Provides multiple benefits: flood control, wetland enhancement, and habitat protection.	Medium
Hunt Canyon Groundwater Recharge and Flood Control Basin (Palmdale)	0	0	> $10M	300 acres open space/ habitat	Not specified	0	1	1		6	0	1	7	0	1	1	0	18	Project would alleviate flooding and have the potential to provide a recharge area for raw aqueduct water.	Medium
45th Street East Flood Control Basin (Q-East Basin) (Palmdale)	0	0	$20M - $25M	210 acres open space/habitat	Not specified	0	1	1	Integrates with the construction of the Avenue Q and 20th Street East detention basin for flood control, provide possible groundwater recharge, and the natural habitat preservation.	6	0	1	7	0	0	1	0	17		Low
Avenue Q and 20th Street East Basin (Q-West Basin) (Palmdale)	0	0	$10M - $15M	160 acres open space/ habitat	Not specified	0	1	1	Integrates with the construction of the 45th Street East and Avenue P-8 detention basin for flood control, provide possible groundwater recharge, and the natural habitat preservation.	6	0	1	7	0	0	1	0	17		Low
Deep wells to Recapture Banked Water (RCSD)	0	0	$1M - $10M		Local + Gov't grants, loans	0	1	1	Will provide a way of capturing banked water when nededonce regional banking programs in place.	6	0	0	8	0	0	1	0	17		High/component high priority AVEK Westside project. Refer to AVEK Westside project template in Appendix E.

Table 7-1 Project Evaluat ion Matrix (continued)

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
Precision Irrigation Control System (Leona Valley Town Council)	1	0	$100K - $1M		Not specified	0	1	1	Integrates with other conservation efforts proposed for the Region.	8	0	0	5	0	0	1	0	17	Would support agricultural operations in Leona Valley. Would demonstrate effectiveness of 'smart' irrigation control in the Valley.	High/to be included high priority coordi-nated conserva-tion program. Refer to Appendix E for Coordinated Conservation Program project template.
PWD New Treatment Plant (PWD)	1	1	$50M	10 MGD treatment	Not specified	1	1	1		6	0	0	4	1	0	1	0	17	Would treat SWP and Littlerock Creek water.	Medium
Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H (Lancaster)	0	0	$100K - $1M		Not specified	0	1	1	Integrates by conjunctive use of Regional Backbone to recharge the over drafted regional groundwater aquifer. This project envisions utilizing tertiary treated recycled water from LWRP, integrating with LACSD14 by providing a flexible and reliable means to dispose of recycled water.	5	0	0	9	0	0	1	0	17	Depends on the regional recycled water backbone project. Would also integrate with LACSD projects by using tertiary treated water and with the proposed recharge projects.	Medium
Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park (Palmdale)	0	1	>$10M		Not specified	0	1	1		6	0	1	5	0	0	1	0	16	The project is a multipurpose flood control basin with the ability to provide wildlife habitat, conservation, and storm water capture.	Low
Aquifer Storage and Recovery Project: Additional Storage Capacity (LACWWD40)	1	1	$500,000		Not specified	1	1	1	Integrates well with the LACWWD40 ASR Project: Injection Well Development.	1	0	0	8	0	0	1	1	16	Would help to improve efficiency of AVEK supply.	Medium
Implement Evapotranspiration (ET) Controller Program (LACWWD40)	1	1	$100K - $1M		Not specified	1	1	1	Integrates with other conservation efforts proposed for the Region.	4	0	0	5	0	0	1	1	16	Could be used as a model for a future mandated program for new development. Cost and schedule well defined, was included in a previous Proposition 50 Chapter 7 grant application.	High/to be included high priority coordi-nated conserva-tion program. Refer to Appendix E for Coordinated Conservation Program project template.
ET-Based Controller Program (PWD)	1	1	$135,000	240 AFY	Not specified	1	1	1	Integrates with landscape ordinances enacted by the cities and county. This project can assist water purveyors in the Antelope Valley in meeting Best Management Practices for water use efficiency, and will reduce runoff from overwatering of landscaped areas.	4	0	0	5	0	0	1	0	15	Could be integrated with LACWWDs ET-Controller project.	High/to be included high priority coordi-nated conserva-tion program. Refer to Appendix E for Coordinated Conservation Program project template.
Purchasing Spreading Basin Land (RCSD)	1	0	$1M - $10M		Local + Gov't grants, loans	0	1	1	Will provide land to spread water for percolation and water banking for other entities.	3	0	0	8	0	0	1	0	15	Supports regional water banking efforts.	High/component high priority AVEK Westside project. Refer to AVEK Westside project template in Appendix E.

Table 7-1 Project Evaluat ion Matrix (continued)

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
Tropico Park Pipeline Project (RCSD)	0	0	$1M - $10M		Local + Gov't grants, loans	0	1	1	Will provide a way of using tertiary water to develop and water a regional park north to Tropico Hill	5	0	1	6	0	0	1	0	15	Provides a way of using tertiary treated water to develop a regional recreational park. Integrates with the recycled water projects.	Medium
Water Conservation Demonstration Garden (PWD)	1	1	$9M	~86,000 AF over 20 years	Not specified	1	1	1	Integrates with other conservation efforts proposed for the Region.	4	0	0	5	0	0	1	0	15	Addresses water quality problems.	High/to be included high priority coordinated conservation program. Refer to Appendix E for Coordinated Conservation Program project template.
Water Conservation School Education Program (LACWWD40)	1	1	$1M		Not specified	1	1	1	Integrates with other conservation efforts proposed for the Region.	3	0	0	5	0	0	1	1	15	County recently issued a new contract for this project, to be awarded soon.	High/to be included high priority coordinated conservation program. Refer to Appendix E for Coordinated Conservation Program project template.
42nd Street East, Sewer Installation (Palmdale)	0	0	$100K - $1M		Not specified	0	1	1		6	0	0	4	1	0	1	0	14	Would reduce groundwater pollution by eliminating septic tanks.	Low
Ultra Low Flush Toilet (ULFT) Change Out Program (LACWWD40)	1	1	$100K - $1M		Not specified	1	1	1	Integrates with other conservation efforts proposed for the Region.	2	0	0	5	0	0	1	1	14	Cost and schedule well defined, was included in a previous Proposition 50 Chapter 7 grant application.	High/to be included high priority coordinated conservation program. Refer to Appendix E for Coordinated Conservation Program project template.
Water Waste Ordinance (LACWWD40)	1	0	Unknown		Not specified	0	1	1	Integrates with local city ordinances	4	0	0	5	0	0	1	1	14	Could integrate with local city ordinances and policies.	High/to be included high priority coordinated conservation program. Refer to Appendix E for Coordinated Conservation Program project template.
Littlerock Dam Sediment Removal Project (PWD)	0	1	$4M		Not specified	1	1	1		3	0	0	5	0	0	1	0	13	CEQA almost complete, provides protection for the Arroyo Toad.	High
Place Valves and Turnouts on Reclaimed Water Pipeline (RCSD)	1	1	$900,000		Local + Gov't grants, loans	0	1	1	Will provide valving and controls to direct water to various pipelines for use by RCSD, AVEK, LA County, etc.	3	0	0	5	0	0	1	0	13	Facilitates water delivery to new facilities and will connect with Tropico Park Pipeline project.	Low
Avenue K Transmission Main, Phases I-IV (LACWWD40)	1	1	> $10M		Not specified	1	1	1		1	0	0	4	0	0	1	1	12	Provides multiple benefits, in-design.	High/linked to AVEK Westside project

Table 7-1 Project Evaluat ion Matrix (continued)

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
Gaskell Road Pipeline (RCSD)	0	0	$8.5M		Local + Gov't grants, loans	0	1	1	Integrates with proposed banking projects.	4	0	0	5	0	0	1	0	12	In close proximity to proposed banking projects. Will provide way of capturing banked water when needed.	High/component high priority AVEK Westside project. Refer to AVEK Westside project template in Appendix E.
RCSD's Wastewater Pipeline (RCSD)	0	1	$13M		Local + Gov't grants, loans	0	1	1	Integrates with the recycled water backbone project and LACSD upgrade projects.	3	0	0	5	0	0	1	0	12		High
Avenue M and 60th Street West Tanks (LACWWD40)	0	1	> $10M	Would provide 12 MG storage	Not specified	0	1	1		2	0	0	4	0	0	1	1	11	Would provide the necessary system pressure if water from AVEK was diminished or not available.	Low
Palmdale Power Project (Palmdale)	0	1	$1M - $10M	3,200 AFY of recycled water demand	Not specified	1	1	1	Integrates with the regional recycled water project. The Project will be a customer and end user of reclaimed water, linked to the regional recycled water backbone system.	2	0	0	4	0	0	1	0	11	Creates a demand for recycled water.	High/component of high priority Antelope Valley Recycled Water Project Phase 2. Refer to project template in Appendix E.
Quartz Hill Storm Drain (LAFCD)	0	1	$6.9M	Flood protection of 95 acres, and 1,108 acres private property	Not specified	0	1	1	The project would alleviate local flooding and have the potential to provide water conservation and improved water quality.	2	0	1	4	0	0	1	0	11	New alignments being designed and may require land acquisition.	Medium
KC & LAC Interconnection Pipeline (RCSD)	0	0	$100K - $1M		Local + Gov't grants, loans	0	1	1	Integrates with the regional recycled water project.	2	0	0	5	0	0	1	0	10	Would allow for recycled water to be used in Kern County.	Medium
Alternative 'Gap' Projects																				
Develop further conjunctive use management	0	0	Not estimated		NA**	0	1	1		15	1	1	9	0	0	1	1	30	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Create a Land use Management Plan	1	0	Not estimated		NA**	0	1	1		13	0	1	8	0	0	1	1	27	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	High
Create a Watershed Management Plan	1	0	Not estimated		NA**	0	1	1		10	0	1	9	0	0	1	1	25	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Promote land conservation projects that enhance flood control, aquifer recharge, and watershed and open space preservation.	0	NA	Not estimated		NA**	0	1	1		12	0	1	9	0	0	1	0	25	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Expand the water quality monitoring program	1	0	Not estimated		NA**	0	1	1		8	0	1	8	1	0	1	1	23	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Create incentives for land owners to protect, restore, preserve open space	1	0	Not estimated		NA**	0	1	1		10	NA	1	6	0	0	1	0	21	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Develop management program for nitrate and TDS	1	0	Not estimated		NA**	0	1	1		6	0	1	8	1	0	1	1	21	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	

Table 7-1 Project Evaluat ion Matrix (continued)

Planned Project/Program Types and Activities	Readiness to Proceed						Broad Support	Integration		No. of IRWM Plan Objectives & Targets Addressed	Six or more AB 3030 Elements Addressed	Six or More Water Mngt Strategies Addressed	No. of Regional Priorities Addressed	Four or more IRWM Plan Preferences Addressed	Five or more Statewide Priorities Addressed	Consistency w/ General Plans	Serves a DAC	Total Criteria Score	Stakeholder Comments/Discussion	Stakeholder's Priority (Low, Medium, High)
	CEQA Completed or Not Required	Cost Estimates Prepared (with some detail)	Cost/Benefit Detail			Schedule Prepared		Integrates Easily	Integration Detail											
			Cost Estimate	"Benefit Estimate (if quantifiable)"	Anticipated Funding Match Source															
Identify contaminated portions of the aquifer	1	0	Not estimated		NA**	0	1	1		6	0	0	8	1	0	1	1	20	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Map contaminated portions of aquifer by December 2008.	1	0	Not estimated		NA**	0	1	1		6	0	0	8	1	0	1	1	20	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Make further use of recycled water	1	1	Refer to Section 6		NA**	0	1	1		6	0	1	6	0	0	1	0	18	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Aggressive conservation	1	1	Refer to Section 6		NA**	0	0	1		6	0	0	6	0	0	1	1	17	High expected cost, and not likely to be implemented unless in drought conditions.	
Use alternative sources of water	0	1	Refer to Section 6		NA**	0	1	1		5	0	1	7	0	0	1	0	17	Alternative sources of water vary considerably with regard to cost and reliability.	
Develop and implement a regional Groundwater Wellhead Protection Program	1	0	Not estimated		NA**	0	1	1		1	0	1	8	1	0	1	1	16	Integrates with Amargosa Creek projects and Lancaster's groundwater recharge project.	
Water banks outside of the Antelope Valley	0	0	Refer to Section 6		NA**	0	1	0		5	0	0	9	0	0	1	0	16	Could be politically charged. Issues have been raised regarding keeping water from the Antelope Valley within the Region.	
Increase small-scale flood management projects	0	NA	Not estimated		NA**	0	1	1		7	0	0	5	0	0	1	1	16	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Establish a well abandonment ordinance	1	0	Not estimated		NA**	0	1	1		1	0	0	8	1	0	1	1	15	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Create regional database for groundwater pumping	1	0	Not estimated		NA**	0	1	1		4	0	0	7	0	0	1	0	15	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Preserve acres of farmland in rotation.	1	0	Not estimated		NA**	0	1	1		4	0	0	5	0	0	1	1	14	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Preserve acres of habitat.	1	0	Not estimated		NA**	0	1	1		5	0	1	4	0	0	1	0	14	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Encourage Low Impact Development	0	NA	Not estimated		NA**	0	1	1		4	0	0	6	0	0	1	1	14	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Coordinate a flood management plan	1	0	Not estimated		NA**	0	1	1		3	0	0	5	0	0	1	1	13	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	High
Develop a HCP for the Antelope Valley	0	0	Not estimated		NA**	0	1	1		5	0	1	4	0	0	1	0	13	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Build public parks and recreational amenities	0	0	Not estimated		NA**	0	1	1		3	0	0	5	0	0	1	1	12	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Storm water capture/recovery feasibility study	1	0	Not estimated		NA**	0	1	1		1	0	0	5	0	0	1	1	11	At this point in the IRWM Plan development, considered a recommended strategy to pursue.	
Inability to approve further development	1	0	Refer to Section 6		NA**	0	0	0		2	0	0	6	0	0	0	0	9	High expected cost, politically charged issue.	

Table 7-1A Regional Priorities Matrix

"Planned Project/Program Types and Activities"	Short-Term Regional Priorities						Long-Term Regional Priorities								
	Complete AV IRWM Plan by January 1, 2008	Identify Gap Projects	Maximize Funding For Project Implementation	Utilize Committee for Continued Development / AV IRWM Plan Implementation	Develop Programs/ Policies to Increase Groundwater Recharge/ Manage Use	Encourage Cooperation in Developing Regional Groundwater Banking	Maintain Committee for Continued AV IRWM Plan Implementation/ Stakeholder Input	Optimize Use of Recycled Water, Conjunctive Management, Conservation, Stormwater	Provide Adequate Water/ Wastewater Services to Meet Projected Growth	Protect Groundwater Supplies	Provide More Efficient Storage for Imported Water Supply	Preserve Open Space, Ag Lands, Conserve Functional Habitats & Protect Species	Continue to Meet Applicable Water Quality Standards	Expand Recycled Water Distribution Systems to New Users	Expand Voluntary Water Conservation Programs for Res/CII/ Ag Users
WATER SUPPLY MANAGEMENT															
Groundwater Recharge/Banking															
Amargosa Creek Recharge and Channelization Project (Palmdale)				X	X	X	X	X	X	X	X	X			
Amargosa Water Banking and Storm Water Retention Project (No financial sponsor identified)				X	X	X	X	X	X	X	X	X			
Antelope Valley Water Bank (WDS)				X	X	X	X	X	X	X	X	X			
Aquifer Storage and Recovery Project: Injection Well Development (LACWWD40)				X	X	X	X	X	X	X	X				
Aquifer Storage and Recovery Project: Additional Storage Capacity (LACWWD40)				X	X	X	X	X	X	X	X				
Deep wells to Recapture Banked Water (RCSD)				X	X	X	X	X	X	X	X				
Gaskell Road Pipeline (RCSD)				X			X	X	X					X	
Groundwater Banking (LACWWD40)				X	X	X	X	X	X	X	X	X			
Purchasing Spreading Basin Land (RCSD)				X	X	X	X	X	X	X	X	X			
Water Supply Stabilization Project – Westside Project (AVEK, AVSWCA)				X	X	X	X	X	X	X	X	X			
Water Supply Stabilization Project – Eastside Project (AVEK, AVSWCA)				X	X	X	X	X	X	X	X	X			
Recycled Water															
Groundwater Recharge Using Recycled Water (GWR-RW) Pilot Project (Lancaster)				X	X	X	X	X	X	X	X			X	
Groundwater Recharge - Recycled Water Project (PWD)				X	X	X	X	X	X	X	X			X	
KC & LAC Interconnection Pipeline (RCSD)				X			X	X	X					X	
North Los Angeles/Kern County Regional Recycled Water System (LACWWD40)				X	X	X	X	X	X	X	X			X	
Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H (Lancaster)				X	X	X	X	X	X	X	X			X	
Water Conservation/Water Use Efficiency															
ET-Based Controller Program (PWD)				X			X	X	X						X
Implement Evapotranspiration (ET) Controller Program (LACWWD40)				X			X	X	X						X
Precision Irrigation Control System (Leona Valley Town Council)				X			X	X	X						X
Ultra Low Flush Toilet (ULFT) Change Out Program (LACWWD40)				X			X	X	X						X
Water Conservation Demonstration Garden (PWD)				X			X	X	X						X
Water Conservation School Education Program (LACWWD40)				X			X	X	X						X
Water Waste Ordinance (LACWWD40)				X			X	X	X						
Water Infrastructure Improvements															
Avenue K Transmission Main, Phases I-V (LACWWD40)				X			X	X	X						
Avenue M and 60th Street West Tanks (LACWWD40)				X			X	X	X		X				
Littlerock Dam Sediment Removal Project (PWD)				X			X	X	X		X				
Place Valves and Turnouts on Reclaimed Water Pipeline (RCSD)				X			X	X	X					X	
RCSD's Wastewater Pipeline (RCSD)				X			X	X	X					X	
WATER QUALITY MANAGEMENT															
Recycled Water															
42nd Street East, Sewer Installation (Palmdale)				X			X		X				X		
Lancaster WRP Stage V (LACSD)				X			X	X	X				X	X	
Lancaster WRP Stage VI (LACSD)				X			X	X	X				X	X	
Lancaster WRP Proposed Effluent Management Sites (LACSD)				X			X	X	X				X	X	
Palmdale Power Project (Palmdale)				X			X	X						X	
Palmdale WRP Existing Effluent Management Sites (LACSD)				X			X	X	X				X	X	
Palmdale WRP Stage V (LACSD)				X			X	X	X				X	X	
Palmdale WRP Stage VI (LACSD)				X			X	X	X				X	X	
Palmdale WRP Proposed Effluent Management Sites (LACSD)				X			X	X	X				X	X	
Water Infrastructure Improvements															
Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (LACWWD40)				X	X		X	X	X	X			X		

Table 7-1A Regional Priorities Matrix (continued)

"Planned Project/Program Types and Activities"	Short-Term Regional Priorities						Long-Term Regional Priorities								
	Complete AV IRWM Plan by January 1, 2008	Identify Gap Projects	Maximize Funding For Project Implementation	Utilize Committee for Continued Development/ AV IRWM Plan Implementation	Develop Programs/ Policies to Increase Groundwater Recharge/ Manage Use	Encourage Cooperation in Developing Regional Groundwater Banking	Maintain Committee for Continued AV IRWM Plan Implementation/ Stakeholder Input	Optimize Use of Recycled Water, Conjunctive Management, Conservation, Stormwater	Provide Adequate Water/ Wastewater Services to Meet Projected Growth	Protect Groundwater Supplies	Provide More Efficient Storage for Imported Water Supply	Preserve Open Space, Ag Lands, Conserve Functional Habitats & Protect Species	Continue to Meet Applicable Water Quality Standards	Expand Recycled Water Distribution Systems to New Users	Expand Voluntary Water Conservation Programs for Res/CII/ Ag Users
PWD New Treatment Plant (PWD)				X			X		X				X		
QHWD Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (QHWD)				X	X		X	X	X	X			X		
FLOOD MANAGEMENT															
Water Infrastructure Improvements															
45th Street East Flood Control Basin (Q-East Basin) (Palmdale)				X	X		X	X	X	X		X			
Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park (Palmdale)				X			X	X	X			X			
Avenue Q and 20th Street East Basin (Q-West Basin) (Palmdale)				X	X		X	X	X	X		X			
Barrel Springs Detention Basin and Wetlands (Palmdale)				X	X		X	X	X	X		X			
Hunt Canyon Groundwater Recharge and Flood Control Basin (Palmdale)				X	X		X	X	X	X	X				
Quartz Hill Storm Drain (LAFCD)				X			X	X	X						
Stormwater Harvesting (Leona Valley Town Council)				X			X	X	X			X			
ENVIRONMENTAL MANAGEMENT															
Habitat Restoration															
Ecosystem & Riparian Habitat Restoration of Amargosa Creek: Avenue J north to Avenue H (Lancaster)							X	X	X			X			
Recycled Water															
Tropico Park Pipeline Project (RCSD)				X			X	X	X			X		X	
LAND USE MANAGEMENT															
Plans and Studies															
Antelope -Fremont Watershed Assessment and Plan (Antelope Valley Conservancy)				X	X	X	X	X				X	X	X	X
Recreation															
Amargosa Creek Pathways Project (Lancaster)							X	X	X			X			
ALTERNATIVE "GAP" PROJECTS															
Aggressive conservation		X		X			X	X	X						X
Develop further conjunctive use management		X		X	X	X	X	X	X	X	X				
Water banks outside of the Antelope Valley		X		X	X	X	X	X	X	X	X				
Create regional database for groundwater pumping		X		X	X		X	X	X	X					
Use alternative sources of water		X		X	X		X	X	X	X					
Make further use of recycled water		X		X			X	X	X					X	
Inability to approve further development		X					X	X	X	X		X			
Identify contaminated portions of the aquifer		X		X	X		X	X	X	X			X		
Map contaminated portions of aquifer by December 2008		X		X	X		X	X	X	X			X		
Establish a well abandonment ordinance		X		X	X		X	X	X	X			X		
Develop and implement a regional Groundwater Wellhead Protection Program		X		X	X		X	X	X	X			X		
Develop management program for nitrate and TDS		X		X	X		X	X	X	X			X		
Expand the water quality monitoring program		X		X	X		X	X	X	X			X		
Coordinate a flood management plan		X		X			X	X	X						
Storm water capture/recovery feasibility study		X		X			X	X	X						
Increase small-scale flood management projects		X		X			X	X	X						
Encourage Low Impact Development		X		X			X	X	X			X			
Preserve acres of habitat		X		X			X					X			
Develop a HCP for the Antelope Valley		X		X			X					X			
Promote land conservation projects that enhance flood control, aquifer recharge, and watershed and open space preservation.		X		X	X	X	X	X		X	X	X			
Preserve farmland		X		X			X	X				X			
Build public parks and recreational amenities		X		X			X	X				X			
Create a Watershed Management Plan		X		X	X	X	X	X		X	X	X			
Create incentives for land owners to protect/restore/preserve open space		X		X			X	X				X			X

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the following short-term (e.g., 3 to 5 years) and long-term (20 years) priorities have been identified for the Antelope Valley Region. For each project, the number of regional priorities that a project contributed to was tallied as its score for this criterion (refer to Table 7-1A).

Short-term Implementation Priorities (3-5-years)

- Complete the Antelope Valley IRWM Plan by January 1, 2008;
- Identify projects that will meet the gap between existing projects and the Regional planning targets;
- Maximize funding opportunities for project implementation from local, state, and federal funding sources;
- Utilize a committee structure for continued development and implementation of the IRWM Plan;
- Develop programs and policies to increase groundwater recharge or better manage groundwater use; and
- Encourage cooperation in the short-term to develop regional groundwater banking programs.

Long-term Implementation Priorities (20 years)

- Maintain a committee structure to oversee plan implementation and continued stakeholder input;
- Optimize use of recycled water, conjunctive management, conservation, and stormwater to enhance water supply reliability;
- Provide adequate water and wastewater services to meet projected growth
- Protect groundwater supplies;
- Provide more efficient storage for imported water supply to increase its reliability;
- Preserve open space, agricultural land uses, conserve functional habitats, and protect special-status species;
- Continue to meet applicable water quality standards;
- Expand distribution systems to provide recycled water to new users; and
- Expand voluntary water conservation programs for residential, commercial, industrial and agricultural uses.

Four or More IRWM Plan Preferences Addressed. The IRWM Plan preferences were identified and used to evaluate stakeholder-identified projects in Section 6. Those projects that contributed to four or more IRWM Plan preferences were given a point.

Five or More Statewide Priorities Addressed. The statewide priorities were used to evaluate stakeholder-identified projects in Section 6. Those projects that contributed to five or more statewide priorities were given a point.

Consistency with General Plans. The local and regional general plan policies related to water supply, water quality, flood management, environmental resource management, and land use management are identified in Section 8 (Table 8-2) and used to evaluate stakeholder-identified projects. Those projects that demonstrated consistency with these general plan policies were given a point.

Serves a Disadvantaged Community. A DAC was assumed to benefit from a particular project if the project increased the reliability of water supply for the Antelope Valley Region as a whole, enhanced water quality in the Antelope Valley Region, or if the DAC was located within the service area of a proposed project. In this manner, a project was given a point if it was determined to benefit a DAC.

Table 7-1 provides a preliminary evaluation and ranking of the stakeholder-identified proposed projects via a tally of the total number of criteria met by each project. The projects were then evaluated for how well they can be integrated with each other. Additionally, the projects were reviewed for geographic coverage while using a mix of plan objectives and water management strategies to provide multiple benefits, as shown in the "Additional Comments" column in Table 7-1.

Table 7-1 was presented to the RWMG/Stakeholder group for further evaluation and prioritization. Additionally, the Stakeholders were given the opportunity to present support for their projects, to discuss the merits of the projects with the group, and to discuss how their projects could potentially be combined to create more regional, comprehensive, and logistically beneficial and efficient projects. Additionally, at this particular Stakeholder meeting, a number of Stakeholders presented modified versions of their projects to the group that they felt better integrated with the goals and objectives of the Antelope Valley Region as well as other projects.

The Stakeholders were then broken up into groups and asked to give a preliminary "priority" ranking to each project based on the information in Table 7-1 and the discussions presented at the meeting. The group was asked to assign priority under the assumption that any particular project would be implemented with or without grant funding. Priority was given as follows:

- A 'high' priority was assigned to projects the group would take action on within the next two (2) years.
- A 'medium' priority was assigned to projects the group would take action on within the next five (5) years.
- A 'low' priority was assigned to projects the group would take action on within the next 5 to 10 years.

A facilitated discussion led the Stakeholders to identify their high, medium, and low projects, as shown below in Table 7-2. Appendix F provides a more detailed breakdown of the high priority project schedules.

Based on the stakeholders determinations of the ranking process above, the suite of projects and alternatives given 'high' priority, were selected for implementation and discussed below in Section 7.4.

Table 7-2 Prioritized Project List

Priority	Project	Responsible Entity	Project Status	Project Schedule
Water Supply Groundwater Recharge/Banking Infrastructure Projects				
High	Antelope Valley Water Bank	WDS	Design	2001 to 2008
	Aquifer Storage and Recovery Project - Injection Well Development	LACWWD 40	Planning	2007 to 2010
	Upper Amargosa Creek Recharge, Flood Control & Riparian Habitat Restoration Project	Palmdale, AVEK	Planning	2006 to 2010
	Water Supply Stabilization Project – Westside	AVEK/AVSWCA/ LACWWD 40	CEQA/ Permitting	2007 to 2009
Medium	Aquifer Storage and Recovery Project: Additional Storage Capacity	LACWWD 40	Planning	2010 to 2013
	Lower Amargosa Creek Recharge & Flood Control Project	J.Goit/Palmdale	Planning	2010 to 2013
	Water Supply Stabilization Project – Eastside Project	AVEK	Planning	2010 to 2013
Water Infrastructure Projects				
High	Avenue K Transmission Main, Phases I-IV	LACWWD 40	Planning	2008 to 2010
	Littlerock Dam Sediment Removal Project	PWD	Planning/ Design	2004 to 2009
	Waste Water Pipeline	RCSD	Planning	2008 to 2010
Low	Avenue M and 60th Street West Tanks	LACWWD 40	Conceptual	2013 to 2018
	Place Valves and Turnouts on Reclaimed Water Pipeline	RCSD	Conceptual	2013 to 2018
Recycled Water Projects				
High	Antelope Valley Recycled Water Project Phase 2	LACWWD 40/ Palmdale/LACSD	Planning	2007 to 2009
	Groundwater Recharge Using Recycled Water Project	Lancaster	Pilot Study	2006 to 2009
Medium	Groundwater Recharge – Recycled Water Project	PWD	Planning	2010 to 2013
	KC & LAC Interconnection Pipeline	RCSD	Planning	2010 to 2013
	Regional Recycled Water Project Phase 3	LACWWD 40/ Palmdale/LACSD	Planning	2010 to 2013
	Tertiary Treated Water Conveyance & Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H	Lancaster	Planning	2010 to 2013
Low	Regional Recycled Water Project Phase 4	LACWWD 40/ Palmdale/LACSD	Planning	2013 to 1018
Water Conservation/Water Use Efficiency				
High	Comprehensive Water Conservation/Efficient Water Use Program. This program would include the following: PWD's & LACWWD 40's "ET-Based Controller Program", Leona Valley's "Precision Irrigation Control System"; PWD's "Water Conservation Demonstration Garden"; LACWWD 40's "Water Conservation School Education Program", "Ultra Low Flush Toilet (ULFT) Change Out Program", and "Waste Water Ordinance." Additionally, this Program is envisioned to include a landscape/nuisance water ordinance.	AVWCC/ LACWWD/PWD	Planning	2007 to 2010

Table 7-2 Prioritized Project List (continued)

Priority	Project	Responsible Entity	Project Status	Project Schedule
Water Quality Projects				
High	Lancaster WRP Stage V	LACSD	Design	2007 to 2010
	Palmdale WRP Existing Effluent Management Sites	LACSD	Design	2007 to 2010
	Palmdale WRP Stage V	LACSD	Design	2007 to 2010
	Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation	LACWWD/ QHWD	Design	2007 to 2010
Medium	Lancaster WRP Stage VI	LACSD	Planning	2010 to 2013
	Lancaster WRP Proposed Effluent Management Sites	LACSD	Planning	2010 to 1013
	Palmdale WRP Stage VI	LACSD	Planning	2010 to 2013
	Palmdale WRP Proposed Effluent Management Sites	LACSD	Planning	2010 to 2013
	PWD New Treatment Plant	PWD	Planning	2010 to 2013
Low	42nd Street East, Sewer Installation	Palmdale	Conceptual	2013 to 2018
Flood Management Projects				
High	Development of Coordinated Antelope Valley Flood Control Plan	Cities of Lancaster, Palmdale, LADPW, Kern County	Planning	2007 to 2009
Medium	Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park	Palmdale	Planning	2010 to 2013
	Barrel Springs Detention Basin and Wetlands	Palmdale	Planning	2010 to 2013
	Hunt Canyon Groundwater Recharge and Flood Control Basin	Palmdale	Planning	2010 to 2013
	Quartz Hill Storm Drain	LADPW	Planning	2010 to 2013
Low	45th Street East Flood Control Basin (Q-East Basin)	Palmdale	Conceptual	2013 to 2018
	Avenue Q and 20th Street East Basin (Q-West Basin)	Palmdale	Conceptual	2013 to 2018
	Storm water Harvesting	Leona Valley Town Council	Conceptual	2013 to 2018
Environmental Resource Management Projects				
High	Ecosystem & Riparian Habitat Restoration of Amargosa Creek; Avenue J to Ave H	Lancaster	Planning	2007 to 2008
Medium	Tropico Park Pipeline Project	RCSD	Planning	2010 to 2013
Land Use Management Projects				
High	Amargosa Creek Pathways Project	Lancaster	Planning	2007 to 2008
	Development of a Coordinated Land Use Management Plan. This project includes the Antelope Valley Conservancy's Antelope-Fremont Watershed Assessment and Plan.	Cities of Lancaster, Palmdale, LADPW, Kern County/ Antelope Valley Conservancy	Planning	2007 to 2009

Notes:
AVEK = Antelope Valley-East Kern Water Agency
AVSWCA = Antelope Valley State Water Contractors Association
AVWCC = Antelope Valley Water Conservation Coalition
LACSD = Los Angeles County Sanitation Districts
LACWWD 40 = Los Angeles County Waterworks District 40
LADPW = Los Angeles County Department of Public Works
PWD = Palmdale Water District
RCSD = Rosamond Community Services District

It is important to note that this AV IRWM Plan is meant to be a living document. As the AV IRWM Plan is updated, the opportunity exists to re-evaluate the projects included in this IRWM Plan as their project scopes are refined, and a

continual assessment of whether this IRWM Plan is meeting the issues and needs of the Antelope Valley Region will be conducted. Additionally, this IRWM Plan provides a mechanism for identifying new projects designed in accordance with the regional objectives, priorities, and management strategies. Therefore, a continual review of the prioritization is anticipated, and is described in more detail in Section 8, Implementation Framework. Table 7-2 is also included as Appendix E. In this way, the Appendix can be more easily evaluated and adjusted rather than having to make changes to the entire IRWM Plan if changes are necessitated more frequently than the scheduled updates as described in Section 8.6.

7.4 CURRENT HIGH PRIORITY PROJECTS

The following provides descriptions of the high priority projects from Table 7-2. During the process of evaluating and prioritizing the projects, the Stakeholders found that a number of their individually submitted projects could be integrated to form enhanced projects that could reach more beneficiaries, integrate geographically to extend to further reaches of the Antelope Valley Region, and take advantage of synergies not previously noticed. The process enabled the stakeholders to look more carefully at their projects and at what phases they may want to implement in the near term, potentially ranking that a higher priority than a later phase in the project. For example, the Regional Recycled Water Project, which is the regional recycled water backbone system project, includes a number of implementation phases. Phase 2, which includes the connection to the Palmdale Power Plant, was given a high priority. Later phases of the project, Phases 3 and 4, were given medium and low priorities, respectively. For a full description of each of the high priority projects, refer to their project templates, which are provided in Appendix F.

7.4.1 High Priority Projects Benefit/Cost Assessment

The IRWM Plan Guidelines require that an IRWM Plan demonstrate its economic and technical feasibility on a programmatic level (technical feasibility is discussed in Section 8). It is appropriate that both quantifiable and non-quantifiable benefits provided by projects be considered in relation to their costs. The potential benefit of each proposed project was initially identified in Section 5, and cumulatively considered in Section 6. It is likely, however, in this initial stage of Plan development, that a lack of detailed data regarding all benefits, especially costs, could preclude a rigorous quantitative comparison of all projects. Therefore, only those projects that have demonstrated priority status resultant from the analysis provided in Table 7-1 and with concurrence from the Stakeholders are assessed for their benefit to cost relationships. This analysis is presented in Table 7-3.

Upper Amargosa Creek Recharge, Flood Control and Riparian Habitat Restoration Project (WS-1)	
Project Sponsor:	City of Palmdale and Antelope Valley-East Kern Water Agency (AVEK)
Joint Agencies:	Antelope Valley State Water Contractors Association (AVSWCA), Los Angeles County Waterworks District No. 40 (LACWWD 40)
Project Description:	This project consists of the project previously entitled "Amargosa Creek Recharge and Channelization" with some modifications and additions included during the prioritization process. The project proposes the release of untreated aqueduct water into the Upper Amargosa Creek in order to recharge the most depressed and damage portion of the Antelope Valley Region's groundwater basin. Per the Stetson Report, the Amargosa ranks as one of the top locations in the Antelope Valley Region for groundwater recharge. Project goals include increasing the Antelope Valley Region's water supply and the amount of open space and protected natural habitat, and providing improved flood prevention within the Amargosa Creek watershed. Proposed project improvements include: expanding the size and capacity of the spreading ground of the natural recharge area; developing and preserving an ephemeral stream habitat; channelization of Amargosa Creek (soft bottom) and providing a grade separation of 20th Street West over Amargosa Creek.
Project Integration:	Possible integration with Water Supply Stabilization Project- Westside Project (WS-2).
Project Benefits:	5,000 – 10,000 AFY, 15 acres open space; 20 acres flood protection
Total Cost:	$13.5 Million

Water Supply Stabilization Project- Westside Project (WS-2)	
Project Sponsor:	AVEK
Joint Agencies:	AVSWCA, Rosamond Community Services District (RCSD), LACWWD 40
Project Description:	WS-2 is an imported water stabilization program that utilizes SWP water delivered to the Antelope Valley Region's westside for groundwater recharge and supplemental supply required for the Antelope Valley Region during summer peaking demand and anticipated dry years. This project increases imported water supply reliability in the Antelope Valley Region by developing storage and allowing for recharge. It includes the design and construction of additional facilities necessary for the delivery of untreated water for direct recharge (percolation basins) or indirect (in-lieu) recharge, and for wells and a pipeline for treated water conveyance. The project is considered an immediate water banking and groundwater recharge opportunity. It also incorporates the use of large acreage of farm land for spreading of water and rotating farm crops to increase percolation. Components of the Westside Project include but are not limited to: drilling and equipment of 6 deep wells between Avenue A and Rosamond Boulevard, 70th to 140th Street West (RCSD's "Deep Wells to Recapture Banked Water Project"); placing a new 36-inch pipeline on Gaskell Road, from 60th Street to 140th Street to transport water from well fields (RCSD's "Gaskell Road Pipeline Project"); and purchasing water spreading basins land in West Kern County from Avenue A to Rosamond B (RCSD" "Purchasing Spreading Basin Land Project").
Project Integration:	Possible integration with Upper Amargosa Creek Recharge Flood Control and Riparian Habitat Restoration Project (WS-1).
Project Benefits:	40,400 to 42,600 AFY
Total Cost:	$230 Million
Aquifer Storage and Recovery Project: Injection Well Development (WS-3)	
Project Sponsor:	LACWWD 40
Joint Agencies:	AVEK
Project Description:	The ASR Injection Well Development project involves the construction of ten new well sites in a groundwater depression area of the Antelope Valley Region to improve water supply reliability. Using wells to access this depressed area of the Antelope Valley groundwater basin will allow for the storage of up to 3,300 AFY of excess imported water supplies during wet years and the extraction of up to 12,000 AFY during dry years. The District is already operating 11 wells in this capacity to store and recover available imported water.
Project Integration:	Integration with other water storage projects proposed in this IRWM Plan (WS 1 and WS-2)
Project Benefits:	Extraction of 12,000 AFY; injection of 3,300 AFY
Total Cost:	$10.0 Million
Antelope Valley Water Bank (WS-4)	
Project Sponsor:	Western Development and Storage (WDS)
Joint Agencies:	WDS is offering storage to willing participants in this program.
Project Description:	The Antelope Valley Water Bank (AVWB) is estimated to provide 500,000 acre-feet (AF) of storage in the Neenach Subbasin of the Antelope Valley Basin and will have the ability to recharge and recover 100,000 AFY. Water recovery will take place through the use of 30 to 50 wells, many already existing, and will utilize water pumped into the AVEK West Feeder or the California Aqueduct. This additional storage capacity could be used to regulate supplies on a seasonal and year-to-year basis by storing water when it is plentiful for later use when needed. In addition to improving supply reliability, this project will assist in stabilizing groundwater levels, protecting the aquifer from contamination, and reducing nuisance water. Project land will remain in agricultural production when not being used for surface recharge and provide associated habitat. Potential participants in this banking program include water agencies or local mutuals that have access to state water.
Project Integration:	Potential integration with WS-2. In addition, water supplies stored in the AVWB could be delivered to all parts of the AVEK, Palmdale Water District (PWD), and Littlerock Creek Irrigation District (LCID) service territories in the Antelope Valley Region via immediately adjacent conveyances.
Project Benefits:	100,000 AFY; 1,700 acres of agriculture; 500,000 AF of storage
Total Cost:	$170 Million

Antelope Valley Recycled Water Project Phase 2 (RW-1)	
Project Sponsor:	City of Palmdale
Joint Agencies:	Los Angeles County Sanitation District (LACSD), Palmdale Water District (PWD), City of Lancaster, LACWWD 40
Project Description:	The Antelope Valley Recycled Water Project Phase 2 is one phase of the North Los Angeles/Kern County Regional Recycled Water Project combined with some modifications to benefit the entire Antelope Valley Region. The North Los Angeles/Kern County Regional Recycled Water Project outlines the foundation of a regional recycled water system in the Antelope Valley Region. It would distribute recycled water throughout the service area and provide a backbone system that could accommodate minimum and maximum demands and allow significant deliveries of recycled water to recharge areas. The recommended placement of the system components is based on an analysis of the service area demands, topography, and desired operating pressures. The proposed RW-1 project provides the addition of a recycled water connection between LACSD14 and LACSD20 Water Reclamation Plants (WRPs); provides recycled water to the existing eastside farmlands and provides the potential to bring recycled water to Littlerock Creek for recharge. RW-1 will also provide approximately 3,400 AFY of recycled water to a future power generating facility whose design is underway. Storage facilities and or "surge basins" could be designed as future park or habitat restoration areas.
Project Integration:	Possible integration with Palmdale WRP Proposed Effluent Management Sites (WQ-2) and PWD's Groundwater Recharge-Recycled Water Pilot Project (RW 2).
Project Benefits:	8,400 AFY of recycled water; potential recharge and habitat restoration
Total Cost:	$10.9 Million
Groundwater Recharge Using Recycled Water Pilot Project (RW-2)	
Project Sponsor:	City of Lancaster
Joint Agencies:	LACSD, PWD, LACWWD 40
Project Description:	The Pilot Program was identified as the first and critical step forwards implementing a $200M, 50,000 AFY Lancaster Area GWR-RW project in the Groundwater Recharge Feasibility Study (RMC, 2007). The proposed program would build upon the regional recycled water project (RW-1) and LACSD projects. The proposed pilot project would assess the maximization of available recycled water for beneficial use by utilizing this valuable source to recharge the local groundwater basin, increasing the Antelope Valley Region's overall water resources and thus working to provide a reliable water supply. The pilot program would recharge a blend of stormwater and recycled water from the Lancaster Water Reclamation Plant. A supplemental blend supply (local groundwater, raw imported water or treated imported water) would likely be needed. Under the current proposal, recharge would occur at the City-proposed 100-acre stormwater basin at 60th Street West and Avenue F in Lancaster, CA. Up to 2,500 AF of water would be recharged annually, including 500 AF of recycled water. The recharged water would be pumped to serve either non-potable uses or municipal and industrial uses, after an initial monitoring phase is complete.
Project Integration:	Integration with WS-2, RW-1, WQ-1, WQ-2, WQ-3.
Project Benefits:	2,500 AFY; 100 acres open space Ultimately 48,000 AFY and 1,000 acres open space.
Total Cost:	$6.0 Million

Comprehensive Water Conservation/Water Use Efficiency Program (WC-1)	
Project Sponsor:	Antelope Valley Water Conservation Coalition (AVWCC), LACWWD, PWD
Joint Agencies:	AVWCC includes the Cities of Lancaster and Palmdale, local mutual water districts, AVEK, Antelope Valley College, Building Industry Association (BIA), and local developers.
Project Description:	The Comprehensive Water Conservation/Water Use Efficiency Program would include a number of water conservation and water use efficiency projects previously discussed in Section 5 including: PWD's & LACWWD 40's "ET-Based Controller Program", Leona Valley's "Precision Irrigation Control System"; PWD's "Water Conservation Demonstration Garden"; LACWWD 40's "Water Conservation School Education Program", "Ultra Low Flush Toilet (ULFT) Change Out Program", and "Waste Water Ordinance." Additionally, WC-1 would include a landscape/nuisance water ordinance.
Project Integration:	Project integrates with all the water supply projects in reducing the expected mismatch of supply and demand in 2035.
Project Benefits:	3,500 AFY by 2010 and ultimately 28,000 to 42,000 AFY
Total Cost:	$900,000
Avenue K Transmission Main, Phases I-IV (WI-1)	
Project Sponsor:	LACWWD 40
Joint Agencies:	None
Project Description:	The Avenue K Transmission Main, Phases I-IV project consists of four phases for a total of approximately 32,000 linear feet of 30-inch and 36-inch diameter steel transmission main. The proposed transmission main will have interconnections to the existing distribution system and will increase the capacity of the water system to meet the existing domestic and fire protection requirements.
Project Integration:	Possibility to connect to WS-2
Project Benefits:	Firms up existing supply
Total Cost:	$10.0 Million
Littlerock Dam Sediment Removal Project (WI-2)	
Project Sponsor:	PWD
Joint Agencies:	None
Project Description	The Littlerock Dam Sediment Removal Project will remove up to 540,000 cubic yards of sediment that has accumulated from runoff in Littlerock Reservoir, and up to 40,000 cubic yards on an annual basis after the initial sediment is removed. The project may include a grade control structure that will protect the identified habitat of the arroyo toad. The project is expected to increase capacity and reliability of surface water storage in Littlerock Reservoir, and could eventually feed into other regional water banking projects such as AVEK's eastside project. CEQA for the project is almost complete.
Project Integration:	Project integrates with the other water supply projects in reducing the expected mismatch between supply and demand in 2035.
Project Benefits:	1,000 AFY
Total Cost:	$5.5 Million
RCSD's Waste Water Pipeline (WI-3)	
Project Sponsor:	RCSD
Joint Agencies:	None
Project Description:	This project would include placing a 36-inch wastewater pipeline from LACSD to RCSD's wastewater treatment plant. The total distance would be approximately 15 miles. This project would provide for a possible expansion of RCSD's recycled water services beyond the 0.5 mgd expansion in order to provide more recycled water in a quicker period of time.
Project Integration:	Integration with RW-1, WQ-1, WQ-2, and WQ-3, by connecting to their systems.
Project Benefits:	Adds additionally potential users of recycled water.
Total Cost:	$13.0 Million

Lancaster Water Reclamation Plant Stage V Plant Expansion, Phase 1 (WQ-1)	
Project Sponsor:	LACSD
Joint Agencies:	None
Project Description:	The Lancaster WRP Stage V project, Phase 1, involves construction and design of a new pump station, storage reservoirs, and other ancillary facilities needed to increase effluent storage capacity to 18 mgd. The project also includes land acquisition needed for site development. The proposed upgrades will help to maximize the beneficial use of recycled water to agricultural and other end users. CEQA for this project has been completed. By providing an increase in recycled water availability to the Region, this project eases demand for potable water and improves recharge opportunities for the Region.
Project Integration:	Integrates with RW-1, RW-2, WQ-2, WQ-3
Project Benefits:	23,500 AFY of increased recycled water availability; benefit limited to identified users within delivery system.
Total Cost:	$74.8 Million
Palmdale WRP Existing Effluent Management Sites (WQ-2)	
Project Sponsor:	LACSD
Joint Agencies:	None
Project Description:	The proposed upgrades to the Palmdale WRP existing effluent management sites will improve overall water quality by extracting water in the Antelope Valley Region that is high in nitrates and maximizing its beneficial reuse by applying it to agricultural lands and redirecting it to other end users. This project includes monitoring, purchase and installation of irrigation equipment, and completion of other capital projects associated with the existing effluent management sites. CEQA for this project has been completed.
Project Integration:	Integrates with RW-1, RW-2, WQ-1, WQ-3
Project Benefits:	Improved groundwater water quality and effluent management.
Total Cost:	$5.2 Million
Palmdale Water Reclamation Plant Stage V Plant Expansion (WQ-3)	
Project Sponsor:	LACSD
Joint Agencies:	None
Project Description:	This plant expansion will upgrade the Palmdale WRP from oxidation ponds to tertiary treatment of 15 mgd of total plant flow. Proposed structural additions will also provide the capacity to deliver treated effluent to agricultural reuse sites and to store effluent during times of low demand, helping to maximize the beneficial use of recycled water. The project augments water supply by providing recycled water in lieu of potable water for landscape irrigation, dust control, construction, and industrial process water. This phase of the upgrade project includes the following series of activities: construction of an effluent pump station, force main, agricultural recycled water pump station, and an agricultural recycled water storage tank and reservoir; development of the new reservoir site and installation of monitoring wells; and design and construction of secondary/tertiary treatment facilities. By providing an increase in recycled water availability to the Region, this project eases demand for potable water and improves recharge opportunities for the Region.
Project Integration:	Integrates with RW-1, RW-2, WQ-1, WQ-2
Project Benefits:	16,800 AFY of increased recycled water availability; benefit limited to identified users within delivery system.
Total Cost:	$94.6 Million

Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation (WQ-4)	
Project Sponsor:	LACWWD 40 and Quartz Hill Water District (QHWD)
Joint Agencies:	None
Project Description:	WQ-4 includes a combination of LACWWD 40's and QHWD's "Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation" projects. WQ-4 proposes arsenic mitigation of six groundwater wells. The proposed method involves using grout with extremely small pour space to seal off localized regions of the well that contain higher levels of arsenic, resulting in an isolation of arsenic located in specific levels of strata and an overall decrease in contamination. This project will benefit several lower income areas that are served by these wells.
Project Integration:	Integrates with other water quality projects in protecting the Basin.
Project Benefits:	Preventing loss of groundwater pumping and supply.
Total Cost:	$1.5 Million
Ecosystem and Riparian Habitat Restoration of Amargosa Creek; Ave J to Ave H (EM-1)	
Project Sponsor:	City of Lancaster
Joint Agencies:	None
Project Description:	The Ecosystem and Riparian Habitat Restoration of Amargosa Creek; Ave J north to Ave H establishes riparian habitat along the eastern edge of the Amargosa Creek in elongated segments and sections resulting in a "Riparian Curtain" approximately extending from Ave J north to Ave H. This restoration project is holistic in that it serves to enhance the environment and improve water quality, and helps to offset impacts on the overall ecosystem of ephemeral and riparian habitat associated with Amargosa Creek. By establishing a riparian corridor, this project provides habitat connectivity and protection; creates acoustic and aesthetic buffers; improves the existing network of wetlands; and works towards overall ecosystem restoration. This project requires site reconnaissance, coordination with California Department of Fish and Game (CDFG), various bio-assessments and planting plans prior to implementation and creation.
Project Integration:	Integrates with WS-1 and LM-1
Project Benefits:	100 – 1,000 AFY
Total Cost:	$10.0 Million
Coordinated Flood Management Plan (FM-1)	
Project Sponsor:	Cities of Lancaster, Palmdale, LADPW, Kern County
Joint Agencies:	Edwards AFB would be an interested participant
Project Description:	The proposed project is the coordination of a flood management plan for the Antelope Valley Region by 2010. The Plan could include regional strategies to: improve and update flood management mapping and technology; coordinate mitigation efforts that address the level of risk associated with different areas and flood events; and direct the location, pattern and design of development in order to reduce flood damage, maximize groundwater recharge and meet other planning objectives throughout the Antelope Valley Region. A regional flood management plan could also include a regional communication and contingency plan, prepared so that regional and local authorities have the means to respond collaboratively to different flood events.
Project Integration:	Integrates with WS-1, EM-1, and LM-1
Project Benefits:	Improved flood management and protection for the Antelope Valley Region.
Total Cost:	To be provided once all project description components are more clearly defined.

Amargosa Creek Pathways Project (LM-1)	
Project Sponsor:	City of Lancaster
Joint Agencies:	None
Project Description:	The Amargosa Creek Pathways Project, proposed by the City of Lancaster, includes development of a top of bank trail or paseo along eastern side of Lake Lancaster, and construction of a foot-bridge structure crossing the lake and connecting under Hwy 14 to link to the existing trailhead at the Antelope Valley Region Fairgrounds. The project integrates stormwater/flood control with natural riparian habitat enhancement and preservation, open/recreational space and land use management. The goal is to construct a pathway in harmony with established riparian habitat, within a flood control management basin which captures stormwater and nuisance water runoff that, in turn, sustains riparian habitat. This project will additionally increase the amount of protected natural habitat and provide improved flood control within the Amargosa Creek watershed.
Project Integration:	Integrates with WS-1 and EM-1
Project Benefits:	1 – 100 AFY
Total Cost:	$1.3 Million
Coordinated Land Use Management Plan (LM-2)	
Project Sponsor:	Cities of Lancaster, Palmdale, LADPW, Kern County
Joint Agencies:	Antelope Valley Conservancy
Project Description:	The proposed project is the coordination of a land use management plan for the Antelope Valley Region. A regional land use plan that directs the Antelope Valley Region's growth towards existing urban centers will help protect agricultural lands, natural habitat and recreational open space, and will encourage the efficient use of water and economic resources dedicated to water utilities infrastructure improvements and expansions. It is likely that this effort will be combined with the "Antelope-Fremont Watershed Assessment and Plan" project described in Section 5. The watershed assessment project would fund the 606 Studio to work with regional stakeholders to coordinate a regional land use plan with emphasis on the preservation and restoration of sensitive natural systems of the Antelope Valley Region.
Project Integration:	Integrates with WS-1, WS-2, WS-4, RW-1, RW-2, WC-1, WQ-1, WQ-2, WQ-3, EM-1, and LM-1.
Project Benefits:	2,000 acres of habitat/conservation lands
Total Cost:	$45,000 to fund the development of the Antelope-Fremont Watershed Assessment and Plan portion of the Plan. Total cost of the Plan to be provided.

7.4.1.1 Integration of High Priority Projects

The combined implementation of these projects would provide multiple benefits to the Antelope Valley Region spanning a number of water management actions. All of the projects proposed for implementation are targeted at reducing the mismatch between supply and demand projected for the Region by 2035. The projects would facilitate the use of recycled water throughout the Region as well as improve water quality in the groundwater through interdependent recycled water projects, thereby providing a new water supply to the Region. Additionally, the suite of projects would reduce regional water demand by as much as 10 percent by 2035 through a regional water conservation program.

These priority projects work as an integrated package. Many of their components are dependant on each other, requiring continual coordination between agencies and Stakeholders. Implementation of these projects are discussion further in Section 8.

Table 7-3 Benefit/Cost for High Priority Projects

Project Code	Project	Quantified Water Supply Benefit	Other Benefits	Costs (in millions)
LM-1	Amargosa Creek Pathways Project	1 – 100 AFY		$1.3
RW-1	Antelope Valley Recycled Water Project Phase 2	8,400 AFY	Potential recharge and habitat restoration	$10.9
WS-4	Antelope Valley Water Bank	100,000 AFY	1,700 acres of agriculture	$170.0
WS-3	Aquifer Storage and Recovery Project: Injection Well Development	12,000 AFY		$10.0
WI-1	Avenue K Transmission Main, Phases I-IV	NA	Firms up supplies	$10.0
WC-1	Comprehensive Water Conservation/Water Use Efficiency Program	3,500 AFY	Ultimate benefit of 28,000 AFY to 42,000 AFY	$0.90
FM-1	Coordinated Flood Management Plan	NA	Would improve overall flood management and protection for the Antelope Valley Region	TBD
LM-2	Coordinated Land Use Management Plan	NA	2,000 acres open space	TBD
EM-1	Ecosystem & Riparian Habitat Restoration of Amargosa Creek; Ave J to Ave H	100 – 1,000 AFY		$10.0
RW-2	Groundwater Recharge Using Recycled Water (GWR-RW) Project	2,500 AFY	100 acres open space	$6.0
WQ-1	Lancaster WRP Stage V	See RW-1	48,000 AFY potential benefits when users identified	$74.8
WI-2	Littlerock Dam Sediment Removal Project	1,000 AFY		$5.5
WQ-2	Palmdale WRP Existing Effluent Management Sites	See RW-1	48,000 AFY potential benefits when users identified	$5.2
WQ-3	Palmdale WRP Stage V	See RW-1	48,000 AFY potential benefits when users identified	$94.6
WQ-4	Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation	NA	Prevents loss of groundwater pumping and existing supply	$1.5
WI-3	RCSD's Waste Water Pipeline	NA	Provides potential future recycled water users	$13.0
WS-1	Upper Amargosa Creek Recharge, Flood Control & Riparian Habitat Restoration Project	5,000 – 10,000 AFY	15 acres open space; 20 acres flood protection	$13.5
WS-2	Water Supply Stabilization Project – Westside Project	40,400 to 42,600 AFY		$230.0

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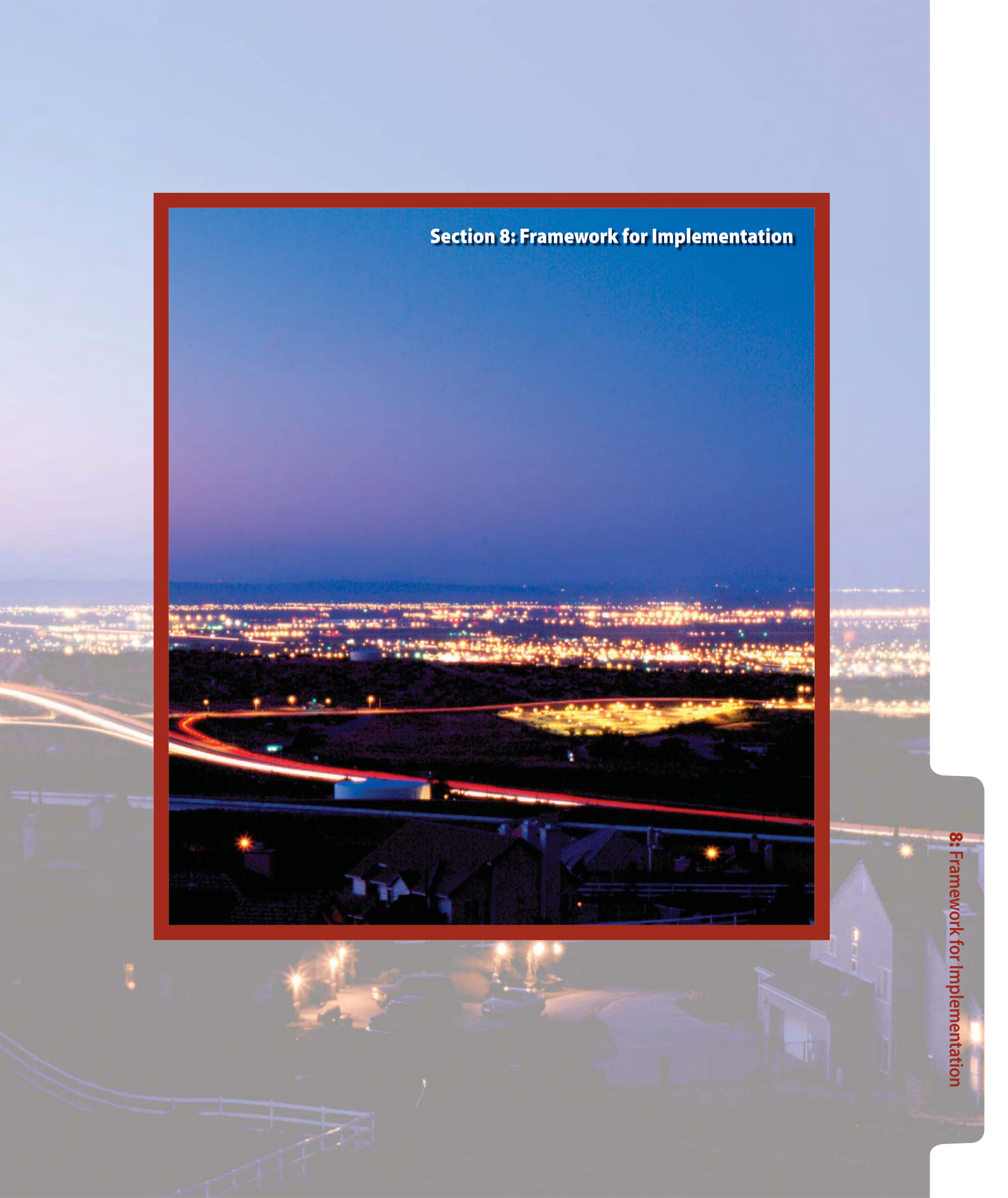
Section 8: Framework for Implementation

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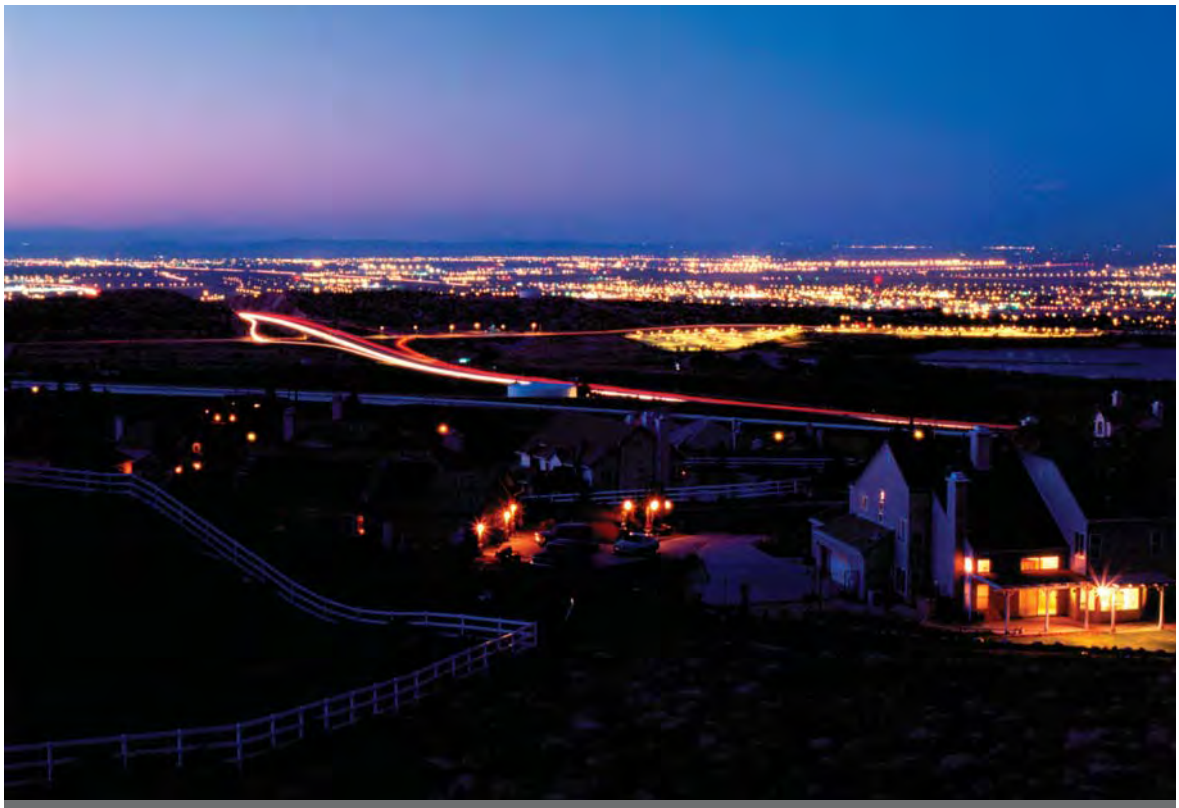

Just as a city can operate more effectively through an organized structure, communities can work together to create a framework to benefit all residents of a region. Photo courtesy of the City of Palmdale.

Section 8: Framework for Implementation

This section develops a comprehensive implementation framework for the Integrated Regional Water Management (IRWM) Plan. The objective of this section is to develop a capital improvement program and financial plan for both construction and operation and maintenance (O&M) of the projects and management actions selected as 'high priority' within this IRWM Plan, as well as to identify a means for updating and maintaining the AV IRWM Plan throughout the planning horizon.

8.1 FRAMEWORK INTRODUCTION

This subsection discusses the agencies and stakeholders that develop plans or participate in the development of plans in the Antelope Valley Region, and identifies the different scales at which planning occurs. How local agencies and stakeholders choose to link regional water issues and challenges with the IRWM Plan priorities, strategies, and objectives noted in Section 4, combine water management strategies, or determine which specific activities should occur for any specific water management strategy may vary based on the scale of planning. It is within this framework that the agencies and stakeholders expect to move toward the shared water management objectives, following a course of greater integration and coordination of water projects and programs in the Antelope Valley Region.

8.1.1 Existing Plans and Programs

A substantial number of federal, state and local/regional agencies and jurisdictions are responsible for, or participate in, the development and implementation of plans and programs that satisfy the water management strategies developed earlier in this report. Table 8-1 identifies those agencies and jurisdictions associated with each established water management strategy in order to demonstrate the coordination required to plan and implement these programs. This table suggests that substantial effort will be required to assure cross-agency coordination and integration for the development of regional plans and projects for individual water management strategies or that incorporate multiple water management strategies.

Table 8-1 Agencies and Jurisdictions Involved with Planning in Antelope Valley Region

Water Management Strategy	Federal	State	Local/Regional
Water Supply Reliability		Department of Water Resources (DWR); State Water Resources Control Board (SWRCB)	Water Agencies; Lahontan Regional Water Quality Control Board (RWQCB)
Groundwater Management and Conjunctive Use		Department of Public Health (DPH); DWR; SWRCB	Cities of Palmdale and Lancaster; Los Angeles and Kern Counties; Antelope Valley State Water Contractors Association (AVSWCA); Lahontan RWQCB
Water Conservation	Bureau of Reclamation (BOR)	DWR; SWRCB	Cities of Palmdale and Lancaster; Water Agencies; Kern County
Water Recycling	Environmental Protection Agency (EPA)	DWR; DPH; SWRCB	Cities of Palmdale and Lancaster; Los Angeles County Sanitation Districts (LACSD) 14 and 20; Kern County; Lahontan RWQCB
Imported Water	BOR	DWR; SWRCB	Antelope Valley-East Kern Water Agency (AVEK); Palmdale Water District; and Littlerock Creek Irrigation District
Surface Storage	BOR; Army Corps of Engineers (ACOE)	DWR; SWRCB	Some cities; Los Angeles County Flood Control District (LAFCD); Kern County; Lahontan RWQCB
Water Transfers	BOR	DWR; SWRCB	Some Water Agencies; Lahontan RWQCB
Desalination	BOR	DWR	Not Applicable for Antelope Valley Region
Water Quality Protection & Improvement	EPA	DPH; DWR; SWRCB	Cities of Palmdale and Lancaster; Water Agencies; Los Angeles and Kern Counties, LACSD; Lahontan RWQCB
Non-point Source Pollution Control	EPA	DWR; SWRCB	Cities of Palmdale and Lancaster; Water Agencies; Los Angeles and Kern Counties; Lahontan RWQCB; Environmental and Watershed Groups
Water & Wastewater Treatment	EPA	DWR; SWRCB	Cities of Palmdale and Lancaster; LACSD 14 and 20; Kern County; Water Agencies; Lahontan RWQCB
Flood Management	BOR; ACOE	DWR; SWRCB	Cities of Palmdale and Lancaster; LAFCD; Kern County; Lahontan RWQCB
Stormwater Capture and Management	BOR; ACOE	DWR; SWRCB	Cities of Palmdale and Lancaster; LAFCD; Kern County; Lahontan RWQCB
Ecosystem Restoration	Fish and Wildlife Service (FWS); Forest Service; National Park Service (NPS); Natural Resources Conservation Service (NRCS); Bureau of Land Management (BLM)	California Department of Fish and Game (Fish and Game); State Parks	Cities of Palmdale and Lancaster; Los Angeles and Kern Counties; Environmental and Watershed Groups

Table 8-1 Agencies and Jurisdictions Involved with Planning in Antelope Valley Region (continued)			
Water Management Strategy	**Federal**	**State**	**Local/Regional**
Environmental and Habitat Protection and Improvement	ACOE; FWS; Forest Service; NPS; NRCS; BLM	Fish and Game; State Parks	Cities of Palmdale and Lancaster; Los Angeles and Kern Counties; Environmental and Watershed Groups
Recreation and Public Access	NPS	State Parks	Cities of Palmdale and Lancaster; Los Angeles and Kern Counties
Wetlands Enhancement and Creation	ACOE; FWS; Forest Service; NPS; NRCS	Fish and Game; State Parks	Cities of Palmdale and Lancaster; Los Angeles and Kern Counties
Land Use Planning	Forest Service; NPS	State Parks	Cities of Palmdale and Lancaster; Los Angeles and Kern Counties
Watershed Planning	ACOE; NPS		Cities of Palmdale and Lancaster; Los Angeles and Kern Counties; Environmental and Watershed Groups

8.1.2 Relationship to Local Planning

The AV IRWM Plan establishes broad objectives and planning targets for the entire Antelope Valley Region. The Antelope Valley Regional Water Management Group (RWMG) created for the development and implementation of the AV IRWM Plan cannot feasibly assume responsibility for meeting all of the objectives and planning targets. Thus, projects and management actions implemented by the AV IRWM Plan stakeholders will likely remain the primary means by which the IRWM Plan's objectives are contributed As acknowledged in a number of the stakeholder meetings, many of the local agencies increasingly acknowledge the value of collaboration in the planning, design, implementation, funding, monitoring and maintenance of integrated projects. Implementation of the AV IRWM Plan supports the development of integrated projects, provides a comprehensive framework that can support planning by individual agencies and jurisdictions, and encourages integrated planning for those issues that could benefit from a regional approach.

Numerous plans and studies related to water resources and land use management in the Antelope Valley Region have contributed to the development of the IRWM Plan. Thus, the AV IRWM Plan has been developed from and is consistent with local planning efforts in the Antelope Valley Region, as discussed below.

- **General Plans:** Plans of the counties and cities that comprise the Antelope Valley Region reflect local planning needs and issues. General Plans express the goals, actions and policies in a number of resource areas, including land use and water management. The Los Angeles County General Plan which covers a large majority of the Antelope Valley Region, in connection with the Antelope Valley Areawide General Plan and the Kern County General Plan specifically calls for a number of policies directly related to IRWM Plan objectives and planning targets such as increased water quality and reliability; water conservation; watershed management, wastewater recovery and reuse; avoidance and mitigation of pollution threats to drainages and groundwater reserves; open space preservation; and establishment of adequate public access and recreational opportunities. General Plans for the Cities of Palmdale and Lancaster offer similar themes of ensuring reliable water supply; maintaining open space and recreational opportunities; and protecting human health and safety and the environment through better floodplain management and ecosystem restoration. Table 8-2 lists applicable goals, policies and programs from each General Plan and compares them to the IRWM Plan objectives and planning targets, the IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, and Statewide Priorities.
- **Lahontan Regional Water Quality Control Board Basin Plan:** The AV IRWM Plan includes key strategies achieving water quality goals for the Antelope Valley Region identified in the Basin Plan developed by the Lahontan RWQCB. The control of Non-point Source Pollution throughout the Antelope Valley Region and restoration of water quality in local water bodies are particular aspects of the Basin Plan that are directly addressed by the IRWM Plan. A number of planning targets are identified to achieve this, such as preventing unacceptable degradation of the aquifer according to the Basin Plan throughout the planning period, identification of contaminated portions of the aquifer and prevention of migration, and mapping and monitoring contaminant movement. In addition, the AV IRWM Plan calls for coordination of a regional flood management

plan and policy mechanism to reduce negative impacts of storm water, urban runoff and nuisance water. Projects designed to reduce, capture, and treat urban and stormwater runoff directly address the water quality objectives in the Basin Plan.

> *"What's important about this effort is that it provides a single forum for all the water resource stakeholders to work together on overlapping planning efforts."*
>
> – Richard Caulkins,
> Los Angeles County Sanitation District

- **Involvement of Land Use Decision Makers:** Land use decisions have the potential to affect the water management strategies utilized in the AV IRWM Plan, as land use can affect population growth, water demand, and surface water quality. The implementation of stormwater capture projects may require acquisition of land which could displace existing uses and may warrant consideration of modifications to land use policies and practices. In addition, the passage and implementation of water conservation or floodplain management ordinances can further address IRWM Plan objectives. In developed areas, the land use decision makers are primarily the cities and the counties. In open space areas, the Forest Service, National Park Service, and California State Parks have regulatory responsibility for the conservation and preservation of those spaces. Additionally, many 'open spaces' in the Antelope Valley Region are undeveloped rural lands under Los Angeles County jurisdiction. All of these agencies and jurisdictions have been involved in the AV IRWM Plan as part of the stakeholder process, or are active members of the Antelope Valley RWMG (e.g., cities and counties).
- **Dynamics between IRWM Plan and Local Planning:** The stakeholder process allows for interactive feedback to occur between local planning and regional IRWM Plan planning. Local planning is conducted by cities, counties, and local agencies and districts. Most of the cities in the Antelope Valley Region have participated either directly, or through the participation of a regional representative. Through the stakeholder workshops, the cities, counties and municipal agencies have advocated for their respective local planning needs and issues, which have been incorporated into the IRWM Plan. Subsequently, the outcomes from the AV IRWM Plan process have been disseminated by the representatives back to their local decision makers, allowing the IRWM Plan priorities, objectives and planning targets to be considered in local planning efforts where appropriate. For example, the Los Angeles County General Plan is currently being updated, and as feasible, the AV IRWM Plan can be used to inform that process in areas related to water resource management.

8.1.3 Relationship of Other Planning Documents to IRWM Plan Objectives

Other water resource management planning documents are also being used to help guide the AV IRWM Plan process. Many of these planning documents are sources of specific projects and programs that can be incorporated directly into the AV IRWM Plan's implementation plan. A general discussion follows of how these planning documents support IRWM Plan objectives related generally to optimizing local resources; complying with water quality standards; protecting and improving groundwater and drinking water quality; increasing watershed-friendly recreational space; protecting, restoring and enhancing natural processes and habitats; and maintaining and enhancing flood protection and infrastructure related to water resources and water quality. Such planning documents include, but are not limited to, Urban Water Management Plans (UWMP), local and regional General Plans, City Master Plans, conservation efforts, and Los Angeles County Flood Control District plans.

Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035. The quantity of supply necessary to meet future population growth and land use development through 2035 (as forecast in the Antelope Valley Region's General Plans) is documented in the UWMPs of the Antelope Valley Region. The AV IRWM Plan includes a number of projects described in these UWMPs, including several water conservation

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities

Local and Regional Plan Policies	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.	
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning
COUNTY OF LOS ANGELES GENERAL PLAN (1990)																				
Water Supply/Water Quality Policies																				
General Goals and Policies																				
Conserve the available supply of water and protect water quality.	X	X	X							X										
Maintain a balance between increased intensity of development and the capacity of needed facilities such as transportation, water and sewage systems.												X							X	X
Land Use Element																				
For development proposed within a non-urban hillside management area, defined by the General Plan as lands characterized by natural slopes of 25% or greater not designated for future urban use nor scheduled to receive an urban level of services, adequate water for domestic consumption and fire protection must be available. Connection to public sewers or provision of a central sewage treatment and disposal facility capable of adequately serving all lots within the development shall be required unless engineering studies clearly demonstrate the acceptability of private disposal systems from the standpoint of geology, sanitation and water quality.	X									X	X	X							X	X
Conservation, Open Space and Recreation Element																				
Protect groundwater recharge and watershed areas, conserve storm and reclaimed water, and promote water conservation programs.	X	X	X	X	X					X				X						X
Encourage the maintenance, management and improvement of the quality of imported domestic water, ground water supplies, natural runoff, and ocean water.	X	X	X	X	X	X	X	X	X	X									X	X
Encourage the maintenance of landscaped areas and pollution-tolerant plants in urban areas, integrate landscaping and open space into housing, commercial and industrial developments especially in urban revitalization areas. Use drought-resistant vegetation.	X		X																X	X
Protect watershed, streams, and riparian vegetation to minimize water pollution, soil erosion and sedimentation, maintain natural habitats, and aid in groundwater recharge.	X	X								X	X		X	X	X	X			X	X
Minimize increased runoff, erosion, and siltation of streambeds that would limit the uses of streams and waterbodies for recreation and other beneficial water-related uses.										X	X		X	X	X	X	X		X	X
Public Facilities Element																				
Encourage private firms and public agencies providing water and waste management services to cooperate with all levels of government in establishing, enacting, and enforcing consistent standards and criteria.	X			X					X	X		X							X	X
Cooperate with federal, State, regional and local agencies to develop and implement new technologies in water and waste management while continuing existing methods until new alternatives are economically feasible.	X			X					X	X		X							X	X
Design water and waste management systems which enhance the appearance of the neighborhoods in which they are located and minimize negative environmental impacts.												X							X	
Improve coordination among operating agencies of all water and waste management systems.												X							X	X
Encourage compatible, multiple use of water and waste management facilities, including public recreational utilization, where consistent with their original purpose and the maintenance of water quality.										X							X		X	X
Increase storage of potable water in underground aquifers through greater use of spreading grounds.	X	X			X														X	X
Encourage development and application of water conservation, including recovery and reuse of storm and waste water.	X		X	X									X	X						
Protect public health and prevent pollution of groundwater through the use of whatever alternative is necessary.	X	X			X		X			X	X	X							X	X
Provide protection for groundwater recharge areas to ensure water quality and quantity.	X	X			X					X	X									X
Economic Development Element																				
Vigorously support measures that will provide an adequate supply of high quality water for Southern California.	X	X	X	X	X	X	X	X	X	X	X	X							X	X
Flood Management Policies																				
General Goals and Policies																				
Direct urban development and revitalization efforts to protect natural and man-made amenities and to avoid severe hazard areas such as flood prone areas, active fault zones, steep hillsides, landslide areas and fire hazard areas.													X	X		X			X	
Land Use Element																				

Local and Regional Plan Policies	AB 3030 Guidelines												IRWM Plan Program Preferences						Statewide Priorities							
	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
COUNTY OF LOS ANGELES GENERAL PLAN (1990)																										
Water Supply/Water Quality Policies																										
General Goals and Policies																										
Conserve the available supply of water and protect water quality.			X		X	X	X			X		X		X	X	X	X	X	X	X	X	X	X	X		X
Maintain a balance between increased intensity of development and the capacity of needed facilities such as transportation, water and sewage systems.										X	X	X							X							
Land Use Element																										
For development proposed within a non-urban hillside management area, defined by the General Plan as lands characterized by natural slopes of 25% or greater not designated for future urban use nor scheduled to receive an urban level of services, adequate water for domestic consumption and fire protection must be available. Connection to public sewers or provision of a central sewage treatment and disposal facility capable of adequately serving all lots within the development shall be required unless engineering studies clearly demonstrate the acceptability of private disposal systems from the standpoint of geology, sanitation and water quality.											X	X		X												
Conservation, Open Space and Recreation Element																										
Protect groundwater recharge and watershed areas, conserve storm and reclaimed water, and promote water conservation programs.	X	X	X		X	X	X	X		X		X		X	X		X	X							X	
Encourage the maintenance, management and improvement of the quality of imported domestic water, ground water supplies, natural runoff, and ocean water.	X	X	X	X	X	X	X	X	X	X		X		X	X		X	X							X	
Encourage the maintenance of landscaped areas and pollution-tolerant plants in urban areas, integrate landscaping and open space into housing, commercial and industrial developments especially in urban revitalization areas. Use drought-resistant vegetation.										X		X	X	X			X								X	
Protect watershed, streams, and riparian vegetation to minimize water pollution, soil erosion and sedimentation, maintain natural habitats, and aid in groundwater recharge.										X				X	X	X		X		X		X				
Minimize increased runoff, erosion, and siltation of streambeds that would limit the uses of streams and waterbodies for recreation and other beneficial water-related uses.										X		X		X	X	X				X		X			X	
Public Facilities Element																										
Encourage private firms and public agencies providing water and waste management services to cooperate with all levels of government in establishing, enacting, and enforcing consistent standards and criteria.											X	X			X		X		X	X	X	X	X	X	X	X
Cooperate with federal, State, regional and local agencies to develop and implement new technologies in water and waste management while continuing existing methods until new alternatives are economically feasible.	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X	X	X		X	X	
Design water and waste management systems which enhance the appearance of the neighborhoods in which they are located and minimize negative environmental impacts.												X			X		X		X						X	
Improve coordination among operating agencies of all water and waste management systems.		X	X	X				X	X	X	X		X	X	X		X	X	X		X	X		X	X	
Encourage compatible, multiple use of water and waste management facilities, including public recreational utilization, where consistent with their original purpose and the maintenance of water quality.	X									X				X		X					X					
Increase storage of potable water in underground aquifers through greater use of spreading grounds.		X			X	X				X				X				X								
Encourage development and application of water conservation, including recovery and reuse of storm and waste water.					X					X				X										X		
Protect public health and prevent pollution of groundwater through the use of whatever alternative is necessary.		X	X	X		X	X	X	X	X	X	X			X					X	X	X			X	
Provide protection for groundwater recharge areas to ensure water quality and quantity.	X	X	X		X	X	X	X		X				X				X		X	X					
Economic Development Element																										
Vigorously support measures that will provide an adequate supply of high quality water for Southern California.	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X							
Flood Management Policies																										
General Goals and Policies																										
Direct urban development and revitalization efforts to protect natural and man-made amenities and to avoid severe hazard areas such as flood prone areas, active fault zones, steep hillsides, landslide areas and fire hazard areas.												X												X	X	
Land Use Element																										

Local and Regional Plan Policies	Water Supply Management Objectives								Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
	Provide reliable water supply to meet the Region's expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
COUNTY OF LOS ANGELES GENERAL PLAN (1990)																												
Water Supply/Water Quality Policies																												
General Goals and Policies																												
Conserve the available supply of water and protect water quality.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
Maintain a balance between increased intensity of development and the capacity of needed facilities such as transportation, water and sewage systems.	X	X	X	X	X	X	X	X									X	X										
Land Use Element																												
For development proposed within a non-urban hillside management area, defined by the General Plan as lands characterized by natural slopes of 25% or greater not designated for future urban use nor scheduled to receive an urban level of services, adequate water for domestic consumption and fire protection must be available. Connection to public sewers or provision of a central sewage treatment and disposal facility capable of adequately serving all lots within the development shall be required unless engineering studies clearly demonstrate the acceptability of private disposal systems from the standpoint of geology, sanitation and water quality.	X	X	X	X	X	X	X	X	X		X	X	X						X	X								
Conservation, Open Space and Recreation Element																												
Protect groundwater recharge and watershed areas, conserve storm and reclaimed water, and promote water conservation programs.	X	X	X	X	X	X	X	X									X	X										
Encourage the maintenance, management and improvement of the quality of imported domestic water, ground water supplies, natural runoff, and ocean water.	X	X	X	X	X	X	X	X	X	X									x	X								
Encourage the maintenance of landscaped areas and pollution-tolerant plants in urban areas, integrate landscaping and open space into housing, commercial and industrial developments especially in urban revitalization areas. Use drought-resistant vegetation.	X	X	X	X	X	X	X	X																				
Protect watershed, streams, and riparian vegetation to minimize water pollution, soil erosion and sedimentation, maintain natural habitats, and aid in groundwater recharge.	X	X	X	X	X	X	X	X											X	X	X	X						
Minimize increased runoff, erosion, and siltation of streambeds that would limit the uses of streams and waterbodies for recreation and other beneficial water-related uses.																			X	X	X	X	X	X	X	X		
Public Facilities Element																												
Encourage private firms and public agencies providing water and waste management services to cooperate with all levels of government in establishing, enacting, and enforcing consistent standards and criteria.									X	X	X	X	X	X	X	X	X	X	X	X								
Cooperate with federal, State, regional and local agencies to develop and implement new technologies in water and waste management while continuing existing methods until new alternatives are economically feasible.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X										
Design water and waste management systems which enhance the appearance of the neighborhoods in which they are located and minimize negative environmental impacts.																												
Improve coordination among operating agencies of all water and waste management systems.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X
Encourage compatible, multiple use of water and waste management facilities, including public recreational utilization, where consistent with their original purpose and the maintenance of water quality.									X	X													X	X	X	X	X	X
Increase storage of potable water in underground aquifers through greater use of spreading grounds.	X	X	X	X	X	X	X	X																				
Encourage development and application of water conservation, including recovery and reuse of storm and waste water.	X	X	X	X	X	X	X	X									X	X										
Protect public health and prevent pollution of groundwater through the use of whatever alternative is necessary.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Provide protection for groundwater recharge areas to ensure water quality and quantity.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Economic Development Element																												
Vigorously support measures that will provide an adequate supply of high quality water for Southern California.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Flood Management Policies																												
General Goals and Policies																												
Direct urban development and revitalization efforts to protect natural and man-made amenities and to avoid severe hazard areas such as flood prone areas, active fault zones, steep hillsides, landslide areas and fire hazard areas.																			X	X								
Land Use Element																												

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

Local and Regional Plan Policies	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.		AB 3030 Guidelines											
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.
For development proposed within a non-urban hillside management area, defined by the General Plan as lands characterized by natural slopes of 25% or greater not designated for future urban use nor scheduled to receive an urban level of services, all water courses should be miantained in as natural a state as possible, minimizing modification of the natural carrying capacity or production of excessive siltation.													X	X		X			X													X
Conservation, Open Space and Recreation Element																																
Restrict urban development in flood prone areas, and thus avoid major new flood control works.													X	X					X	X												
Encourage the multiple use of flood prone areas, and thus avoid major new flood control works.													X	X			X		X	X												
Safety Element																																
Continue to review proposals and projects for expansion of existing development and construction of new facilities, especially critical facilities, within areas subject to floods and other high risk inundation areas, and disapprove projects which cannot mitigate the hazards to the satisfaction of responsible agencies.													X	X					X	X											X	X
Promote the use of flood plain management measures in high-risk inundation areas, and require expansion of existing and proposed new developments to be flood-proofed and secured to minimize future flood losses.													X	X					X	X											X	
Encourage improvement of the existing flood control system capacity to ensure that it is capable of protecting existing development from rising amounts of runoff produced by increased urbanization.													X	X					X	X											X	
Upgrade protection of the public from inundation hazards caused by structural failure and/or breaching of water storage tanks, debris basins, or dam and reservoir facilities.													X	X					X	X											X	
Public Facilities Element																																
Avoid or mitigate threats to pollution of the ocean, drainage ways, lakes and groundwater reserves.										X	X		X	X		X				X												
Design flood control facilities to minimize alteration of natural stream channels.													X	X		X				X												
Environmental Resource Management Policies																																
General Goals and Policies																																
Protect areas that have significant natural resources and scenic values, including significant ecological areas, the coastal zone, and prime agricultural lands.															X	X	X	X	X													
Land Use Element																																
Establish and implement regulatory controls that ensure compatibility of development adjacent to or within major public open space and recreation areas including National Forests, the National Recreation Area, and State and regional parks.															X	X	X		X													
Encourage more efficient use of land, compatible with, and sensitive to, natural ecological, scenic, cultural and open space resources.															X	X	X		X													
Establish land use controls that afford effective protection for significant ecological resources, and lands of major scenic value.															X	X			X													
It is the intent of General Plan policy to preserve the County's significant ecological resources and habitat areas in viable and natural conditions. Major factors influencing the realization of Plan objectives in this regard include the County's ability to accurately identify areas of significant resource value; the availability of financial and other resources necessary to support preservation, restoration, and enhancement efforts; and the competing priorities between resource preservation and other critical public needs.															X	X			X													
Recognizing the resource values at stake and the constraints imposed by competing priorities and objectives, the General Plan seeks to provide a process for reconciling specific conflicts between proposed land use and the preservation of Significant Ecological Areas (SEAs). The Plan does not, however, suggest that this can be accomplished by applying a single set of regulatory standards to all SEAs. Nor does it infer that reasonable use of privately held lands within such areas shall be precluded without justification. Instead, the Plan recognizes that measures necessary to preserve and enhance SEAs will vary depending on the nature of resource values present and the degree of threat implied by potentially incompatible development. Within this context, general conditions and standards are provided to guide specific land use decisions. (These conditions and standards are too numerous to list on this table, but are identified on pages LU-A12 through LU-A14 of the General Plan.)															x	x			x													
Protect known mineral resource reserves (including sand and gravel) from encroachment of incompatible land uses.																			X													
Encourage the recycling of abandoned mineral extraction sites to recreational, industrial or other productive use.																	X		X													

Local and Regional Plan Policies	IRWM Plan Program Preferences						Statewide Priorities								Water Supply Management Objectives							
	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.	Provide reliable water supply to meet the Region's expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.
For development proposed within a non-urban hillside management area, defined by the General Plan as lands characterized by natural slopes of 25% or greater not designated for future urban use nor scheduled to receive an urban level of services, all water courses should be miantained in as natural a state as possible, minimizing modification of the natural carrying capacity or production of excessive siltation.												X										
Conservation, Open Space and Recreation Element																						
Restrict urban development in flood prone areas, and thus avoid major new flood control works.												X		X								
Encourage the multiple use of flood prone areas, and thus avoid major new flood control works.												X	X	X								
Safety Element																						
Continue to review proposals and projects for expansion of existing development and construction of new facilities, especially critical facilities, within areas subject to floods and other high risk inundation areas, and disapprove projects which cannot mitigate the hazards to the satisfaction of responsible agencies.												X		X								
Promote the use of flood plain management measures in high-risk inundation areas, and require expansion of existing and proposed new developments to be flood-proofed and secured to minimize future flood losses.												X		X								
Encourage improvement of the existing flood control system capacity to ensure that it is capable of protecting existing development from rising amounts of runoff produced by increased urbanization.												X		X								
Upgrade protection of the public from inundation hazards caused by structural failure and/or breaching of water storage tanks, debris basins, or dam and reservoir facilities.												X		X								
Public Facilities Element																						
Avoid or mitigate threats to pollution of the ocean, drainage ways, lakes and groundwater reserves.				X								X		X								
Design flood control facilities to minimize alteration of natural stream channels.														X								
Environmental Resource Management Policies																						
General Goals and Policies																						
Protect areas that have significant natural resources and scenic values, including significant ecological areas, the coastal zone, and prime agricultural lands.				X																		
Land Use Element																						
Establish and implement regulatory controls that ensure compatibility of development adjacent to or within major public open space and recreation areas including National Forests, the National Recreation Area, and State and regional parks.				X																		
Encourage more efficient use of land, compatible with, and sensitive to, natural ecological, scenic, cultural and open space resources.				X																		
Establish land use controls that afford effective protection for significant ecological resources, and lands of major scenic value.				X																		
It is the intent of General Plan policy to preserve the County's significant ecological resources and habitat areas in viable and natural conditions. Major factors influencing the realization of Plan objectives in this regard include the County's ability to accurately identify areas of significant resource value; the availability of financial and other resources necessary to support preservation, restoration, and enhancement efforts; and the competing priorities between resource preservation and other critical public needs.																						
Recognizing the resource values at stake and the constraints imposed by competing priorities and objectives, the General Plan seeks to provide a process for reconciling specific conflicts between proposed land use and the preservation of Significant Ecological Areas (SEAs). The Plan does not, however, suggest that this can be accomplished by applying a single set of regulatory standards to all SEAs. Nor does it infer that reasonable use of privately held lands within such areas shall be precluded without justification. Instead, the Plan recognizes that measures necessary to preserve and enhance SEAs will vary depending on the nature of resource values present and the degree of threat implied by potentially incompatible development. Within this context, general conditions and standards are provided to guide specific land use decisions. (These conditions and standards are too numerous to list on this table, but are identified on pages LU-A12 through LU-A14 of the General Plan.)																						
Protect known mineral resource reserves (including sand and gravel) from encroachment of incompatible land uses.																						
Encourage the recycling of abandoned mineral extraction sites to recreational, industrial or other productive use.																						

Local and Regional Plan Policies	Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
For development proposed within a non-urban hillside management area, defined by the General Plan as lands characterized by natural slopes of 25% or greater not designated for future urban use nor scheduled to receive an urban level of services, all water courses should be miantained in as natural a state as possible, minimizing modification of the natural carrying capacity or production of excessive siltation.											X	X								
Conservation, Open Space and Recreation Element																				
Restrict urban development in flood prone areas, and thus avoid major new flood control works.											X	X								
Encourage the multiple use of flood prone areas, and thus avoid major new flood control works.											X	X			X	X	X	X		
Safety Element																				
Continue to review proposals and projects for expansion of existing development and construction of new facilities, especially critical facilities, within areas subject to floods and other high risk inundation areas, and disapprove projects which cannot mitigate the hazards to the satisfaction of responsible agencies.											X	X								
Promote the use of flood plain management measures in high-risk inundation areas, and require expansion of existing and proposed new developments to be flood-proofed and secured to minimize future flood losses.											X	X								
Encourage improvement of the existing flood control system capacity to ensure that it is capable of protecting existing development from rising amounts of runoff produced by increased urbanization.											X	X								
Upgrade protection of the public from inundation hazards caused by structural failure and/or breaching of water storage tanks, debris basins, or dam and reservoir facilities.											X	X								
Public Facilities Element																				
Avoid or mitigate threats to pollution of the ocean, drainage ways, lakes and groundwater reserves.											X	X	X	X						
Design flood control facilities to minimize alteration of natural stream channels.											X	X	X	X						
Environmental Resource Management Policies																				
General Goals and Policies																				
Protect areas that have significant natural resources and scenic values, including significant ecological areas, the coastal zone, and prime agricultural lands.													X	X	X	X				
Land Use Element																				
Establish and implement regulatory controls that ensure compatibility of development adjacent to or within major public open space and recreation areas including National Forests, the National Recreation Area, and State and regional parks.													X	X						
Encourage more efficient use of land, compatible with, and sensitive to, natural ecological, scenic, cultural and open space resources.													X	X						
Establish land use controls that afford effective protection for significant ecological resources, and lands of major scenic value.													X	X						
It is the intent of General Plan policy to preserve the County's significant ecological resources and habitat areas in viable and natural conditions. Major factors influencing the realization of Plan objectives in this regard include the County's ability to accurately identify areas of significant resource value; the availability of financial and other resources necessary to support preservation, restoration, and enhancement efforts; and the competing priorities between resource preservation and other critical public needs.													X	X						
Recognizing the resource values at stake and the constraints imposed by competing priorities and objectives, the General Plan seeks to provide a process for reconciling specific conflicts between proposed land use and the preservation of Significant Ecological Areas (SEAs). The Plan does not, however, suggest that this can be accomplished by applying a single set of regulatory standards to all SEAs. Nor does it infer that reasonable use of privately held lands within such areas shall be precluded without justification. Instead, the Plan recognizes that measures necessary to preserve and enhance SEAs will vary depending on the nature of resource values present and the degree of threat implied by potentially incompatible development. Within this context, general conditions and standards are provided to guide specific land use decisions. (These conditions and standards are too numerous to list on this table, but are identified on pages LU-A12 through LU-A14 of the General Plan.)													X	X						
Protect known mineral resource reserves (including sand and gravel) from encroachment of incompatible land uses.													x							
Encourage the recycling of abandoned mineral extraction sites to recreational, industrial or other productive use.																	X	X		

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

Local and Regional Plan Policies	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.	
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning
Mineral resource areas (MRAs) include existing surface mining activities, areas identified or to be identified as containing significant mineral resources by the State Mining and Geology Board, and areas suitable for the production of energy resources, including crude oil and natural gas. Within identified MRAs, proposed development other than open space, passive recreation, agriculture, extraction or surface mining shall be reviewed for compatibility with existing or potential mineral resource production. (Compatibility factors identified for review are too numerous to list on this table, but are identified on page LU-A20 of the General Plan.)																	X		X	
Circulation Element																				
Avoid construction of transportation facilities within SEAs unless found essential following a detailed analysis of alternatives including a "no project" alternative. If the facility is still found to be necessary, it shall be constructed in the most environmentally sensitive manner.																X			X	
Conservation, Open Space and Recreation Element																				
Manage development in hillside areas to protect their natural and scenic character and to reduce risks from fire, flood, mudslides, erosion and landslides.													X	X		X			X	
Land Use Management Policies																				
General Goals and Policies																				
Accept and plan for a level and rate of population and economic growth consistent with improved environmental quality and the availability of air, water, and energy resources.	X																		X	
Promote a distribution of population consistent with service system capacity, resource availability, environmental limitations, and accessibility.	X																		X	X
Stress the development of community parks particularly in areas of the greatest deficiency, and take advantage of opportunities to preserve large natural and scenic areas.																	X		X	
Promote the efficient use of land through a more concentrated pattern of urban development, including the focusing of new urban growth into areas of suitable land.																			X	
Land Use Element																				
In urban areas, encourage the retention of economically viable agricultural production, e.g., high value crops such as strawberries, cut flowers, nursery stock, etc., through the identification and mitigation of significant adverse impacts resulting from adjacent new development.																			X	
In non-urban areas outside of Potential Agricultural Preserves, encourage the retention and expansion of agriculture by promoting compatible land use arrangements and providing technical assistance to involved farming interests.																			X	
Agricultural Opportunity Areas include large contiguous land areas either devoted to agricultural production or highly suitable for agricultural use due to the presence of favorable growing conditions such as climate, soils, and water. The intent of General Plan policy is to preserve and protect such resource areas from the intrusion of incompatible uses which conflict with or preclude viable agricultural activity. To this end, the Plan supports voluntary establishment of agricultural preserves such as those provided for by the CA Land Conservation Act. The Act provides incentives for the preservation of prime agricultural lands and sets forth specific criteria governing the creation and maintenance of recognized preserves.																			X	
Improved planning and tools to preserve agricultural resource areas should include the cooperative participation of farming interests, resource conservation districts, the County Agricultural Commissioner and other concerned State and federal agencies. More specifically, the Plan recommends the development and application of exclusive agricultural zones designed to minimize conflicts between agricultural and other urban and non-urban land uses. Such zones define compatible use types and intensities based upon the characteristics and needs of local agricultural activities.																			X	
Circulation Element																				
Stress environmental compatibility (including air quality, noise, ecology, aesthetics, and health and safety) in developing transportation systems.													X			X			X	
Conservation, Open Space and Recreation																				
Protect significant agricultural resource areas and encourage the expansion of agricultural activities into underutilized lands such as utility rights of way and flood prone areas.													X						X	
Encourage open space easements and dedications as a means of meeting scenic, recreational and conservation needs.																X	X		X	
Provide low intensity outdoor recreation in areas of scenic and ecological value compatible with protection of these natural resources.																	X		X	
Develop a system of bikeways, scenic highways, and riding and hiking trails; link recreational facilities where possible.																	X		X	
Safety Element																				
Encourage the use of nonurbanized segments of active fault zones for rural and open space purposes.																	X		X	

Local and Regional Plan Policies	AB 3030 Guidelines												IRWM Plan Program Preferences					
	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.
Mineral resource areas (MRAs) include existing surface mining activities, areas identified or to be identified as containing significant mineral resources by the State Mining and Geology Board, and areas suitable for the production of energy resources, including crude oil and natural gas. Within identified MRAs, proposed development other than open space, passive recreation, agriculture, extraction or surface mining shall be reviewed for compatibility with existing or potential mineral resource production. (Compatibility factors identified for review are too numerous to list on this table, but are identified on page LU-A20 of the General Plan.)																		
Circulation Element																		
Avoid construction of transportation facilities within SEAs unless found essential following a detailed analysis of alternatives including a "no project" alternative. If the facility is still found to be necessary, it shall be constructed in the most environmentally sensitive manner.																X		
Conservation, Open Space and Recreation Element																		
Manage development in hillside areas to protect their natural and scenic character and to reduce risks from fire, flood, mudslides, erosion and landslides.																X		
Land Use Management Policies																		
General Goals and Policies																		
Accept and plan for a level and rate of population and economic growth consistent with improved environmental quality and the availability of air, water, and energy resources.										X		X		X				
Promote a distribution of population consistent with service system capacity, resource availability, environmental limitations, and accessibility.										X		X		X				
Stress the development of community parks particularly in areas of the greatest deficiency, and take advantage of opportunities to preserve large natural and scenic areas.																		
Promote the efficient use of land through a more concentrated pattern of urban development, including the focusing of new urban growth into areas of suitable land.												X						
Land Use Element																		
In urban areas, encourage the retention of economically viable agricultural production, e.g., high value crops such as strawberries, cut flowers, nursery stock, etc., through the identification and mitigation of significant adverse impacts resulting from adjacent new development.																		
In non-urban areas outside of Potential Agricultural Preserves, encourage the retention and expansion of agriculture by promoting compatible land use arrangements and providing technical assistance to involved farming interests.																		
Agricultural Opportunity Areas include large contiguous land areas either devoted to agricultural production or highly suitable for agricultural use due to the presence of favorable growing conditions such as climate, soils, and water. The intent of General Plan policy is to preserve and protect such resource areas from the intrusion of incompatible uses which conflict with or preclude viable agricultural activity. To this end, the Plan supports voluntary establishment of agricultural preserves such as those provided for by the CA Land Conservation Act. The Act provides incentives for the preservation of prime agricultural lands and sets forth specific criteria governing the creation and maintenance of recognized preserves.											X							
Improved planning and tools to preserve agricultural resource areas should include the cooperative participation of farming interests, resource conservation districts, the County Agricultural Commissioner and other concerned State and federal agencies. More specifically, the Plan recommends the development and application of exclusive agricultural zones designed to minimize conflicts between agricultural and other urban and non-urban land uses. Such zones define compatible use types and intensities based upon the characteristics and needs of local agricultural activities.											X							
Circulation Element																		
Stress environmental compatibility (including air quality, noise, ecology, aesthetics, and health and safety) in developing transportation systems.												X				X		
Conservation, Open Space and Recreation																		
Protect significant agricultural resource areas and encourage the expansion of agricultural activities into underutilized lands such as utility rights of way and flood prone areas.																		
Encourage open space easements and dedications as a means of meeting scenic, recreational and conservation needs.																		
Provide low intensity outdoor recreation in areas of scenic and ecological value compatible with protection of these natural resources.																		
Develop a system of bikeways, scenic highways, and riding and hiking trails; link recreational facilities where possible.																		
Safety Element																		
Encourage the use of nonurbanized segments of active fault zones for rural and open space purposes.																		

Local and Regional Plan Policies	Statewide Priorities								Water Supply Management Objectives							
	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.	Provide reliable water supply to meet the Region's expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.
Mineral resource areas (MRAs) include existing surface mining activities, areas identified or to be identified as containing significant mineral resources by the State Mining and Geology Board, and areas suitable for the production of energy resources, including crude oil and natural gas. Within identified MRAs, proposed development other than open space, passive recreation, agriculture, extraction or surface mining shall be reviewed for compatibility with existing or potential mineral resource production. (Compatibility factors identified for review are too numerous to list on this table, but are identified on page LU-A20 of the General Plan.)																
Circulation Element																
Avoid construction of transportation facilities within SEAs unless found essential following a detailed analysis of alternatives including a "no project" alternative. If the facility is still found to be necessary, it shall be constructed in the most environmentally sensitive manner.																
Conservation, Open Space and Recreation Element																
Manage development in hillside areas to protect their natural and scenic character and to reduce risks from fire, flood, mudslides, erosion and landslides.																
Land Use Management Policies																
General Goals and Policies																
Accept and plan for a level and rate of population and economic growth consistent with improved environmental quality and the availability of air, water, and energy resources.							X		X	X	X	X	X	X	X	X
Promote a distribution of population consistent with service system capacity, resource availability, environmental limitations, and accessibility.							X		X	X	X	X	X	X	X	X
Stress the development of community parks particularly in areas of the greatest deficiency, and take advantage of opportunities to preserve large natural and scenic areas.							X									
Promote the efficient use of land through a more concentrated pattern of urban development, including the focusing of new urban growth into areas of suitable land.							X									
Land Use Element																
In urban areas, encourage the retention of economically viable agricultural production, e.g., high value crops such as strawberries, cut flowers, nursery stock, etc., through the identification and mitigation of significant adverse impacts resulting from adjacent new development.																
In non-urban areas outside of Potential Agricultural Preserves, encourage the retention and expansion of agriculture by promoting compatible land use arrangements and providing technical assistance to involved farming interests.																
Agricultural Opportunity Areas include large contiguous land areas either devoted to agricultural production or highly suitable for agricultural use due to the presence of favorable growing conditions such as climate, soils, and water. The intent of General Plan policy is to preserve and protect such resource areas from the intrusion of incompatible uses which conflict with or preclude viable agricultural activity. To this end, the Plan supports voluntary establishment of agricultural preserves such as those provided for by the CA Land Conservation Act. The Act provides incentives for the preservation of prime agricultural lands and sets forth specific criteria governing the creation and maintenance of recognized preserves.																
Improved planning and tools to preserve agricultural resource areas should include the cooperative participation of farming interests, resource conservation districts, the County Agricultural Commissioner and other concerned State and federal agencies. More specifically, the Plan recommends the development and application of exclusive agricultural zones designed to minimize conflicts between agricultural and other urban and non-urban land uses. Such zones define compatible use types and intensities based upon the characteristics and needs of local agricultural activities.																
Circulation Element																
Stress environmental compatibility (including air quality, noise, ecology, aesthetics, and health and safety) in developing transportation systems.																
Conservation, Open Space and Recreation																
Protect significant agricultural resource areas and encourage the expansion of agricultural activities into underutilized lands such as utility rights of way and flood prone areas.																
Encourage open space easements and dedications as a means of meeting scenic, recreational and conservation needs.																
Provide low intensity outdoor recreation in areas of scenic and ecological value compatible with protection of these natural resources.																
Develop a system of bikeways, scenic highways, and riding and hiking trails; link recreational facilities where possible.																
Safety Element																
Encourage the use of nonurbanized segments of active fault zones for rural and open space purposes.																

Local and Regional Plan Policies	Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
Mineral resource areas (MRAs) include existing surface mining activities, areas identified or to be identified as containing significant mineral resources by the State Mining and Geology Board, and areas suitable for the production of energy resources, including crude oil and natural gas. Within identified MRAs, proposed development other than open space, passive recreation, agriculture, extraction or surface mining shall be reviewed for compatibility with existing or potential mineral resource production. (Compatibility factors identified for review are too numerous to list on this table, but are identified on page LU-A20 of the General Plan.)															X	X	X	X		
Circulation Element																				
Avoid construction of transportation facilities within SEAs unless found essential following a detailed analysis of alternatives including a "no project" alternative. If the facility is still found to be necessary, it shall be constructed in the most environmentally sensitive manner.													X	X						
Conservation, Open Space and Recreation Element																				
Manage development in hillside areas to protect their natural and scenic character and to reduce risks from fire, flood, mudslides, erosion and landslides.											X	X	X	X						
Land Use Management Policies																				
General Goals and Policies																				
Accept and plan for a level and rate of population and economic growth consistent with improved environmental quality and the availability of air, water, and energy resources.																			X	X
Promote a distribution of population consistent with service system capacity, resource availability, environmental limitations, and accessibility.																			X	X
Stress the development of community parks particularly in areas of the greatest deficiency, and take advantage of opportunities to preserve large natural and scenic areas.																	X	X	X	X
Promote the efficient use of land through a more concentrated pattern of urban development, including the focusing of new urban growth into areas of suitable land.													X	X					X	X
Land Use Element																				
In urban areas, encourage the retention of economically viable agricultural production, e.g., high value crops such as strawberries, cut flowers, nursery stock, etc., through the identification and mitigation of significant adverse impacts resulting from adjacent new development.															X	X				
In non-urban areas outside of Potential Agricultural Preserves, encourage the retention and expansion of agriculture by promoting compatible land use arrangements and providing technical assistance to involved farming interests.															X	X				
Agricultural Opportunity Areas include large contiguous land areas either devoted to agricultural production or highly suitable for agricultural use due to the presence of favorable growing conditions such as climate, soils, and water. The intent of General Plan policy is to preserve and protect such resource areas from the intrusion of incompatible uses which conflict with or preclude viable agricultural activity. To this end, the Plan supports voluntary establishment of agricultural preserves such as those provided for by the CA Land Conservation Act. The Act provides incentives for the preservation of prime agricultural lands and sets forth specific criteria governing the creation and maintenance of recognized preserves.															X	X				
Improved planning and tools to preserve agricultural resource areas should include the cooperative participation of farming interests, resource conservation districts, the County Agricultural Commissioner and other concerned State and federal agencies. More specifically, the Plan recommends the development and application of exclusive agricultural zones designed to minimize conflicts between agricultural and other urban and non-urban land uses. Such zones define compatible use types and intensities based upon the characteristics and needs of local agricultural activities.															X	X				
Circulation Element																				
Stress environmental compatibility (including air quality, noise, ecology, aesthetics, and health and safety) in developing transportation systems.													X	X						
Conservation, Open Space and Recreation																				
Protect significant agricultural resource areas and encourage the expansion of agricultural activities into underutilized lands such as utility rights of way and flood prone areas.															X	X			X	X
Encourage open space easements and dedications as a means of meeting scenic, recreational and conservation needs.													X	X			X	X	X	X
Provide low intensity outdoor recreation in areas of scenic and ecological value compatible with protection of these natural resources.													X	X			X	X	X	X
Develop a system of bikeways, scenic highways, and riding and hiking trails; link recreational facilities where possible.																	X	X	X	X
Safety Element																				
Encourage the use of nonurbanized segments of active fault zones for rural and open space purposes.													X	X			X	X	X	X

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

Local and Regional Plan Policies	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.		AB 3030 Guidelines											
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.
ANTELOPE VALLEY AREAWIDE GENERAL PLAN (1986)																																
Water Supply/Water Quality Policies																																
Protect underground water supplies by enforcing controls on sources of pollutants.	X	X			X					X	X	X							X	X			X		X	X	X			X	X	X
Develop and use groundwater sources to their safe yield limits.	X	X			X					X										X					X	X	X	X		X		
Use imported water, when available, to relieve overdrafted groundwater basins and maintain their safe yield for domestic uses outside of urban areas.	X	X			X	X													X	X					X	X	X			X		
Encourage utilization of flood waters and reclaimed wastewater for groundwater recharge.	X	X		X									X	X						X		X				X	X			X		
Require a public or private sewerage system for land use densities which, if unsewered, would threaten nitrate pollution of groundwater, or where otherwise required by County regulations.		X								X	X	X				X			X				X							X		X
Prohibit continued use of septic tanks where a community sewerage system has been installed or if identified groundwater pollution or vector problems exist.		X								X	X	X							X				X							X		X
Continue to use land use planning and control as a tool in Water Quality Management.		X								X	X	X							X				X							X		X
Maintain, where feasible, aquifer recharge zones to assure water quality and quantity.	X	X			X					X										X		X				X				X		
Protect and conserve valuable water resources by discouraging the use of high water consumptive, non-native plans for landscaping purposes.	X		X																X											X		
Carefully consider, in all governmental and private actions related to sewage and solid waste disposal, the potential effects on local groundwater quality.		X								X	X	X							X												X	X
Protect and manage watershed areas to maximize water yield in combination with public needs for fire protection, maintenance of habitat and recreation.	X	X														X	X		X	X										X		
Encourage a sustained yield management approach for renewable resources which includes consideration of watershed conservation, scenic quality, habitat protection and recreation.	X	X	X													X	X			X								X		X		
Encourage the installation of water saving devices such as low-flow faucets, shower-heads, etc., in newly constructed private and public structures.	X		X																X											X		X
FLOOD MANAGEMENT POLICIES																																
In the areas deemed significantly hazardous to the health and welfare of the public, limit future development unless appropriate corrective measures can be implemented.													X						X													
Designate areas of the 100-year flood as delineated on mapping provided by the Federal Emergency Management Agency of the Federal Insurance Administration or areas mapped by the Department of Public Works as "Flood Plain Management Areas".													X						X												X	
In urban areas, institute measures to mitigate the impacts of environmental hazards, as feasible, to facilitate infilling development consistent with the attainment of community goals and with the maintenance of public health and welfare.													X						X													
Permit the use of floodways for those recreational uses not involving structures or improvements (except checkdams) that could obstruct the natural flow of flood water.													X	X			X		X													
Prohibit expansion of existing structures (other than checkdams or other flood control facilities) in floodways.													X	X					X													
Prepare an Antelope Valley Comprehensive Plan of Flood Control and Water Conservation to coordinate a regional drainage solution and provide for conservation of flood waters.													X	X					X	X											X	
Identify alignments and other needed improvements on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation for future flood control and water conservation facilities in urban areas.													X	X					X											X		
Identify planned flow paths and groundwater recharge preserves on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation for the primary water course and for conservation of storm runoff in the rural areas.		X	X										X	X					X											X		
As an interim policy, pending construction of regional discharge facilities, require installation of appropriate systems and facilities to retain the increase in storm runoff due to development on the project site or equivalent mitigating measures.													X	X					X											X		
Encourage and support the formation of an Antelope Valley Flood Control District to include the entire Antelope Valley drainage area.													X	X					X													
Prevent public exposure to flood hazards by prohibiting residential, commercial and industrial development in recognized flood inundation areas unless proper mitigation is instituted.													X	X					X													
Encourage the multiple use of flood inundation areas for recreation, agriculture, scenic relief, groundwater recharge and wildlife protection.		X	X										X	X	X	X	X	X	X	X												
Environmental Resource Management Policies																																
Direct future growth away from areas exhibiting high environmental sensitivity to land use development unless appropriate mitigating measures can be implemented.																X			X													X
Minimize disruption and degradation of the environment as land use development occurs, integrating land uses so that they are compatible with natural environmental systems.																X			X													X
Prohibit expansion of urban uses into areas of rare and endangered species.																X			X													

Local and Regional Plan Policies	IRWM Plan Program Preferences						Statewide Priorities								Water Supply Management Objectives							
	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.	Provide reliable water supply to meet the Region's expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.
ANTELOPE VALLEY AREAWIDE GENERAL PLAN (1986)																						
Water Supply/Water Quality Policies																						
Protect underground water supplies by enforcing controls on sources of pollutants.		X	X	X				X	X	X					X	X	X	X	X	X	X	X
Develop and use groundwater sources to their safe yield limits.		X				X	X								X	X	X	X	X	X	X	X
Use imported water, when available, to relieve overdrafted groundwater basins and maintain their safe yield for domestic uses outside of urban areas.		X	X			X	X								X	X	X	X			X	X
Encourage utilization of flood waters and reclaimed wastewater for groundwater recharge.		X				X						X									X	X
Require a public or private sewerage system for land use densities which, if unsewered, would threaten nitrate pollution of groundwater, or where otherwise required by County regulations.			X	X	X			X													X	X
Prohibit continued use of septic tanks where a community sewerage system has been installed or if identified groundwater pollution or vector problems exist.			X	X	X			X													X	X
Continue to use land use planning and control as a tool in Water Quality Management.			X	X				X	X	X	X	X	X	X								
Maintain, where feasible, aquifer recharge zones to assure water quality and quantity.		X	X												X	X	X	X	X	X	X	X
Protect and conserve valuable water resources by discouraging the use of high water consumptive, non-native plans for landscaping purposes.		X													X	X	X	X	X	X	X	X
Carefully consider, in all governmental and private actions related to sewage and solid waste disposal, the potential effects on local groundwater quality.			X		X				X	X					X	X	X	X	X	X	X	X
Protect and manage watershed areas to maximize water yield in combination with public needs for fire protection, maintenance of habitat and recreation.		X			X							X			X	X	X	X	X	X	X	X
Encourage a sustained yield management approach for renewable resources which includes consideration of watershed conservation, scenic quality, habitat protection and recreation.		X										X			X	X	X	X	X	X	X	X
Encourage the installation of water saving devices such as low-flow faucets, shower-heads, etc., in newly constructed private and public structures.		X													X	X	X	X	X	X		
FLOOD MANAGEMENT POLICIES																						
In the areas deemed significantly hazardous to the health and welfare of the public, limit future development unless appropriate corrective measures can be implemented.												X		X								
Designate areas of the 100-year flood as delineated on mapping provided by the Federal Emergency Management Agency of the Federal Insurance Administration or areas mapped by the Department of Public Works as "Flood Plain Management Areas".												X		X								
In urban areas, institute measures to mitigate the impacts of environmental hazards, as feasible, to facilitate infilling development consistent with the attainment of community goals and with the maintenance of public health and welfare.												X	X	X								
Permit the use of floodways for those recreational uses not involving structures or improvements (except checkdams) that could obstruct the natural flow of flood water.												X		X								
Prohibit expansion of existing structures (other than checkdams or other flood control facilities) in floodways.												X		X								
Prepare an Antelope Valley Comprehensive Plan of Flood Control and Water Conservation to coordinate a regional drainage solution and provide for conservation of flood waters.												X		X								
Identify alignments and other needed improvements on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation for future flood control and water conservation facilities in urban areas.	X											X		X								
Identify planned flow paths and groundwater recharge preserves on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation for the primary water course and for conservation of storm runoff in the rural areas.	X											X		X							X	X
As an interim policy, pending construction of regional discharge facilities, require installation of appropriate systems and facilities to retain the increase in storm runoff due to development on the project site or equivalent mitigating measures.												X		X								
Encourage and support the formation of an Antelope Valley Flood Control District to include the entire Antelope Valley drainage area.												X		X								
Prevent public exposure to flood hazards by prohibiting residential, commercial and industrial development in recognized flood inundation areas unless proper mitigation is instituted.												X		X								
Encourage the multiple use of flood inundation areas for recreation, agriculture, scenic relief, groundwater recharge and wildlife protection.	X											X		X							X	X
Environmental Resource Management Policies																						
Direct future growth away from areas exhibiting high environmental sensitivity to land use development unless appropriate mitigating measures can be implemented.												X		X								
Minimize disruption and degradation of the environment as land use development occurs, integrating land uses so that they are compatible with natural environmental systems.												X		X								
Prohibit expansion of urban uses into areas of rare and endangered species.												X		X								

Local and Regional Plan Policies	Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
ANTELOPE VALLEY AREAWIDE GENERAL PLAN (1986)																				
Water Supply/Water Quality Policies																				
Protect underground water supplies by enforcing controls on sources of pollutants.	X	X	X	X	X	X	X	X			X	X								
Develop and use groundwater sources to their safe yield limits.																				
Use imported water, when available, to relieve overdrafted groundwater basins and maintain their safe yield for domestic uses outside of urban areas.																				
Encourage utilization of flood waters and reclaimed wastewater for groundwater recharge.									X	X	X	X								
Require a public or private sewerage system for land use densities which, if unsewered, would threaten nitrate pollution of groundwater, or where otherwise required by County regulations.			X	X	X	X	X	X			x	X								
Prohibit continued use of septic tanks where a community sewerage system has been installed or if identified groundwater pollution or vector problems exist.			X	X	X	X	X	X			x	X								
Continue to use land use planning and control as a tool in Water Quality Management.	X	X	X	X	X	X	X	X			X	X	X	X						
Maintain, where feasible, aquifer recharge zones to assure water quality and quantity.	X	X	X	X	X	X	X	X												
Protect and conserve valuable water resources by discouraging the use of high water consumptive, non-native plans for landscaping purposes.																				
Carefully consider, in all governmental and private actions related to sewage and solid waste disposal, the potential effects on local groundwater quality.	X	X	X	X	X	X	X	X												
Protect and manage watershed areas to maximize water yield in combination with public needs for fire protection, maintenance of habitat and recreation.													X	X			X	X	X	X
Encourage a sustained yield management approach for renewable resources which includes consideration of watershed conservation, scenic quality, habitat protection and recreation.													X	X			X	X	X	X
Encourage the installation of water saving devices such as low-flow faucets, shower-heads, etc., in newly constructed private and public structures.																				
FLOOD MANAGEMENT POLICIES																				
In the areas deemed significantly hazardous to the health and welfare of the public, limit future development unless appropriate corrective measures can be implemented.											X	X								
Designate areas of the 100-year flood as delineated on mapping provided by the Federal Emergency Management Agency of the Federal Insurance Administration or areas mapped by the Department of Public Works as "Flood Plain Management Areas".											X	X								
In urban areas, institute measures to mitigate the impacts of environmental hazards, as feasible, to facilitate infilling development consistent with the attainment of community goals and with the maintenance of public health and welfare.											X	X								
Permit the use of floodways for those recreational uses not involving structures or improvements (except checkdams) that could obstruct the natural flow of flood water.											X	X					X	X	X	X
Prohibit expansion of existing structures (other than checkdams or other flood control facilities) in floodways.											X	X								
Prepare an Antelope Valley Comprehensive Plan of Flood Control and Water Conservation to coordinate a regional drainage solution and provide for conservation of flood waters.											X	X								
Identify alignments and other needed improvements on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation for future flood control and water conservation facilities in urban areas.											X	X								
Identify planned flow paths and groundwater recharge preserves on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation for the primary water course and for conservation of storm runoff in the rural areas.											X	X								
As an interim policy, pending construction of regional discharge facilities, require installation of appropriate systems and facilities to retain the increase in storm runoff due to development on the project site or equivalent mitigating measures.											X	X								
Encourage and support the formation of an Antelope Valley Flood Control District to include the entire Antelope Valley drainage area.											X	X								
Prevent public exposure to flood hazards by prohibiting residential, commercial and industrial development in recognized flood inundation areas unless proper mitigation is instituted.											X	X								
Encourage the multiple use of flood inundation areas for recreation, agriculture, scenic relief, groundwater recharge and wildlife protection.											X	X	X	X	X	X	X	X	X	X
Environmental Resource Management Policies																				
Direct future growth away from areas exhibiting high environmental sensitivity to land use development unless appropriate mitigating measures can be implemented.													X	X						
Minimize disruption and degradation of the environment as land use development occurs, integrating land uses so that they are compatible with natural environmental systems.													X	X						
Prohibit expansion of urban uses into areas of rare and endangered species.													X	X						

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

Local and Regional Plan Policies	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.	
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning
In order to promote and preserve biotic diversity in the Antelope Valley and Los Angeles County, designate significant plant and wildlife habitats in the Antelope Valley as “Significant Ecological Areas” (SEAs) and establish appropriate measures for their protection.															X	X			X	
Encourage federal, state and county funding for acquisition of appropriate areas within SEA designations. High priority acquisitions would include the habitat of the unarmored three-spine stickleback in the Santa Clara River SEA; expansion of the California Poppy Sanctuary in the Fairmount/Antelope Buttes SEA; the steeper butte areas in the eastern Antelope Valley; and riparian areas of Little Rock Wash, Big Rock Wash, Portal Ridge-Liebre Mountain and Tehachapi Foothills SEAs.															X	X			X	
Encourage public agencies, and particularly the Bureau of Land Management, to retain present holdings in or contiguous to SEAs in the Antelope Valley.																X			X	
As an alternative, consider the acquisition and maintenance of BLM excess lands which are located in SEAs.																X			X	
Encourage the County Department of Parks and Recreation to retain designated excess County lands which are located within SEAs.																X			X	
Ensure conservation of natural resources through the establishment of public programs to encourage continued agricultural production and to control energy consumption, mineral extraction, groundwater recharge, construction, and other public and private activities which affect the future availability and quality of such resources.	X	X														X			X	X
Where a proposed discretionary application includes major riparian areas, assess the impact of the project on biotic resources and encourage project design which is sensitive to, and compatible with, the biotic resources present. Major riparian areas shall be defined as streamside or lakeside areas which provide major habitat for fish, wildlife, or plants.															X	X		X	X	
Establish an open space network to protect and preserve the ecological balance of unique and rare wildlife and plant communities.															X	X	X		X	X
Consolidate urban development in well-defined growth centers to reduce disruption of native plant and animal habitat and to prevent degradation of SEAs.															X	X			X	
Protect the visibility of surface water since it provides a habitat for fish and other water-related organisms, as well as being an important environmental component for land-based plants and animals.										X	X				X	X				X
Land Use Management Policies																				
Accommodate population and land use growth in a “centralized”, rather than a uniformly “dispersed” pattern, providing for a broad range of densities and types of uses. Higher density and intensity uses will be structured at the “core” or “cores” of the community around which lower intensity uses will be grouped. Lowest density uses should be located at the periphery of the community.																X			X	
Assign priorities for future land use growth in the Antelope Valley considering the following criteria: (a) Hazards or constraints of natural environmental systems on land use; (b) Sensitivities of natural environmental systems; and (c) Constraints of man-made systems.													X			X			X	
Encourage growth in and adjacent to existing urban, suburban, and rural communities.																			X	
Maintain a general plan amendment procedure to permit “new communities” in or outside of existing communities, with proper consideration of environmental sensitivities and hazards, absorption of all appropriate costs by the developer, and evidence of overall community benefit.												X				X			X	
Within designated Agricultural Opportunity Areas, carefully evaluate extension of urban and suburban uses (outside the urban areas and the rural communities) for its impact on adjacent agricultural operations.																			X	
Encourage development of services to meet the needs of Antelope Valley residents including health, education, welfare, police and fire, governmental operations, recreation, cultural, and utility services. Such services should be expanded at a rate commensurate with population growth.												X					X		X	
Minimize travel time by centralizing community facilities, intensifying land use densities, minimizing outward expansion, and establishing centralized shopping and industrial facilities.																			X	
Encourage the continued production of existing agricultural lands within the Antelope Valley.																			X	

Local and Regional Plan Policies	AB 3030 Guidelines												IRWM Plan Program Preferences						Statewide Priorities							
	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board’s Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
In order to promote and preserve biotic diversity in the Antelope Valley and Los Angeles County, designate significant plant and wildlife habitats in the Antelope Valley as “Significant Ecological Areas” (SEAs) and establish appropriate measures for their protection.																								X		X
Encourage federal, state and county funding for acquisition of appropriate areas within SEA designations. High priority acquisitions would include the habitat of the unarmored three-spine stickleback in the Santa Clara River SEA; expansion of the California Poppy Sanctuary in the Fairmount/Antelope Buttes SEA; the steeper butte areas in the eastern Antelope Valley; and riparian areas of Little Rock Wash, Big Rock Wash, Portal Ridge-Liebre Mountain and Tehachapi Foothills SEAs.											X													X		X
Encourage public agencies, and particularly the Bureau of Land Management, to retain present holdings in or contiguous to SEAs in the Antelope Valley.											X													X		X
As an alternative, consider the acquisition and maintenance of BLM excess lands which are located in SEAs.											X													X		X
Encourage the County Department of Parks and Recreation to retain designated excess County lands which are located within SEAs.																								X		X
Ensure conservation of natural resources through the establishment of public programs to encourage continued agricultural production and to control energy consumption, mineral extraction, groundwater recharge, construction, and other public and private activities which affect the future availability and quality of such resources.										X		X		X		X					X			X		X
Where a proposed discretionary application includes major riparian areas, assess the impact of the project on biotic resources and encourage project design which is sensitive to, and compatible with, the biotic resources present. Major riparian areas shall be defined as streamside or lakeside areas which provide major habitat for fish, wildlife, or plants.												X				X								X		X
Establish an open space network to protect and preserve the ecological balance of unique and rare wildlife and plant communities.																X								X		X
Consolidate urban development in well-defined growth centers to reduce disruption of native plant and animal habitat and to prevent degradation of SEAs.												X				X								X		X
Protect the visibility of surface water since it provides a habitat for fish and other water-related organisms, as well as being an important environmental component for land-based plants and animals.										X		X				X				X	X	X		X		X
Land Use Management Policies																										
Accommodate population and land use growth in a “centralized”, rather than a uniformly “dispersed” pattern, providing for a broad range of densities and types of uses. Higher density and intensity uses will be structured at the “core” or “cores” of the community around which lower intensity uses will be grouped. Lowest density uses should be located at the periphery of the community.												X					X	X								
Assign priorities for future land use growth in the Antelope Valley considering the following criteria: (a) Hazards or constraints of natural environmental systems on land use; (b) Sensitivities of natural environmental systems; and (c) Constraints of man-made systems.												X					X	X	X						X	
Encourage growth in and adjacent to existing urban, suburban, and rural communities.										X																
Maintain a general plan amendment procedure to permit “new communities” in or outside of existing communities, with proper consideration of environmental sensitivities and hazards, absorption of all appropriate costs by the developer, and evidence of overall community benefit.										X		X														
Within designated Agricultural Opportunity Areas, carefully evaluate extension of urban and suburban uses (outside the urban areas and the rural communities) for its impact on adjacent agricultural operations.		X										X							X							
Encourage development of services to meet the needs of Antelope Valley residents including health, education, welfare, police and fire, governmental operations, recreation, cultural, and utility services. Such services should be expanded at a rate commensurate with population growth.										X		X														
Minimize travel time by centralizing community facilities, intensifying land use densities, minimizing outward expansion, and establishing centralized shopping and industrial facilities.																										
Encourage the continued production of existing agricultural lands within the Antelope Valley.		X																	X							

Local and Regional Plan Policies	Water Supply Management Objectives								Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
	Provide reliable water supply to meet the Region’s expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
In order to promote and preserve biotic diversity in the Antelope Valley and Los Angeles County, designate significant plant and wildlife habitats in the Antelope Valley as “Significant Ecological Areas” (SEAs) and establish appropriate measures for their protection.																					X	X						
Encourage federal, state and county funding for acquisition of appropriate areas within SEA designations. High priority acquisitions would include the habitat of the unarmored three-spine stickleback in the Santa Clara River SEA; expansion of the California Poppy Sanctuary in the Fairmount/Antelope Buttes SEA; the steeper butte areas in the eastern Antelope Valley; and riparian areas of Little Rock Wash, Big Rock Wash, Portal Ridge-Liebre Mountain and Tehachapi Foothills SEAs.																					X	X						
Encourage public agencies, and particularly the Bureau of Land Management, to retain present holdings in or contiguous to SEAs in the Antelope Valley.																					X							
As an alternative, consider the acquisition and maintenance of BLM excess lands which are located in SEAs.																					X	X						
Encourage the County Department of Parks and Recreation to retain designated excess County lands which are located within SEAs.																					X	X						
Ensure conservation of natural resources through the establishment of public programs to encourage continued agricultural production and to control energy consumption, mineral extraction, groundwater recharge, construction, and other public and private activities which affect the future availability and quality of such resources.	X	X	X	X																	X	X	X	X				
Where a proposed discretionary application includes major riparian areas, assess the impact of the project on biotic resources and encourage project design which is sensitive to, and compatible with, the biotic resources present. Major riparian areas shall be defined as streamside or lakeside areas which provide major habitat for fish, wildlife, or plants.																					X	X						
Establish an open space network to protect and preserve the ecological balance of unique and rare wildlife and plant communities.																					X	X			X	X	X	X
Consolidate urban development in well-defined growth centers to reduce disruption of native plant and animal habitat and to prevent degradation of SEAs.											X	X	X	X	X	X			X	X	X	X						
Protect the visibility of surface water since it provides a habitat for fish and other water-related organisms, as well as being an important environmental component for land-based plants and animals.											X	X	X	X	X	X			X	X	X	X						
Land Use Management Policies																												
Accommodate population and land use growth in a “centralized”, rather than a uniformly “dispersed” pattern, providing for a broad range of densities and types of uses. Higher density and intensity uses will be structured at the “core” or “cores” of the community around which lower intensity uses will be grouped. Lowest density uses should be located at the periphery of the community.																					X	X						
Assign priorities for future land use growth in the Antelope Valley considering the following criteria: (a) Hazards or constraints of natural environmental systems on land use; (b) Sensitivities of natural environmental systems; and (c) Constraints of man-made systems.							X	X			X	X	X	X	X	X			X	X								
Encourage growth in and adjacent to existing urban, suburban, and rural communities.	X	X	X	X	X	X															X	X						
Maintain a general plan amendment procedure to permit “new communities” in or outside of existing communities, with proper consideration of environmental sensitivities and hazards, absorption of all appropriate costs by the developer, and evidence of overall community benefit.	X	X	X	X	X	X																						
Within designated Agricultural Opportunity Areas, carefully evaluate extension of urban and suburban uses (outside the urban areas and the rural communities) for its impact on adjacent agricultural operations.																							X	X				
Encourage development of services to meet the needs of Antelope Valley residents including health, education, welfare, police and fire, governmental operations, recreation, cultural, and utility services. Such services should be expanded at a rate commensurate with population growth.	X	X	X	X	X	X																			X	X	X	X
Minimize travel time by centralizing community facilities, intensifying land use densities, minimizing outward expansion, and establishing centralized shopping and industrial facilities.																												
Encourage the continued production of existing agricultural lands within the Antelope Valley.																							X	X				

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

Local and Regional Plan Policies	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.	
	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning
Within the identified Agricultural Opportunity Areas designated on the Hazards and Resources map: (a) consider the implementation of California Land Conservation (Williamson) Act, (b) implement "right to farm" legislation to protect existing producers from inappropriate nuisance lawsuits, (c) require landowners who desire to construct non-agricultural structures or otherwise convert agricultural uses to non-agricultural uses to sign a covenant, prior to issuance of the needed building permits, preventing present and future landowners from seeking nuisance damages from properly maintained existing agricultural operations, (d) consider the use of such innovative techniques as "Transfers of Development Credits" and "Land Banks or Trusts" as aids in protecting existing agricultural operations.																			X	
Where feasible, utilize designated open bottom flood control channels for horseback riding trails during the dry season.													X				X		X	
Establish a fund derived from monies from the sale of excess county-owned park lands in the Antelope Valley, and use this fund for the purposes of acquisition, consolidation, upgrading, and development of local parks within the Antelope Valley.																	X		X	
KERN COUNTY GENERAL PLAN (2004)																				
Water Supply/Water Quality Policies																				
Land Use, Open Space and Conservation Element																				
Ensure that water quality standards are met for existing users and future development.										X	X	X							X	
Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.	X						X					X							X	
Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.	X	X			X							X							X	X
Flood Management Policies																				
Land Use, Open Space and Conservation Element																				
In order to minimize risk to Kern County residents and their property, new development will not be permitted in hazard areas in the absence of implementing ordinances and programs. These ordinances will establish conditions, criteria, and standards for the approval of development in hazard areas.													X						X	
Encourage the preservation of the floodplain's flow conveyance capacity, especially in floodways, to be open space/passive recreation areas throughout the County.													X	X			X		X	
Construction of structures that impede water flow in a primary floodplain will be discouraged.													X	X					X	
The County will allow lands which are within flood hazard areas, other than primary floodplains, to be developed in accordance with the General Plan and Floodplain Management Ordinance, if mitigation measures are incorporated so as to ensure that the proposed development will not be hazardous within the requirements of the Safety Element (Chapter 4) of the General Plan.													X						X	
The County will comply with the Colbey-Alquist Floodplain Management Act in regulating land use within designated floodways.													X						X	
Development within areas subject to flooding, as defined by the appropriate agency, will require necessary flood evaluations and studies.													X						X	
Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.													X	X		X				
Designated flood channels and water courses, such as creeks, gullies, and riverbeds, will be preserved as resource management areas or in the case of urban areas, as linear parks whenever practical.													X				X		X	
Environmental Resource Management Policies																				
Land Use, Open Space and Conservation Element																				
Provide a balanced system of parks and recreational facilities to meet Kern County's diverse needs, and clearly define responsibility for the provision of these facilities.																	X		X	
Provide a variety of park and recreation programs that offer safe, equitable, and balanced recreation opportunities for all residents and visitors.																	X		X	
The provision of parks and recreational facilities of varying size, function, and location to serve County residents will be encouraged. Special attention will be directed to providing linear parks along creeks, rivers, and streambeds in urban areas.																	X		X	
Implement a level of service standard of 2.5 acres of park area per 1,000 residents.																	X		X	
The Kern County Parks and Recreation Department will evaluate the possibility of alternative funding sources for the development, rehabilitation, and operation of park and recreational facilities. These funding sources shall include the possible implementation of development fees and/or special assessment districts such as used for lighting and landscaping, under a County Service Area (CSA).																	X		X	
Land Use Management Policies																				

Local and Regional Plan Policies	AB 3030 Guidelines												IRWM Plan Program Preferences						Statewide Priorities							
	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force of State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.
Within the identified Agricultural Opportunity Areas designated on the Hazards and Resources map: (a) consider the implementation of California Land Conservation (Williamson) Act, (b) implement "right to farm" legislation to protect existing producers from inappropriate nuisance lawsuits, (c) require landowners who desire to construct non-agricultural structures or otherwise convert agricultural uses to non-agricultural uses to sign a covenant, prior to issuance of the needed building permits, preventing present and future landowners from seeking nuisance damages from properly maintained existing agricultural operations, (d) consider the use of such innovative techniques as "Transfers of Development Credits" and "Land Banks or Trusts" as aids in protecting existing agricultural operations.																										
Where feasible, utilize designated open bottom flood control channels for horseback riding trails during the dry season.																										
Establish a fund derived from monies from the sale of excess county-owned park lands in the Antelope Valley, and use this fund for the purposes of acquisition, consolidation, upgrading, and development of local parks within the Antelope Valley.																									X	
KERN COUNTY GENERAL PLAN (2004)																										
Water Supply/Water Quality Policies																										
Land Use, Open Space and Conservation Element																										
Ensure that water quality standards are met for existing users and future development.										X		X		X	X		X				X		X			
Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.							X			X		X														X
Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.							X	X		X		X		X	X			X			X		X			
Flood Management Policies																										
Land Use, Open Space and Conservation Element																										
In order to minimize risk to Kern County residents and their property, new development will not be permitted in hazard areas in the absence of implementing ordinances and programs. These ordinances will establish conditions, criteria, and standards for the approval of development in hazard areas.												X												X		
Encourage the preservation of the floodplain's flow conveyance capacity, especially in floodways, to be open space/passive recreation areas throughout the County.												X												X		X
Construction of structures that impede water flow in a primary floodplain will be discouraged.												X												X		
The County will allow lands which are within flood hazard areas, other than primary floodplains, to be developed in accordance with the General Plan and Floodplain Management Ordinance, if mitigation measures are incorporated so as to ensure that the proposed development will not be hazardous within the requirements of the Safety Element (Chapter 4) of the General Plan.												X												X		
The County will comply with the Colbey-Alquist Floodplain Management Act in regulating land use within designated floodways.											X													X		X
Development within areas subject to flooding, as defined by the appropriate agency, will require necessary flood evaluations and studies.												X												X		
Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.												X												X		X
Designated flood channels and water courses, such as creeks, gullies, and riverbeds, will be preserved as resource management areas or in the case of urban areas, as linear parks whenever practical.												X												X		X
Environmental Resource Management Policies																										
Land Use, Open Space and Conservation Element																										
Provide a balanced system of parks and recreational facilities to meet Kern County's diverse needs, and clearly define responsibility for the provision of these facilities.																										
Provide a variety of park and recreation programs that offer safe, equitable, and balanced recreation opportunities for all residents and visitors.																										
The provision of parks and recreational facilities of varying size, function, and location to serve County residents will be encouraged. Special attention will be directed to providing linear parks along creeks, rivers, and streambeds in urban areas.																										
Implement a level of service standard of 2.5 acres of park area per 1,000 residents.																										
The Kern County Parks and Recreation Department will evaluate the possibility of alternative funding sources for the development, rehabilitation, and operation of park and recreational facilities. These funding sources shall include the possible implementation of development fees and/or special assessment districts such as used for lighting and landscaping, under a County Service Area (CSA).																										
Land Use Management Policies																										

Local and Regional Plan Policies	Water Supply Management Objectives								Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
	Provide reliable water supply to meet the Region's expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
Within the identified Agricultural Opportunity Areas designated on the Hazards and Resources map: (a) consider the implementation of California Land Conservation (Williamson) Act, (b) implement "right to farm" legislation to protect existing producers from inappropriate nuisance lawsuits, (c) require landowners who desire to construct non-agricultural structures or otherwise convert agricultural uses to non-agricultural uses to sign a covenant, prior to issuance of the needed building permits, preventing present and future landowners from seeking nuisance damages from properly maintained existing agricultural operations, (d) consider the use of such innovative techniques as "Transfers of Development Credits" and "Land Banks or Trusts" as aids in protecting existing agricultural operations.																							X	X				
Where feasible, utilize designated open bottom flood control channels for horseback riding trails during the dry season.																									X	X	X	X
Establish a fund derived from monies from the sale of excess county-owned park lands in the Antelope Valley, and use this fund for the purposes of acquisition, consolidation, upgrading, and development of local parks within the Antelope Valley.																									X	X	X	X
KERN COUNTY GENERAL PLAN (2004)																												
Water Supply/Water Quality Policies																												
Land Use, Open Space and Conservation Element																												
Ensure that water quality standards are met for existing users and future development.									X	X	X	X	X	X	X	X												
Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.																	X	X										
Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Flood Management Policies																												
Land Use, Open Space and Conservation Element																												
In order to minimize risk to Kern County residents and their property, new development will not be permitted in hazard areas in the absence of implementing ordinances and programs. These ordinances will establish conditions, criteria, and standards for the approval of development in hazard areas.																			X	X								
Encourage the preservation of the floodplain's flow conveyance capacity, especially in floodways, to be open space/passive recreation areas throughout the County.																			X	X					X	X	X	X
Construction of structures that impede water flow in a primary floodplain will be discouraged.																			X	X								
The County will allow lands which are within flood hazard areas, other than primary floodplains, to be developed in accordance with the General Plan and Floodplain Management Ordinance, if mitigation measures are incorporated so as to ensure that the proposed development will not be hazardous within the requirements of the Safety Element (Chapter 4) of the General Plan.																			X	X								
The County will comply with the Colbey-Alquist Floodplain Management Act in regulating land use within designated floodways.																			X	X								
Development within areas subject to flooding, as defined by the appropriate agency, will require necessary flood evaluations and studies.																			X	X								
Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.																			X	X								
Designated flood channels and water courses, such as creeks, gullies, and riverbeds, will be preserved as resource management areas or in the case of urban areas, as linear parks whenever practical.																			X	X					X	X	X	X
Environmental Resource Management Policies																												
Land Use, Open Space and Conservation Element																												
Provide a balanced system of parks and recreational facilities to meet Kern County's diverse needs, and clearly define responsibility for the provision of these facilities.																									X	X	X	X
Provide a variety of park and recreation programs that offer safe, equitable, and balanced recreation opportunities for all residents and visitors.																									X	X	X	X
The provision of parks and recreational facilities of varying size, function, and location to serve County residents will be encouraged. Special attention will be directed to providing linear parks along creeks, rivers, and streambeds in urban areas.																									X	X	X	X
Implement a level of service standard of 2.5 acres of park area per 1,000 residents.																									X	X	X	X
The Kern County Parks and Recreation Department will evaluate the possibility of alternative funding sources for the development, rehabilitation, and operation of park and recreational facilities. These funding sources shall include the possible implementation of development fees and/or special assessment districts such as used for lighting and landscaping, under a County Service Area (CSA).																									X	X	X	X
Land Use Management Policies																												

Table 8-2 Local & Regional Plan Policies vs. IRWM Plan Strategies, AB 3030, IRWM Plan Guidelines, & Statewide Priorities (continued)

	Water Supply									Water Quality			Flood Mgmt.		Environmental Resource Management				Land Use Mgmt.		AB 3030 Guidelines												IRWM Plan Program Preferences						Statewide Priorities								Water Supply Management Objectives								Water Quality Management Objectives										Flood Mgmt. Objectives		Env. Mgmt. Obj.		Land Use Management Objectives					
Local and Regional Plan Policies	Water Supply Reliability	Groundwater Management	Water Conservation	Water Recycling	Water Banking & Conjunctive Use	Imported Water	Surface Storage	Water Transfers	Desalination	Water Quality Protection and Improvement	Non-Point Source Pollution Control	Water and Wastewater Treatment	Flood Management	Storm water Capture and Management	Ecosystem Restoration	Environmental and Habitat Protection and Improvement	Recreation and Public Access	Wetlands Enhancement and Creation	Land Use Planning	Watershed Planning	The control of saline water intrusion.	Identification and management of wellhead protection areas and recharge areas	Regulation of the migration of contaminated groundwater.	The administration of a well abandonment and well destruction program.	Mitigation of conditions of overdraft.	Replenishment of groundwater extracted by water producers.	Monitoring of groundwater levels and storage.	Facilitating conjunctive use operations.	Identification of well construction policies.	The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling and extraction projects.	The development of relationships with state and federal regulatory agencies.	The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.	Include integrated projects with multiple benefits.	Support and improve local and regional water supply reliability.	Contribute expeditiously and measurably to the long-term attainment and maintenance of water quality standards.	Eliminate or significantly reduce pollution in impaired waters and sensitive habitat areas, including areas of special biological significance.	Include safe drinking water and water quality projects that serve disadvantaged communities.	Include groundwater management and recharge projects that are located 1) in San Bernardino or Riverside counties; 2) outside of the service area of the Metropolitan Water District of Southern California; or 3) within one mile of established residential and commercial development.	Reduce conflict between water users or resolve water rights	Implementation of TMDLs that are established or under development.	Implementation of Regional Water Quality Control Board Watershed Management initiative Chapters, plans, and policies.	Implementation of the State Water Resource Control Board's Non-point Source Pollution Plan.	Assist in meeting Delta Water Quality Objectives.	Implementation of recommendations of the floodplain management task force, desalination Task force, recycling task force or State species recovery plan	Address environmental justice concerns.	Assist in achieving one or more goals of the CALFED Bay-Delta Program.	Provide reliable water supply to meet the Region's expected demand between now (2010) and 2035.	Reduce (73,600 to 236,800 AFY) mismatch of expected supply and demand in average years by providing new water supply and reducing demand, starting 2009.	Provide adequate reserves (50,600 to 57,400 AFY) to supplement average condition supply to meet demands during single-dry year conditions, starting 2009.	Provide adequate reserves (0 to 62,000 AFY) to supplement average condition supply to meet demands during multi-dry year conditions, starting 2009.	Establish a contingency plan to meet water supply needs of the region during a plausible disruption of SWP water deliveries.	Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer by June 2010.	Stabilize groundwater levels at current conditions.	Manage groundwater levels throughout the basin such that a 10 year moving average of change in observed groundwater levels is greater than or equal to 0.	Provide drinking water that meets customer expectations.	Continue to meet Federal and State water quality standards as well as customer standards for taste and aesthetic throughout the planning period.	Protect aquifer from contamination.	Prevent unacceptable degradation of aquifer according to the Basin Plan throughout the planning period.	Identify contaminated portions of aquifer and prevent migration of contaminants by June 2009.	Map contaminated sites and monitor contaminant movement by December 2008.	Protect natural streams and recharge areas from contamination.	Prevent unacceptable degradation of natural streams and recharge areas according to the Basin Plan throughout the planning period.	Maximize beneficial use of recycled water.	Increase infrastructure and establish policies to use 33% of recycled water to meet expected demand by 2015, 66% by 2025, and 100% by 2035.	Reduce negative impacts of storm water, urban runoff, and nuisance water.	Coordinate a regional flood management plan and policy mechanism by the year 2010.	Preserve open space and natural habitats that protect and enhance water resources and species in the region.	Contribute to the preservation of an additional 2,000 acres of open space and natural habitat, to integrate and maximize surface and groundwater management by 2015.	Maintain agricultural land use within the Region.	Preserve 10,000 acres of farmland in rotation through 2035.	Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres of recreational space by 2035.	Improve integrated land use planning to support water management.	Coordinate a regional land use management plan by the year 2010.
Land Use, Open Space and Conservation Element																																																																										
To contain new development within an area large enough to meet generous projections of foreseeable need, but in locations which will not impair the economic strength derived from the petroleum, agriculture, rangeland, or mineral resources, or diminish the other amenities which exist in the County.																X			X																				X																																X	X				
Conserve prime agriculture lands from premature conversion.																			X																																																				X	X				
Areas designated for agricultural use, which include Class I and II and other enhanced agricultural soils with surface delivery water systems, should be protected from incompatible residential, commercial, and industrial subdivision and development activities.																			X													X							X																																X	X				
The County shall encourage qualifying agricultural lands to participate in the Williamson Act program or Farmland Security Zone program.																			X												X																																								X	X				
Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.												X				X			X													X							X					X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X							
Discretionary projects shall analyze watershed impacts and mitigate for construction-related and urban pollutants, as well as alterations of flow patterns and introduction of impervious surfaces as required by the California Environmental Quality Act (CEQA), to prevent the degradation of the watershed to the extent practical.										X	X		X	X		X			X	X												X	X							X	X	X		X		X											X	X	X	X	X	X			X	X								
Ensure the protection of environmental resources and the development of adequate infrastructure with specific emphasis on conserving agricultural areas, discouraging unplanned urban growth, ensuring water supplies and acceptable quality for future growth, and addressing air quality issues.	X									X	X	X	X	X		X			X													X		X	X			X	X					X		X	X	X	X	X	X	X			X	X	X	X	X	X	X	X							X	X				
CITY OF LANCASTER GENERAL PLAN (1997, REVISED THROUGH 2001)																																																																											
Water Supply/Water Quality Policies																																																																											
Plan for the Natural Environment																																																																											
Work with Los Angeles County to require that all development projects within the city and its sphere of influence comply with discharge permit requirements established by the Regional Water Quality Control Board.										X	X	X							X	X			X									X			X	X				X	X																X	X	X	X	X	X												
Through the development review process, evaluate proposals to identify potential negative impacts on existing watershed areas, and to ensure inclusion of appropriate mitigation measures.	X									X	X	X							X	X												X		X				X																			X	X	X	X	X	X			X	X	X	X						
To ensure that land use changes will not increase the demand on local groundwater basin, the applicants for all General Plan and zoning ordinance amendments shall provide a factual statement of: current water demand; proposed water demand; potential conservation; and water from new sources.	X		X		X	X						X							X													X		X				X									X	X	X	X	X	X	X	X																				
Determine the desirability of adjudication of the local groundwater basin as a means of protecting the groundwater basin from future overdrafting.	X	X																	X	X					X									X					X														X	X																				
Cooperate with area water agencies to manage the use and quality of the groundwater basin in the Antelope Valley.	X	X								X	X	X							X	X						X	X	X		X		X		X	X												X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
In conjunction with local water purveyors, investigate the possibility of receiving additional AVEK water when available to store in the aquifer.	X				X	X	X												X	X						X				X				X				X									X	X	X	X	X	X	X	X																				
Work with Los Angeles County to ensure that individual wells are permitted only if it can be proven that an adequate supply of good quality water is available; restrict use of individual wells to areas where it is not feasible to connect to the community water system.	X	X								X									X	X		X		X					X																								X	X	X	X	X	X	X	X	X	X												
Meet on an annual basis with AVEK to review new technologies to expand available water resources. Technologies may include, but shall not be limited to, importation, desalinization, and conservation. Consider incorporating applicable new technologies into the development review process and general City operations.	X		X		X	X			X										X	X														X										X		X	X	X	X	X	X	X	X	X									X	X										
Encourage the use of reclaimed water and tertiary wastewater for irrigation and other non-contact uses.				X								X							X															X													X	X	X	X	X	X	X	X									X	X										
Promote the use of water conservation measures in the landscape plans and design of new developments.			X																X															X												X	X	X	X	X	X	X	X	X																				
Consider the potential impact of new development projects on the existing water supply.	X																		X													X		X												X	X	X	X	X	X	X	X	X																				
Plan for Physical Development																																																																											
Through the development review process, ensure coordination between landscape design and drainage plans for individual projects, to ensure percolation of surface water from the landscaped portion of the site. Swale designs in landscaped and turf areas should be employed to slow down runoff and maximize percolation.		X								X	X		X	X					X													X				X																	X	X											X	X								
Flood Management Policies																																																																											
Plan for the Natural Environment																																																																											
To minimize the impact of introducing impervious surfaces in new development, review and revise as necessary zoning and subdivision ordinance provisions related to maximum building and parking area coverage.										X	X		X	X					X													X				X								X		X																			X	X								