ATTACHMENT 15. IRWM PLAN REDUCE DELTA WATER DEPENDENCE

INTRODUCTION

The Antelope Valley Integrated Regional Water Management (IRWM) Plan was originally adopted in 2007. Cost and other factors continue to lead local interests to develop and implement programs that emphasize efficient water use and full utilization of local supplies, including water reuse. The 2007 Plan emphasizes water management strategies that will maximize reliance on local supplies and reduce dependence on imported water. The Region currently relies on State Water Project (SWP) supplies to meet a significant portion of the demand; therefore, the Region is eligible for augmented funding in this grant process.

Commitment to Reduce Dependence

The RWMG has committed to full utilization and development of local supplies, efficient water use, and environmental protection. Part of the IRWM Plan recognized the need to reduce reliance on water exported from the San Joaquin-Sacramento River Delta (Delta) system. The commitment to reducing dependence is reflected in the IRWM Plan, and the submitted "Application for Proposition 84 Planning Grant Round 1" funding provides assurances that the updates to the IRWM Plan will continue to help reduce dependence on the Delta.

Relevant excerpts from the IRWM Plan that refer to reduced dependence on the Delta are included in this attachment.

Use of Delta Water in IRWM Region

Water currently used in the Antelope Valley Region comes from two sources: (1) naturally occurring water within the Antelope Valley Region (surface water and groundwater accumulated from rain and snow that falls in the Antelope Valley and surrounding mountains), and (2) SWP water (surface water that is collected in northern California and imported into the Antelope Valley and other areas around the state). Current State Water Contractor (SWC) allotments are shown in Table 15-1.

TABLE 15-1
State Water Project Current Table A. Amounts in Antelope Valley Region in Acre Feet per Year (IRWMP 2007)

State Water Project Participant	Table A Amount (AFY)
Antelope Valley - East Kern Water Agency (AVEK)	141,400
Palmdale Water District (PWD)	21,300
Littlerock Creek Irrigation District (LCID)	2,300
Total Regional Table A	**165,000**

All agencies are members of the RWMG

SWP water is delivered wholesale to the Antelope Valley as both an agricultural and urban supply. Table 15-2 shows the history of actual wholesale SWP deliveries to the Antelope Valley. SWP deliveries are used by the Region's retail water purveyors along with local groundwater resources. The IRWMP provides a complete discussion of each water purveyor's supplies in Section 2 and 3.

TABLE 15-2
State Water Project Historical Table A. Amounts vs. Actual Deliveries in Antelope Valley Region in Acre Feet by Year (IRWMP 2007)

Year	Table A Amount (AFY)	Actual Delivery Amount (AFY)
1975	41,100	8,588
1980	81,530	72,598
1985	55,910	38,622
1990	151,700	57,561
1995	158,000	54,727
2000	162,000	92,637
2004	165,000	110,379

SUMMARY

Conjunctive use, water efficiency and water recycling all play a prominent role in regional water planning and the increased emphasis on regional self-sufficiency. These sections are included in the IRWM Plan (Sections 4.2 and 5.1.1). The implementation of these types of projects demonstrates the Region's commitment to reducing dependence on water supplied from the Delta.

Much of the water used within the Antelope Valley Region is extracted from groundwater aquifers. The amount of water pumped within the Antelope Valley Region has varied tremendously since the early 1900s. With the need to balance the water being pumped from the groundwater aquifers with the water being naturally recharged, a legal process called adjudication has begun in the Antelope Valley. If the adjudication process is successful, groundwater users within the Region will create and abide by a plan to stabilize groundwater levels and prevent further damage that can result from declining groundwater levels.

The members of the RWMG agreed that since the IRWM Plan and the adjudication were focused on different aspects of water management, the two could proceed in parallel. The IRWM Plan encourages a quick and collaborative settlement of the adjudication process, but the contents of the Plan identify and recommend actions that go well beyond the adjudication. Members of the RWMG and other community participants agreed to focus on these actions in the Plan by presenting high-priority projects for implementation beyond the adjudication itself.

Currently, all water agencies in the Antelope Valley Region utilize water conservation methods as a means to reduce demand during drought conditions. Additionally, the Antelope Valley - East Kern Water Agency's (AVEK) largest retail customer, Los Angeles County Waterworks District 40 (LACWWD40) 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).

IRWM PLAN

2007 IRWM Objectives

The IRWM Plan identified several objectives within each of five issue areas. Those relating to increasing water supply reliability and management of SWP supplies (IRWM Plan, Table 4-1) include:

- Water Supply Management
  - Provide reliable water supply to meet the Antelope Valley Region's expected demand between now and 2035.
  - Establish a contingency plan to meet water supply needs of the Antelope Valley Region during a plausible disruption of SWP water deliveries.
  - Stabilize groundwater levels at current conditions.
- Water Quality Management
  - Provide drinking water that meets customer expectations.
  - Protect aquifer from contamination
  - Protect natural streams and recharge areas from contamination.
  - Maximize beneficial use of recycled water
- Land Use Planning/Management
  - Improve integrated land use planning to support water management.

In the 2007 IRWMP, Planning Targets were developed for each Objective. Relevant examples (IRWMP, Table 4-1) include:

- Establish a contingency plan to meet water supply needs of the Antelope Valley Region during a plausible disruption of SWP water deliveries.
  - **Target**: Demonstrate ability to meet regional water demands without receiving SWP water for 6 months over the summer, by June 2010.
- 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.

Implementation of these portions of the IRWMP are helping the Region move toward reducing dependence on the Delta for water supply by increasing reliability of local water sources, using local supplies in periods of decreased SWP availability, and planning for additional local supplies such as recycled water and implementation of water banks. In order to meet these objectives, the Plan identified several strategies (Plan Section 5.1) including:

- Conjunctive use
- Land use planning
- Non-point source pollution control
- Surface storage
- Watershed planning
- Water and wastewater treatment
- Water transfers

Selection of Project for this Implementation Grant Application

The RWMG reviewed objectives of the 2007 IRWM Plan and identified the AVEK Water Supply Stabilization Project (WSSP- 2) Water banking project as the one with highest priority with the greatest potential for immediate implementation.

Assurances Regarding the IRWM Plan Update

The Antelope Valley IRWM Region has demonstrated a commitment to improved water use efficiency and effective management of local supplies which is an essential step to reducing SWP water from the Bay-Delta. The Antelope Valley RWMG has been recommended for a Planning Grant to revise the 2007 IRWM Plan to include program preferences such as:

- Effectively integrate water management programs and projects;
- Use and reuse water more efficiently, climate change response;
- Practice integrated flood management; and
- Protect surface water and groundwater quality, ensure equitable distribution of benefits) were adequately addressed.

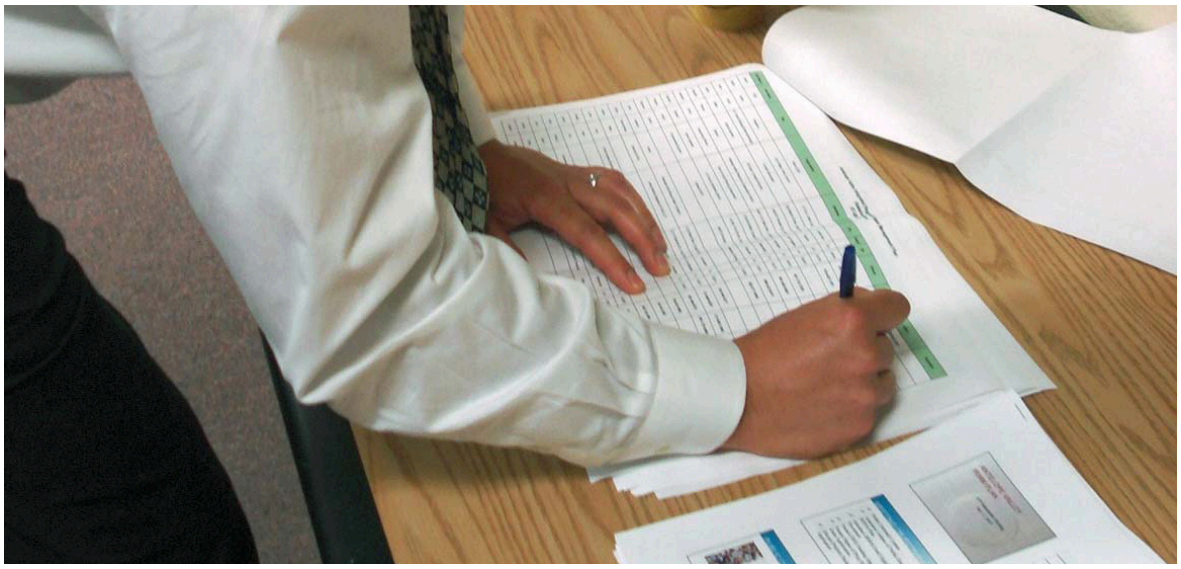
The Antelope Valley RWMG will begin revising the 2007 IRWM Plan as soon as final approval of its grant occurs. This approval is expected in June of 2011.

ATTACHMENT EXHIBITS

File 2 of 3 – IRWMP Excerpt Section 4.2 Water Supply Management Objectives and Targets

File 3 of 3 – IRWMP Excerpt Section 5.1.1 Water Management Strategy Descriptions

Attachment 15 Exhibit
IRWMP Excerpt:
Section 4.2 Water Supply Management Objectives and Targets



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.

Attachment 15 Exhibit
IRWMP Excerpt:
Section 5.1.1 Water Management Strategy Descriptions

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.