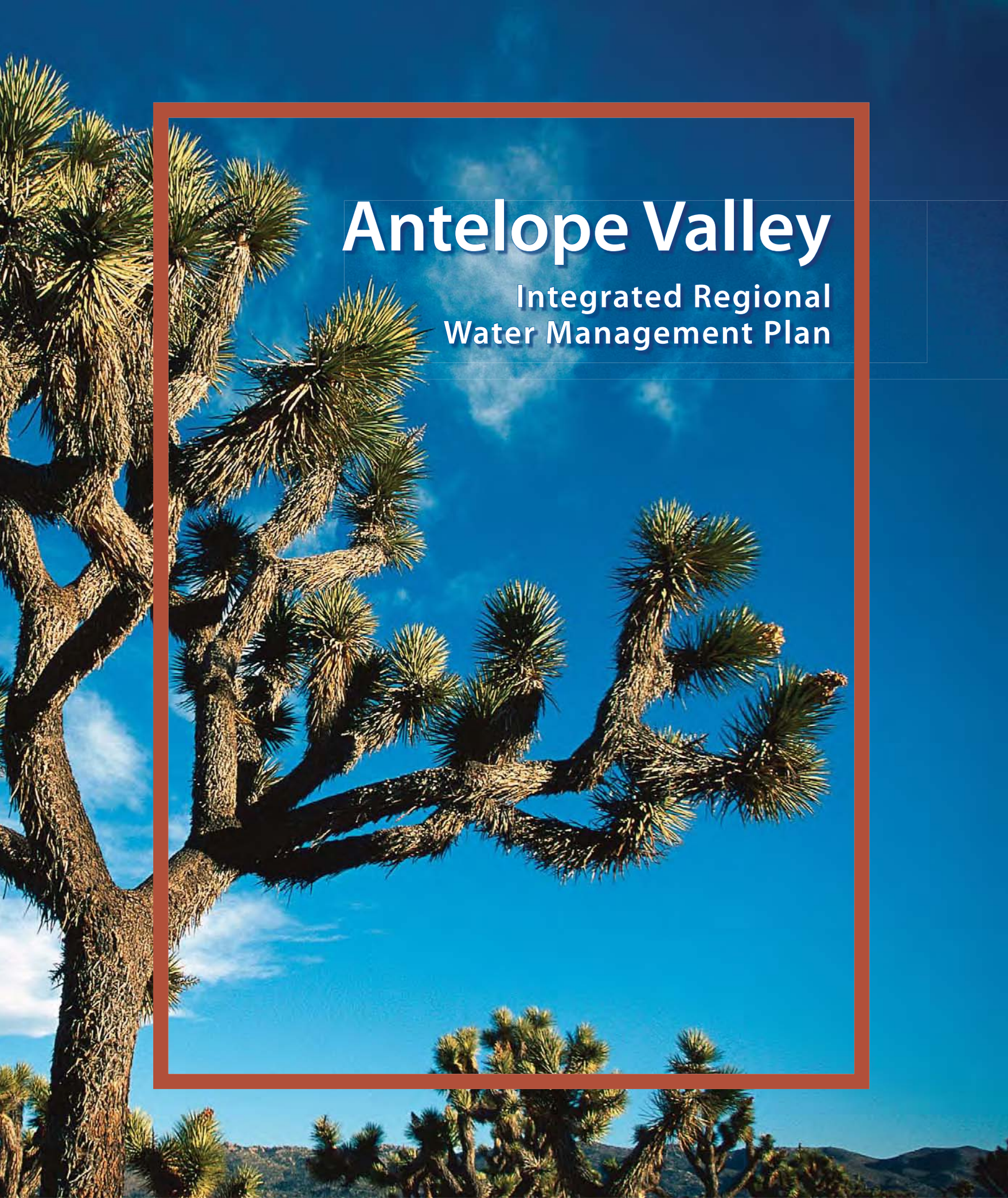
5-AVUMG-9 (PART 1 OF 3)



Antelope Valley

Integrated Regional Water Management Plan

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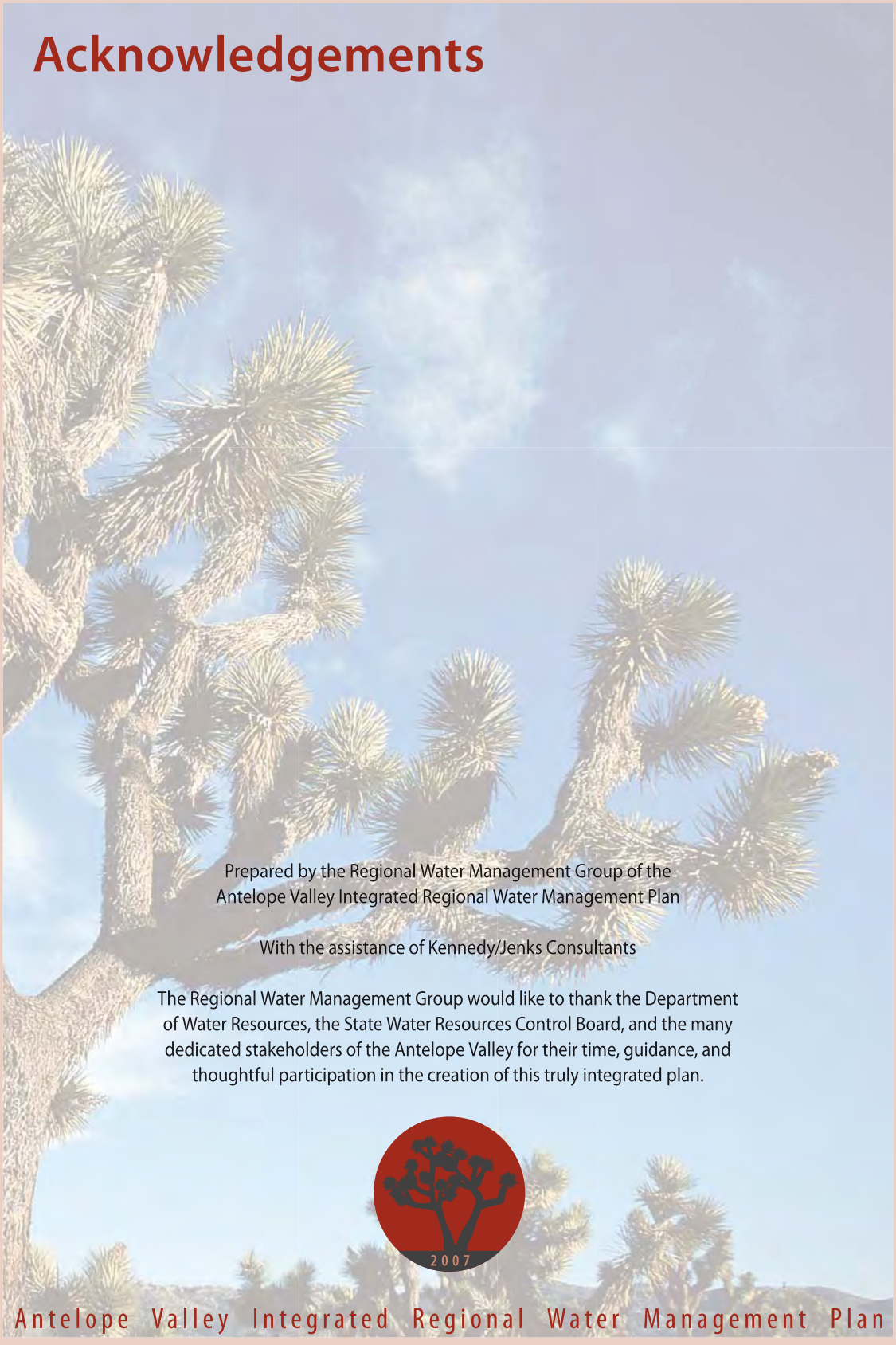
Acknowledgements



Prepared by the Regional Water Management Group of the
Antelope Valley Integrated Regional Water Management Plan

With the assistance of Kennedy/Jenks Consultants

The Regional Water Management Group would like to thank the Department of Water Resources, the State Water Resources Control Board, and the many dedicated stakeholders of the Antelope Valley for their time, guidance, and thoughtful participation in the creation of this truly integrated plan.

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Compliance with Proposition 50 Required Elements

The AV IRWM Plan meets all the necessary required elements identified in Proposition 50 for an IRWM Plan as shown below.

Quick Reference Guide: Proposition 50 Guidelines Required Elements	
Standard	**IRWM Plan Reference/Section (§)**
A. Regional Agency or Regional Water Management Group	1.2.1
B. Region Description	1.0, 2.1 3.1.1, 3.1.2, 3.1.3 , 3.1.4, 3.1.5, 3.1.8, 3.2, 3.4.1, 3.4.2, 2.6, 2.7
C. Objectives	4.0; 5.0, 6.0, 7.0, 8.0
D. Water Management Strategies	5.1.1
E. Integration	6.1, 6.2, 6.3, Table 6-1, Table 6-2
F. Regional Priorities	7.3, 8.6.1.1, 8.6.1.2, 8.6.1.3
G. Implementation	5.0; 7.3; 7.4.1, 7.4.1.1, Table 7-2, 8.2.2, 8.5.1, Appendix F
H. Impacts and Benefits	7.2.1.1, 7.2.1, 7.2.2, 7.2.3, 7.2.4
I. Technical Analysis and Plan Performance	8.5.1, 8.5.1.1, 8.5.2, 8.5.3
J. Data Management	8.4.1, 8.4.2, 8.4.3, 8.5.2, 8.5.3, 8.4.4
K. Financing	8.3.3, 8.3.4, Table 8-4, Table 8-5
L. Statewide Priorities	6.2.2, Table 6-6
M. Relation to Local Planning	8.1.2, Table 8-2
N. Stakeholder Involvement	1.2.2, 1.2.4, 1.3.3, 8.2.2, 8.6, 8.6.2, 1.2.4.1,1.2.4.3,
O. Coordination	1.2.2.4, 1.2.2.5, 8.1.1, Table 8-1

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Executive Summary

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This plan defines a clear vision and direction for the sustainable management of groundwater reserves in the Antelope Valley Region.

Executive Summary

ANTELOPE VALLEY INTEGRATED REGIONAL WATER MANAGEMENT PLAN OVERVIEW

The California Water Plan 2005 update is the basis for all Integrated Regional Water Management (IRWM) planning efforts underway throughout the State, including this IRWM Plan for the Antelope Valley Region. It represents a fundamental transition in how the State looks at water resource management, and how the State government needs to be more involved at a local and regional level with governing agencies and interest groups to better identify and address State-wide water concerns.

The State recognizes that there is a need to consider a broader range of resource management issues, competing water demands, new approaches to ensuring water supply reliability, and new ways of financing.

IRWM planning was derived from Proposition 50 which was passed by California voters in November 2002, authorizing $3.4 billion in general obligation bonds to fund a variety of specified water and wetlands projects. It set aside $380 million for grants related to the implementation of IRWM Plans and is jointly administered by the California Department of Water Resources (DWR) and the State Water Resources Control Board (SWRCB).

Proposition 50 states that IRWM Plans should include a description of the region and participants, regional objectives and priorities, water management strategies, implementation, impacts and benefits, data management, financing, stakeholder involvement, relationship to local planning, and state and federal coordination. This Antelope Valley Integrated Regional Water Management (IRWM) Plan includes a discussion of the specified elements, as summarized below.

INTRODUCTION (SECTION 1)

Several years ago, leaders and agencies in the Antelope Valley Region recognized the need for regional cooperation and planning. In an effort to represent the broad interests within the Antelope Valley Region, a number of organizations joined to form a Regional Water Management Group (RWMG) to work together and create this IRWM Plan. Members of the RWMG include the Antelope Valley-East Kern Water Agency (AVEK), Antelope Valley State Water Contractors Association (AVSWCA), City of Lancaster, City of Palmdale, Littlerock Creek Irrigation District, Los Angeles County Sanitation District (LACSD) Nos. 14 and 20, Los Angeles County Waterworks District No. 40 (LACWWD 40), Palmdale Water District (PWD), Quartz Hill Water District (QHWD), and Rosamond Community Services District (RCSD). These agencies agreed to contribute funds to help develop the AV IRWM Plan, provide and share information, review and comment on drafts, adopt the final AV IRWM Plan, and assist in future grant applications for the priority projects identified in this IRWM Plan.

"We have a responsibility for future generations, and we have a responsibility just as responsible citizens, to protect this groundwater resource and make sure that we use it in the best way possible."

– Adam Ariki,
Los Angeles County Waterworks District No. 40

In January 2007, the RWMG and other community participants (the Stakeholders) set about developing a broadly supported water resource management plan that defines a meaningful course of action to meet the expected demands for water within the entire Antelope Valley Region through 2035. They chose to create the water resource management plan consistent with the State sponsored Integrated Regional Water Management Program that makes grant funds available to support sound regional water management. The goals of the AV IRWM Plan are to 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 supplies of reasonable cost irrigation water; and
- Opportunities to protect and enhance the current water resources (including groundwater) and the environmental resources within the Antelope Valley Region.

The RWMG acknowledged that a separate process (called adjudication) related to groundwater management was also underway. Members of the RWMG and other stakeholders discussed at length whether it was possible (and if possible, how) to develop a Regional Water Management Plan before the adjudication was settled. The members of the RWMG agreed that since the IRWM Plan and the adjudication were focused on different aspects of water management, they could proceed in parallel. This IRWM Plan contains information to help take action to meet shared objectives for long-term water management for the entire region. The results of the adjudication will help provide important clarity and certainty between groundwater users about how the groundwater resources will be managed, but other important water management actions can and should be taken without waiting for a final adjudicated solution. Members of the RWMG agreed that no information developed for the purposes of the IRWM Plan should be interpreted to interfere in any way with the adjudication process. The data provided in this report were not prepared in a manner suitable to answer the questions being addressed in the adjudication.

REGION DESCRIPTION (SECTION 2)

The Antelope Valley Region of California is home to over 444,000 people living in many different communities. Residents within this Region have experienced tremendous changes over the past generation due to a rapid increase in population coming from nearby large cities. Current forecasts of population growth suggest even larger changes

Surface water for the Antelope Valley Region comes from the state aqueduct and Littlerock Reservoir

will occur before 2035. Water plays a central role in the health and well being of all residents within the Antelope Valley Region. People use water for drinking, bathing, household and outdoor activities, agriculture, business endeavors, recreation, and to sustain and enhance natural habitats. This common need for water links communities together in many ways. When anyone uses water, the ability of other people to use water within the Antelope Valley Region can be affected.

The Antelope Valley Region encompasses approximately 2,400 square miles in northern Los Angeles County, southern Kern County, and western San Bernardino County. Major communities within the Antelope Valley Region include Boron, California City, Edwards Air Force Base, Lancaster, Mojave, Palmdale and Rosamond. All of the 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) State Water Project water (surface water that is collected in northern California and imported into the Antelope Valley and other areas around the state).

"This plan is going to provide a long-range benefit to the Antelope Valley and will be able to continue to provide for economic development, particularly with residential development throughout the Antelope Valley Region."

– Gretchen Gutierrez,
Antelope Valley Building Industry Association

The number of residents within the Antelope Valley Region expanded more than 330 percent between 1970 and 2005, growing from 103,000 people in 1970 to 444,000 people in 2005. Forecasters expect the population to continue to swell, potentially reaching 1,174,000 residents by the year 2035. 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.

Creation of a proactive, "smart" design for the fast-developing Antelope Valley Region makes this IRWM Plan essential to efficient and effective water management.

ISSUES AND NEEDS (SECTION 3)

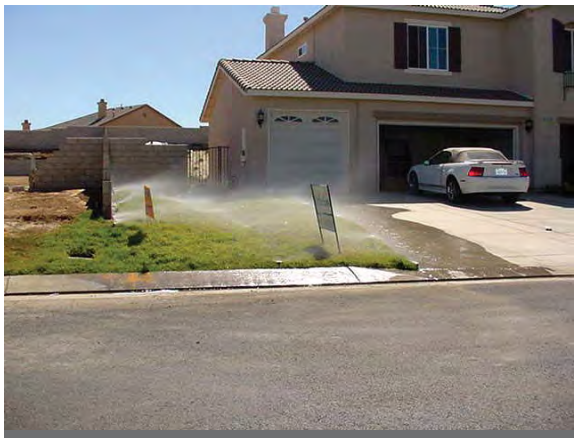
Water managers and local planners face many daunting challenges related to supporting the well being of the Antelope Valley Region. Past activities have created problems that need to be addressed and expected increases in population growth make resolving these problems even more difficult. In order to help address the broad challenges, the AV IRWM Plan was organized to address issues and needs in the following categories. Section 3 of the Plan describes these issues and needs in detail.

Supplies are Variable and Uncertain

Determining the amount of water available for use at any given time (now or in the future) is more challenging than one might imagine. The amount of water supply available varies considerably due to changes in weather, rain and snow, and other conditions. All water supplies within the Antelope Valley Region come from two sources: (1) local rain and snow, or (2) imports of water from outside the Antelope Valley Region. The local water supplies come from rainfall and snowmelt that percolate into the groundwater aquifers or are captured in Littlerock Reservoir. Current estimates of water supplies made available from local rainfall and snowmelt vary widely (30,300 to 81,400 acre-feet per year (AFY).[1,2] Imported water comes from the State Water Project, which has historically varied. The currently available supplies from imported water can also vary widely from year to year (6,400 to 74,300 AFY).

Demand is Greater than Supply

One fundamental challenge in the Antelope Valley Region is that demand for water exceeds available supplies. The



The expected rapid growth in the Antelope Valley Region will affect water demand and increase the threat of water contamination from additional wastewater and urban runoff without proper management.

demand for water clearly exceeds even the higher estimates of currently available supplies. By 2010 the demand for water in an average year by 2010 will be 274,000 AFY and by 2035 could be 447,000 AFY. Even using the higher estimates of available supply, this means demand could exceed supply by 73,600 AFY in 2010 and by 236,800 AFY in 2035. The expected imbalance between supply and demand in 2035 is about the same as currently available supplies. If communities do not begin conserving water more effectively, the Region will need twice the water as it currently has in order to meet demand in 2035.

Historically, water supplies within the Antelope Valley Region have been used primarily for agriculture; however, due to population growth, water demands from residential and business uses have increased significantly and this trend is expected to continue. The expected continuation of rapid growth in the Antelope Valley Region will affect water demand and increase the threat of water contamination from additional wastewater and urban runoff. More residents will also lead to higher demand for water-based recreation.

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. The United States Geological Survey estimated that groundwater pumping in 1919 was about 29,000 AFY and reached as high as 400,000 AFY in the 1950's. For many of those years, the amount of water being pumped was greater than the amount of water being replenished, creating an imbalance within the groundwater aquifers. Because the amounts pumped were greater than the amounts being replenished, groundwater levels have declined significantly throughout the Antelope Valley Region. The long-term depletion of aquifers cannot be continued indefinitely without serious

1 An acre-foot per year is enough water to cover an acre of land one foot deep and meet the water needs of a family of four for one year.

2 The analyses provided in the IRWM Plan are strictly for long-term planning purposes and have not been conducted to answer the questions being addressed within the adjudication. Once the detailed analysis of available local water supply are completed within the adjudication, the supply numbers for the IRWM Plan will need to be updated.

consequences. The historical declines in groundwater levels within the Antelope Valley Region have caused permanent damage to aquifers in some areas through land subsidence, or sinking.

In order to prevent further damage from declining groundwater levels, many water providers and managers within the Antelope Valley Region recognize the need to balance the water being pumped from the aquifers with the water being put back. In response to this need, a legal process called adjudication is currently underway. If the adjudication process is successful, groundwater users within the Antelope Valley Region will create and abide by a plan to stabilize groundwater levels and prevent further damage that can result from declining groundwater levels. While determining a method to balance groundwater use with the amount of water being replenished is a necessary piece to creating a viable water management strategy within the Antelope Valley Region, the adjudication likely will not provide any additional water supplies needed to meet the growing demands within the Antelope Valley Region.

Recognizing the need to identify meaningful actions beyond the adjudication, members of the Group and other community participants agreed to focus on actions beyond the adjudication in the Plan. Participants in developing the AV IRWM Plan encourage a quick and collaborative settlement of the adjudication process, but the contents of the AV IRWM Plan identify and recommend actions that go well beyond the adjudication. The actions identified in the AV IRWM Plan can help meet the larger needs of the Antelope Valley Region but will require a solution from the adjudication to stabilize groundwater levels. Nothing in the IRWM Plan shall be interpreted to interfere in any way with the adjudication process.

Water Quality and Flood Management

The groundwater basin within the Antelope Valley Region is an undrained, closed basin, meaning there is no outlet for water to flow to the ocean. When water enters a closed basin, any minerals or chemicals in the water typically accumulate in the basin. Currently, groundwater quality is excellent within the principal aquifer but is not as good toward the northern portion of the dry lake areas. Some portions of the basin contain groundwater with high fluoride, boron, total dissolved solids, and nitrate concentrations. Arsenic is another emerging contaminant of concern in the Antelope Valley Region and has been observed in LACWWD 40, PWD, Boron, and QHWD wells. Research conducted by the LACWWD and the United States Geological Survey has shown the problem to reside primarily in the deep aquifer,

The need for regional coordination of flood control efforts is readily apparent with the increase of paved surfaces, along with the increase of local flood events.

The preservation of the Antelope Valley Region's unique environmental features can be achieved through integrated surface and groundwater management actions.

and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the Antelope Valley.

Portions of the Antelope Valley Region are also subject to flooding from uncontrolled runoff in the nearby foothills, which can be aggravated by lack of proper drainage facilities and defined flood channels. This runoff can negatively affect the water quality of the underlying groundwater basin, and can create stagnant ponds in places where clay soils beneath the surface do not allow for percolation to occur. The need for regional coordination of flood control efforts becomes more readily apparent as urban development and paved surfaces increase throughout the Antelope Valley Region, along with the frequency of local flood events.

Environmental Resources

The Antelope Valley Region has many unique environmental features, and several plant and animal species are only found in this area. As the pressure for growth expands out into undeveloped or agricultural lands, the need to balance industry and growth against protection of endangered species and sensitive ecosystems requires difficult decisions and trade-offs, each resulting in a variety of unique impacts on water demands and supplies in the Region. The actions identified in the AV IRWM Plan can help to preserve open space and natural habitats in the greater the Antelope Valley Region while maximizing surface water and groundwater management efforts.

Water Management and Land Use

What people do on the land of the Antelope Valley and how they do it directly impacts many aspects of life, including the water cycle, within the Antelope Valley Region. Historically throughout California, land use planning and water use planning have been done almost independently of one another. The challenges identified within the Plan clearly show a need for much closer collaboration between

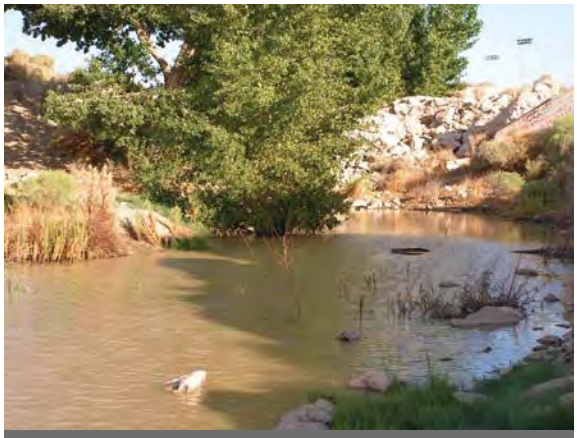
The expected rapid growth in the Antelope Valley Region will affect water demand and increase the threat of water contamination from additional wastewater and urban runoff without proper management.

land use planning efforts and water management planning efforts. Continued development within the Antelope Valley Region depends heavily on the successful completion of the objectives presented in the Plan to meet the growing demand for recreational opportunities while minimizing or avoiding the loss of local culture and values.

OBJECTIVES (SECTION 4)

The Stakeholders worked together to identify clear objectives and planning targets they want to accomplish by implementing the AV IRWM Plan (see Table ES-1). Although the AV 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 well. Refer to Section 4 of the AV IRWM Plan for details on how the objectives and targets were determined.

These objectives and planning targets represent the most important things the Stakeholders have chosen to work together to accomplish over the next several years. Everything done within the context of this IRWM Plan should contribute in some way to achieving these objectives. Also, because the planning targets are measurable, residents within the Antelope Valley Region can monitor how well the Plan is being implemented.



Stephen Sorenson County Park, a community recreation facility within the Antelope Valley, is home to "Lovejoy Springs" as it is known by the community.

Apollo Park Lake

Table ES-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.[3]
	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.[4]
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[5] through 2035.
Meet growing demand for recreational space.	Contribute to local and regional General Planning documents to provide 5,000 acres[6] 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.

3 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.

4 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.

5 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.

6 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.

WATER MANAGEMENT STRATEGIES (SECTION 5)

An overview and description of each of the Proposition 50 Water Management Strategies required to be considered in the AV IRWM Plan is provided in Section 5. These water management strategies include those that are currently utilized by the agencies and organizations in the Antelope Valley Region on an ongoing basis, the strategies now being implemented, and those that are planned for the future.

Additionally, in the AV IRWM Plan, the 20 different water management strategies identified in the IRWM Plan Guidelines (CWC §§ 79562.5 and 79564) were compared with those identified in the California Water Plan and then grouped into the AV IRWM Plan's five regional and broad-based water management strategy areas: water supply management; water quality management; flood management; environmental resource management; and land use management.

To help identify the many potential projects in the Antelope Valley Region and to assess the contribution of these projects towards meeting the AV IRWM Plan objectives and planning targets (as identified in Table ES-1, above), a "Call for Projects" form was sent out to all the Stakeholders to give them the opportunity to submit their project concepts for consideration. The Call for Projects provided an avenue to engage the Stakeholders in the information-sharing aspect of Plan development, and resulted in identification of many projects that provide multiple benefits that span more than one water management strategy.

IRWM PLAN AND PROJECTS INTEGRATION, EVALUATION AND PRIORITIZATION (SECTIONS 6 AND 7)

Many local agencies and other community participants have worked well together to create a Plan that identifies challenging issues and needs being faced by all Antelope Valley residents. Fortunately, this IRWM Plan also identifies actions that can help meet the objectives for the Antelope Valley Region and identifies methods for cooperative implementation of those actions.

Table ES-2 lists the projects and actions that the Stakeholders believe will help meet the Regional objectives. Implementing the high priority actions will require focused effort, broad community support, political resolve, and money. The Stakeholders are actively pursuing financial assistance through several grant programs to help leverage local investments. The RWMG is also working to establish a secure and long-lasting way to coordinate resources to meet the growing needs of the entire Antelope Valley Region.

Table ES-2 Stakeholder Prioritized Projects

Priority	Project	Project Sponsor
Water Supply Groundwater Recharge/Banking Infrastructure Projects		
High	Antelope Valley Water Bank	Western Development and Storage
	Aquifer Storage and Recovery Project - Injection Well Development	LACWWD 40
	Upper Amargosa Creek Recharge, Flood Control & Riparian Habitat Restoration Project	City of Palmdale, AVEK
	Water Supply Stabilization Project – Westside	AVEK/AVSWCA/ LACWWD 40
Medium	Aquifer Storage and Recovery Project: Additional Storage Capacity	LACWWD 40
	Lower Amargosa Creek Recharge & Flood Control Project	J. Goit/City of Palmdale
	Water Supply Stabilization Project – Eastside Project	AVEK
Water Infrastructure Projects		
High	Avenue K Transmission Main, Phases I-IV	LACWWD 40
	Littlerock Dam Sediment Removal Project	PWD
	Wastewater Pipeline	RCSD
Low	Avenue M and 60th Street West Tanks	LACWWD 40
	Place Valves and Turnouts on Reclaimed Water Pipeline	RCSD

Table ES-2 Stakeholder Prioritized Projects (continued)

Priority	Project	Project Sponsor
Recycled Water Projects		
High	Antelope Valley Recycled Water Project Phase 2	LACWWD 40/Palmdale/ LACSD
	Groundwater Recharge Using Recycled Water Project	City of Lancaster
Medium	Groundwater Recharge – Recycled Water Project	PWD
	Kern County and Los Angeles County Interconnection Pipeline	RCSD
	Regional Recycled Water Project Phase 3	LACWWD 40/Palmdale/LACSD
	Tertiary Treated Water Conveyance and Incidental Groundwater Recharge of Amargosa Creek Avenue M to Avenue H	City of Lancaster
Low	Regional Recycled Water Project Phase 4	LACWWD 40/Palmdale/ LACSD
Water Conservation/Water Use Efficiency		
High	Comprehensive Water Conservation/Efficient Water Use Program	Antelope Valley Water Conservation Coalition/ LACWWD/PWD
Water Quality Projects		
High	Lancaster Water Reclamation Plan Stage V	LACSD
	Palmdale Water Reclamation Plan Existing Effluent Management Sites	LACSD
	Palmdale Water Reclamation Plan Stage V	LACSD
	Partial Well Abandonment of Groundwater Wells for Arsenic Mitigation	LACWWD 40
Medium	Lancaster Water Reclamation Plan Stage VI	LACSD
	Lancaster Water Reclamation Plan Proposed Effluent Management Sites	LACSD
	Palmdale Water Reclamation Plan Stage VI	LACSD
	Palmdale Water Reclamation Plan Proposed Effluent Management Sites	LACSD
	Palmdale Water District New Treatment Plant	PWD
Low	42nd Street East, Sewer Installation	City of Palmdale
Flood Management Projects		
High	Development of Coordinated Antelope Valley Flood Control Plan	Cities of Lancaster, Palmdale, Los Angeles Department of Public Works (LADPW), Kern County
Medium	Quartz Hill Storm Drain	LADPW
	Anaverde Detention Basin, Dam & Spillway at Pelona Vista Park	City of Palmdale
	Barrel Springs Detention Basin and Wetlands	City of Palmdale
	Hunt Canyon Groundwater Recharge and Flood Control Basin	City of Palmdale
Low	45th Street East Flood Control Basin (Q East Basin)	City of Palmdale
	Avenue Q and 20th Street East Basin (Q West Basin)	City of Palmdale
	Storm water Harvesting	Leona Valley Town Council
Environmental Resource Management Projects		
High	Ecosystem and Riparian Habitat Restoration of Amargosa Creek; Avenue J to Avenue H	City of Lancaster
Medium	Tropico Park Pipeline Project	RCSD
Land Use Management Projects		
High	Development of a Coordinated Land Use Management Plan	Cities of Lancaster, Palmdale, LADPW, Kern County /Antelope Valley Conservancy
	Amargosa Creek Pathways Project	City of Lancaster

FRAMEWORK FOR IMPLEMENTATION (SECTION 8)

The AV IRWM Plan is a dynamic document that identifies monitoring guidelines and sets forth procedures for measuring the success, benefits, and impacts of the AV IRWM Plan. An ongoing management process is proposed for evaluating, updating and maintaining the Plan, and a comprehensive implementation framework has been developed to establish and identify a capital improvement program and financial plan for both construction and operation and maintenance of the projects and management actions selected as "high priority" (see Table ES-2, for a list of the high priority projects).

The 11 public agencies that have joined together to create the RWMG have recognized the value of working collectively towards meeting the regional goals identified in this Plan. In order to do this, they have signed a Memorandum of Understanding (MOU) to define what their roles and responsibilities are in developing and moving forward with implementation of the AV IRWM Plan. The decision-making structure of the MOU provides the RWMG with the responsibility to make formal decisions regarding the scope and content of the AV IRWM Plan. While the structure and approach has been successful to create the plan, the RWMG discussed whether the MOU and facilitated broad agreement approach would work well to implement and update the Plan after it is adopted. Several potential options were discussed including selection of one willing existing agency within the RWMG, (the City of Palmdale for example), that would serve on behalf of the entire stakeholder group, or creation of a new legal entity, such as a new Joint Powers Authority (JPA) to lead the collaboration with the stakeholder group and help implement the IRWM Plan.

The stakeholders decided that they would like to continue using the current approach of facilitated broad agreement to implement and update the AV IRWM Plan. However, several of the RWMG Members expressed a desire to form a more formal governance structure to implement the Plan over the next several years. The stakeholders understand that creating a new, more formal governance structure that will maintain the positive momentum the group has demonstrated during the past year until the year 2035 will likely require a few years.

Implementation of the high priority projects in the IRWM Plan is currently the responsibility of the individual lead agency with the jurisdictional authority to approve the project. The Stakeholders and RWMG have chosen these projects because they want to take action on them within the next two to three years, and they directly address the objectives and targets of better management of resources within the Antelope Valley Region. Furthermore, implementing the projects together yield greater benefits to the Region then if each agency implemented on their own.

The collection, management, distribution and use of data collected as part of this IRWM Planning effort, and through implementation, are essential to making this a sustainable effort that will benefit the Antelope Valley Region for years to come. Data regarding water quantity and quality are currently collected and distributed by a number of different agencies. The Stakeholders have identified strategies in this IRWM Plan to ensure quick identification of data gaps, avoiding duplicative (and costly) studies that result in the same information, and integrating with other important regional, statewide programs, and federal needs.

This IRWM Plan identifies performance measures that will be used to evaluate strategy performance, monitoring systems that will be used to gather actual performance data, and mechanisms to change these strategies if the data collected shows the Antelope Valley Region's IRWM planning targets are not being met. The Stakeholders also recognized that additional technical detail is needed for several of the IRWM Plan's performance measures to be properly implemented and measurable. The Stakeholder group has agreed to continue to refine these performance measures as the AV IRWM Plan is implemented.

This IRWM Plan is necessarily a Stakeholder-driven Plan. The RWMG invites the public and interested Stakeholders to become active participants in the Region's ongoing efforts to:

- Identify, evaluate, prioritize, and implement solutions to the Region's complex water management issues, challenges, and conflicts; and
- Continue the development and evolution of this Plan.

The San Gabriel Mountains provide a beautiful, natural backdrop to many Antelope Valley households.

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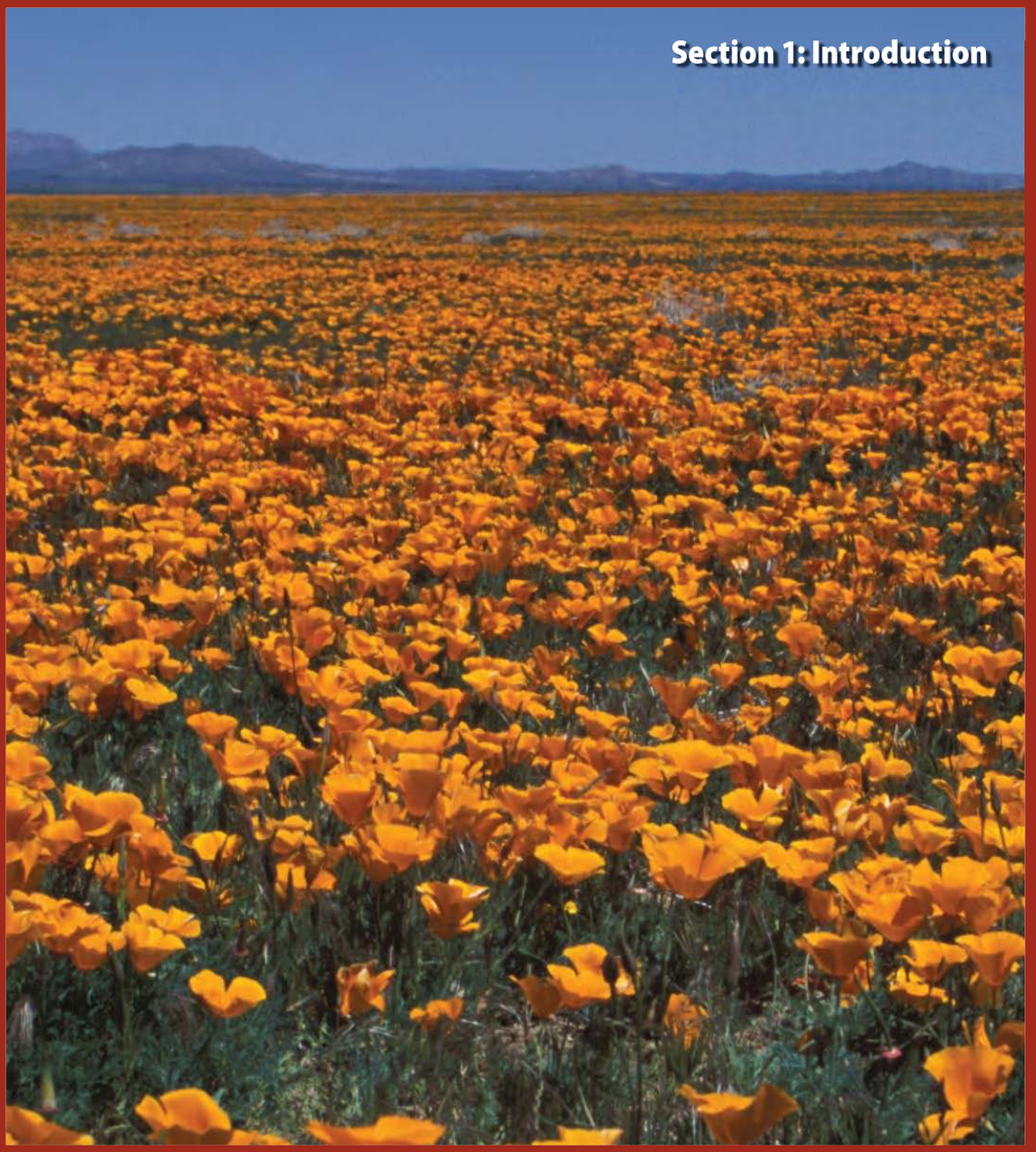
Section 1: Introduction



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When in bloom, the desert floor of the Antelope Valley can be seen bathed in the rich color of the prized California poppy.

Section 1: Introduction

This Integrated Regional Water Management Plan (IRWM Plan) defines a clear vision and direction for the sustainable management of water resources in the Antelope Valley Region through 2035. Although this IRWM Plan contains a viable action plan to provide a wide range of crucial water-related services necessary to support the well-being of people living in this unique and vibrant part of Southern California, this Plan is simply a planning and feasibility study and no implementation or any project is being approved or required through the adoption of this Plan. Implementation of this IRWM Plan will require further discretionary approvals either individually or jointly by the Group members. The IRWM Plan identifies existing key water-related challenges being faced by the residents of the Antelope Valley Region, along with projections of how these challenges will change by 2035. In response to current and expected challenges, this IRWM Plan provides a thorough inventory of possible actions to address the challenges, along with estimated costs and benefits of implementing each action. This IRWM Plan documents an extensive collaborative process that led to the selection of a robust combination of actions that may be implemented cooperatively by the stakeholders in the Antelope Valley Region.

Before efforts began to create this IRWM Plan, individual water purveyors and users were actively studying the effects of recent accelerated development of the Antelope Valley Region and were attempting to identify appropriate actions to address the growing pressure on water services. The recent acceleration of industrial and residential activity stimulated demand for both more water and higher quality water. Attempts by individual agencies to meet the growing challenges were frequently criticized and the atmosphere was one of mistrust with fierce competition among water users for limited water supplies. Water managers and stakeholders in the Antelope Valley Region began to recognize that some of the challenges being faced by residents could not be addressed using a single-agency or single-purpose perspective. They agreed that water resource needs in the Antelope Valley Region are highly interconnected and require a broad and integrated perspective in order to provide efficient and effective services throughout the Antelope Valley Region.

Acknowledging the need for a more comprehensive view, proactive stakeholders (including agencies with an interest in water and other resource management) in the Antelope Valley Region began meeting in May 2006 to improve communication and explore opportunities to leverage their resources. As a result, eleven public agencies formed the Antelope Valley Regional Water Management Group (RWMG) to lead stakeholders' collaborative efforts to resolve a growing number of water management challenges.

Early in their discussions, the stakeholders decided to develop a plan with a regional focus designed to identify a set of integrated solutions addressing goals for water supply, water quality, habitat improvement, and increased recreational parks and open space. The stakeholders acknowledged that no single funding source will be sufficient to pay for all of the warranted actions. This IRWM Plan addresses how to make wise use of all available funding sources, with an emphasis on improving regional self-sufficiency. This IRWM Plan identifies local and regional funding sources that may also be used to obtain state and federal funds from a variety of sources that require a local cost share.

The RWMG acknowledged that a separate process (called adjudication) related to groundwater management was also underway. Members of the RWMG and other stakeholders discussed at length whether it was possible (and if possible, how) to develop a Regional Water Management Plan before the adjudication was settled. The members of the RWMG agreed that since the IRWM Plan and the adjudication were focused on different aspects of water management, they could proceed in parallel. This IRWM Plan contains information to help take action to meet shared objectives for long-term water management for the entire region. The results of the adjudication will help provide important clarity and certainty between groundwater users about how the groundwater resources will be managed, but other important water management actions can and should be taken without waiting for a final adjudicated solution. Members of the RWMG agreed that no information developed for the purposes of the IRWM Plan should be interpreted to interfere in any way with the adjudication process. The data provided in this report were not prepared in a manner suitable to answer the questions being addressed in the adjudication.

This IRWM Plan creates opportunities for new partnerships and collaboration as well as documents a collective vision to meet water resource needs and improve the ecological health of the Antelope Valley Region. The quantitative planning targets provide investors the means to measure progress and account for the tangible community benefits. In short, this IRWM Plan describes a specific and financially feasible set of actions necessary to manage the precious water resources within this Antelope Valley Region through 2035 for the benefit of every resident.

1.1 BACKGROUND

The Antelope Valley Region is a triangular-shaped, topographically closed basin bordered on the southwest by the San Gabriel Mountains, on the northwest by the Tehachapi Mountains, and on the east by a series of hills and buttes that generally follow the Los Angeles/San Bernardino County line (Figure 1-1, Antelope Valley IRWM Plan Region). The Antelope Valley Region encompasses approximately 2,400 square miles in northern Los Angeles County, southern Kern County, and western San Bernardino County, and covers the majority of the service area of the Antelope Valley-East Kern Water Agency (AVEK), the largest water wholesaler in the Antelope Valley Region. Major communities within the Antelope Valley Region include Boron, California City, Edwards Air Force Base (AFB), Lancaster, Mojave, Palmdale and Rosamond.

Water supply for the Antelope Valley Region comes from three primary sources: the State Water Project (SWP), surface water stored in the Littlerock Reservoir, and the Antelope Valley Groundwater Basin. The Antelope Valley Region's SWP contractual Table A Amount is approximately 160,000 acre-feet per year (AFY). With proper treatment, SWP water is generally high quality water well-suited for municipal and industrial (M&I) uses; however, the reliability of the SWP water supply is variable. Surface water stored at the Littlerock Reservoir, which has a storage

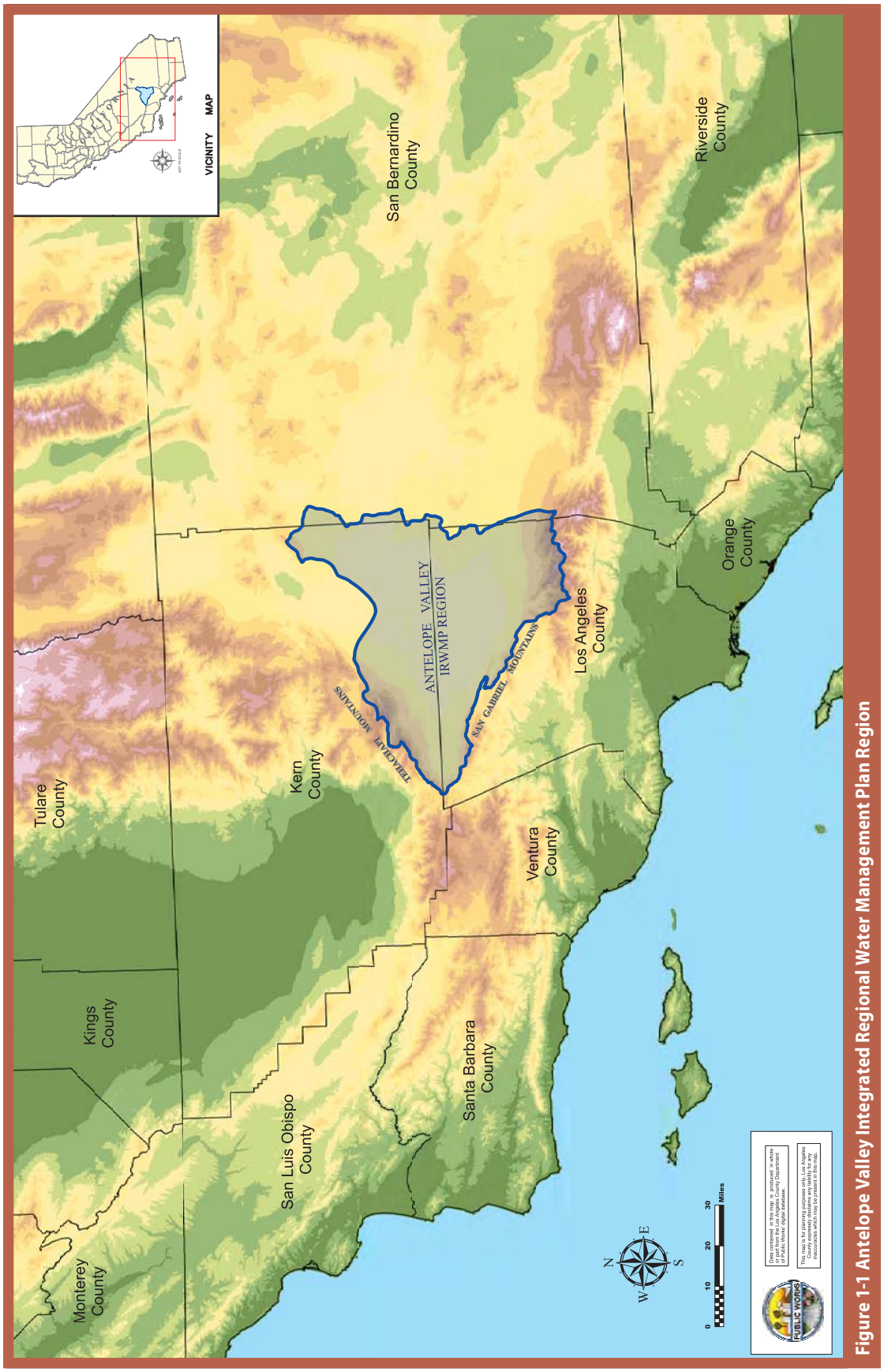

Figure 1-1 Antelope Valley Integrated Regional Water Management Plan Region

Mojave Desert floor landscape

capacity of 3,500 acre-feet (AF), is used directly for agricultural uses and for M&I purposes following treatment.

The Antelope Valley Groundwater Basin is a large basin comprised of a principal aquifer that yields most of the current groundwater supplies, and several less-used deep aquifers. Groundwater levels in some areas have declined significantly since the early 1900s due to over-extraction. Groundwater quality is excellent within most of the principal aquifer but degrades toward the northern portion of the dry lakes areas. High levels of arsenic, fluoride, boron, and nitrates are a problem in some areas of the Basin. The groundwater in the Basin is currently used for both agricultural and M&I uses.

Reclaimed water and stormwater are secondary sources of water supply. A portion of the effluent from the Antelope Valley Region's two large wastewater treatment plants, Los Angeles County Sanitation Districts' (LACSD) plants in Palmdale and Lancaster, are used for maintenance of wetlands, agricultural irrigation, landscape irrigation, and a park impoundment. Stormwater runoff from the Antelope Valley and the surrounding mountains and hills is usually carried by ephemeral streams. Except during the biggest rainfall events of a season, stormwater runoff quickly percolates into the stream bed and recharges the groundwater basin. Any runoff that reaches the dry lakes is generally lost to evaporation. Historically, water supplies within the Antelope Valley Region had been used primarily for agriculture; however, due to population growth beginning in the mid-1980s, water demands from residential and industrial uses have increased significantly and this trend is expected to continue. Projections indicate that approximately 1.17 million people will reside in the Antelope Valley Region by the year 2035, nearly 161 percent more than currently live in the Antelope Valley Region.

The expected continuation of rapid growth in the Antelope Valley Region will affect water demand and increase the threat of water contamination from additional wastewater and urban runoff. More residents will also lead to higher demand for water-based recreation. Increasing demands coupled with recent curtailments of SWP deliveries have intensified the competition for available water supplies. This competition has often limited the water available for natural habitat within the Antelope Valley.

Thus, these potential impacts could affect most residents within the Antelope Valley Region. In order to establish a viable action plan that will inspire action, a broad representation of stakeholders throughout the Antelope Valley must be involved in formulating this IRWM Plan.

1.2 STAKEHOLDER PARTICIPATION

An extensive stakeholder outreach process is crucial to ensure that this IRWM Plan reflects the needs of the entire Antelope Valley Region, promotes the formation of partnerships, and encourages coordination with state and federal agencies. One of the benefits of this planning process is that it brings together a broad array of groups into a forum to discuss and better understand shared needs and opportunities. Residents of the Antelope Valley Region are facing rapidly changing conditions that increase the likelihood of serious disruption in water-related services or long-term degradation of water supply or environmental resources. Agencies and planning jurisdictions must work closely together in order to assure the delivery of clean reliable water while maintaining the quality of life in the Antelope Valley Region. If sufficient planning and preventative action is not taken, the consequences for the Antelope Valley Region are likely to be severe.

A section of the California Aqueduct, the principal water-conveyance structure of the California SWP.

This IRWM Plan benefited from active participation by a wide range of stakeholders. Members of the RWMG and other stakeholders participated in fifteen stakeholder meetings, reviewed draft document materials, and provided extensive collaborative input to shape this IRWM Plan. For those topics that required further discussion during Plan development, stakeholders engaged in smaller, focused group dialogue to ensure that all stakeholder concerns were being considered while continuing to expedite this IRWM Plan development process. Through participation in stakeholder meetings (at a minimum, monthly, and maximum of three times a month) stakeholders have been exposed to a variety of opportunities for discovering and establishing mutually beneficial partnerships.

1.2.1 Regional Water Management Group

As described earlier, agencies in the Antelope Valley Region recognized the need for, and benefits of, regional cooperation and planning. In an effort to adequately represent the Antelope Valley Region, the RWMG was formed through a Memorandum of Understanding (MOU) (Appendix A). By signing the MOU, the agencies agreed to contribute funds to help develop this IRWM Plan, provide and share information, review and comment on drafts of this IRWM Plan, adopt the final IRWM Plan, and assist in future grant applications for the priority projects selected in this IRWM Plan.

The RWMG includes AVEK, Antelope Valley State Water Contractors Association (AVSWCA), City of Lancaster (Lancaster), City of Palmdale (Palmdale), Littlerock Creek Irrigation District (LCID), LACSDs14 and 20, Los Angeles County Waterworks District No. 40 (LACWWD 40), Palmdale Water District (PWD), Quartz Hill Water District (QHWD), and Rosamond Community Services District (RCSD). These participants' roles and responsibilities for managing water, natural resources, and land use within the Antelope Valley Region are discussed below:

1.2.1.1 Antelope Valley-East Kern Water Agency

AVEK is a wholesale supplier of SWP water to the Antelope Valley Region. AVEK's service area encompasses nearly 2,400 square miles in northern Los Angeles and eastern Kern Counties as well as a small portion of Ventura County. AVEK was granted charter by the State in 1959 and became a SWP contractor in 1962.

AVEK is the third largest SWP contracting agency with a current contractual Table A amount of 141,400 AFY. 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. This volume includes both agricultural and M&I SWP water, which AVEK distributes to M&I

The Stakeholders are presented with funding opportunities from the California Department of Public Health during the 16th Stakeholder meeting in Lancaster, CA

retailers in the Antelope Valley Region. AVEK estimates that it currently provides water to a population of approximately 285,000 persons through seventeen retail water agencies and water companies. Currently AVEK customers utilize approximately 75,000 AFY of its Table A Amount.

AVEK does not have production groundwater wells and does not provide recycled water. AVEK, however, does provide a small amount of SWP water to areas outside of the Antelope Valley. AVEK is also a partner in the Joint Powers Authority (JPA) for the AVSWCA.

1.2.1.2 Antelope Valley State Water Contractors Association

The AVSWCA is a JPA of the three local SWP contractors of the Antelope Valley (AVEK, LCID, and PWD) that was formed in May 1999.

The AVSWCA has a declared Statement of Principals and Objectives to frame its roles and responsibilities:

- to make optimum use of available water supplies to meet current and anticipated demands;
- to confirm that the AVSWCA will not take away any water rights within the Antelope Valley;
- to develop plans for maximum cooperative use of the available water resources;
- to establish an equitable means of apportioning the benefit and burdens of water resource management;
- to prevent the export of native surface water and groundwater from the Antelope Valley and to develop reasonable limitations upon the export of any other water from the Antelope Valley;
- to provide a mechanism for the storage and recovery of water;
- to encourage the protection and preservation of surface water and groundwater quality;
- to develop conservation plans to promote reasonable beneficial use of water;
- to respect existing jurisdictional authority of the public agencies and water suppliers in the Antelope Valley;
- to solicit and welcome the advice, council and support of interested parties and the public in the implementation of these principals and objectives; and
- to conduct regularly scheduled meetings to advance these principles and objectives and discuss other matters of common interest.

In August 2006, the AVSWCA accepted responsibility as the facilitator for groundwater banking projects in the Antelope Valley.

1.2.1.3 City of Lancaster

Lancaster is located at the northern edge of Los Angeles County in the Antelope Valley and borders the northern edge of Palmdale to the south. It is located 60 miles northeast of the Los Angeles Civic Center and is approximately 2,400 feet above sea level. It serves as a commercial, cultural and educational center for the high desert Antelope Valley. Lancaster is suburban in nature and enjoys a temperate year-round climate.

Lancaster is a highly acclaimed, award winning municipality. Lancaster has received seventeen League of California Cities Helen Putnam Awards of excellence and was one of ten cities in the nation to be honored with the City Livability award in 2000. It is the eighth-largest city in Los Angeles County, is also the County's fastest growing city, with a population of approximately 138,000 and an area of 94 square miles.

The Planning Department is responsible for development and implementation of a variety of short-, mid-, and long-range plans, including the City's General Plan, various specific plans, and the City's zoning and subdivision ordinances. The Public Works Department has received National Awards for Economic Development Programs and innovative Public Works projects, and it is responsible for various environmental compliance and conservation projects as well as flood control and stormwater management. The Parks, Recreation and Arts Department manages eleven City parks with more than 500 acres, including athletic fields, swimming pools, playgrounds and walking trails.

Lancaster is a General Law City, incorporated in 1977, and operating under Council-Manager form of government. The City government provides various municipal services related to water and natural resources management. Utility services within Lancaster are provided by several public and private agencies. Water service is primarily provided by LACWWD 40; and sewer service is provided by the LACSD 14.

1.2.1.4 City of Palmdale

Palmdale, the first community within the Antelope Valley to incorporate as a city in 1962, is

located in the northeast reaches of Los Angeles County, separated from Los Angeles by the San Gabriel Mountain range. Over the last 20 years, Palmdale has consistently been ranked in the top ten fastest growing cities in the U.S. based on percentage change. As of spring 2005, the population is estimated at 143,000, making Palmdale the sixth largest city in Los Angeles County and the largest "desert city" in California. With 105 square miles of land in its incorporated boundaries, Palmdale is in the top 100 largest cities in the U.S. in geographic area and as of 2005 ranks 150th by population in the U.S.

The Palmdale government provides various municipal services related to water and natural resource management. The Planning Department is responsible for the development and implementation of a variety of short-, mid-, and long-range plans, including the City's General Plan, various specific plans, and the City's zoning and subdivision ordinances. The Public Works Department is responsible for the development and maintenance of the City's flood control and stormwater management facilities. The Parks and Recreation Department's responsibilities include the administration, management and implementation of programs that maintain and beautify Palmdale's parklands and recreational facilities.

Utility services within Palmdale are provided by several public and private agencies. Water service is primarily provided by PWD and LACWWD 40; sewer service is provided by the LACSD 20; and refuse pickup and disposal service is provided by Waste Management, Inc. of the Antelope Valley under a franchise agreement with the City.

1.2.1.5 Littlerock Creek Irrigation District

LCID is the smallest of the three SWP Contractors within the Antelope Valley. LCID's service area comprises approximately 17 square miles within the southeastern region of the Antelope Valley. The majority of LCID consists of unincorporated land east of the City of Palmdale, though a small portion of the city is within LCID's boundaries.

LCID receives raw water from the SWP, local surface water from Littlerock Reservoir and pumps groundwater. LCID's SWP contractual Table A amount is 2,300 AF and provides water to approximately 1,130 active service connections (LAFCO 2004).

Scenic vista across Littlerock Reservoir

LCID is a partner in the JPA for the AVSWCA and also participates in a joint use agreement with PWD for shared use of Littlerock Dam for treated water. LCID's surface water source is from surface runoff collected in Littlerock Reservoir. Littlerock Reservoir, which is co-owned with PWD, is fed by the runoff from the San Gabriel Mountains and has a useable storage capacity of 3,500 AF of water. PWD and LCID jointly have long-standing water rights to 5,500 AFY from Littlerock Creek flows (PWD 2001). LCID has an agreement with PWD to treat LCID's SWP and Littlerock Creek water when it is needed for potable use. LCID has one groundwater well for agriculture, four groundwater wells producing potable water and five one-million gallon tanks to store potable water for residential use (personal communication, LCID, 2005).

1.2.1.6 Los Angeles County Sanitation District Nos. 14 and 20

LACSDs are a confederation of independent special districts serving about 5.1 million people in Los Angeles County. LACSD's service area covers approximately 800 square miles and encompasses 78 cities and unincorporated territory within the County. The agency is made up of 24 separate Sanitation Districts working cooperatively under a Joint Administration Agreement with one administrative staff headquartered near the City of Whittier. Each Sanitation District has a separate Board of Directors consisting of the Mayor of each city within that District and the Chair of the Board of Supervisors for county unincorporated territory. Each Sanitation District pays for its proportionate share of joint administrative costs. The Antelope Valley is served by the LACSD 14 and 20.

The Antelope Valley Stakeholders are presented with an update on their Proposition 50 Round 2 Step 1 application during the 16th Stakeholder meeting in Lancaster, CA.

LACSD 14 was formed on August 31, 1938, to provide wastewater management services in the Antelope Valley. LACSD 14, whose service area is 45 square miles, serves a large portion of Lancaster as well as portions of Palmdale and adjacent unincorporated areas of Los Angeles County. LACSD 20 was formed on August 7, 1951, to provide wastewater management services for the Palmdale area. Its service area is approximately 31.4 square miles and serves the majority of residents within Palmdale, as well as adjacent unincorporated Los Angeles County areas.

The LACSD owns, operates, and maintains over 1,300 miles of main trunk sewers and eleven wastewater treatment plants with a total permitted capacity of 636.8 million gallons per day (mgd). The LACSD sewerage system currently conveys and treats approximately 510 mgd of wastewater. During 2004, a total of approximately 187 mgd of wastewater was treated to a tertiary level and approximately 35 percent (65 mgd) of the effluent was reused for a variety of applications. Operation of LACSD facilities influence the community and environment in the Antelope Valley by providing effluent to landscape and agricultural irrigation, industrial process water, recreational impoundments, wildlife habitat maintenance, and groundwater replenishment.

1.2.1.7 Los Angeles County Waterworks District No. 40

LACWWD 40 is a public water agency that serves portions of the Cities of Lancaster and Palmdale, and several small communities in the eastern portion of the Antelope Valley. LACWWD 40 was formed in accordance with Division 16 Sections 55000 through 55991 of the State Water Code to supply water for urban use throughout the Antelope Valley. It is governed by the Los Angeles County Board of Supervisors with the Waterworks Division of the County Department of Public Works providing administration, operation and maintenance of LACWWD 40's facilities.

LACWWD 40 provides water service to approximately 162,000 residents through 53,000 service connections, and operates and maintains 46 wells, approximately 923 miles of water mains, 30 booster pumping stations, 59 water storage tanks with 65 million gallons of storage capacity. LACWWD 40's service area encompasses approximately 554 square miles which is comprised of eight regions serving customers in the communities of Lancaster (Region 4), Pearblossom (Region 24), Littlerock (Region 27), Sun Village (Region 33), Desert View Highlands (Region 34), Northeast Los Angeles County (Region 35), Lake Los Angeles (Region 38), and Rock Creek (Region 39). It is noted that Regions 4 and 34 are integrated and operated as one system. Regions 24, 27, and 33 are also integrated and operated as one system.

LACWWD 40's permanent water supply is from its own groundwater wells. In order to protect this invaluable resource, LACWWD 40 utilizes water from the SWP to meet its customers' demands whenever the SWP supply is available. SWP water is obtained through connections to AVEK's facilities. During 2005, LACWWD 40 supplied 54,421 AF of water to its customers. Approximately 66 percent of the water served in its service area was purchased water from AVEK and the remaining 34 percent was groundwater from its wells.

1.2.1.8 Palmdale Water District

PWD is a wholesaler and retailer of potable water. PWD was established in 1918 as the Palmdale Irrigation District (PID). The name was changed in 1973 to reflect the absence of agricultural water service. As stated above, PWD is also a partner in the JPA for the AVSWCA. PWD boundaries encompass approximately 187 square miles. Approximately 35 square miles are directly served by PWD and an additional two square miles are served through agreements with AVEK (the majority of the remaining area falls within the Angeles National Forest).

PWD has three sources for water: (1) imported water from SWP, of which it has a contractual Table A amount of 21,300 AFY, (2) local groundwater, and (3) surface water (Littlerock Reservoir, which is jointly owned by LCID, and PWD). Littlerock Reservoir has a storage capacity of 3,500 AF of water. Palmdale Lake stores the SWP water and any Littlerock Reservoir discharges until treatment and distribution. Groundwater wells produce approximately 40 percent of PWD's water supply. Recycled water is projected for use within the PWD service area in the future.

In general, PWD serves the eastern half of the City of Palmdale and adjacent unincorporated areas of Los Angeles County, and maintains over 26,000 service connections.

1.2.1.9 Quartz Hill Water District

QHWD is an independent special district that was incorporated in 1955, with a service area of about 4.5 square miles located in the southwest end of the Antelope Valley at the north end of Los Angeles County.

QHWD's service area includes portions of both Cities of Lancaster and Palmdale as well as unincorporated County land between the two. Water service is provided to residential, commercial, industrial, and agricultural customers, as well as for environmental and fire protection uses.

QHWD is a retailer of imported water from AVEK and produces local groundwater. In 2004, QHWD imported approximately 4,099 AF of water from AVEK, and pumped approximately 1,348 AF of groundwater for distribution in its service area.

1.2.1.10 Rosamond Community Services District

RCSD was formed in 1966 under the Community Services District Law, Division 3, Section 61000 of Title 6 of the Government code of the State of California. RCSD's service area boundary encompasses approximately 31 square miles of unincorporated residential, industrial, and undeveloped land. The majority of the land located within the RCSD's service area is undeveloped. The developed property focuses around central Rosamond, with the exception of the Tropico Hills.

RCSD provides water, sewer, lighting service, and public park maintenance services to residential, commercial, industrial, and agricultural customers, as well as water for environmental and fire protection uses.

RCSD is a retailer of imported water from AVEK and produces local groundwater. In 2004, RCSD imported approximately 1,191 AF of water from AVEK, and pumped approximately 1,990 AF of groundwater for distribution in its service area.

The composition of the RWMG provides a good cross-sectional representation of all water/natural resource and land-use management activities for the Antelope Valley Region. Table 1-1 provides a summary of participating agencies' roles and responsibilities specific to this IRWM Plan development and implementation.

1.2.2 Planning Group ("Stakeholders")

In addition to the RWMG, this IRWM Plan has had the input of many other interested agencies and organizations. Membership in the stakeholder group was broadly extended to a number of entities and membership continues to grow. Neither a financial contribution nor agency status were required to be part of the collaborative IRWM Plan development process. Through extensive outreach efforts, individuals from disadvantaged, small, and rural communities as well as other interested groups are continually encouraged to participate, and are being informed of IRWM Plan development efforts through

The Stakeholders review the goals for the planning process during the 7th Stakeholder meeting on December 13th.

Table 1-1 Participating Entities	
Agency	**Roles and Responsibility**
AVEK	Wholesaler of imported water to the Antelope Valley Region
AVSWCA	Members provide imported water to Antelope Valley
City of Lancaster	Provides land-use planning, environmental, flood management, and parks and recreation services
City of Palmdale	Provides land-use planning, environmental, flood management, and parks and recreation services
LCID	Supplies surface and imported water to the Antelope Valley Region
LACSD 14	Provides collection and treatment of wastewater and supplies recycled water to portions of the Antelope Valley Region
LACSD 20	Provides collection and treatment of wastewater and supplies recycled water to portions of the Antelope Valley Region
LACWWD 40	Supplies water to portions of Los Angeles County
PWD	Supplies water to portions of Palmdale and adjacent unincorporated areas of Los Angeles County
QHWD	Supplies water to portions of the southwest end of Antelope Valley
RCSD	Supplies water to portions of unincorporated Kern County

presentations, media relations, and information disseminated in their communities.

In an effort to reduce existing conflicts in the Antelope Valley Region, many of which have traditionally been experienced in areas that include both large and small communities, urban, rural, and agricultural interests, and no mechanism for joint planning and prioritization, this IRWM Plan has been prepared through a collaborative process of many agencies and organizations with an interest in improving water supply reliability and sufficiency, water quality, water conservation, flood control, natural habitat, and land-use planning in the Antelope Valley Region. This subsection lists all current stakeholders grouped into several categories and describes their roles in the planning process. The broad array of participants include the agencies that comprise the RWMG as well as an extensive mix of other cities and regulatory, environmental, industrial, agricultural, and land-use planning agencies that represent all areas of the Antelope Valley Region. A brief discussion of coordination efforts with local planning, State, and Federal agencies is also provided where appropriate.

Planning group meetings were held, at a minimum, monthly, to allow for discussion of issues facing the Antelope Valley Region. These meetings were open to the public and all other interested parties. Copies of the meeting minutes and presentations from these meetings are available on the project website (www.avwaterplan.org).

1.2.2.1 State Water Project Contractors

The State Water Project Contractors include agencies that provide distribution of SWP water to the Antelope Valley. Each of these agencies is a member of the RWMG and was described in Section 1.2.1. These agencies include AVSWCA, AVEK, LCID, and PWD.

1.2.2.2 Retail Water Purveyors

The retail water purveyors include agencies that have water management responsibilities in the Antelope Valley Region. A majority of these agencies is a member of the RWMG and was described in Section 1.2.1. These agencies include LACWWD 40, QHWD, Palm Ranch Irrigation District, and RCSD.

1.2.2.3 Local Jurisdictions/Land-Use Planning Agencies

Several land-use planning departments and agencies have been involved in the development and implementation of the projects and objectives of this IRWM Plan. Their participation provides a link between local planning agencies and this IRWM Plan by offering input in meetings, providing accurate and consistent land-use planning information, and incorporating local planning documents and goals into the IRWM Plan objectives. In addition, representatives of the Cities of Palmdale, Lancaster, California City, and Boron, and the Los Angeles and Kern County Departments of Regional Planning, participate in the meetings.

1.2.2.4 Federal Agencies

Several federal agencies have been involved in the development and implementation of the objectives and projects for the IRWM Plan. Coordination with federal regulatory agencies is essential to the development and implementation of all recommended projects due to the need for

regulatory and environmental approval prior to implementation. The federal agencies involved include: the United States Department of Agriculture, Natural Resources Conservation District, United States Geological Survey, and Edwards AFB. The role of Edwards AFB is to ensure that their natural resource management goals are incorporated into this IRWM Plan.

1.2.2.5 Regulatory Agencies/State Agencies

Several state regulatory agencies have been involved in the development and implementation of the objectives and projects for this IRWM Plan. Their participation has focused particularly on water quality issues pertaining to groundwater recharge within the Antelope Valley Region. Coordination with state regulatory agencies is essential to the development and implementation of all recommended projects due to the need for regulatory and environmental approval prior to implementation. The Lahontan Regional Water Quality Control Board (RWQCB) has participated in preparing this IRWM Plan, and coordination regarding projects within this IRWM Plan has already begun. Furthermore, these agencies have had the chance to address items of concern on these projects at the monthly stakeholder meetings. The roles and responsibilities of these agencies are to ensure that regulatory compliance standards and goals are incorporated in this IRWM Plan. The agencies include: the Lahontan RWQCB, the California Department of Health Services, the California State Parks, and the California State Department of Fish and Game.

1.2.2.6 Environmental Community

The role and responsibility of the environmental community is to ensure that goals for conservation and protection of the natural resources and habitat within the Antelope Valley are incorporated in this IRWM Plan. The environmental communities involved include the Antelope Valley Conservancy, the Antelope Valley Water Conservation Coalition, Antelope Valley Resource Conservation District and the Sierra Club.

1.2.2.7 Building Industry

The Building Industry Association's role is to ensure land-use planning and growth management within the Antelope Valley is incorporated in this IRWM Plan. The building industry entities involved include two chapters of the Building Industry Association, the Antelope Valley Chapter and the Kern County Chapter.

1.2.2.8 Agricultural/Farm Industry

Agricultural and Farm interests for the Antelope Valley Region have been represented by the Los Angeles County and Kern County Farm Bureaus as well as individual farm and land owners. Their role is to ensure that agricultural and farm interests are incorporated in this IRWM Plan.

1.2.2.9 Wastewater Agency

Wastewater service for the Antelope Valley is provided by the LACSDs 14 and 20. The LACSD is a member of the RWMG and its roles and responsibilities are described in Section 1.2.1.

1.2.2.10 Mutual Water Companies

There are several mutual water companies in the Antelope Valley that provide water-related services to the Antelope Valley Region. Their role is to ensure that their water management goals are incorporated in to this IRWM Plan. Mutual water companies involved include: Antelope Park Mutual Water Company, Edgemont Acres Mutual Water Company, El Dorado Mutual Water Company, Evergreen Mutual Water Company, Golden Valley Mutual Water, Land Projects Mutual Water, Little Baldy Water Company, Westside Park Mutual Water Company, and White Fence Farms Mutual Water Company.

1.2.2.11 Media

Representatives of the Antelope Valley Press and the Mojave Desert News regularly attended RWMG stakeholder meetings and informed their readership of the goals and objectives of this IRWM Plan. Progress was regularly reported on in these two major area newspapers as well as other local papers.

A variety of agricultural and flora prosper in the Antelope Valley climate. Photo courtesy of Nevel Burke, U.S. Army Retired.

1.2.2.12 Others

Other agencies involved in the planning process include the Boron Community Services District, the Mojave Chamber of Commerce, California City Economic Development Commission, the Association of Rural Town Councils, and individual town councils throughout the Antelope Valley Region. The various town councils' roles are to ensure that their water, natural resource, fire suppression, flood control, and land-use planning goals are incorporated in this IRWM Plan. Inclusion and participation by these organizations marks a first for the area and ensures that the resulting IRWM Plan is truly regional. A copy of a sign-in sheet from one of the many Stakeholder meetings can be found in Appendix B.

1.2.3 Activities

This IRWM Plan was developed to evaluate and address regional issues while recognizing and honoring local conditions and preferences. In order to accomplish this delicate balance, an effective process to involve stakeholders and incorporate their input was necessary. The process centered on, at a minimum, monthly stakeholder meetings open to the public where attendees were invited to participate in several ways. Attendees were asked to participate in facilitated discussions of major items of interest, to review draft plan chapters, and to provide input on the agenda for upcoming stakeholder meetings. These meetings were announced to a broad distribution list via e-mail and all materials developed for use in stakeholder meetings were made available on the project website. The methods for stakeholder involvement and input are described below:

- **Review of Plan Sections:** This IRWM Plan synthesizes and extends a significant body of work related to water supply, water quality, and open space for the Antelope Valley Region. This information was synthesized and generated incrementally and provided to all interested stakeholders periodically for review. Given the incremental development and review cycle, stakeholders had multiple opportunities to provide input and the material was adopted only after the stakeholders reached facilitated broad agreement on the material. The subjects of the chapters include: introduction, Region description, key issues and needs, Plan objectives, water management strategy development, water management strategy integration, water management strategy prioritization and selection, and framework for implementation. These chapters incorporate and integrate stakeholder-generated information and aggregate this information across the entire Antelope Valley Region. In addition, a summary of existing plans, reports, studies, and interviews with selected stakeholders to obtain the individual perspective of those entities have been compiled for reference.
- **Monthly Stakeholder Meetings:** These meetings provide background on the planning process; identify issues, opportunities and constraints; consider opportunities for project integration, and identify comments on the chapters and draft plans. They also provide a forum for more detailed discussion of the issues related to development of this IRWM Plan, including the prioritization and selection of projects for Round 2 of Proposition 50, Chapter 8, Proposition 84, and Proposition 1E.
- **Project Website:** A project website was developed (www.avwaterplan.org) to facilitate the distribution of project information to stakeholders. The website contains background information about Plan development, a schedule of meetings, and contact information. The website also includes a database tool through which stakeholders could submit or review projects or project concepts. Since the project website was created in November 2006, it has received over 9,750 hits. A print out of the home page is included in Appendix C.
- **Electronic and Written and Communications:** Electronic mail was the main tool used to maintain a high level of stakeholder communication and engagement. All meetings and public hearing announcements were sent as far in advance as possible to stakeholders. Various stakeholder groups also forwarded these messages to their constituencies, thereby reaching additional stakeholders. In addition, written communications in the form of letters to cities and press releases to the media were utilized to expand awareness of, and participation in, this IRWM Plan development. Regular attendance at stakeholder meetings by members of the local press also went a long way toward keeping the residents of the Antelope Valley Region informed. Sample letters are provided in Appendix C.

The delicate balance between the natural and man-made environment will be dependent on the future security of our water.

Public Outreach Subcommittee members meet to discuss various opportunities to involve more Antelope Valley communities in the development of the plan.

1.2.4 Community Outreach

Community outreach within the Antelope Valley Region is a key component to a successful IRWM Plan. Simply stated, a regional plan should have regional input, and would incorporate the widest variety of stakeholders possible. Initial outreach efforts began in the early stages of the planning process and were targeted at improving overall stakeholder participation through increased agency and organized committee involvement. However, it soon became clear that this method of solicitation was not as effective with many of the smaller communities in the Antelope Valley with valuable input were not being represented at the general group meetings. Therefore, outreach efforts were accelerated in January of 2007 to broaden the scope to improve outreach to smaller communities in the region through the formation of the Public Outreach Subcommittee (Subcommittee).

> *"We see an interaction that is taking place now that hasn't happened before."*
>
> – Claud Seal,
> Rosamond Community Services District

The Subcommittee was composed of volunteer members representing a diverse cross section of the active Antelope Valley IRWM Plan stakeholders including cities, a farming entity, a local town council member, and wastewater and water agencies. The members soon developed and implemented a multifaceted outreach campaign to support the IRWM Plan that would more actively address the general public through improved media relations with the local press, increased information accessibility at the www.avwaterplan.org website, and more focused community outreach. The outreach strategy outlined subcommittee objectives, key messages, and tasks needed to reach the objectives. Overall, the two main goals of the Subcommittee were to:

- Encourage participation and solicit input into Antelope Valley IRWM Plan development, and
- Educate target audiences about the purpose and benefits of the Antelope Valley IRWM Plan

The varied background and knowledge and overall enthusiasm of the Subcommittee members proved very helpful in determining the most effective way to reach more Antelope Valley communities. As multiple tactics were discussed, a decision was made for Subcommittee members to begin outreach through the Antelope Valley Association of Rural Town Councils (Association) community meeting to obtain input from local leaders on the most effective ways to reach their residents. Members collectively prepared PowerPoint presentation materials that would introduce the collaborative IRWM Plan concept and its importance to the Antelope Valley while soliciting feedback about community outreach methods and project ideas that could be incorporated into the IRWM Plan. The Association unanimously advised the Subcommittee that the IRWM Plan presentation should be given at each of the individual Town Council meetings to reach the largest audience. The response was so positive that a couple town council meetings were scheduled immediately following the conclusion of the presentation.

With the newly-acquired information from the Association, the Subcommittee obtained a complete roster of the active rural town councils in the Antelope Valley from the Los Angeles County Board of Supervisor's Office and began an intense coordination effort to speak at the community meetings. At least two Subcommittee members volunteered to present at each outreach meeting scheduled. This allowed for a diversity of presenters to attend each meeting as well as demonstrated the united efforts being developed through participation in the IRWM Plan. In addition to the PowerPoint presentation, handouts were provided at each meeting that included detailed meeting schedules, project eligibility criteria, IRWM Plan goals, plan objectives, and technical assistance listings with contact information. Based upon community feedback, these materials were distributed to every attendee at each meeting in hardcopy and electronic formats and created in both English and Spanish. As meetings progressed, outreach materials continuously evolved to reflect the new information received. Table 1-2 contains a list of the community outreach meetings scheduled with the town councils.

Table 1-2 Community Outreach Meetings

Meeting/Event	Presenters	Meeting Date	Attendance
Hispanic Chamber of Commerce, Palmdale(a)	TBD	TBD	TBP
Division High School, Lancaster(a)	TBD	TBD	TBP
Association of Rural Town Councils(a)	LACWWD 40	April 26, 2007	14
Three Points Town Council	LACWWD 40	May 12, 2007	13
Antelope Acres Town Council	LACWWD/RCSD	May 16, 2007	16
Lake Los Angeles Town Council(a)	LACSD	May 22, 2007	17
Roosevelt Town Council(a)	City of Lancaster /LACWWD	May 29, 2007	19
The Lakes Town Council	Leona Valley/PWD	June 2, 2007	80+
Leona Valley Town Council	LACSD	June 11, 2007	NR
Juneteenth Festival - Sun Village	LACWWD 40/PWD	June 16 - 17, 2007	NR
California City Economic Development Corporation	City of Lancaster/RCSD	June 21, 2007	35
Boron Community Services District	LACWWD 40/RCSD	June 21, 2007	5
Sun Village & Littlerock Town Councils(a)	LACWWD 40/AV Resources Conservation District/Kennedy Jenks	June 25, 2007	20
Mojave Chamber of Commerce(a)	LACWWD 40/RCSD	June 28, 2007	25
Littlerock Town Council(a)	LACWWD 40/PWD	July 12, 2007	40
Southern AV Community Draft Plan Review	Multiple	July 10, 2007	30
Northern AV Community Draft Plan Review	Multiple	July 17, 2007	17
Juniper Hills Town Council	LACSD	August 1, 2007	NR
Junifer Hills Town Council	LACWWD 40	October 3, 2007	11

Note: (a) DAC or DAC leaders present
TBD: To Be Determined
TBP: To Be Provided
NR: Not Recorded

While additional presentation materials were generated for more effective town council meetings, members also began analyzing census data, interviewing additional community organizations, and consulting with state representatives to better identify disadvantaged communities (DACs), environmental justice problems, underrepresented, and rural populations within the region.

Initial Research and Feedback

The following subsection outlines multiple areas of research utilized and information gathered about the Antelope Valley Region the subcommittee gathered to tailor outreach efforts that would more effectively spread the word about the IRWM Plan and provide the best assistance to each community. As a part of this research phase, Subcommittee members proactively solicited advice and input from the Department of Water Resources (DWR), the Lahontan RWQCB, and the Environmental Justice Coalition for Water (EJCW).

Census Data and Community Categorization

Through outreach and data gathering, the subcommittee categorized the smaller, rural communities into three categories: disadvantaged, isolated, and underrepresented.

Disadvantaged Communities

As defined by Proposition 50, Chapter 8, DACs are defined as having an annual median household income (MHI) that is less than 80 percent of the statewide annual median household income, which is $37,994 using Census 2000 data. To begin identifying disadvantaged areas in the Antelope Valley Region, subcommittee members conducted an initial assessment of the Antelope Valley Region using 2000 Census data. In order to provide the most accurate determination of the DACs in the Antelope Valley Region, MHI was compared at the census tract level. The analysis showed that approximately 20 census tracts within the Region have an MHI less than 80 percent of the statewide MHI. This equates to approximately 20 percent of the Antelope Valley

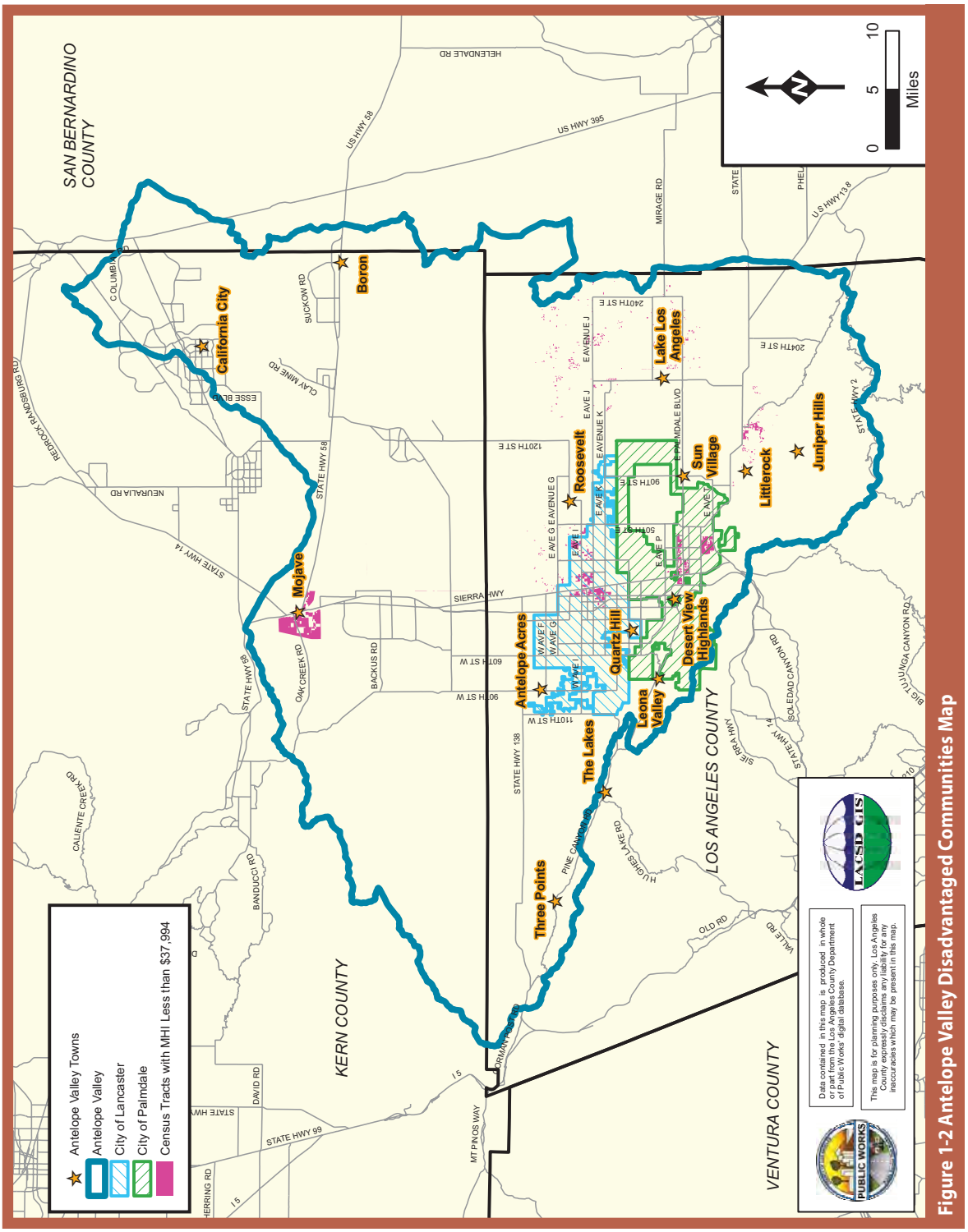

Figure 1-2 Antelope Valley Disadvantaged Communities Map

Region's population. Census block information, which is more detailed than census tract level information, was further refined through the creation of a map with residential household areas. This allowed members to compare census tract and residential information to more-accurately pinpoint specific communities within the census blocks that were disadvantaged, as census blocks tend to cover large areas with very few residents. By identifying the actual residential areas within the blocks, subcommittee members could then effectively locate the organizations that would ensure communication with DAC community members (see Figure 1-2). Using these methods, the following DACs and their critical water related needs were identified in the Antelope Valley Region:

Lake Los Angeles, Unincorporated Los Angeles County

- Interest in restoring Lake Los Angeles – could create reservoir for farming, fire usage, recreation, tourism/commercial, possible groundwater recharge site, possible use of recycled water.
- Provide flood control at Big Rock Creek Wash – heavy rains cause flooding along local roads.
- Transition from septic systems to sewer – they have some sewer lines installed but have not been used.

Littlerock, Unincorporated Los Angeles County

- Would like to see the creation and enforcement of zero-scaping ordinances designed for their community.
- Interested in opportunities for water recharge, banking, and conservation – although no specific examples were cited at the time.
- Concern about growth of communities vs. water reliability for the region.

Mojave, Unincorporated Kern County

- Water conservation concerns. Specifically, the Mojave School District is interested in constructing two new high schools in a water-efficient manner. The Outreach Subcommittee put the School District in contact with Mojave Utilities District and EJCW representative, Cindy Wise.

Portions of the City of Lancaster

- Critical water-related needs to be determined at scheduled community meetings.

Portions of the City of Palmdale (Desert View Highlands)

- Critical water-related needs to be determined at scheduled community meetings.

Roosevelt, Unincorporated Los Angeles County

- Primarily concerned with protecting their wells, protecting agricultural water rights, and preventing LACSD from "wasting water" on "new farms." An LACSD Outreach Subcommittee member followed up directly with community member concerns about the current and future LACSD water usage in their area.

Refer to Appendix C of the IRWM Plan for larger DAC Census Block and Residential Area Maps and Census data printouts.

Under-represented Communities

A subset of disadvantaged communities are under-represented communities. These communities are composed of minority communities living within disadvantaged communities. There are two areas within the Antelope Valley Region that were identified to meet this criterion, and they are both contained within the Cities of Lancaster and Palmdale. These cities are working to identify the exact community locations to receive public outreach, and additionally, the Hispanic Chamber of Commerce has been contacted in an effort to reach underrepresented minorities in these cities.

Rural/Isolated Communities

Many communities that do not face the economic constraints of disadvantaged communities must deal with obstacles due to limited resources and geographic location. Many smaller, rural communities in the Antelope Valley Region are isolated, both politically and physically, from the agency and organizational happenings in the Antelope Valley Region, and the subcommittee agreed that these communities would also be incorporated into our IRWM Plan outreach efforts as a result of this isolation.

Native American Tribal Identification

Research and outreach efforts were also made to identify and contact local Native American tribal communities through contacts with other Antelope Valley community groups and research. Although no organized tribes were identified through this outreach process, an invitation was extended to those Native Americans who had expressed

interest in water management planning activities in the area. Some Native American individuals within the Antelope Valley Region were reached but reported that their lineage groups were not land holders and, therefore, not recognized as tribes or nations.

The Antelope Valley Indian Museum further reports that during the late 19th and early 20th centuries, most American Indian residents remaining in the Antelope Valley integrated with the ever-expanding European culture in Southern California, and the binding group ties of earlier times began to be erode the cultural base. As such, there are no formal reservations or rancherias in the Antelope Valley.

1.2.4.1 Disadvantaged Community Outreach

This section discusses how DACs were engaged for this IRWM Plan and demonstrates how the planning process can provide benefits to their communities. As mentioned, DACs were identified as key target audiences identified in the outreach efforts. During the data-gathering process, work continued to identify disadvantaged communities and to ensure that their issues and needs in terms of water and environmental resources were included in this IRWM Plan. Presentations and outreach focused on soliciting input and participation. The subcommittee emphasized that within the IRWM Plan, project ideas are evaluated based on their merits and not on the size or relative power of the project proponent. For example, within the IRWM Plan there are examples of smaller projects that had already been judged as high priority by the Stakeholder Group whose project proponents were small, traditionally underserved communities.

The DAC outreach strategy and action steps took advantage of existing efforts and relationships, worked directly with community leaders and RWMG members, and gathered and used input from all stakeholders. The members provided technical assistance and other resources, as well as encouraged participation from the smaller, disadvantaged communities in the Stakeholder Group.

The outreach subcommittee proceeded to contact community groups within the identified DACs to schedule outreach meetings. Contacts were made with the Mojave Chamber of Commerce, Mojave School District, and Mojave Utilities District based on information received from the Mojave Desert News reporter who covered the Stakeholder Group meetings. Subcommittee members representing the Cities of Palmdale and Lancaster assisted in arranging community meetings to present this IRWM Plan and gathered information from residents in the identified DAC areas of their respective cities. Town Council meetings in Lake Los Angeles, Littlerock, and Roosevelt were held in order to reach the DACs living in those areas.

One of the main topics of concern that initially surfaced for the region occurred at the Association of Rural Town Council meeting: the pending, controversial groundwater adjudication in the Antelope Valley. They expressed the feeling of being excluded from most planning efforts that they felt were dominated by large jurisdictions and agencies. This concern, although a separate issue from the IRWM Plan, is undoubtedly connected to the water issues for the region, and subcommittee members found the need to open the floor for discussion about this important concern. As a result of the tensions surrounding the legal adjudication, communities were asked if they would prefer to talk about the groundwater adjudication issues upfront before presentations were given. All communities indicated that initial discussion of groundwater adjudication issues would be useful and desirable. This approach helped to clarify the relationship between the adjudication and the IRWM Plan and to alleviate potential tensions due to the sensitivity of the topic. During the meetings, we emphasized that the IRWM Plan has provided a new way of working together in the region despite traditional barriers or ongoing disputes.

Concurrent with identification of underrepresented DAC areas, subcommittee members provided all meeting materials in printed and electronic formats and also prepared all materials in English and Spanish for distribution. Meeting materials included PowerPoint presentation, a listing of RWMG general stakeholder meetings, a list of technical resources, IRWM Plan goals and objectives, and a list of proposed project ideas.

Additionally, the governance structure of the IRWM Plan will be designed to encourage regional participation, to accept project proposals on an ongoing basis, and to continue to reach out to DACs and provide technical assistance to those who need it. Representation from DACs in the stakeholder group will be beneficial in implementing the Plan in a fair and balanced way.

1.2.4.2 Rural Community Outreach

Outreach efforts were not limited to DACs, rather they extended to all communities in the Region to include taking the IRWM Plan message to traditionally-isolated and more rural areas of the Antelope Valley to include the following communities (see Figure 1-3):

- Antelope Acres
- Boron
- Juniper Hills

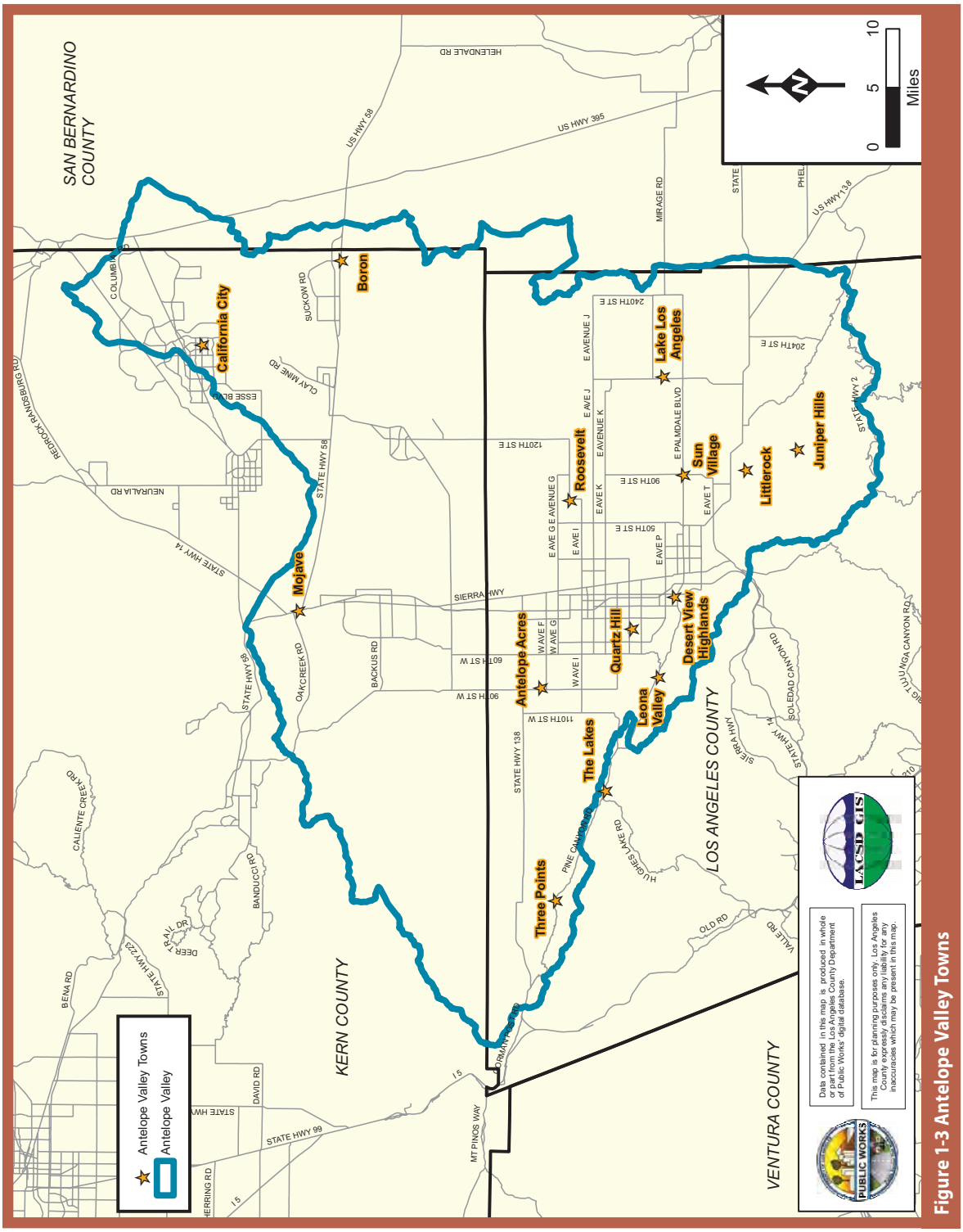

Figure 1-3 Antelope Valley Towns

- Leona Valley
- Sun Village
- The Lakes Community
- Three Points

Although they are not considered 'disadvantaged,' these are towns that are generally very small in population, have fewer resources, and thus, a smaller organizational structure. Most often, these towns are not able to participate in many of the larger projects that municipalities are engaging in with respect to water and environmental resource related issues in the Antelope Valley Region. However, these communities were eager to participate in a Regional group in what, for most, was the first such collaborative effort. Areas like Antelope Acres, Boron, Leona Valley, and Three Points have relatively high median household incomes but have been frustrated in trying to get specific projects implemented or tying in to regional efforts because of the long distances which separate many communities in the Antelope Valley Region. This approach was believed to be the most effective way to reach the largest possible number of stakeholders and gather information from DACs, underrepresented, rural communities, and, therefore, all areas within the Antelope Valley Region within the short timeframe required by this IRWM Plan schedule.

In incorporating these rural areas into our outreach efforts, we had the ability to tour communities like Antelope Acres and Three Points while having direct conversations with residents about the concerns and issues facing their communities. As a result of these outreach efforts, subcommittee members were also invited to attend community events such as the Juneteenth Festival in Sun Village to continue further promote the IRWM Plan, and although resources within these communities are typically very limited, several communities proactively nominated representatives to attend the RWMG stakeholder meetings to be part of Plan development and to carry news back to their members and their community.

1.2.4.3 Environmental Justice Outreach

Environmental justice is important to every community, and the Antelope Valley Region is no exception to this rule. The United States Environmental Protection Agency (EPA) defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Simply stated, this means that no group of people should bear a disproportionate share of negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

To begin identifying potential environmental justice issues facing the Antelope Valley, subcommittee members performed independent research and contacted the Environmental Justice Coalition for Water (EJCW) for further documented information and expert advice. The EJCW was not aware of any water-related environmental justice concerns in the Antelope Valley Region. Additionally, the Subcommittee used the EPA EnviroMapper maps found on www.city-data.com (provided in Appendix C) to locate any hazardous waste sites within the Region. The EPA maps did show some hazardous waste landfills within the Region, but they did not appear to be located in populated areas or concentrated in any one community. Based on review of the EPA maps and discussions with EJCW, other non-governmental organizations and community members, it was discovered that there were no documented environmental justice issues in the Antelope Valley Region. However, subcommittee members continued to solicit input from community groups at every outreach meeting in an effort to reveal any undocumented environmental justice issues.

The EJCW provided valuable advice in successfully incorporating DACs into the IRWM Plan process that would help prevent future environmental justice issues from developing. The major suggestions made by the EJCW were the following:

- Provide technical assistance, both to facilitate participation, and to assist with project development.

The California Aqueduct provides recreational benefits to the community in addition to water supply benefits. The Aqueduct contains fish such as striped bass and catfish.

- Include an Environmental Justice Community representative on the governing body.
- Ensure that the on-going governance structure defined in the Plan includes a prominent role for Environmental Justice communities, including some influence over which projects are selected for future implementation grants.
- Ensure that there is mechanism for Environmental Justice communities to participate in the evaluation of the plan over time.

Each of these suggestions were incorporated into the overall outreach strategy for the IRWM Plan. Technical resources were provided in the outreach presentation at each meeting with specific contact information of persons to call or email being identified directly. As feedback from individual communities was received, this resource list expanded, and community members had specific questions forwarded to appropriate agencies and organizations to receive further information. Additionally, the IRWM Plan was founded on the basis of broad agreement amongst all participating stakeholders. The selection of projects, the development of a governance structure, and the mechanism for updating the IRWM Plan are all dependent upon this foundation, and the DACs located in the Antelope Valley Region are ensured an equal voice in the Plan processes, current and future. This kind of collaboration is implemented as more members of the rural Town Councils, like Antelope Acres, Lake Los Angeles, and Roosevelt, join the RWMG stakeholder group after hosting IRWM Plan outreach meetings. Also of note is a potential environmental justice issue: water quality, specifically arsenic and nitrate contamination. Naturally-occurring arsenic contamination problems occur in many areas of the Antelope Valley, including DAC areas. There are projects included in the Plan to address arsenic contamination through treatment as well as efforts to develop additional projects to better understand the regional problem for arsenic and other contaminants. Therefore, arsenic contamination that could impact DACs are being addressed. Nitrate contamination is a water quality issue that has not been linked to an environmental justice concern because the disposal does not occur in or near any DAC.

> *"This process is very important to the Antelope Valley and the future of the Antelope Valley."*
>
> – Adam Ariki,
> Los Angeles County Waterworks District No. 40

The main concern regarding environmental justice seems to be directed toward the future. As the Antelope Valley Region continues to grow (Lancaster was designated as the fastest growing city in California in 2007), care will need to be taken to prevent creating environmental justice issues

that unfairly affect certain communities. The IRWM Plan objectives of ensuring water supply, water quality, flood protection, wise land use management, and environmental protection must be consistently applied to future projects and development to benefit all residents equally. Land use planning must take into account to designate enough open space to meet the recreational needs of all communities and include habit preservation and restoration throughout the Valley.

As the Antelope Valley communities expand and evolve, the IRWM Plan Stakeholder group will continue to assess environmental justice concerns throughout implementation of the Plan.

1.2.4.4 Media Coverage of Plan Preparation

Progress of the RWMG plan development was also covered by two reporters who regularly attended stakeholder meetings representing the Antelope Valley Press and the Mojave Desert News. Subcommittee members found that many residents were already aware of this IRWM Plan because of the continuous coverage by these two newspapers. Their exposure has greatly helped keep members of the general public and DACs informed about the IRWM Plan updates.

Additionally, two general public meetings were held in July to give an overview of the Draft IRWM Plan, answer questions and gather public feedback and comments. To increase involvement, one meeting was held in the southern portion of the region and the other, in the northern portion of the region.

1.2.4.5 Requests for Follow-up Outreach

Once presentations were underway, Subcommittee members began to be contacted by individual community members with project ideas, and by the Mojave School District, a large school district serving one of the largest DAC areas in the Region. We also received invitations to attend community events, such as the Juneteenth Festival in Sun Village. Additionally, numerous town councils have requested a second presentation to discuss specific project ideas (Antelope Acres, Lake Los Angeles, Roosevelt, and Sun Village).

Thus far, subcommittee members have shared the responsibility of traveling and presenting the IRWM Plan at 14 community meetings throughout the Antelope Valley Region, all of which were disadvantaged, underrepresented, and/or rural communities. These meetings collectively reached hundreds of community members directly and many more indirectly when the information was shared by those attending, and the response has been overwhelmingly positive from all sects. Overall, presentation at these community meetings further solidified the two most important aspects of the IRWM Plan outreach strategy:

- To physically attend the individual community meetings held in areas to present information and solicit input, rather than holding a meeting and inviting community members to attend, and
- To provide resources and technical assistance so that these communities could fully develop any potential project proposals.

As a result of these direct interactions, the individual communities expressed appreciation at the genuine interest of the IRWM Plan group members to incorporate the ideas and willingness to listen to all community members as exhibited through the outreach meetings. These outreach efforts, motivated through the development of the IRWM Plan, have provided an invaluable step towards helping unify the very diverse region that is the Antelope Valley Region. Together, the Public Outreach Subcommittee activities, in combination with the IRWM Plan Stakeholder meetings have reached over 40 public and non-governmental organizations, of which 20 percent represent disadvantaged communities. Six of the outreach meetings were in DACs, two of which reached primarily underrepresented minority communities. Our stakeholders believe the IRWM Plan to be a living document, and as such, community outreach will be ongoing and will continue to change as the plan and the region evolve.

All community outreach materials, including the DAC Outreach Plan, the Outreach Subcommittee meeting agendas and meeting minutes, various outreach materials, the Antelope Valley Water Plan presentation on CD-Rom (CD), Stakeholder testimonial videos on CD, press releases, correspondence from the EJCW and Native American Tribes, and other relevant community outreach information can be found in Appendix C of the IRWM Plan.

We expect the topics listed below to be updated as they are developed through additional DAC outreach and Plan Development:

- Specific critical water-related needs of such communities
- Document how the Plan identifies any water-related Environmental Justice concerns for the region.
- Discuss what mechanisms were used in development of the Plan to ensure that implementation of the Plan addresses Environmental Justice concerns.

1.3 PLAN DEVELOPMENT

This subsection provides a brief overview of the planning process utilized to develop this IRWM Plan.

1.3.1 Goals for Planning Group

The primary objective 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 other resources within the entire Antelope Valley Region through 2035. This IRWM Plan will address:

- How 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 supplies of reasonable cost irrigation water; and
- Opportunities to protect and enhance the current water resources (including groundwater) and the environmental resources within the Antelope Valley Region.

In order to achieve this objective, the Planning Group developed the following goals for the planning process:

1. Develop and Adopt an Integrated Regional Water Management Plan for a planning period between 2005 and 2035 by December 31, 2007 that:
   a. is written to be a useful tool to a broad range of organizations within our region;
   b. describes reasonably foreseeable water demands for our region during the planning period;
   c. characterizes the available water supplies for our region during the planning period;
   d. describes and evaluates potential management actions that we can take to meet the expected water demand of everyone within the region during the planning period;
   e. sets workable planning targets to be accomplished by specified future dates within the planning period;
   f. identifies potential and promising sources of money to pay to implement this IRWM Plan;
   g. sets priorities for implementation;
   h. is flexible and responsive to changing conditions;
   i. satisfies the guidelines published by DWR for IRWM Plans;
   j. satisfies the requirements published by DWR for AB 3030 groundwater management plans; and
   k. qualifies entities within our region to apply for water related grant funds from State sources such as Proposition 50, and Proposition 84, and Proposition 1E.
2. Discuss and describe how all broad-based regional planning efforts are related and how they will be coordinated:

Water plays a central role in the health and well-being of all Antelope Valley residents, including local wildlife.

a. IRWM Plan;
b. Adjudication;
c. Water Storage District Proposal;
d. Water Banking JPA; and
e. Others.

3. Establish cooperative relationships, new partnerships, and an optimistic approach to create a useful regional plan.

4. Each member of the RWMG will take ownership in this IRWM Plan and collaborate to produce, implement, and update a widely accepted plan.

5. Conduct strategic education and outreach to the public informing the target audiences of the following:
   a. the need for regional planning;
   b. benefits of a cooperative approach;
   c. the priorities for implementation;
   d. how the public can participate; and
   e. others?

6. Identify a back-up plan for meeting grant application deadlines.

While these goals for the planning group were envisioned to be reached by the end of 2007, many of these goals are recognized to continuing value and will require further efforts in the future.

1.3.2 Planning Process

This planning process recognized the importance of three key elements to any successful public policy planning exercise: people, information, and action. First and foremost, this planning process was for the benefit of the people in the Antelope Valley Region. This regional planning process was designed to provide a forum for safe and effective dialogue among the various groups of stakeholders. The group agreed to the following steps for interaction through a professionally facilitated process while developing this IRWM Plan:

- Adopt Specific Measurable Attainable Relevant Time-based (SMART) goals;
- Create a safe place for interaction;
- Establish a clear course of action;
- Demonstrate tangible progress; and
- Iterate until group is satisfied.

Second, the regional planning process must provide useful, broadly accepted information that can support clear action. The information gathering and generation portion of this process is summarized in Figure 1-4, Antelope Valley IRWM Plan Planning Process. It includes the following key steps:

- **Identify the Antelope Valley Region's issues and needs:** Illustrate the issues and needs of the Antelope Valley Region related to water resources in a manner that reflects the majority of Stakeholder concerns. These issues and needs are what drives the Stakeholders into taking action, and are discussed in Section 3.
- **Identify clear plan objectives:** Collectively establish the quantifiable objectives that the regional entities will work together to accomplish between now and 2035. These objectives and the planning targets that will be used to help measure their progress are discussed in Section 4.
- **Water Management Strategy Development:** Involves reviewing existing documents to identify projects within the following water management strategy areas (WMSA) that could satisfy these IRWM Plan objectives: water supply, water quality, flood management, environmental management, and land use management. Also includes a discussion of the Call for Projects in which Stakeholders submitted projects for inclusion in the IRWM Plan. Water Management Strategy development is discussed in more detail in Section 5.
- **Integration:** Includes intra- and inter-water management strategy integration between projects of a particular WMSA and between WMSAs themselves. Integration is discussed in more detail in Section 6.
- **Evaluation and Prioritization:** Includes identifying short-term and long-term regional priorities, evaluating and ranking Stakeholder-identified projects and management actions, and identifying which projects the group would take "action" on first. This step is presented in Section 7. This section also includes a discussion of the impacts and benefits of the IRWM Plan, and a discussion of the benefits and costs of the prioritized projects chosen for implementation.

Third, this planning process must empower the entities within the Antelope Valley Region to take meaningful action. The implementation plan presented in Section 8 provides the linkage to local planning entities, the governance structure and framework for implementing the Plan, options for financing, sources of funding and a list of performance measures that will be used to gauge progress, data management tools, and a means to update the Plan into the future.

Throughout the development of the IRWM Plan, from the Administrative Draft to this Final Plan, public comments

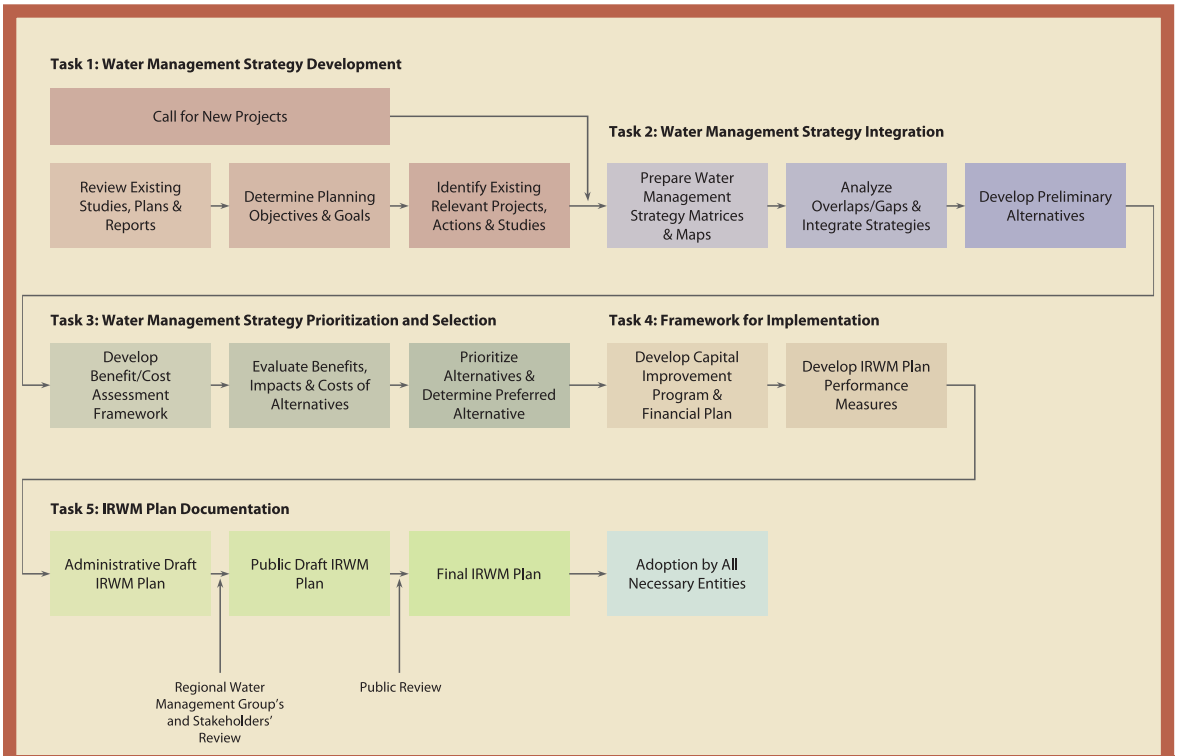

Figure 1-4 Antelope Valley Integrated Regional Water Management Planning Process

as well as Stakeholder comments on the Plan's content have been reviewed, evaluated, discussed amongst the Stakeholder group as necessary, and incorporated into the document as appropriate. These comments have been summarized into a comment response matrix and can be found in Appendix I.

1.3.3 Potential Obstacles to Plan Implementation

One potential obstacle to implementation of the IRWM Plan is the pending adjudication of the Antelope Valley Groundwater Basin. The IRWM Plan's water supply analysis is based on assumptions made regarding availability and reliability of the groundwater supply and was used to identify specific objectives and planning targets for the IRWM Plan. Thus it is possible that the outcome of the adjudication may require a change in the assumptions as well as the objectives and planning targets, which may delay implementation of the IRWM Plan. Additionally, the adjudication may place limitations not considered on the groundwater banking and recharge projects included for implementation. However, the IRWM Plan is meant to be a dynamic planning document and as such will be updated at a minimum of every two years with the project priority list being kept up-to-date as discussed in Section 8.6.2.

1.3.4 Groundwater Management Plan

This IRWM Plan defines a clear vision and direction for the sustainable management of water resources in the Antelope Valley Region through 2035. Inherent to this discussion is how groundwater will be managed to help meet the needs within the Antelope Valley Region now, and into the future. While a groundwater management plan currently does not exist for the Antelope Valley Groundwater Basin as a whole, one has been developed for the RCSD service area. There is the need, however, to develop a groundwater management plan for the Antelope Valley Region in order to provide a better understanding of the Antelope Valley Groundwater Basin and to recommend various strategies that result in a reliable water supply for all basin users and help meet increasing water demands. Therefore, the IRWM Plan will also meet the requirements for an AB 3030 Plan and establish a groundwater management plan for the whole basin.

The Groundwater Management Act (California Water Code Part 2.75 Section 10753), originally enacted as Assembly Bill (AB) 3030 (1992) and amended by Senate Bill (SB) 1938 (2002), provides the authority to prepare groundwater management plans. The intent of AB 3030 is to encourage local public agencies and water purveyors to adopt formal plans to manage groundwater resources within their jurisdiction.

Within the scope of Water Code Section 10753.8, a local groundwater management plan can potentially include up to twelve technical components, although this IRWM Plan need not be restricted to those specific components. This IRWM Plan addresses all the relevant components related to Groundwater Management Plans in the Water Code, as well as the components recommended by the California DWR in California's Groundwater, Bulletin 118 (DWR, 2004). Nothing in this IRWM Plan will supersede or interfere with the pending adjudication of the Antelope Valley Groundwater Basin. Table 1-3 provides a checklist at the end of this section to indicate where in this IRWM Plan specific Groundwater Management Plan components are located.

Table 1-3 Groundwater Management Plan Checklist According to Required Components

Required Components		
Items to Address	**Section of Law**	**Location in Plan**
Provide documentation that a written statement was provided to the public describing the manner in which interested parties may participate in developing the groundwater management plan.	10753.4(b)	Appendix C (Community Outreach Materials)
Provide basin management objectives for the groundwater basin that is subject to this IRWM Plan.	10753.7(a)(1)	Section 4
Describe components relating to the monitoring and management of groundwater levels, groundwater quality, inelastic land surface subsidence and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by pumping.	10753.7(a)(1)	Section 3
Describe plan to involve other agencies that enables the local agency to work cooperatively with other public entities whose service area or boundary overlies the groundwater basin .	10753.7 (a)(2)	Section 1 and Section 8
Adoption of monitoring protocols for the components in Water Code Section 10753.7(a)(1)	10753.7 (a)(4)	Table 8-8
Provide a map showing the area of the groundwater basin as defined by DWR Bulletin 118 with the area of the local agency subject to this IRWM Plan as well as the boundaries of other local agencies that overlie the basin in which the agency is developing a groundwater management plan.	10753.7 (a)(3)	Figure 2-10

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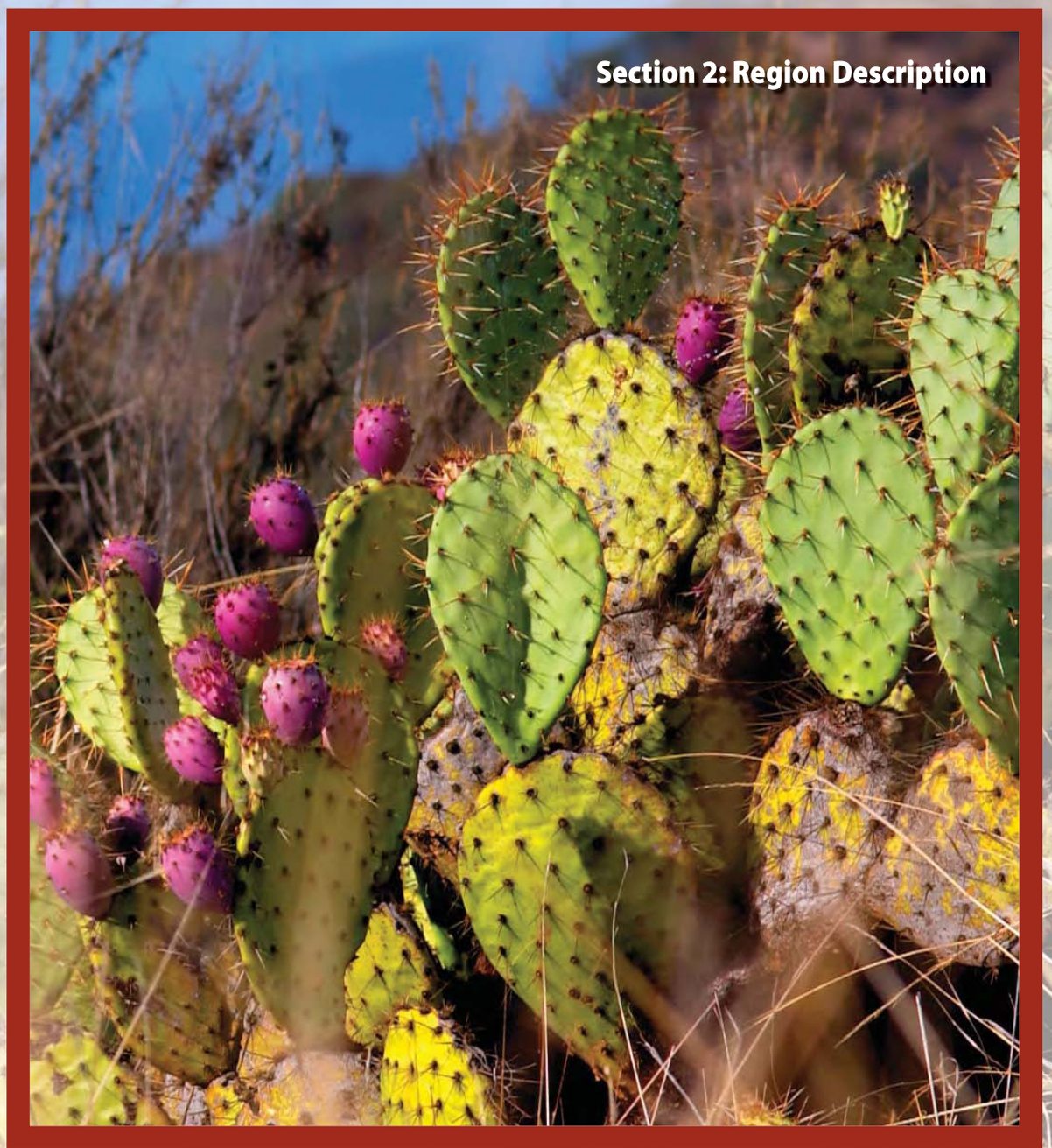
Section 2: Region Description

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Beavertail Cacti are one of many of the beautiful, drought tolerant plants that are native to the Antelope Valley.

Section 2: Region Description

This section presents a regional description for the Antelope Valley Region including location, climate, hydrologic features, land uses, population and demographic information, and regional growth projections. The Antelope Valley Region description emphasizes that the combination of the increasing population growth, the lack of proper water-related infrastructure, the need to maintain existing water levels in the groundwater basin, and the unparalleled opportunity to create a proactive, "smart" design for the fast-developing Antelope Valley Region makes this Integrated Regional Water Management (IRWM) Plan essential to efficient and effective water management in the Antelope Valley Region.

2.1 REGION OVERVIEW

The 2,400 square miles of the Antelope Valley Region lie in the southwestern part of the Mojave Desert in southern California. Most of the Antelope Valley Region is in Los Angeles County and Kern County, and a small part of the eastern Antelope Valley Region is in San Bernardino County. For the purposes of this IRWM Plan, the Antelope Valley Region is defined by the Antelope Valley's key hydrologic features; bounded by the San Gabriel Mountains to the south and southwest, the Tehachapi Mountains to the northwest, and a series of hills and buttes that generally follow the San Bernardino County Line to the east, forming a well-defined triangular point at the Antelope Valley Region's western edge. The drainage basin was chosen as the boundary for this IRWM Plan because it has been used in several older studies such as "Land Use and Water Use in the Antelope Valley" by the United States Geological Survey (USGS) and "The Antelope Valley Water Resource Study" by the Antelope Valley Water Group. The area within the boundary also included key agen-

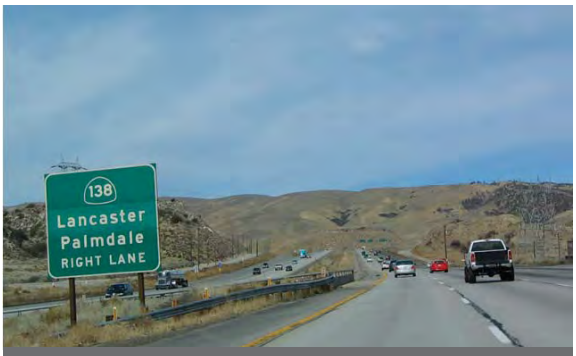
cies dealing with similar water management issues such as increasing population, limited infrastructure, and increasing pumping costs with shared water resources and, therefore, it was an appropriate boundary to define the Antelope Valley Region for this IRWM Plan.

> *"The Water Plan is a very significant effort to coordinate a number of activities between a number of different agencies that are responsible for managing water supply in the Antelope Valley."*
>
> – Leon Swain, City of Palmdale

Water demands within the Antelope Valley Region are serviced by a variety of water purveyors, including large wholesale agencies, irrigation districts, special districts providing primarily water for municipal and industrial

The desert floor is where the natural and built environments interface.

(M&I) uses, investor-owned water companies, mutual water companies, and private well owners. Water supply for the Antelope Valley Region comes from three primary sources: the State Water Project (SWP), local surface water runoff that is stored in Little Rock Reservoir, and the Antelope Valley Groundwater Basin, with recycled water and storm-water used as secondary sources of water supply. Rapid development demands on water availability and quality, coupled with the potential curtailments of SWP deliveries due to prolonged drought periods, have intensified the



The drive along Highway 14 connects Los Angeles to the expanding communities of the Antelope Valley.

competition for available water supplies. Consensus is needed to develop a water resource management plan and strategy that addresses the needs of the M&I purveyors to reliably provide the quantity and quality of water necessary to serve the continually expanding Antelope Valley Region, while concurrently addressing the need of agricultural users to have adequate supplies of reasonably-priced irrigation water. For these reasons, the Antelope Valley Region is an appropriate area for integrated regional water management. Figure 1-1, Antelope Valley IRWM Plan Region, provides an overview of the Antelope Valley Region.

2.2 LOCATION

As discussed above, the Antelope Valley Region, as defined for the purposes of this IRWM Plan, encompasses most of the northern portion of Los Angeles County and the southern region of Kern County. Bordered by the mountain ranges to the north, south, and west and the hills and buttes along the east, the Antelope Valley Region is composed of the following major communities: Boron, California City, Edwards Air Force Base (AFB), Lancaster, Mojave, Palmdale, and Rosamond. Smaller communities include Littlerock and Quartz Hill. The communities are predominantly concentrated in the eastern portions of the Antelope Valley Region.

Four major roadways traverse the Antelope Valley Region. The Antelope Valley Freeway (State Route 14) and the Sierra Highway both bisect the Antelope Valley Region from north to south. The Pearblossom Highway (Highway 138) traverses the southeastern and central-western portions of the Antelope Valley Region in an east-west direction. Highway 58 traverses the northern portion of the Antelope Valley Region in an east-west direction. Refer to Figure 2-1, Antelope Valley Service Districts, and Figure 2-2, Antelope Valley City Boundaries and Special Districts, for maps showing the locations of the major roads, county lines, city lines, special districts, and water agency service areas within the Antelope Valley Region.

There are four nearby areas that are currently represented by, or that are in the process of developing, IRWM Plans. These consist of the Mojave Water Agency IRWM Plan in the Lahontan Hydrologic Region; the Upper Santa Clara River IRWM Plan in the Los Angeles Hydrologic Region; the Los Angeles IRWM Plan in the Los Angeles Hydrologic Region; and the Watersheds Coalition of Ventura County IRWM Plan, which includes the Ventura River, lower Santa Clara River and Calleguas Creek watersheds, also within the Los Angeles Hydrologic Region. The relatively small portions of the Antelope Valley that are located in San Bernardino County are served by the Mojave Water Agency (MWA) and were included in the MWA IRWM Plan. Thus demands from these areas and any proposed projects serving these areas were not accounted for in this IRWM Plan to avoid significant overlap with the MWA IRWM Plan. The MWA has submitted a letter of support for our Region boundary. Letters of Support are provided in Appendix H. These four plan areas nearly surround the Antelope Valley Region (the Kern County areas north and northwest of the Antelope Valley Region are not currently covered by an IRWM Plan), which means that the Antelope Valley IRWM Plan will play an integral role in completing watershed analyses for the Lahontan Region and provide an important link to the neighboring Los Angeles Hydrologic Regions. The collective efforts of these interconnected IRWM Plan will not only benefit their respective regions, but the watersheds of Southern California as a whole.

2.3 CLIMATE STATISTICS

Comprising the southwestern portion of the Mojave Desert, the Antelope Valley Region ranges in elevation from approximately 2,300 feet to 3,500 feet above sea level. Vegetation native to the Antelope Valley Region are typical


Native vegetation includes the regal joshua tree.

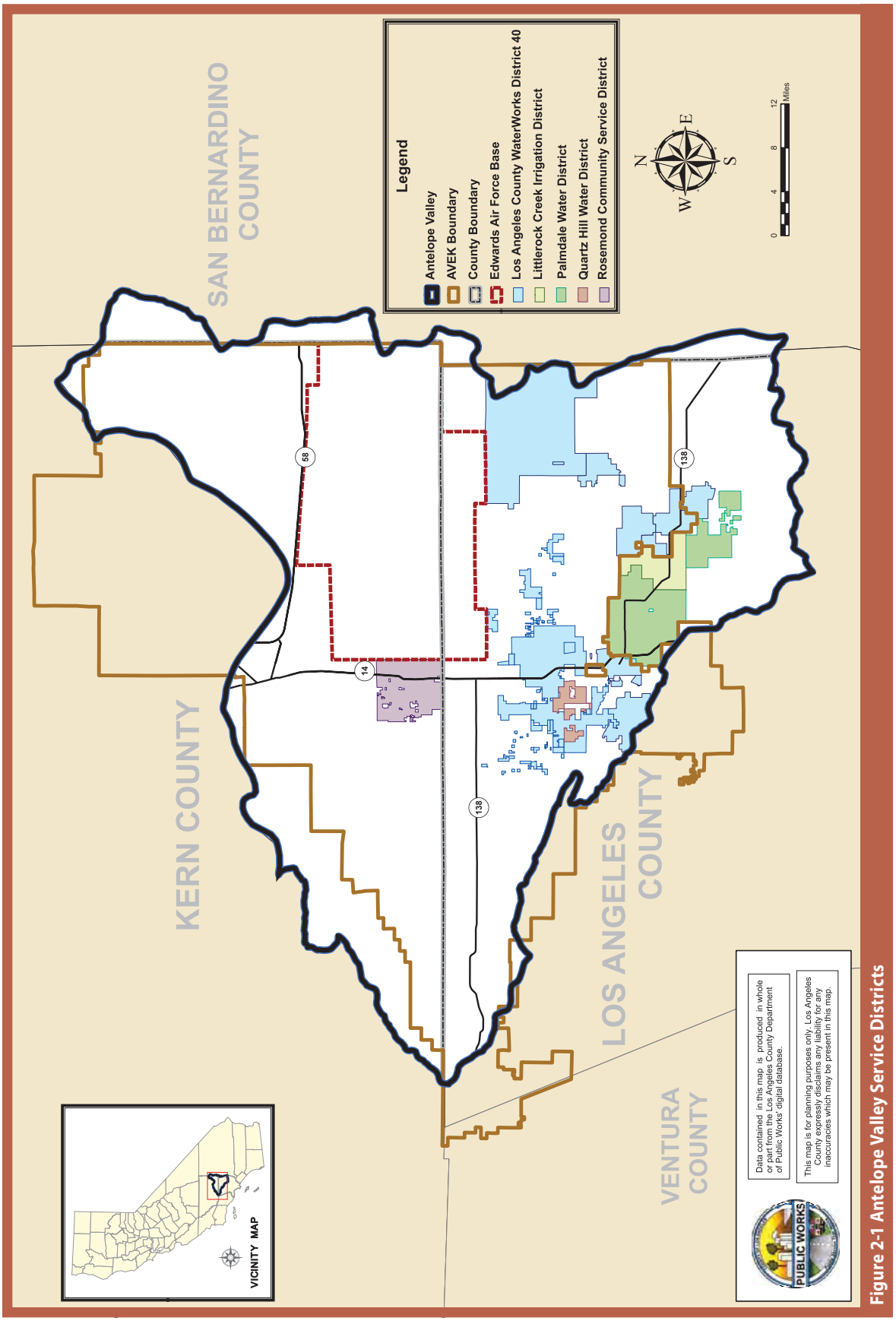


Figure 2-1 Antelope Valley Service Districts

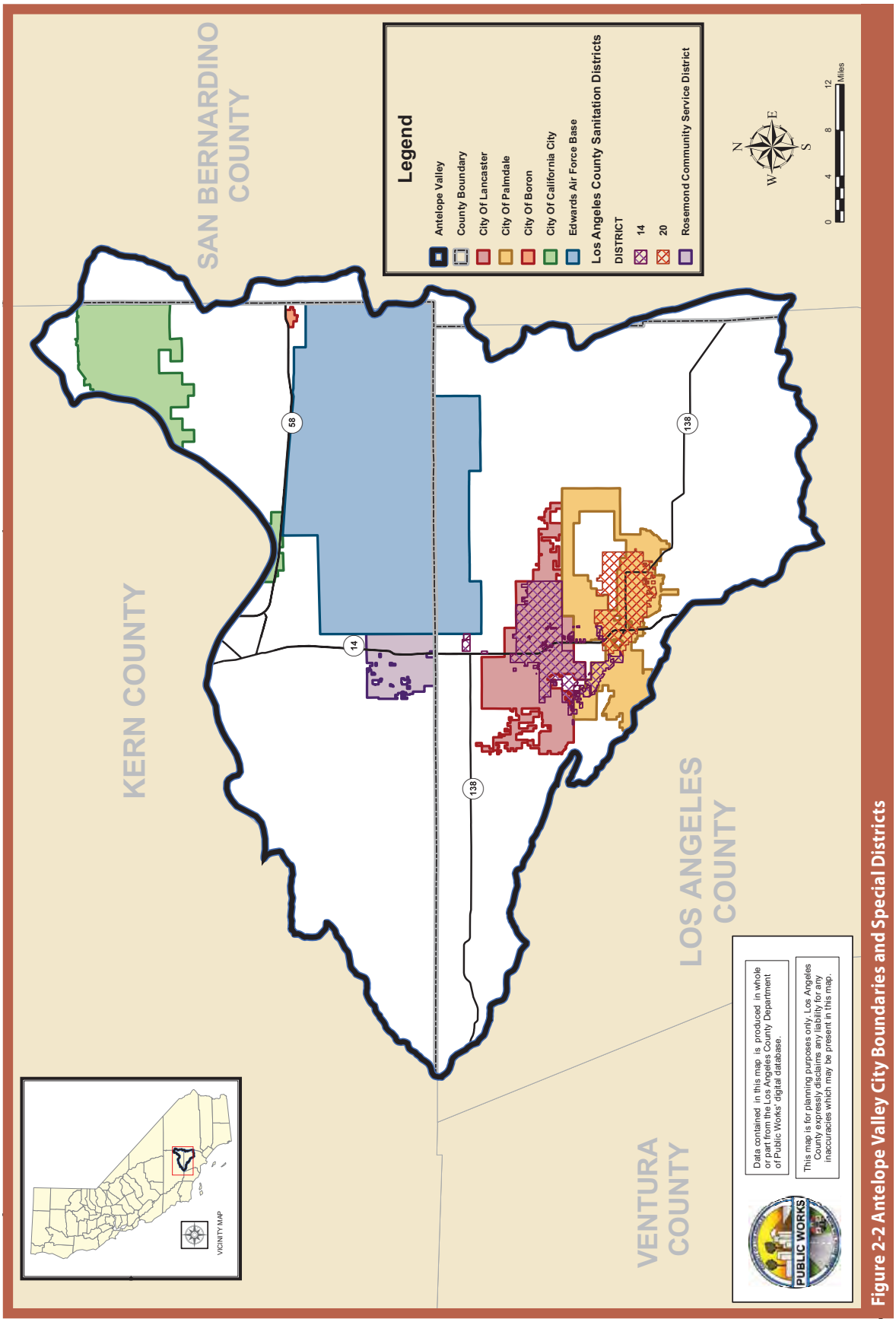


Figure 2-2 Antelope Valley City Boundaries and Special Districts

Littlerock Reservoir provides not only water supply storage but valuable recreational opportunities.

of the high desert and include Joshua trees, saltbush, mesquite, sagebrush, and creosote bush. The climate is characterized by hot summer days, cool summer nights, cool winter days, and cool winter nights. Typical of a semi-arid region, mean daily summer temperatures range from 63 degrees Fahrenheit (°F) to 93°F, and mean daily winter temperatures range from 34°F to 57°F. The growing season is primarily from April to October. However, most rainfall occurs between December and March, and cultivated crops and non-native plants must rely heavily on irrigation.

Surface runoff for the Antelope Valley Region is divided between Little Rock and Santiago Canyons and precipitation ranges from 5 inches per year along the northern boundary to 10 inches per year along the southern boundary. Annual variations in precipitation are important to the annual variations in applied water required for crop production and landscape maintenance. Rainfall records indicate that runoff may be available and retained for artificial groundwater recharge use (USGS 1995).

, Annual Precipitation, summarizes the historical annual precipitation for the Antelope Valley Region, based on the data for rain guage Station 455B Lancaster.

Table 2-1 and the following charts provide a summary of the Antelope Valley Region's climate. Climatic data is based on data collected from 1931 to 2005. Figures 2-4 and 2-6 present the average maximum and minimum temperature and the average rainfall and monthly evapotranspiration (ETo) in the Antelope Valley Region.

2.4 HYDROLOGIC FEATURES

The Antelope Valley Region is a closed topographic basin with no outlet to the ocean. All water that enters

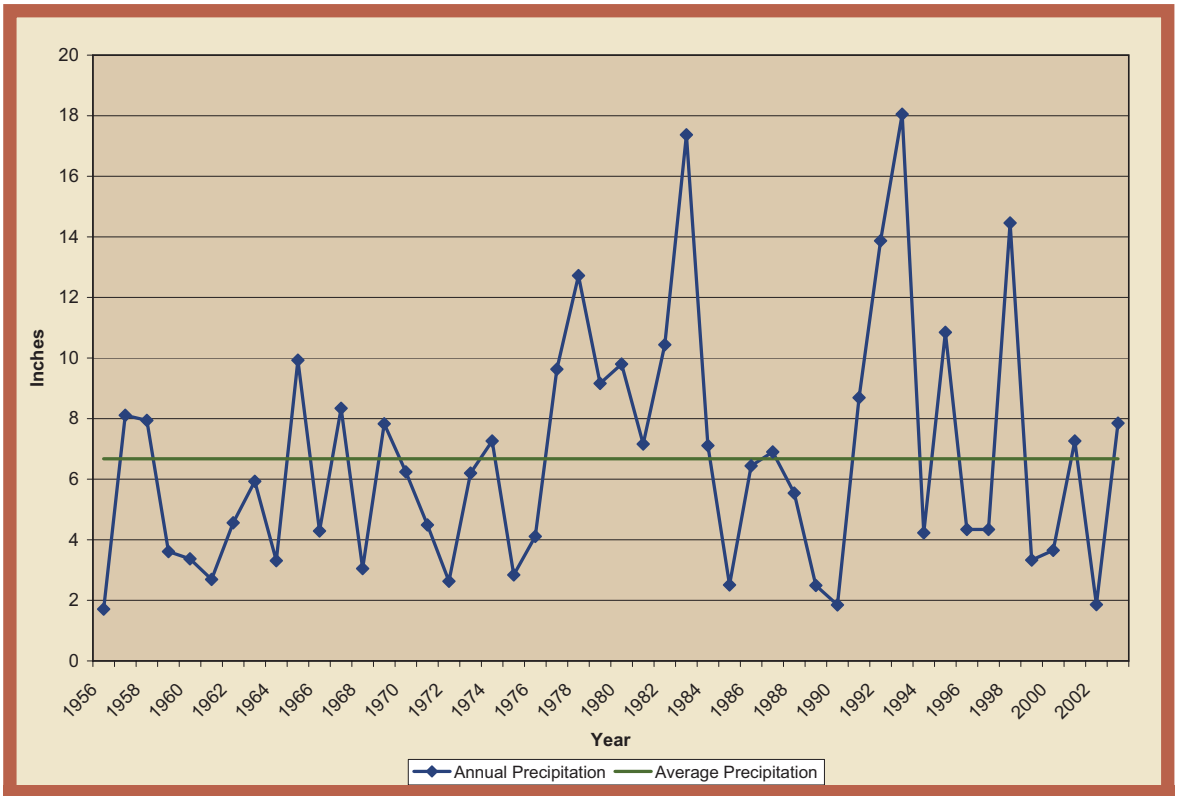


Figure 2-3 Annual Precipitation

Source: 1956-1990, NOAA Climatological Data, as presented in Law Environmental (1991); 1991-2006, LACDPW, Water Resources Division Station 455B

Table 2-1 Climate in the Antelope Valley Region

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo (inches)[a]	2.02	2.61	4.55	6.19	7.30	8.85
Average Rainfall (inches)[b]	1.51	1.65	1.28	0.48	0.13	0.04
Average Max Temperature(°F)[b]	58.3	62.1	67.1	73.9	81.8	90.1
Average Min Temperature (°F)[b]	32.4	35.6	38.9	43.7	50.7	57.8

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo (inches)[b]	9.77	8.99	6.52	4.66	2.68	2.05	66.19
Average Rainfall (inches)[b]	0.05	0.18	0.20	0.34	0.68	1.37	7.91
Average Max Temperature(oF)[b]	97.5	96.9	91.3	80.3	67.2	58.8	77.1
Average Min Temperature (oF)[b]	65.0	63.7	57.4	48.0	38.0	32.7	47.0

(a) CIMIS Data for Palmdale No. 197 Station since April 2005.
(b) Western Regional Climate Center, Palmdale Station for the Years 1931 to 2005.

the Valley Region either infiltrates into the groundwater basin, evaporates, or flows toward the three dry lakes on Edwards AFB; Rosamond Lake, Buckhorn Lake, and Rogers Lake. In general, groundwater flows northeasterly from the mountain ranges to the dry lakes. Due to the relatively impervious nature of the dry lake soil and high evaporation rates, water that collects on the dry lakes eventually evaporates rather than infiltrating into the groundwater (LACSD 2005). The surface water and groundwater features of the Antelope Valley Region are discussed in more detail below and depicted in Figure 2-7.

2.4.1 Surface Water

Surface water flows are carried by ephemeral streams. The most hydrologically significant streams begin in the San Gabriel Mountains on the southwestern edge of the Antelope Valley Region and include, from east to west, Big

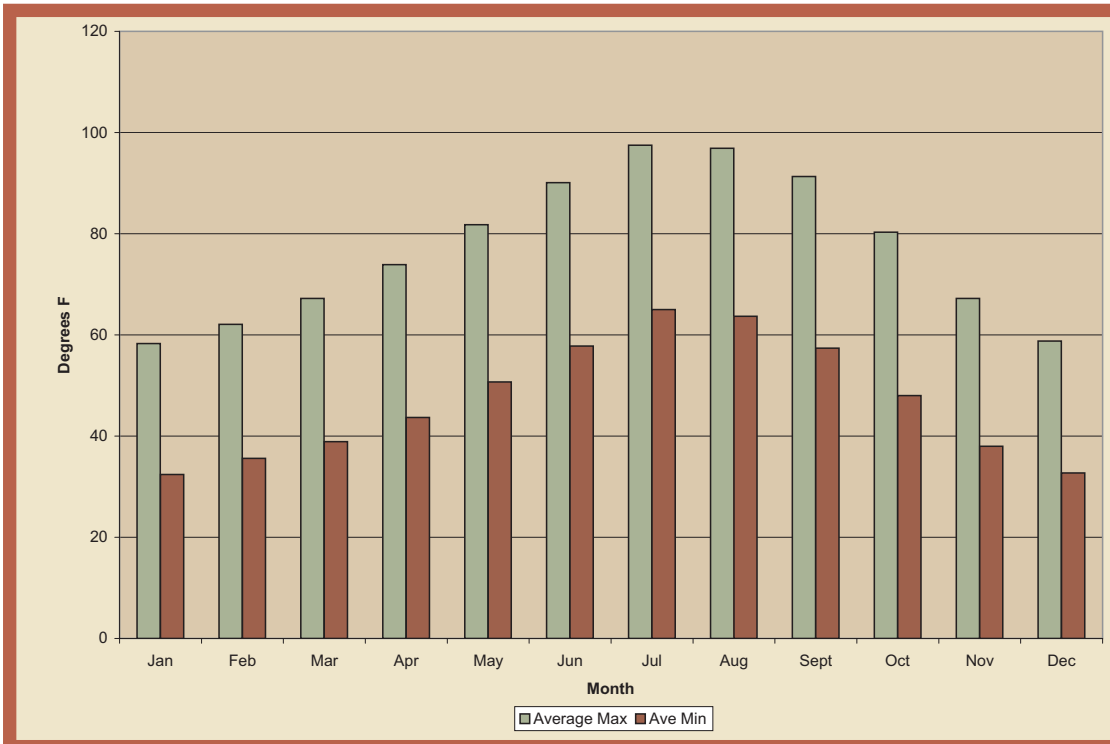


Figure 2-4 Average Maximum and Minimum Temperature in the Antelope Valley Region

Source: Western Regional Climate Center, Palmdale Station for the Years 1931 to 2005.

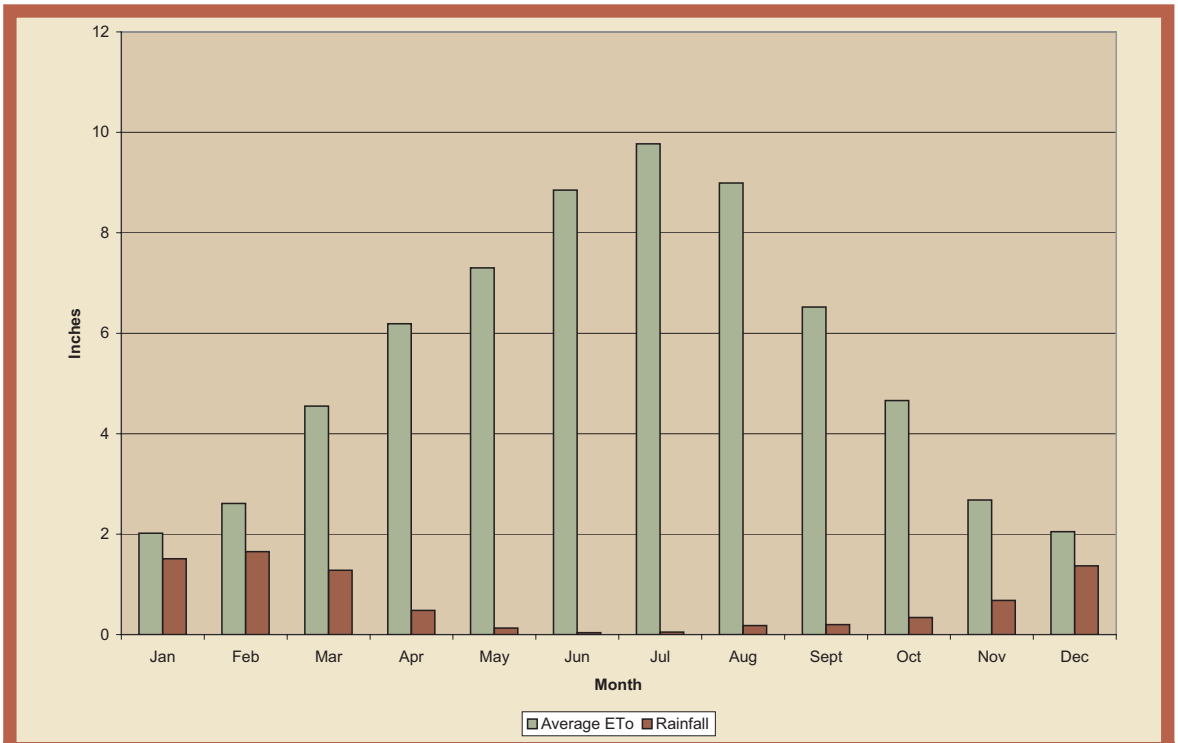


Figure 2-5 Average Rainfall and Monthly Evapotranspiration (ETo) in the Antelope Valley Region

Source: CIMIS Data for Palmdale No. 197 Station since April 2005 and Western Regional Climate Center, Palmdale Station for the Years 1931 to 2005.

Rock Creek, Little Rock Creek and Amargosa Creek, and Oak Creek from the Tehachapi Mountains. Amargosa Creek runs south/north and is between the State Route 14 and Sierra Highway. The hydrologic features are shown on Figure 2-7.

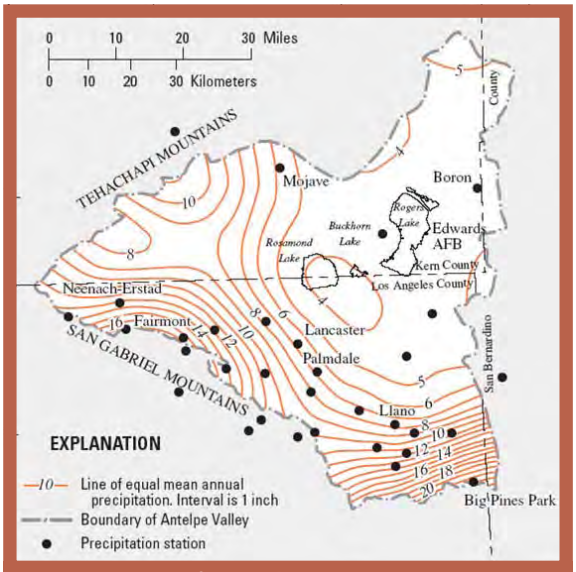


Figure 2-6 Map of Annual Precipitation for the Antelope Valley Region

Source: "Precipitation depth-duration and frequency characteristics for Antelope Valley, Mojave Desert, California" Author(s): Blodgett, J. C., Los Angeles County (Calif.), Geological Survey (U.S.) Sacramento, Calif. : U.S. Geological Survey ; Denver, CO : Earth Science Information Center, Open-File Report Section [distributor], 1996.

2.4.1.1 Little Rock Reservoir

Little Rock Creek is the only developed surface water supply in the Antelope Valley Region. The Little Rock Reservoir, jointly owned by Palmdale Water District (PWD) and Littlerock Creek Irrigation District (LCID), collects runoff from the San Gabriel Mountains. The reservoir currently has a useable storage capacity of 3,500 acre-feet (AF) of water (PWD 2001). Historically, water stored in the Little Rock Reservoir has been used directly for agricultural uses within LCID's service area and for M&I uses within PWD's service area following treatment at PWD's water purification plant.

2.4.1.2 Dry Lakes and Percolation

Surface water from the surrounding hills and from the Antelope Valley Region floor flows primarily toward the three dry lakes on Edwards AFB. Except during the largest rainfall events of a season, surface water flows toward the Antelope Valley Region from the surrounding mountains, quickly percolates into the stream bed, and recharges the groundwater basin. Surface water flows that reach the dry lakes are generally lost to evaporation. It appears that little

Note location of Amargosa Creek.

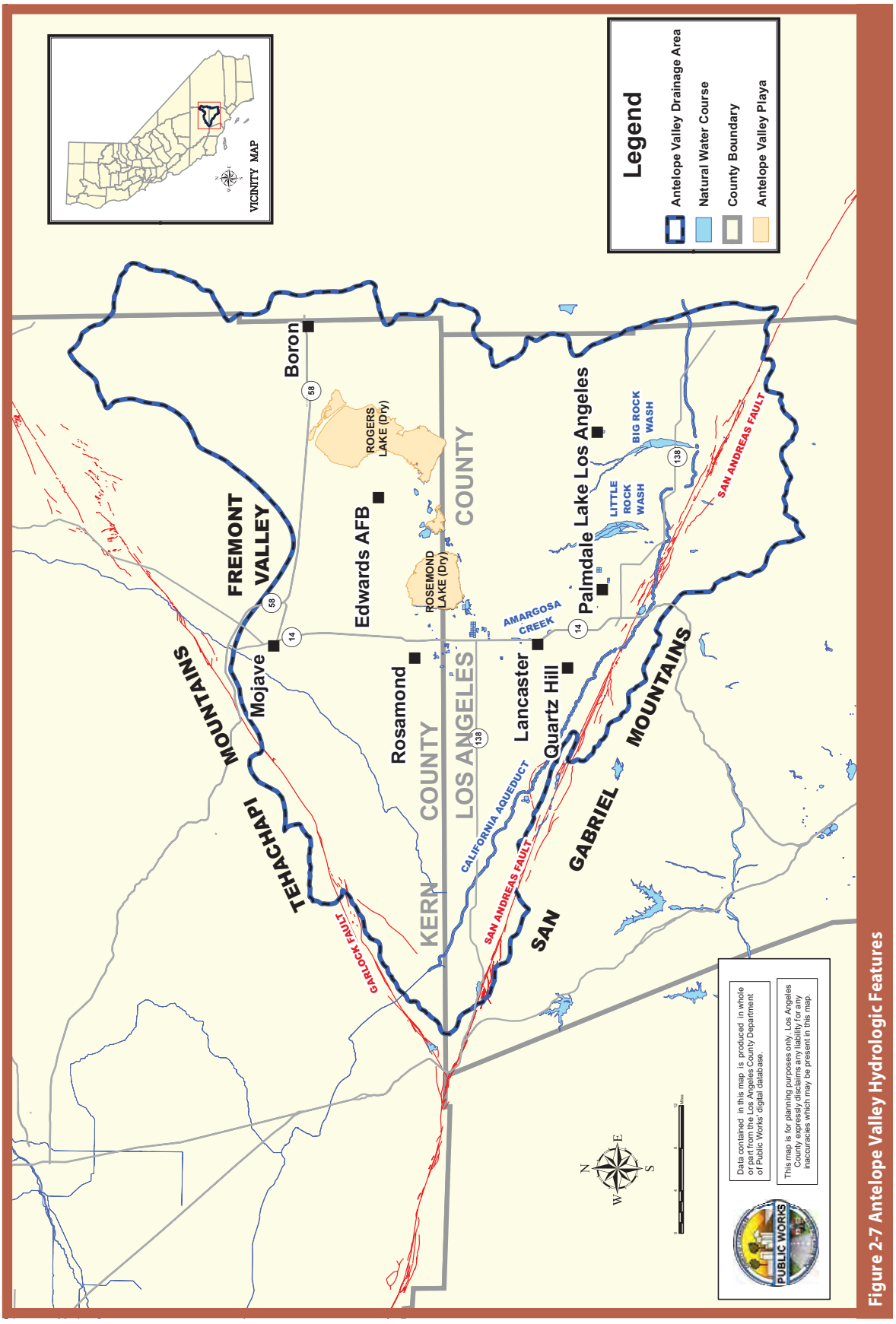


Figure 2-7 Antelope Valley Hydrologic Features

percolation occurs in the Antelope Valley Region other than near the base of the surrounding mountains due to impermeable layers of clay overlying the groundwater basin. See Figure 2-8 for a sample cross-sectional illustration of the clay layer as it is positioned between the upper and lower aquifers in the Antelope Valley Region.

USGS estimates that of the 1.5 million AF of precipitation in the Antelope-Fremont Valley each year, approximately 76,000 AF percolate to the groundwater reservoirs, while the remaining is lost to evaporation (1987).

2.4.1.3 Geology and Soils

The Antelope Valley represents a large topographic and groundwater basin in the western part of the Mojave Desert in southern California. It is a prime example of a single, undrained, closed basin, and it is located at an approximate elevation of 2,300 to 2,400 feet above mean sea level. Antelope Valley Region occupies part of a structural depression that has been downfaulted between the Garlock, Cottonwood-Rosamond, and San Andreas Fault Zones. The Antelope Valley Region is bounded on the southwest by the San Andreas Fault and San Gabriel Mountains, the Garlock Fault and Tehachapi Mountains to the northwest, and San Bernardino County to the east. Consolidated rocks that yield virtually no water underlie the basin and crop out in the highlands that surround the basin. They consist of igneous and metamorphic rocks of pre-Tertiary age that are overlain by indurated continental rocks of Tertiary age interbedded with lava flows (USGS 1995).

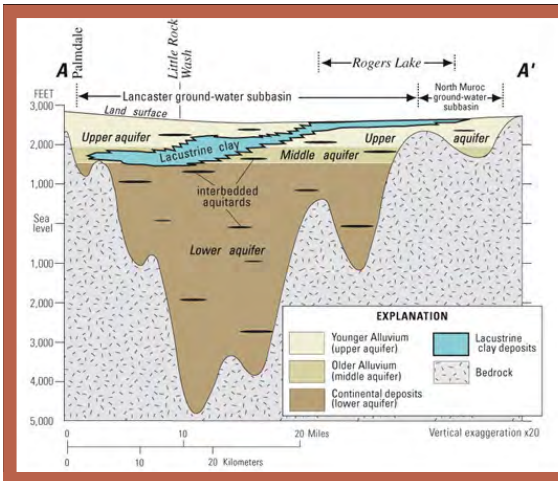


Figure 2-8 Cross Sectional View of the Clay Layer Between the Upper and Lower Aquifers in the Antelope Valley Region

Source: USGS 2000b

Alluvium and interbedded lacustrine deposits of Quaternary age are the important aquifers within the closed basin and have accumulated to a thickness of as much as 1,600 feet. The alluvium is unconsolidated to moderately consolidated, poorly sorted gravel, sand, silt, and clay. Older units of the alluvium are somewhat coarser grained, and are more compact and consolidated, weathered, and poorly sorted than the younger units. The rate at which water moves through the alluvium, also known as the hydraulic conductivity of the alluvium, decreases with increasing depth.

During the depositional history of the Antelope Valley Region, a large intermittent lake occupied the central part of the basin and was the site of accumulation of fine-grained material. The rates of deposition varied with the rates of precipitation. During periods of relatively heavy precipitation, massive beds of blue clay formed in a deep perennial lake. During periods of light precipitation, thin beds of clay and evaporative salt deposits formed in playas or in shallow intermittent lakes. Individual beds of the massive blue clay can be as much as 100 feet thick and are interbedded with lenses of coarser material as much as 20 feet thick. The clay yields virtually no water to wells, but the interbedded, coarser material can yield considerable volumes of water.

Soils within the area are derived from downslope migration of loess and alluvial materials, mainly from granitic rock sources originating along the eastern slopes of the Tehachapi and San Gabriel Mountains. Additional detailed information on soil types and their distribution can be found in the Lancaster Water Reclamation Plant (WRP) 2020 Plan Final Environmental Impact Report (EIR). Figure 2-9 provides a soil map of the Antelope Valley Region.

2.4.2 Groundwater

The Antelope Valley Groundwater Basin is comprised of two[1] primary aquifers: (1) the upper (principal) aquifer and (2) the lower (deep) aquifer. The principal aquifer is an unconfined aquifer and historically had provided artesian flows due to perched water tables in some areas. These artesian conditions are currently absent due to extensive pumping of groundwater. Separated from the principal aquifer by clay layers, the deep aquifer is generally considered to be confined. In general, the principal aquifer is thickest in the southern portion of the Antelope Valley Region near the San Gabriel Mountains, while the

1 USGS is currently investigating the possibility of a third aquifer. The IRWM Plan may need to be updated with information regarding the third aquifer when it is available.

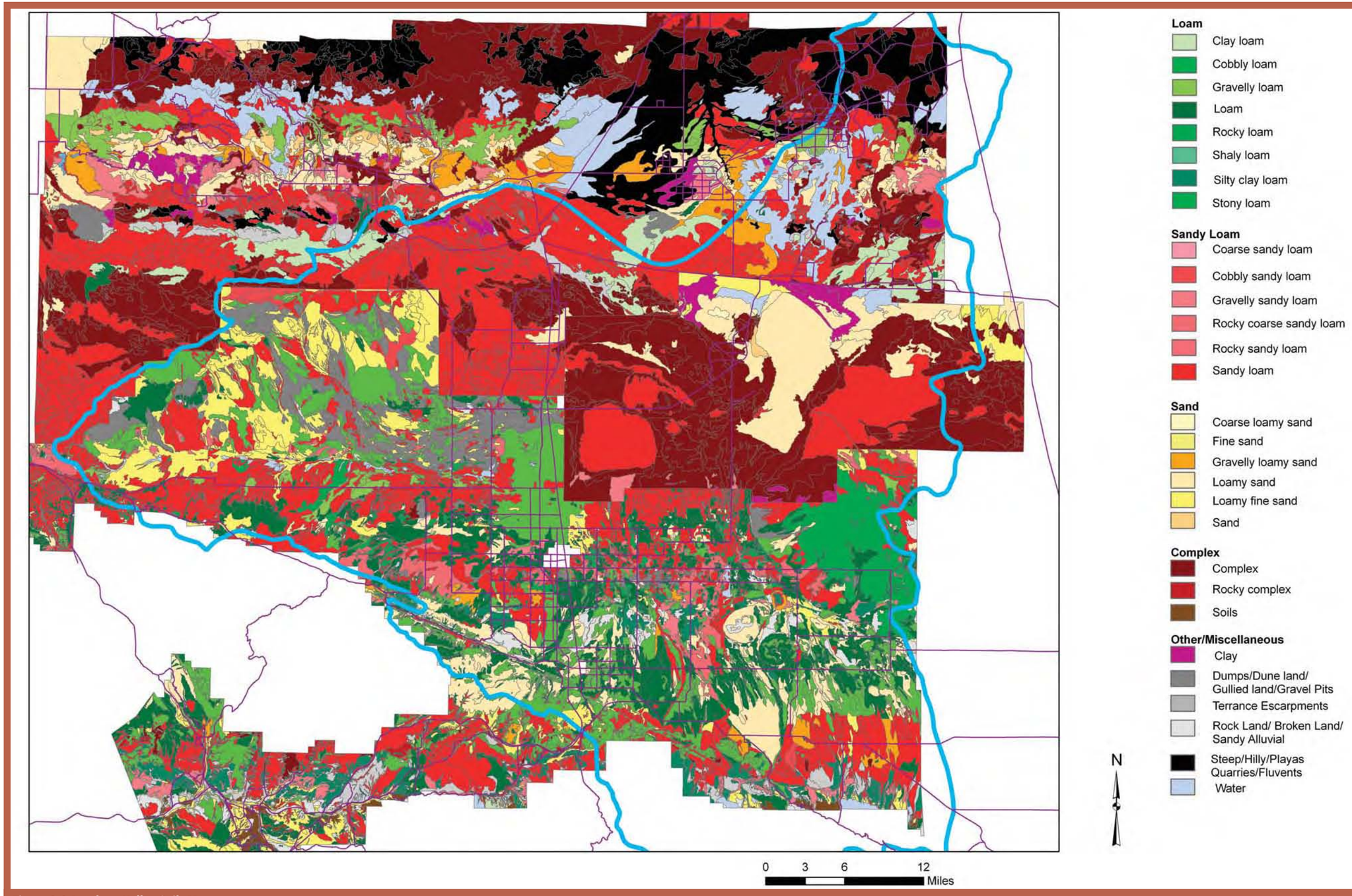


Figure 2-9 Antelope Valley Soils Map

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Infrastructure capacity is an important concern in the Antelope Valley, especially during the summer months when demand is high.

deep aquifer is thickest in the vicinity of the dry lakes on Edwards AFB.

Groundwater has been, and continues to be, an important resource within the Antelope Valley Region. Prior to 1972, groundwater provided more than 90 percent of the total water supply in the Antelope Valley Region; since 1972, it has provided between 50 and 90 percent (USGS 2003). Groundwater pumping in the Antelope Valley Region peaked in the 1950s (USGS 2000a), and it decreased in the 1960s and 1970s when agricultural pumping declined due to increased pumping costs from greater pumping lifts and higher electric power costs (USGS 2000a). The rapid increase in urban growth in the 1980s resulted in an increase in the demand for municipal and industrial (M&I) water and an increase in groundwater use. Projected urban growth and limits on the available local and imported water supply are likely to continue to increase the reliance on groundwater.

Although the groundwater basin is not currently adjudicated, an adjudication process has begun and is in the early stages of development. Although there are no existing restrictions on groundwater pumping, pumping may be altered or reduced as part of the adjudication process.

2.4.2.1 Groundwater Subunits

The complex Antelope Valley Groundwater Basin is divided by the USGS into twelve subunits as shown on Figure 2-10. Groundwater basins are generally divided based upon differential groundflow patterns, recharge characteristics, and geographic location, as well as controlling geologic structures. The Antelope Valley Groundwater Basin's subunits are: Finger Buttes, West Antelope, Neenach, Willow Springs, Gloster, Chaffee, Oak Creek, Pearland, Buttes, Lancaster, North Muroc, and Peerless. The USGS mentions that groundwater levels in these subunits have improved in some areas due to the importation of SWP water to the Antelope Valley Region, and declined in others due to increased groundwater pumping. Each subunit has varying characteristics, and the current conditions in each subunit are briefly summarized below (USGS 1987).[2]

Subunit Characteristics, listed generally from north to south and west to east (USGS 1987):

- **Finger Buttes:** A large part of this subunit is in range and forest lands. Flow is generally from southwest to southeast. Depth to water varies, but is commonly more than 300 feet.
- **West Antelope:** Groundwater flows southeasterly to become outflow into the Neenach subunit. Depth to water ranges from 250 to 300 feet.
- **Neenach:** Groundwater flow is mainly eastward into the "principal" and "deep" aquifers of the Lancaster subunit. Depth to water ranges from 150 to 350 feet.
- **Willow Springs:** Groundwater flows southeast and ultimately enters the Lancaster subunit. This subunit receives recharge for intermittent surface flows from the surrounding Tehachapi Mountain area. Depth to water ranges from 100 to 300 feet.
- **Gloster:** Groundwater flows to the east and southeast as outflow to the Chaffee subunit. Depth to water levels for the southeast area of the subunit are 50 and 100 feet; other water level data is sparse.
- **Chaffee:** Groundwater moves into this subunit from Cache Creek, adjacent alluvial fans to the west and, in lesser amounts, from the Gloster subunit. Water moves eastward in the western part of the subunit, and northward in the southern part, generally toward the City of Mojave. Water levels range from 50 to 300 feet.
- **Oak Creek:** This unit is recharged by flows from the Tehachapi Mountains. Groundwater flows are generally to the southeast, with some southward flows toward the Koehn Lake area. Data for depth to water is not available.
- **Pearland:** Substantial recharge to this subunit comes from Littlerock and Big Rock Creeks. Groundwater generally moves from southeast to northwest, with outflow to the Lancaster subunit. Water levels range from 100 to 250 feet.
- **Buttes:** Groundwater generally moves from southeast to northwest, with outflow to the Lancaster subunit. Depth to water ranges from 50 to 250 feet.
- **Lancaster:** This is the largest and most economically important subunit, in both size and water use. Due

2 As part of information being complied during the adjudication process, the Basin may be divided into different subunits and potentially sub-basins in the future, at which time the IRWMP would be updated.

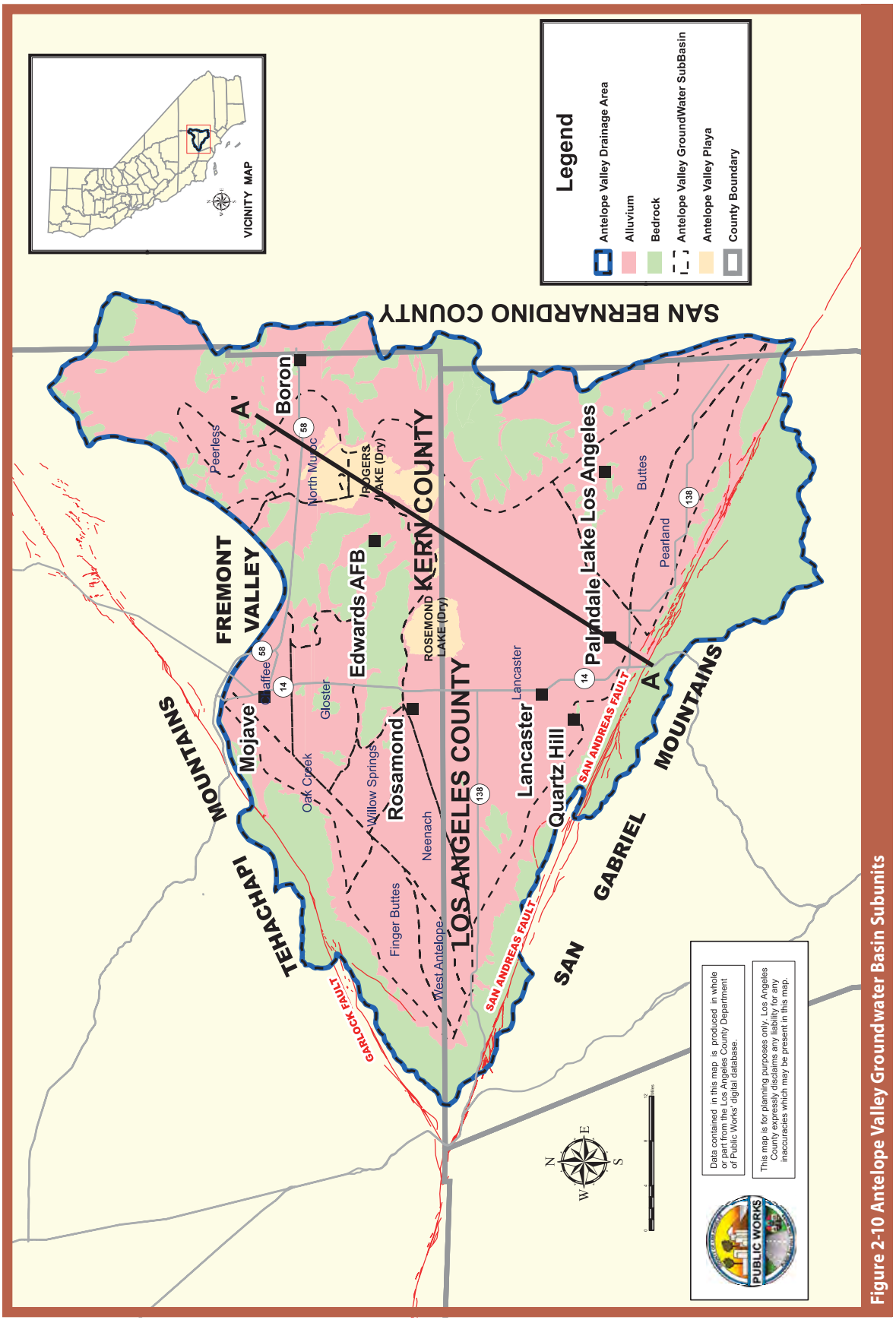

Figure 2-10 Antelope Valley Groundwater Basin Subunits

Reliance on imported water is variable and uncertain. A diversified mix of water resources is needed to increase viability.

to the use of this subunit, depths to water levels vary widely, being generally greater in the south and west. Pumping depressions can be observed in various locations. There are two major aquifers in the subunit, the "principal" and "deep" aquifers, separated by clay layers. As noted above, groundwater moves into the subunit from the Neenach, West Antelope and Finger Buttes subunits. Groundwater also moves into the principal aquifer from the Buttes and Pearland subunits. The Lancaster subunit underlies Lancaster, Palmdale, Quartz Hill, Rosamond, Antelope Acres and other smaller communities.

- **North Muroc:** This unit underlies part of the Rogers Lake and Edwards AFB area. Groundwater moves north and west, then north again and possibly into the Peerless subunit. Data on depth to groundwater is not available.
- **Peerless:** Little information is available on this subunit, which cannot be clearly delineated, but represents the eastern limit of highly developed water-bearing deposits. As of the date of the USGS report, water levels had declined by as much as 150 feet and flow was toward a pumping depression.

2.4.2.2 Groundwater Quality

Groundwater quality is excellent within the principal aquifer but degrades toward the northern portion of the dry lake areas. 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 milligrams per liter (mg/L). The deeper aquifers typically have higher TDS levels. Hardness levels range from 50 to 200 mg/L and high fluoride, boron, and nitrates are problematic in some areas of the basin. Arsenic is another emerging contaminant of concern in the Antelope Valley Region and has been observed in Los Angeles County Waterworks District (LACWWD) 40, PWD, and Quartz Hill Water District (QHWD) wells. Research conducted by the LACWWD and the USGS has shown the problem to reside primarily in the deep aquifer, and it is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a water supply resource for the Antelope Valley Region. Additionally, portions of the Basin have experienced nitrate levels above the maximum contamination limit (MCL) of 10 mg/L.

2.4.2.3 Groundwater Storage Capacity and Recharge

The total storage capacity of the Antelope Valley Groundwater Basin has been reported at 68 million acre-feet (MAF) (Planert and Williams 1995 as cited in DWR 2004) to 70 MAF (DWR 1975 as cited in DWR 2004). The groundwater basin is principally recharged by deep percolation of precipitation and runoff from the surrounding mountains and hills (see Figure 2-10 for a depiction of groundwater basin boundaries). Estimates of groundwater natural recharge rates range from about 31,200 to 80,400 acre-feet per year (AFY) based on a variety of approaches (USGS 2003, USGS 1993).[3] Other sources of recharge to the basin include artificial recharge and return flows from agricultural irrigation, urban irrigation, and wastewater management activities. Depending on the thickness and characteristics of the unsaturated zone of the aquifer, these sources may or may not contribute to recharge of the groundwater. As previously stated, precipitation over the Antelope Valley Region floor is generally less than 10 inches per year and ETo rates (along with soil requirements) are high; therefore, recharge from direct infiltration of precipitation is considered negligible (Snyder 1955; Durbin 1978 as cited in USGS 2003). Estimates of the amount of recharge to the basin attributable to the types of recharge (other than mountain-front or precipitation infiltration) could not be found.

The basin has historically shown large fluctuations in groundwater levels. Data from 1975 to 1998 show that groundwater level changes over this period ranged from an increase of 84 feet to a decrease of 66 feet (Carlson and Phillips 1998 as cited in DWR 2004).

In general, data collected by the USGS (2003) indicate that groundwater levels appear to be falling in the southern and eastern areas of the Antelope Valley Region and rising in the rural western and far northeastern areas of the Antelope Valley Region. This pattern of falling and rising groundwater levels correlates directly to changes in land use over the past 40 to 50 years. Falling groundwater levels are generally associated with areas that are developed and rising groundwater levels are generally associated with areas that were historically farmed, but have been largely fallowed during the last 40 years. However, recent increases in agricultural production, primarily carrots, in the northeastern and western portions of the Antelope Valley Region may have reduced rising groundwater trends in these areas (LACSD 2005).

2.4.2.4 Groundwater Extraction

According to the USGS (2003)[4], groundwater extractions have exceeded the estimated natural recharge of the basin since the 1920's. This overdraft has caused water levels to decline by more than 200 feet in some areas and by at least 100 feet in most of the Antelope Valley Region (USGS 2003). Extractions in excess of the groundwater recharge can cause groundwater levels to drop and associated environmental damage (e.g., land subsidence).

Groundwater extractions are reported to have increased from about 29,000 AF in 1919 to about 400,000 AF in the 1950's, when groundwater use in the Antelope Valley Region was at its highest (USGS 1995). Use of SWP water has since stabilized groundwater levels in some areas of the Antelope Valley Region. In recent years, groundwater pumping has resulted in subsidence and earth fissures in the Lancaster and Edwards AFB areas, which has permanently reduced storage by 50,000 AF (DWR 2004). Although an exact groundwater budget for the basin is not available, data estimates pertaining to groundwater production are available from the early 1900's through 1995. The most recent estimates from the USGS contend that during the 1991 through 1995 period, groundwater pumpage averaged 81,700 AFY (USGS 2003).

In the Lancaster basin, the groundwater generally moves northeasterly from the San Gabriel and Sierra Pelona Mountains to Rosamond and Rogers dry lakes. Heavy pumping has caused large groundwater depressions that disrupt this movement (LACSD 2005).

2.5 LAND USE

Figure 2-11 presents a map of major existing land use categories within the Antelope Valley Region, characterized and grouped together according to broad water use sectors. The map was created with Los Angeles County and Kern County Planning Department GIS parcel level data. Each major land use category is identified, below, including the types of "like water uses" assigned to each category.

- **Residential:** Residential uses include a mix of housing developed at varying densities and types. Residential uses in the Antelope Valley Region include single-family, multiple-family, condominium, mobile home, low-density "ranchettes," and senior housing.

3 The analyses provided in the IRWM Plan are strictly for long-term planning purposes and have not been conducted to answer the questions being addressed within the adjudication. Once the detailed analysis of available local water supply are completed within the adjudication, the supply numbers for the IRWM Plan will need to be updated.

4 The analyses provided in the IRWM Plan are strictly for long-term planning purposes and have not been conducted to answer the questions being addressed within the adjudication. Once the detailed analysis of groundwater extractions are completed within the adjudication, the values for the IRWM Plan will need to be updated.

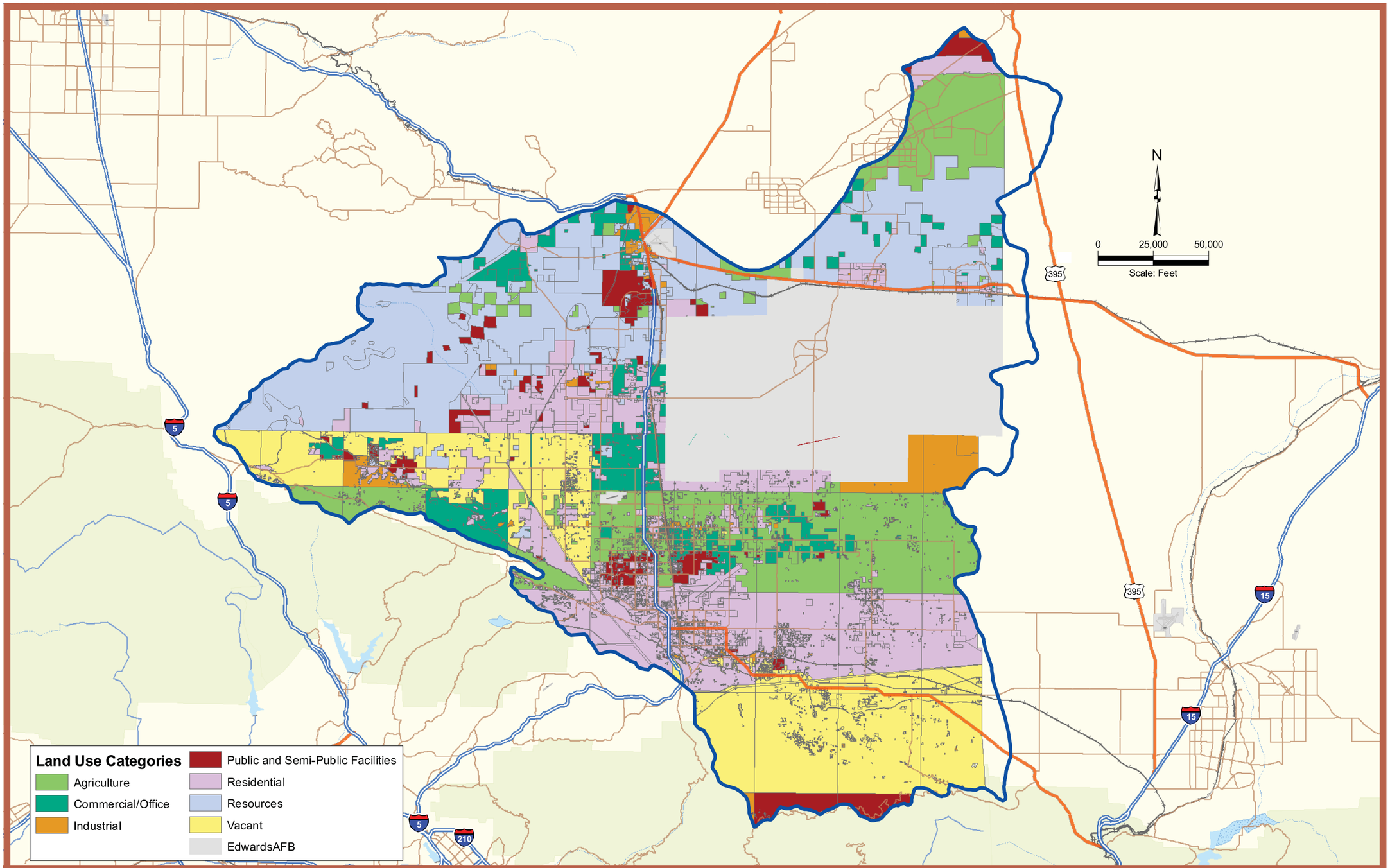

Figure 2-11 Current Land Use Designations for the Antelope Valley Region

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The aerospace industry was influential in bringing economic development and growth to the Antelope Valley.

- **Commercial/Office:** This category includes commercial uses that offer goods for sale to the public (retail) and service and professional businesses housed in offices (doctors, accountants, architects, etc.). Retail and commercial businesses include those that serve local needs, such as restaurants, neighborhood markets and dry cleaners, and those that serve community or regional needs, such as entertainment complexes, auto dealers, and furniture stores. Also included in this category are government offices that have similar water duty requirements as a typical commercial/office use.

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.

- **Industrial:** The industrial category includes heavy manufacturing and light industrial uses found in business, research, and develo pment parks. Light industrial activities include some types of assembly work, utility infrastructure and work yards, wholesaling, and warehousing.
- **Public and Semi-Public Facilities:** Libraries, schools, and other public institutions are found in this category. Uses in this category support the civic, cultural, and educational needs of residents.
- **Resources:** This category encompasses land used for private and public recreational open spaces, and local and regional parks. Recreational use areas also include golf courses, cemeteries, water bodies and water storage. Also included in this category are mineral extraction sites.
- **Agriculture:** Agricultural lands are those in current crop, orchard or greenhouse production, as well as any fallow lands that continue to be maintained in agricultural designations or participating in tax incentive agricultural programs.
- **Vacant:** Vacant lands are undeveloped lands that are not preserved in perpetuity as open space or for other public purposes.

Historically, agriculture was the predominant land use in the Antelope Valley. Photo courtesy of the Los Angeles County Farm Bureau.

2.6 SOCIAL AND CULTURAL VALUES

The story of the Antelope Valley Region's development helps to unveil the range of local cultural values that characterize the area. The continuing tradition of its historically rural character, combined with the emergent influence of the aerospace industry and metropolitan Los Angeles, give meaning to the diverse and, in some cases divergent, lifestyles and values that define the Antelope Valley Region's collective goals and challenges for the future.

Historically, agriculture was the Antelope Valley Region's predominant land use, characterized by dry wheat farming in the west, alfalfa on the Antelope Valley Region floor, and orchards on its southern fringes. The City of Palmdale was settled over 100 years ago as a residential community by Swiss and German migrants from the Midwest. At the time, land in the Antelope Valley Region sold for fifty cents an acre. The development of the Southern Pacific Railroad connected the Antelope Valley Region to Los Angeles and the Central Valley and spurred the first large influx of white settlers to the Antelope Valley Region. Most of the Antelope Valley Region's smaller communities emerged around this same time as agricultural settlements or local farm trade centers.

In 1933, the U.S. Department of Defense established Edwards Air Force Base (AFB), (then called Muroc Army Air Field) east of Rosamond and roughly 60 kilometers northeast of Palmdale's current city limits. Because of the vast landing area provided by Edwards AFB's dry lake beds, it was the original site of NASA space shuttles landings, as well as the site of other important aeronautical events. To this day U.S. military flight testing is a large and important part of Edwards AFB operations.

As a result of increased governmental defense spending in the 1950s, the Antelope Valley Region underwent a dramatic change in character. In 1952, the aerospace industry officially took hold at U.S. Air Force Plant 42. Plant 42 in northeast Palmdale is home to Lockheed Martin, Boeing, Northrop Grumman and BAE systems, among other significant aeronautical companies.

Increasing development pressures in the 1980s were in part driven by the continuing appeal of the Antelope Valley Region's high desert climate as well as land values lower than those in the Los Angeles metropolitan area. As the Los Angeles population rapidly expanded into the Antelope Valley Region, the desire for more cultural amenities and new skills and resources increased and the Antelope Valley Region became more metropolitan in character. The increase in population and the 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.

The Lancaster Community Visioning Report helps to shed light on the current interplay of these interests and how they may influence the direction of future planning and growth Antelope Valley Region-wide. The Visioning Report presents a common vision for the future of Lancaster and the Antelope Valley Region that is focused on the following priorities:

- Balancing growth
- Ensuring economic well-being
- Strengthening Community Identity
- Improving public safety
- Promoting Active Living
- Focusing on Education and Youth
- Supporting Environmental Conservation

These priorities were echoed throughout the IRWM Plan visioning process, where Stakeholders routinely expressed the need to develop a balance of resources, while preserving the area's natural environment and rural history. These ideals were further emphasized during each of the outreach meetings with the Rural Town Councils and community members in the Antelope Valley Region. 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 that preserving a hometown feel and developing a strong sense of neighborhood stability are critical to maintaining 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.

2.7 ECONOMIC CONDITIONS AND TRENDS

Historically, the economy within the Antelope Valley Region has focused primarily on agriculture, and crops grown in the Antelope Valley Region have included alfalfa, wheat, barley, and other livestock feed crops. However, the area is in transition as the predominant land use shifts from agricultural uses to residential and industrial uses.

The increase in residential land use and its impact on the economy is evident from the population growth in the Antelope Valley Region, which is discussed in Section 2.8. With significantly lower home prices than in other portions of Los Angeles County, the Antelope Valley Region housing market has seen an increase as people choose to commute to the Los Angeles area. According to the Antelope Valley Building Industry Association (BIA) (2006), a number of trends over the last couple of years can be seen from single- and multi-family households in the Antelope Valley Region. Even after acknowledging the recent slowing of the housing market, the BIA recognized that the Antelope Valley Region is the last large available open space "opportunity" for development in Southern California, whether it be for residential, commercial/industrial/retail or agricultural land uses. As such, the BIA predicted that 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).

Industry 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. Mining of borate in the northern areas and of salt extract, rock, gravel, and sand in the southern areas contribute to the Antelope Valley Region's industrial economy.

As previously mentioned, ensuring economic well-being is a key social and cultural value of the Antelope Valley Region's community.

As shown in Table 2-2 and Figure 2-12, approximately 55 percent of the Antelope Valley Region's population has a household income of less than $50,000, approximately 22 percent of the population has a household income between $50,000 and $74,999, and approximately 22 percent has a household income of $75,000 or higher.

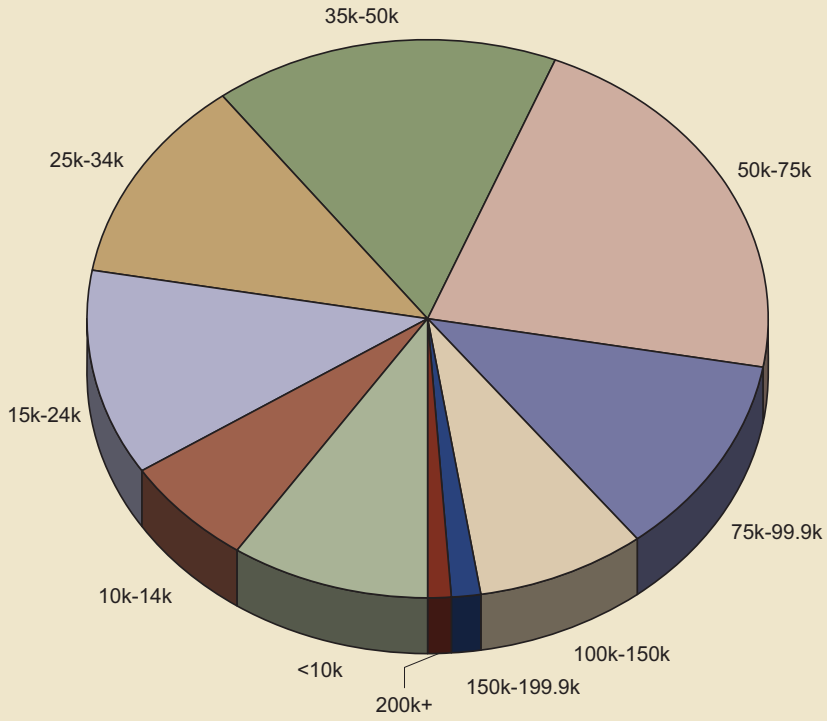


Figure 2-12 Income Levels for the Antelope Valley Region

Table 2-2 Demographics Summary for the Antelope Valley Region

Area	Lancaster	Palmdale	Unincorp. LA County	California City	Boron	Mojave	Rosamond	Edwards AFB	Unincorp. Kern County	Antelope Valley Region
Age Structure (by %)										
under 5	8.0	9.3	6.9	6.7	7.3	9.1	7.6	14.0	5.8	8.1
5-9	9.5	11.5	9.4	8.2	6.7	9.5	9.8	10.6	7.5	10.0
10-14	9.2	11.5	10.3	9.8	8.4	8.8	9.9	8.7	8.7	10.3
15-19	8.6	8.9	7.9	8.6	8.0	8.0	8.4	5.7	7.2	8.2
20-24	6.4	5.4	5.3	4.7	4.4	5.9	5.0	17.0	2.6	5.6
25-34	13.8	12.7	12.2	10.3	9.5	12.1	12.6	25.1	6.6	12.3
35-44	17.5	18.4	20.2	17.5	15.7	15.6	19.4	17.0	18.0	18.5
45-54	11.6	11.3	13.3	14.6	15.2	11.6	12.2	1.6	15.8	12.1
55-59	3.7	3.2	3.9	4.9	5.9	4.2	3.9	0.1	6.2	3.7
60-64	2.9	2.2	3.0	4.0	5.8	4.4	3.3	0.1	5.6	3.0
65-74	4.6	3.4	4.5	6.8	7.7	6.3	5.0	0.1	11.4	4.8
75-85	3.0	1.7	2.4	3.2	4.8	3.6	2.3	0.1	4.4	2.6
85 and over	1.0	0.4	0.6	0.8	0.7	0.9	0.6	0	0.4	0.7
Median Household Income	$41,127	$46,941	NA	$45,735	$40,625	$24,761	$42,307	$36,915	NA	--

Table 2-2 Demographics Summary for the Antelope Valley Region (continued)

Area	Lancaster	Palmdale	Unincorp. LA County	California City	Boron	Mojave	Rosamond	Edwards AFB	Unincorp. Kern County	Antelope Valley Region
Income Levels (by %)										
< $10,000	9.7	8.8	8.5	10.6	14.8	24.9	6.8	0	6.8	9.6
$10k to $14.9k	7.0	5.7	5.6	6.4	11.9	6.6	5.4	1.3	4.7	6.2
$15k to $24.9k	13.4	10.5	9.8	11.4	11.7	18.8	10.4	19.0	10.4	11.9
$25k to $34.9k	13.0	11.3	10.6	12.0	8.6	12.8	13.2	24.7	8.8	12.0
$35k to $49.9k	16.2	16.7	17.1	12.7	19.4	15.9	17.0	25.3	12.7	16.2
$50k to $74.9k	20.5	23.0	22.6	25.3	19.4	11.8	26.6	21.1	29.1	21.8
$75k to $99.9k	10.4	12.9	13.1	12.1	8.9	5.4	13.8	6.6	11.2	11.6
$100k to $149k	7.3	8.8	9.9	7.2	4.0	3.9	5.2	2.0	11.8	8.0
$150k to $199k	1.3	1.5	1.3	1.4	0	0	0.7	0	2.6	1.4
$200k or more	1.2	0.8	1.5	0.9	1.2	0	0.9	0	1.7	1.2
Population Density (persons per sq. mile)	1,263	1,112	70.1	107.0	88.8	9.7	91.9	19.4	14.5	96.6
Languages spoken(a)										
English	78%	66%	75%	85%	78%	79%	77%	88%	91%	75%
Spanish	17%	29%	19%	9%	19%	17%	20%	6%	6%	20%
French	1%	<1%	<1%	1%	<1%	<1%	<1%	<1%	<1%	<1%
Tagalog	1%	1%	1%	1%	2%	<1%	2%	2%	<1%	1%
German	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1%	1%	<1%
Other (all <1%)	2%	4%	5%	4%	1%	4%	1%	3%	2%	4%

Note: (a) For age 5 and up, 2000 Census Tract Data.

2.8 POPULATION

This subsection provides demographic information from the 2000 Census as well as regional growth projections.

2.8.1 Demographics

Table 2-2 provides a summary of the human demographics for the Antelope Valley Region as determined by 2000 U.S. Census Bureau data. Regional data was estimated from the data for the census tracts within the regional boundaries. Although Figure 1-5 shows several Disadvantaged Communities (DACs) near Boron, the Median Household Income (MHI) for Boron does not reflect this. This is mainly a direct result of the 1.2 percent of the Boron population with average salary above $200,000, which increases the overall median income level for Boron.

Figure 2-12 shows the breakdown of the income levels in the Antelope Valley Region as laid out in Table 2-2.

2.8.2 Regional Growth Projections

Growth in the Antelope Valley Region proceeded at a slow pace until 1985. Between 1985 and 1990, the growth rate increased approximately 1,000 percent from the average growth rate between the years 1956 to 1985 as land uses shifted from agricultural to residential and industrial. The historical and projected population for the Antelope Valley Region is shown in Table 2-3. Historical population estimates were based on the Geolytics normalization of past U.S. Census tract data to 2000 census tract boundaries. This normalization allows for a direct comparison of the past U.S. Census tract population data. These Census tracts were then assigned to the individual jurisdictions in the Antelope Valley Region to determine the jurisdiction's population. Projections for the Cities of Lancaster and Palmdale were derived from Southern California Association of Governments (SCAG) estimates. Projections for the City of Rosamond and Unincorporated Kern County were derived from the Rosamond and Willow Springs Specific Plans. Population projections for the rest of the Kern County portion of the Antelope Valley Region and unincorporated Los Angeles County portion of the Antelope Valley Region assume the annual growth rate similar to the City

Table 2-3 Population Projections

	1970(a)	1980(a)	1985(b)	1990(a)	2000(a)	2005	2015	2035
Boron (d)	3,000	3,000	3,000	3,000	2,000	2,000	3,000	5,000
California City (d)	2,000	3,000	4,000	6,000	8,000	9,000	12,000	20,000
Edwards AFB (d)	10,000	9,000	8,000	7,000	7,000	7,000	10,000	16,000
Mojave (d)	4,000	5,000	5,000	7,000	6,000	7,000	9,000	14,000
Rosamond (e)	4,000	5,000	6,000	9,000	15,000	21,000	39,000	137,000
Unincorporated Kern County (e)	1,000	2,000	3,000	8,000	12,000	16,000	29,000	103,000
Lancaster (c)	41,000	51,000	55,000	98,000	113,000	142,000	192,000	283,000
Palmdale (c)	17,000	22,000	24,000	67,000	96,000	146,000	218,000	380,000
Unincorporated Los Angeles County (d)	20,000	29,000	33,000	69,000	88,000	100,000	129,000	215,000
Antelope Valley Region	**103,000**	**128,000**	**140,000**	**275,000**	**346,000**	**450,000**	**641,000**	**1,174,000**

Notes: Projections Rounded to the nearest 1,000 people.

(a) Based on Geolytics Normalization of Past U.S. Census Tract Data to 2000 Census Tract Boundaries.

(b) Based on an Interpolation of the 1980 and 1990 U.S. Census Data.

(c) SCAG projections for North Los Angeles County Subregion. 2035 Estimates assume same growth rate as in 2030.

(d) Projections assume the Antelope Valley Region would have a similar annual growth rate as the City of Lancaster, estimated as approximately 2.6 percent from SCAG projections.

(e) Projections based on the Rosamond and Willow Springs Specific Plans.

of Lancaster, estimated as approximately 2.6 percent from SCAG projections. Projections indicate that approximately 1.17 million people will reside in the Antelope Valley Region by the year 2035. This represents an increase of approximately 161 percent from the 2005 population. Figures 2-13 and 2-14 graphically depict these population projections.

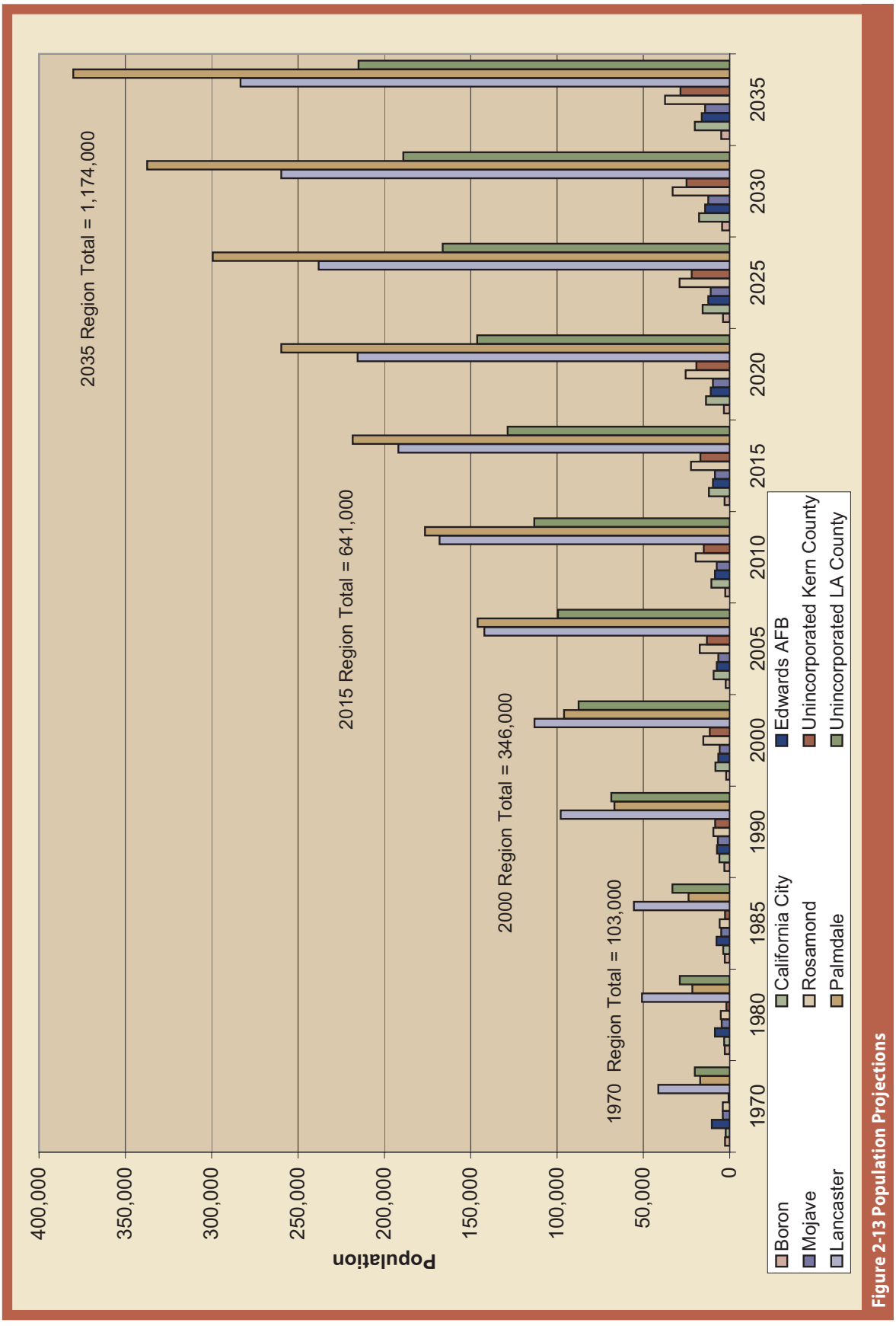


Figure 2-13 Population Projections

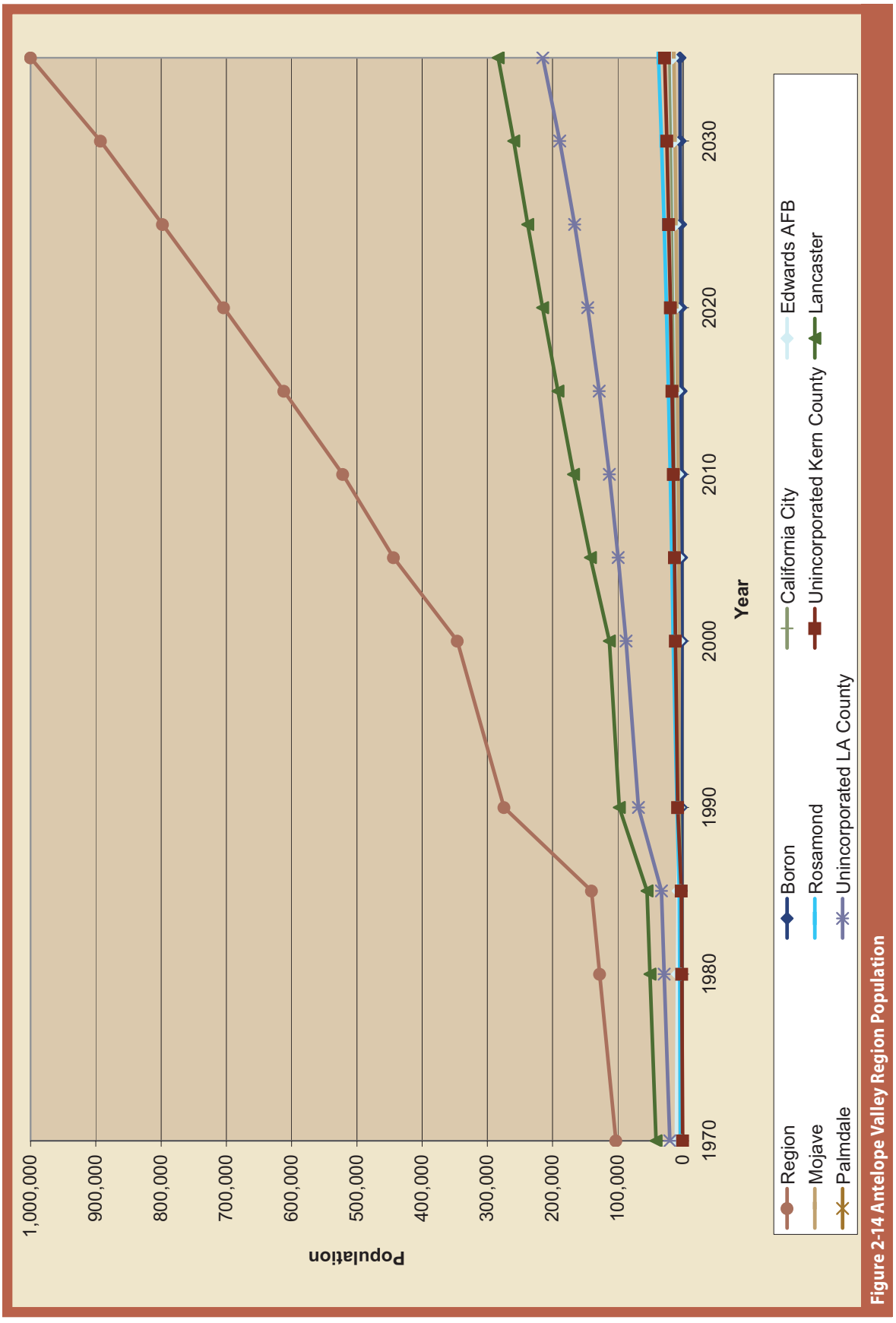
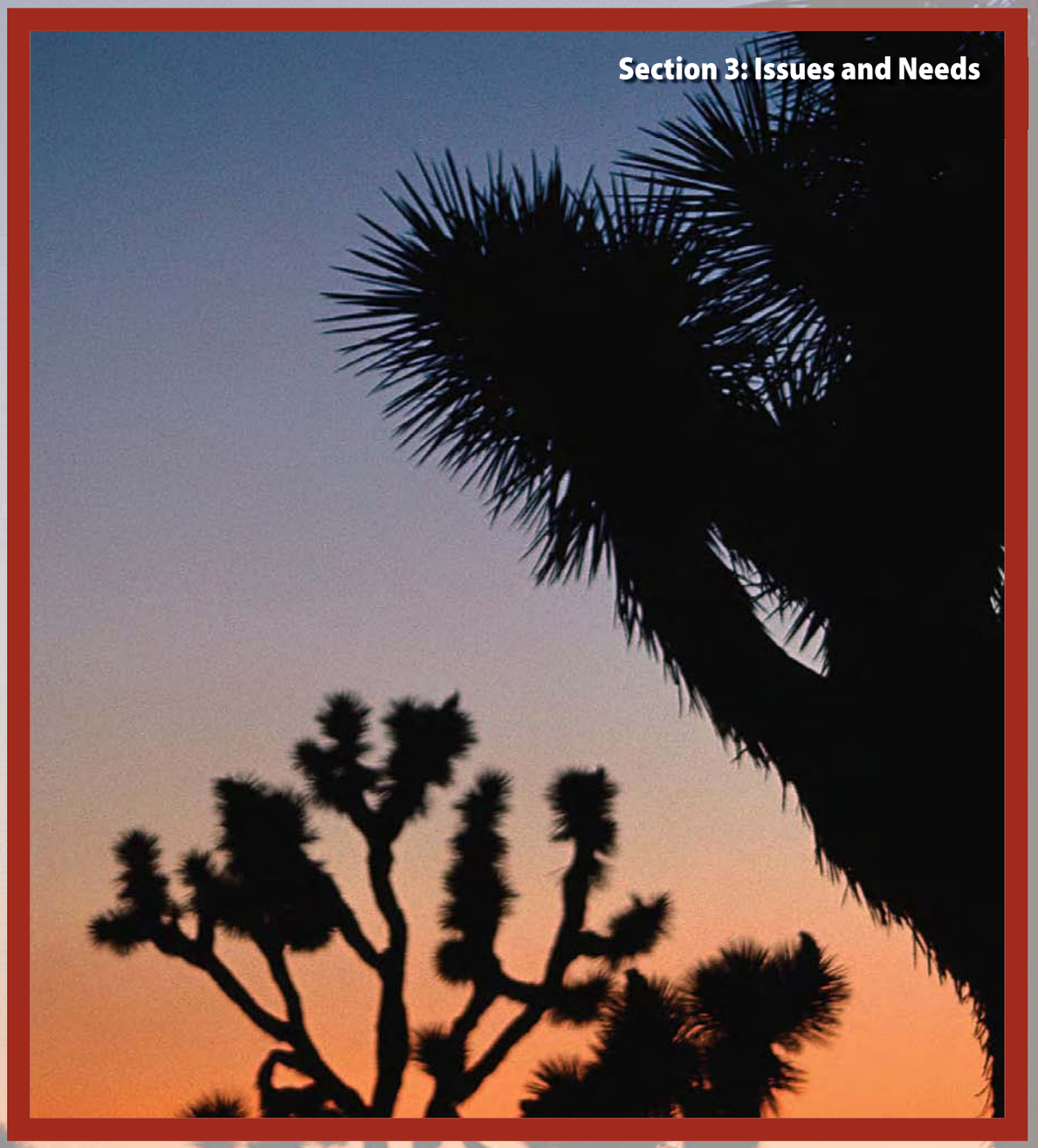


Figure 2-14 Antelope Valley Region Population


Section 3: Issues and Needs

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One fundamental challenge in the Antelope Valley Region is that demand for water exceeds available supplies. If communities do not begin conserving water more effectively, the Region will need twice as much water as it currently has in order to meet demand in 2035.

Section 3: Issues & Needs

The purpose of this section is to identify the issues, needs, challenges and priorities for the Antelope Valley Region through the year 2035 related to water supplies and other resources within the Antelope Valley Region. The section will assess the current and projected water demands of the Antelope Valley Region, which include agricultural and municipal and industrial (M&I) demands on groundwater, imported water, and recycled water as well as an analysis of the current and projected supplies[1] needed to meet those demands. In addition, an assessment of the water quality issues and challenges affecting these sources will be presented. A discussion of the flood management, environmental resource management, and land use planning issues will be presented, as these issue areas affect the water supply and demand requirements within the Antelope Valley Region. Finally, a discussion of the issues and needs specific to the underrepresented communities within the Antelope Valley Region are discussed.

1 During the analysis for this Integrated Regional Water Management (IRWM) Plan, the Regional Water Management Group (RWMG) was aware that a separate analysis of water supplies was being conducted by a Technical Advisory Committee (TAC) to the adjudication. The analyses provided in the IRWM Plan are strictly for long-term planning purposes and have 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.