Appendix D: DAC Maps and Technical Memoranda

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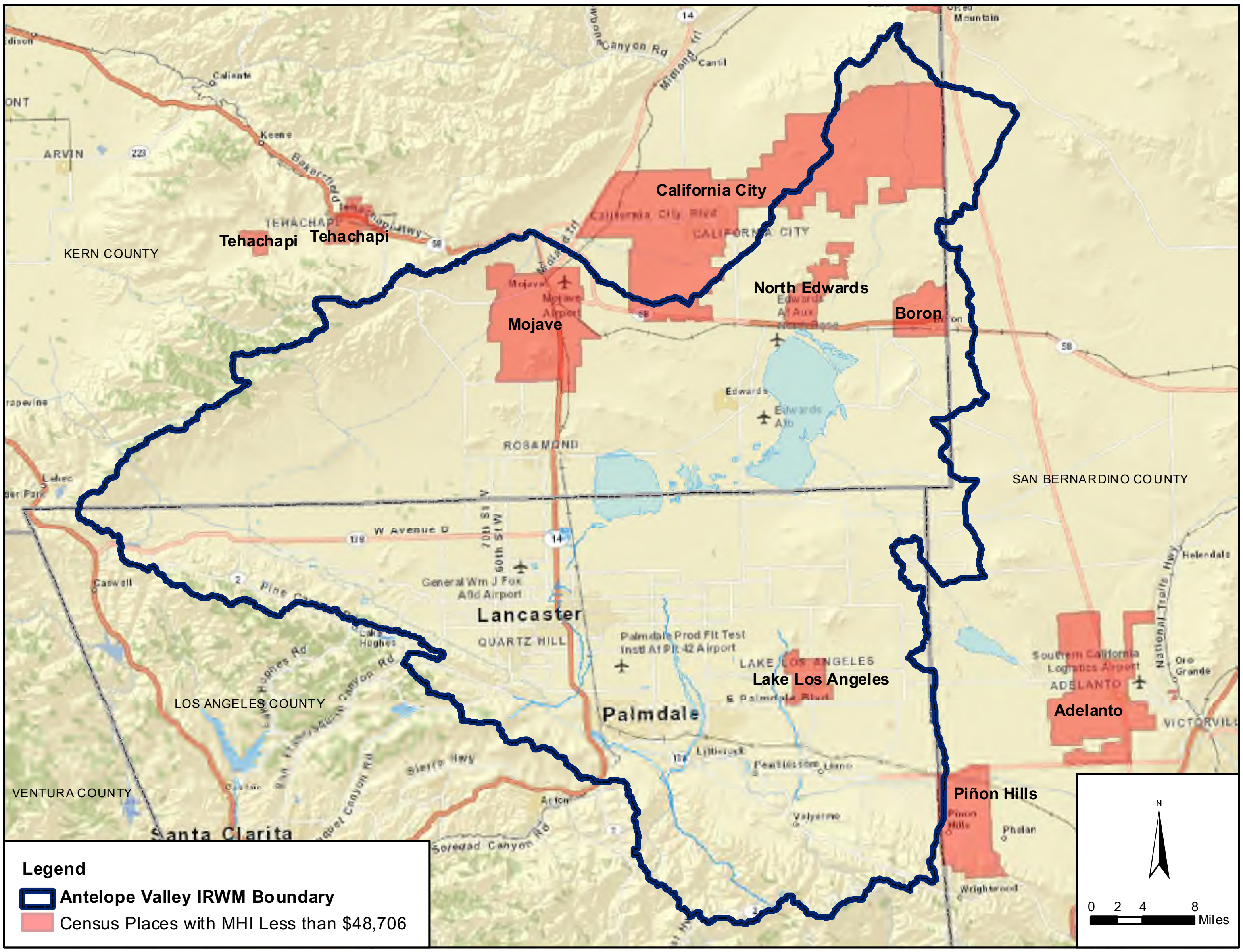
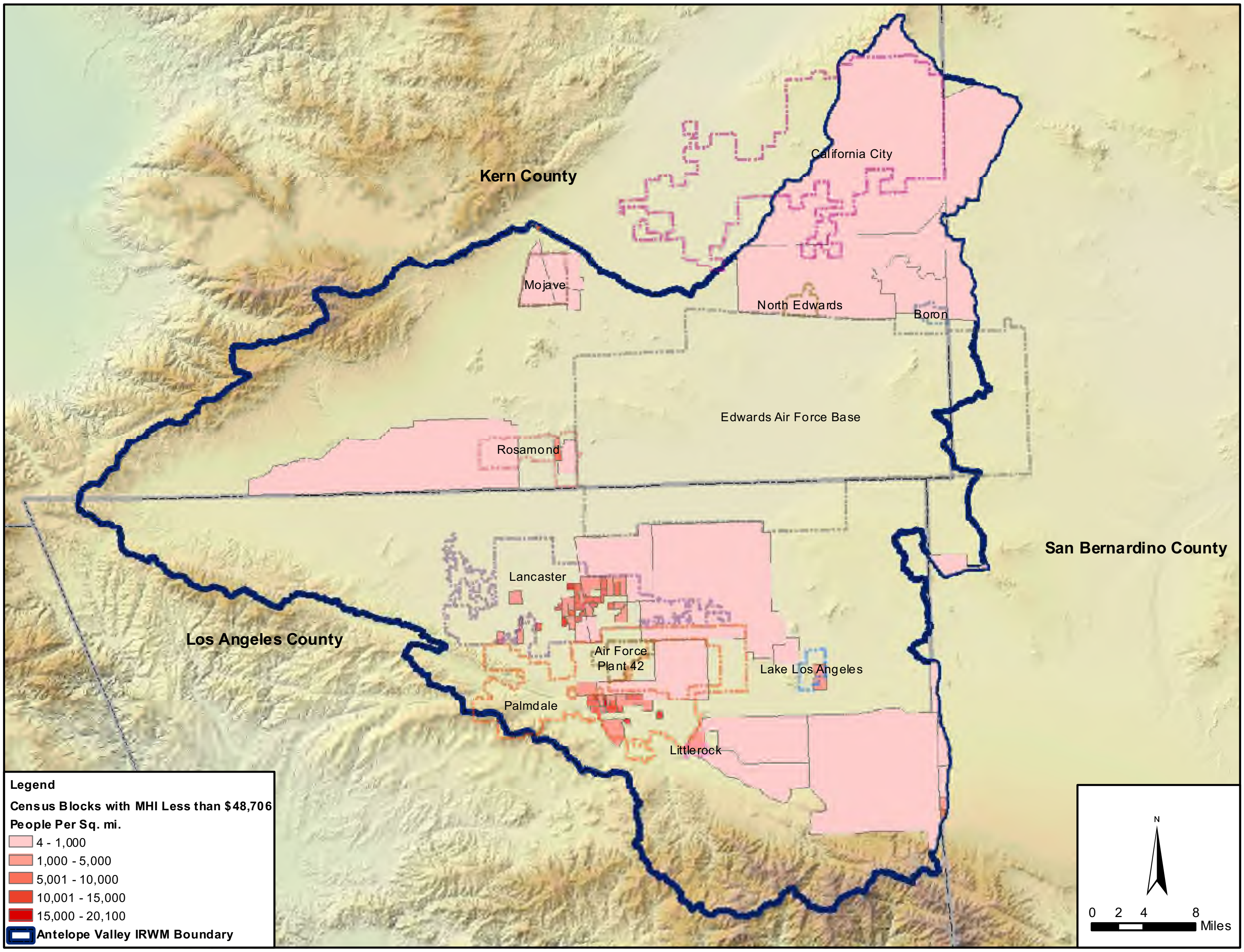


California City
Tehachapi
Tehachapi
KERN COUNTY
North Edwards
Mojave
Boron
SAN BERNARDINO COUNTY
Lancaster
Lake Los Angeles
Adelanto
LOS ANGELES COUNTY
Palmdale
VENTURA COUNTY
Piñon Hills
Santa Clarita
Legend
Antelope Valley IRWM Boundary
Census Places with MHI Less than $48,706
N
0 2 4 8
Miles



Kern County
California City
Mojave
North Edwards
Boron
Edwards Air Force Base
Rosamond
San Bernardino County
Lancaster
Los Angeles County
Air Force Plant 42
Lake Los Angeles
Palmdale
Littlerock
Legend
Census Blocks with MHI Less than $48,706
People Per Sq. mi.
4 - 1,000
1,000 - 5,000
5,001 - 10,000
10,001 - 15,000
15,000 - 20,100
Antelope Valley IRWM Boundary
N
0 2 4 8
Miles

FINAL DRAFT Technical Memorandum

Antelope Valley IRWMP 2007 Update

Subject: **Task 2.1.2 DAC Water Supply, Quality, and Flooding Data**

Prepared For: Antelope Valley State Water Contractors Association

Prepared by: Grizelda Soto/Dawn Flores

Reviewed by: Brian Dietrick

Date: May 20, 2013 (Revised August 2, 2013)

1 Purpose

The purpose of this technical memorandum (TM) is to document the process for identifying disadvantaged community (DAC) areas in the Antelope Valley Region and to compile and summarize the existing water quality, supply, and flooding information available for DACs[1]. The findings of this TM will be used to develop a conceptual monitoring plan for DAC areas in the Region (Task 2.1.3).

2 DAC Background

A DAC under the Integrated Regional Water Management (IRWM) Program is defined as a community with a median household income (MHI) less than 80% of the Statewide average. An MHI of less than $48,706 is the IRWM DAC threshold from the 2012 Proposition 84 Guidelines.

Within the Antelope Valley Region IRWM stakeholder group, a DAC Outreach committee was formed to assist with data collection, outreach efforts, and project solicitation in DAC areas. The committee was composed of volunteer members representing a diverse cross section of the active stakeholders including DACs, the California Department of Water Resources (DWR), and mutual water companies. The members soon developed and implemented a multifaceted outreach campaign to support the IRWM Plan that would more actively address the needs of DACs. Overall, the two main goals of the committee were to:

- Encourage participation by DACs and solicit input (including potential projects) into the Antelope Valley IRWM Plan updates
- Educate target audiences in DAC areas about the purpose and benefits of the Antelope Valley IRWM Plan

3 Determination of DAC Areas

This section provides a short background on the types of census data that are available for determining DAC areas, and it then discusses how two DAC maps were developed for the Region. Finally, a description of DAC outreach efforts is provided.

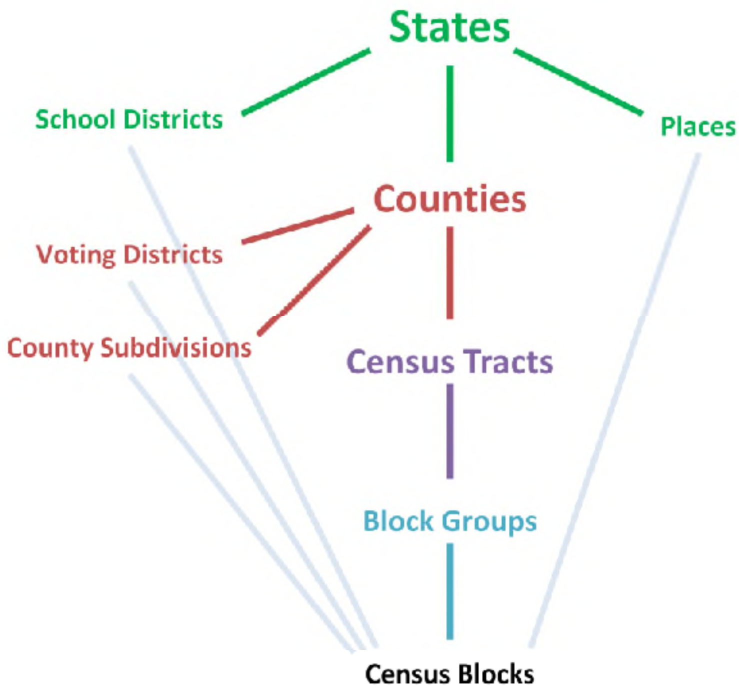
3.1 Background on Census Data

United States Census data is organized in multiple ways. The most basic unit of measurement is the **"block". Census blocks are used to make up larger areas** of organization, such as block groups, tracts, and up to counties, states and nations. This sequence of organization is used by the Census Bureau for statistical analysis. Another unit of organization that is also built from Census blocks is called a Census

[1] As recommended in the 2012 DWR IRWM Grant Program Guidelines, Appendix G.

"Place". Census places are areas that have a particular identity or meaning for local residents. For example, an unincorporated area that is a town could be a Census place. A Census place is simply another way to organize blocks. Figure 1 below illustrates multiple ways that are used to organize Census blocks.

Figure 1: Organization of Census Blocks



3.2 DAC Maps Developed for the Antelope Valley Region

The Department of Water Resources (DWR) developed a mapping tool to help determine which communities within the IRWM region meet the DAC MHI definition.[2] The maps and GIS files were derived from the US Census Bureau's American Community Survey (ACS) for the five year period 2006-2010. The initial DAC map was drafted using Census Place GIS data from DWR (Figure 3-2), which provided a larger scale overview of the DAC areas within the Antelope Valley IRWM Region. After an initial review of the Antelope Valley IRWM DAC map that was subsequently shared with the DAC Outreach committee and Stakeholder group, a second map was developed using Census Block GIS data from DWR. The Census Block GIS data provided DAC information at the smallest geographic unit available. The result was that more DAC areas within the Antelope Valley IRWM Region were captured than had previously been captured using the Census Places GIS data. The Census Block GIS data was further defined to include the population density (people per square mile) within the Antelope Valley IRWM Region (Figure 3). For the purposes of DAC outreach, it was decided that the Census Block information would be used since it provides a more inclusive accounting of DAC areas.

[2] As defined by the Department of Water on the Integrated Regional Water Management Site: http://www.water.ca.gov/irwm/grants/resourceslinks.cfm

Figure 2: Antelope Valley IRWM Disadvantaged Communities as Defined by Census Places

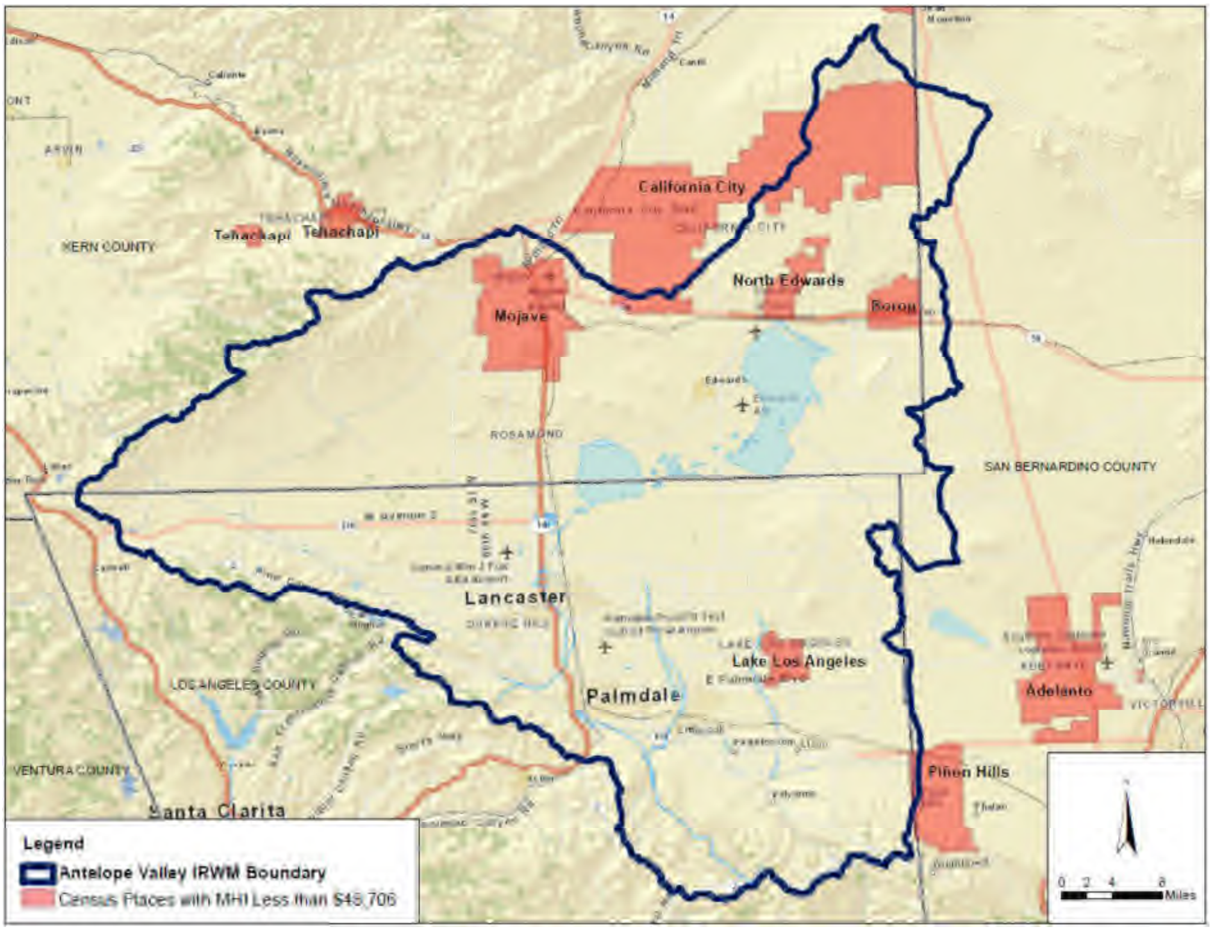
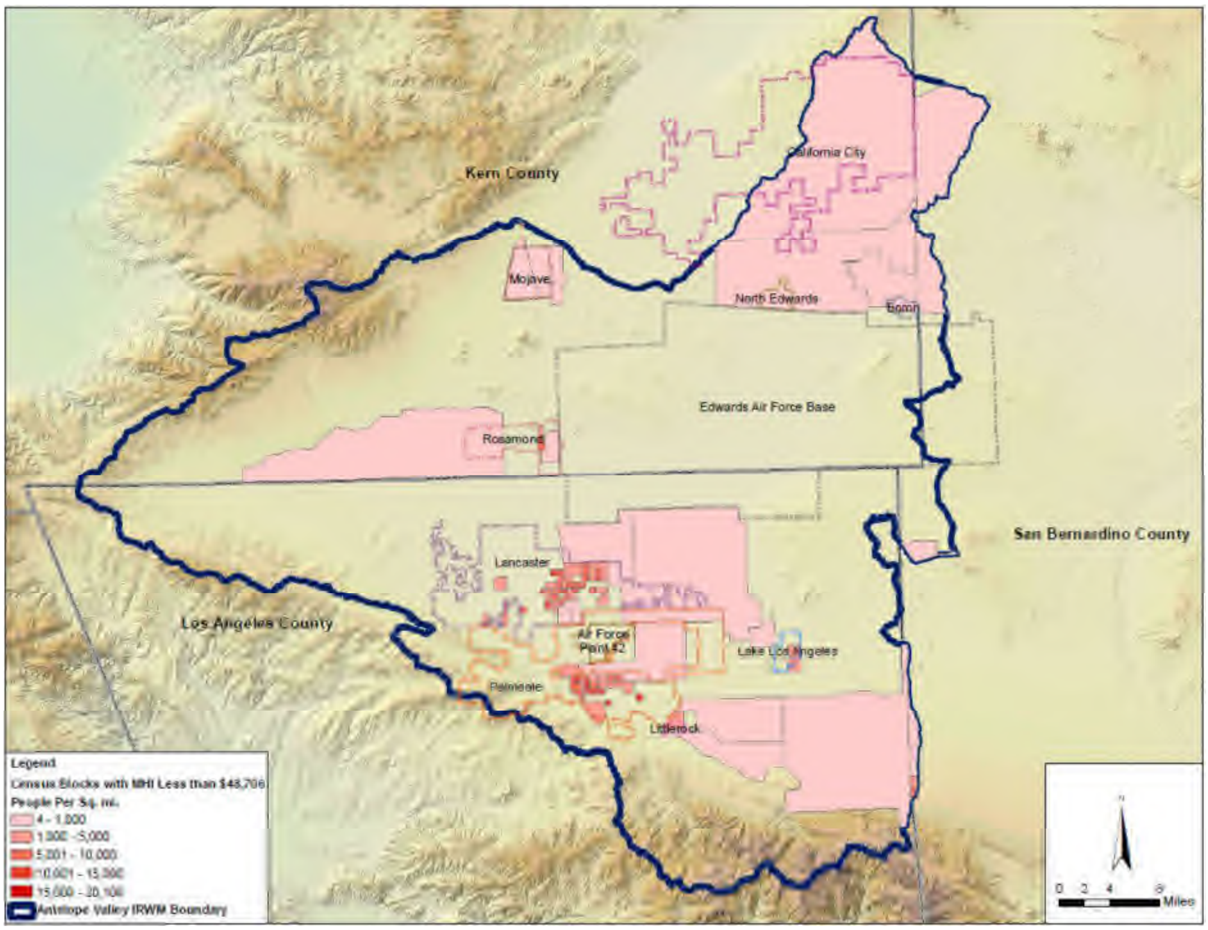


Figure 3: Antelope Valley IRWM Disadvantaged Communities as Defined by Census Blocks and Population Densities



3.3 DAC Outreach Efforts

After the various DAC areas were identified, a coordinated effort was initiated to provide outreach. Initial contact was made with representatives from Lake Los Angeles, Mojave Public Utility, Boron Community Services District, North Edwards Water District, Edgemont Acres Mutual Water Company, California City, and others. Subsequent presentations at local community meetings were also arranged. In addition to PowerPoint presentations, handouts were provided at each meeting that included detailed schedules, project eligibility criteria, IRWM Plan goals, plan objectives, and technical assistance listings with contact information. At these meetings, data was requested on any water resource issues and DAC projects that could be eligible for Prop 84 and Prop 1E grant funding. Calls were also conducted with representatives of several of the DAC areas. Table 3-1 contains a list of the DAC outreach meetings thus far for the 2013 IRWM Plan updates and those that are anticipated in the near future.

Table 3-1: DAC Outreach Meetings

Meeting/Event	RMC Attendees	Meeting Date	Other Attendees
DAC Committee Meeting No. 1	Brian Dietrick Tom West Grizelda Soto	April 18, 2012	11 people from AV IRWMP stakeholder group
North Edwards Water District/Desert Lake CSD	Brian Dietrick Grizelda Soto	Aug 10, 2012	Dollie Kostopoulos, GM
Boron Community Services District	Brian Dietrick Grizelda Soto	Aug 10, 2012	Stopped by office and left copies of the AV IRWM Kern County DAC Outreach materials; follow-up call to Natalie Dadey on 8/14/2012
Mojave Public Utility District	Brian Dietrick Grizelda Soto	Aug 10, 2012	Stopped by office and left copies of the AV IRWM Kern County DAC Outreach materials; follow-up call to Bee Coy on 8/14/2012
Lake Los Angeles Town Council Meeting	Brian Dietrick	Aug 28, 2012	Approx. 15 w/council
DAC Committee Meeting No. 2	Brian Dietrick Grizelda Soto	March 20, 2013	Approx. 6 from AV IRWMP stakeholder group
DAC Committee Meeting No. 3	Brian Dietrick Dawn Flores	May 15, 2013	Approx. 10 from AV IRWMP stakeholder group
Edgemont Acres Mutual Water Company	Brian Dietrick	Anticipated June 2013	TBA
Quartz Hill - AV Board of Trade	Brian Dietrick Dawn Flores	Anticipated June 5, 2013	TBA
Rosamond CSD	Brian Dietrick Dawn Flores	Anticipated in June 2013	TBA

4 DAC Issues

This section describes the methodology for identifying water supply, water quality, and flooding issues in the DAC areas discussed in Section 3.

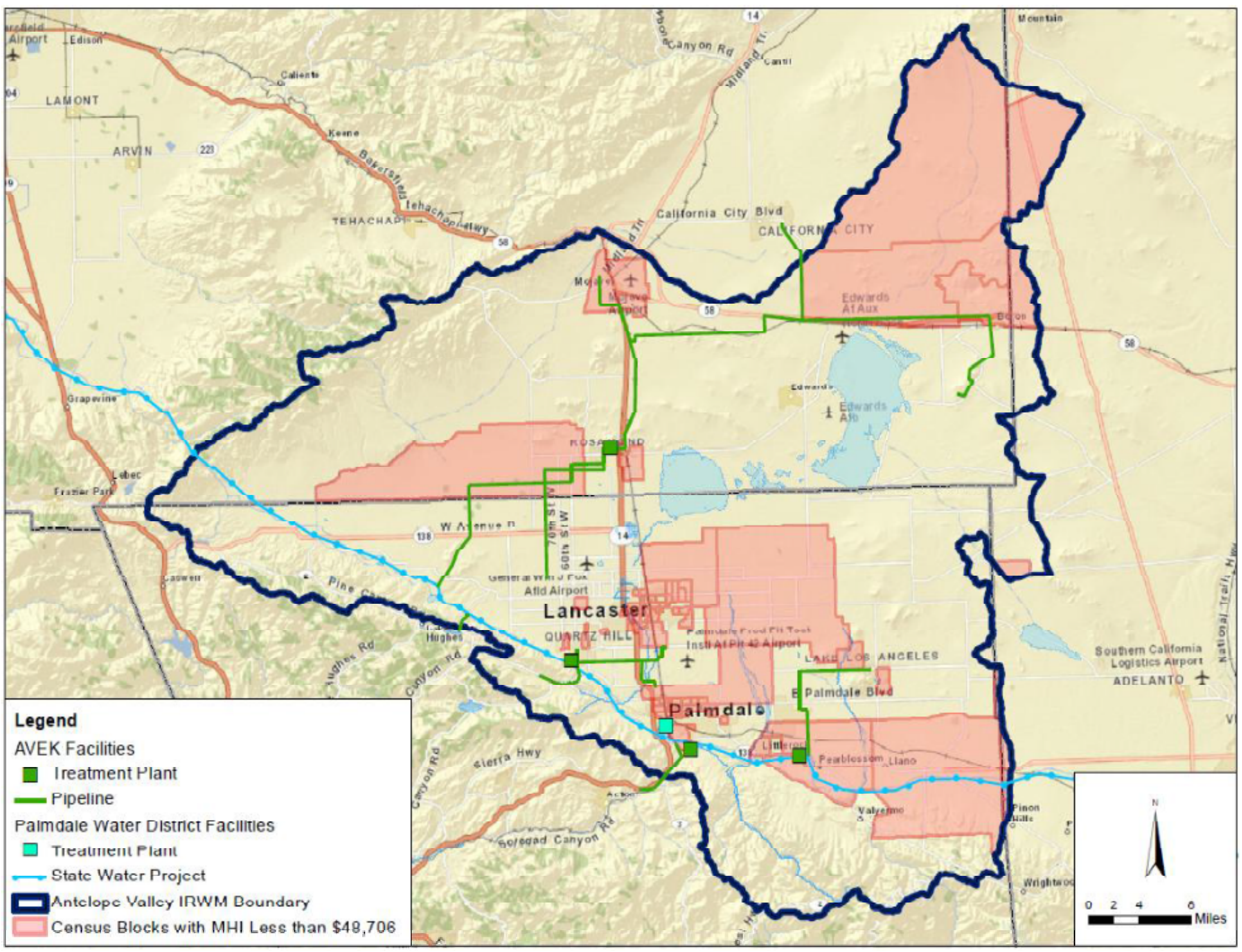
4.1 Water Supply

To identify water supply issues in each of the DAC areas, the consultant team contacted water agencies that served each area and verified the information with available 2010 Urban Water Management Plans (UWMPs). In general, DAC areas rely on (1) imported water served from the Antelope Valley East Kern (AVEK) Water Agency, Palmdale Water District (PWD), or Littlerock Creek Irrigation District (LCID); (2) groundwater pumped from wells; or (3) recycled water from water reclamation plants operated by the Los Angeles County Sanitation Districts (LACSD). Water supply issues in specific DAC areas will be documented in a subsequent DAC TM.

4.1.1 Imported Supply

Imported water supply issues are similar to non-DAC areas. For DAC areas, AVEK supplies are provided by the State Water Project (SWP) and transfers/exchanges with surrounding agencies. AVEK supplies potable water directly to Los Angeles County Waterworks District (LACWWD 40), Quartz Hill Water District (QHWD), and Rosamond Community Services District (RCSD). Other areas receive imported supply water through purveyors such as Palmdale Water District (PWD), which in turn treats imported water for the Littlerock Creek Irrigation District. Imported water facilities for the Region are shown below in Figure 4 in relation to DAC areas.

Figure 4: AVEK and PWD Imported Water Facilities in Relation to DAC Areas



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

AVEK currently treats SWP water with four Water Treatment Plants (WTPs) that are capable of treating approximately 132,270 acre-feet per year (AFY) of imported water. The main WTP, Quartz Hill WTP, is rated for 90 million gallons per day (mgd) (100,880 AFY). The Eastside WTP, expanded in 1988, provides a treatment capacity of 10 mgd (11,210 AFY). Rosamond WTP is a 14 mgd (15,695 AFY) capacity treatment plant. The fourth AVEK plant, Acton WTP, has a capacity of 4 mgd (4,484 AFY) and is located outside of the Antelope Valley Region boundaries. Los Angeles County Waterworks District 40 (LACWWD 40), Quartz Hill Water District (QHWD), and Rosamond Community Services District (RCSD) all receive treated water from AVEK and thus have no SWP treatment facilities of their own.

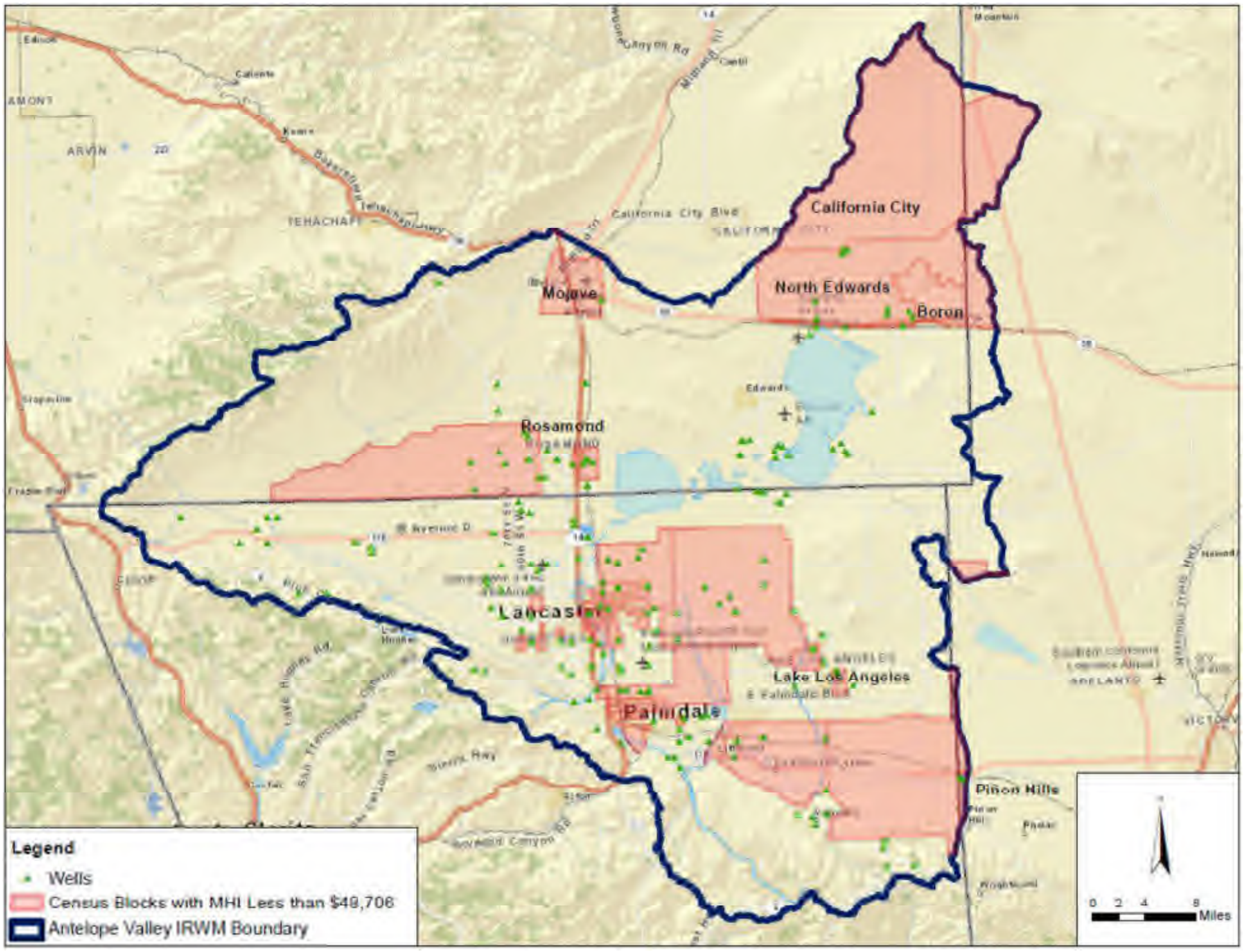
Palmdale Water District's (PWD's) water treatment plant capacity is 35 mgd (39,230 AFY), but it is limited to treating 28 mgd (31,390 AFY) in accordance with the California Department of Public Health (DPH) (formerly the Department of Health Services) requirements to keep one filter offline in reserve (PWD 2001). PWD is also in the preliminary design stage for a new recycled water treatment plant with an initial capacity of 10 mgd. Littlerock Creek Irrigation District (LCID) has an agreement with PWD to treat its raw SWP water and thus has no treatment facilities of its own.

The amount of SWP supply that would be available for a given water demand is highly variable and depends on hydrologic conditions in northern California, the amount of water in SWP storage reservoirs at the beginning of the year, regulatory and operational constraints, and the total amount of water requested by the contractors.

4.1.2 Groundwater Supply

Groundwater supplies for DAC areas are mainly impacted by water quality and aging well infrastructure. Specific arsenic water quality issues as well as general water quality concerns are described in Section 4.2. The Region relies on groundwater to meet a significant portion of its water demand. Figure 55 shows the locations of groundwater wells throughout the Valley in relation to DAC areas.

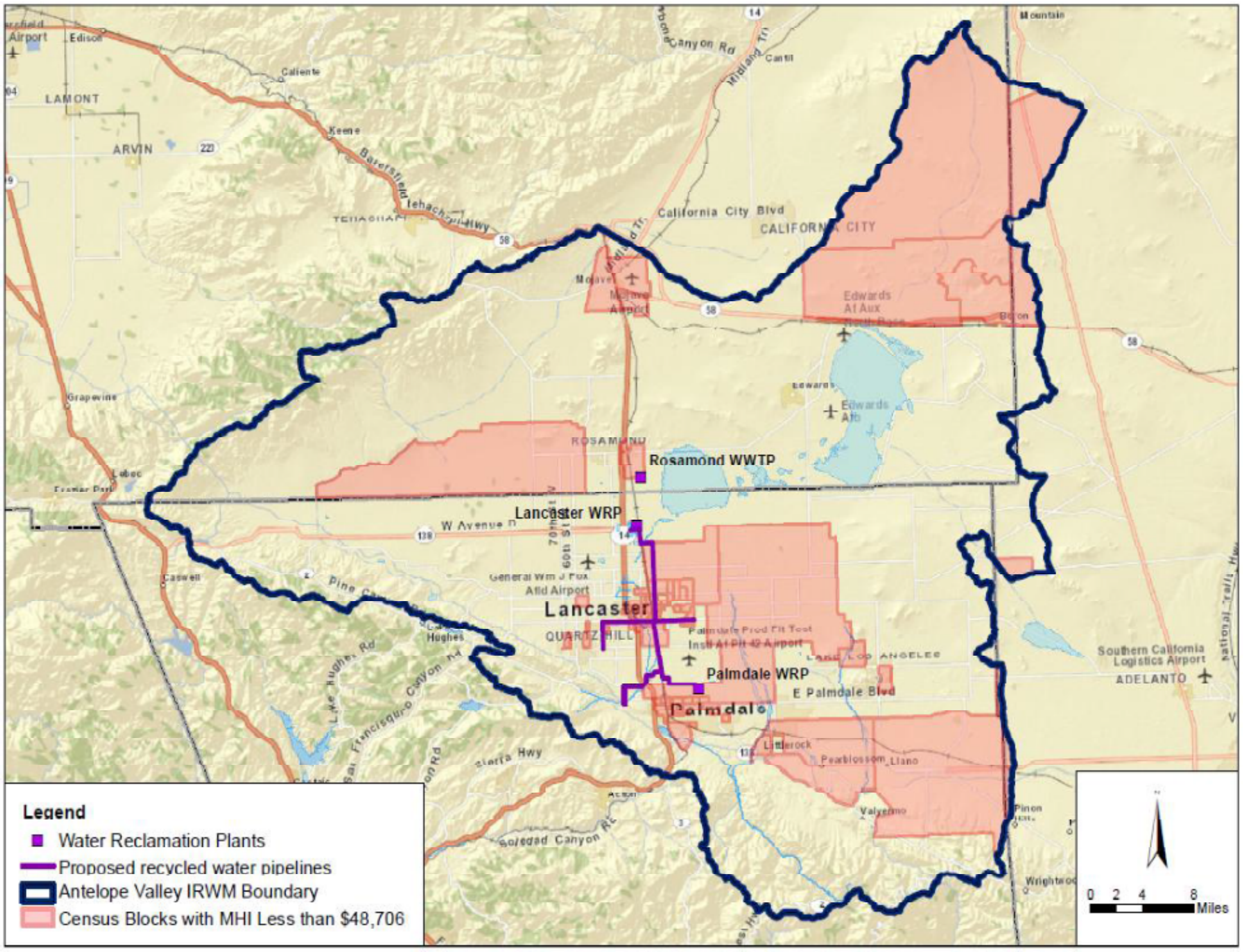
Figure 5: Antelope Valley Groundwater Wells in Relation to DAC Areas



4.1.3 Recycled Water Supply

Recycled water planning is underway in several areas of the Valley to plan for the beneficial use of recycled water supplies to offset imported water use. There are currently three wastewater treatment plants in the Antelope Valley: Lancaster Water reclamation Plant (LWRP), Palmdale Water Reclamation Plant (PWRP) and Rosamond Wastewater Treatment Plant (RWWTP). The LWRP and PWRP provide disinfected tertiary treatment with nitrification. The RWWTP provides tertiary treated effluent as well. As shown in Figure 6, these three treatment plants and proposed recycled water distribution pipelines are located in the southern portion of the Region in the cities of Rosamond, Lancaster and Palmdale. Figure 6 also shows the location of the facilities in relation to DAC areas.

Figure 6: Recycled Water Facilities in Relation to DAC Areas



4.2 Water Quality

To identify water quality issues in each of the DAC areas, the consultant team contacted water agencies that served each area and documented the information using the Geotracker Groundwater Ambient Monitoring Assessment (GAMA) and National Water Quality Monitoring Council (NWQMC) database. **The GAMA program is California's comprehens**ive groundwater quality monitoring program. GAMA collects data by testing untreated, raw water in different types of wells for naturally-occurring and man-made chemicals (State Water Resources Control Board N.D.).[3] The test results are complied with existing groundwater quality data from several agencies into a public accessible database (State Water Resources Control Board). The GAMA program was created by the State Water Board in 2000 and its main goals are to: 1) improve statewide groundwater monitoring and 2) increase the availability of groundwater quality information to the public. The NWQMC is a portal to access stored data in various large water quality databases (NWQMC N.D.). The available databases through this portal are the USGS NWIS and USEPA STORET. The USGS NWIS collects water resource data from approximately 1.5 million sites throughout the United States (NWQMC N.D.). These data are updated every 24 hours (NWQMC N.D.). USEPA STORET is a data warehouse for water quality, biological, and physical data used by state environmental agencies, the Environmental Protection Agency, other federal agencies, universities, private citizens, and others (NWQMC N.D.). STORET data is updated weekly (NWQMC N.D.).

The Antelope Valley IRWM groundwater well water quality data from both the GAMA and NWQMC databases were downloaded into an excel format. The groundwater well water quality data were screened using the California maximum contaminant levels (MCL) for drinking water and national secondary

[3] Source: http://www.waterboards.ca.gov/gama/

drinking water standards (**which match California's secondary maximum contaminant levels for the** contaminants examined). Table 1 and Table 2 list all the drinking water contaminants screened for groundwater well water quality data (if information was available). All groundwater supply wells and the contaminants exceeding the MCL and/or national secondary drinking water regulations are shown in the tables below. In addition, groundwater wells exceeding selected California MCL and/or the national secondary drinking water regulations located in DAC areas within the Antelope Valley IRWM are mapped in Figures 7 though 10.

Table 1: California Primary MCLs

Contaminant	MCL (mg/L)	Effective Date
	Inorganic	
Aluminum	1	2/25/1989
	0.2[4]	9/8/1994
Antimony	0.006	9/8/1994
Arsenic	0.05	1977
	0.010	11/28/2008
Asbestos	7 MFL[5]	9/8/1994
Barium	1	1977
Beryllium	0.004	9/8/1994
Cadmium	0.010	1977
	0.005	9/8/1994
Chromium	0.05	1977
Copper	1[2]	1977
	1.3[6]	12/11/1995
Cyanide	0.2	9/8/1994
	0.15	6/12/1903
Fluoride	2	4/1998
Lead	0.05[7]	1977
	0.015[4]	12/11/1995
Mercury	0.002	1977
Nickel	0.1	9/8/1994
Nitrate	45	1977
Nitrite (as N)	1	9/8/1994
Total Nitrate/Nitrite (as N)	10	9/8/1994
Perchlorate	0.006	10/18/2007
Selenium	0.01	1977
	0.05	9/8/1994
Thallium	0.002	9/8/1994
	VOCs	
Benzene	0.001	2/25/1989

[4] Secondary MCL
[2] Secondary MCL
[5] MFL = million fibers per liter, with fiber 3enth > 10 microns9/8/94
[6] Regulatory Action Level; if system exceeds, it must take certain actions such as additional monitoring, corrosion control studies and treatment, and for lead, a public education program, replaces MCL.
[7] The MCL for lead was rescinded with the adoption of the regulatory action level described in footnote 4.

Contaminant	MCL (mg/L)	Effective Date
Carbon Tetrachloride	0.0005	4/4/1989
1,2 - Dichlorobenzene	0.6	9/8/1994
1,4 – Dichlorobenzene	0.005	4/4/1989
1,1 – Dichloroethane	0.005	6/24/1990
1,2 – Dichloroethane	0.0005	4/4/1989
1,1 – Dichloroethylene	0.006	2/25/1989
Cis – 1,2 – Dichloroethylene	0.006	9/8/1994
Trans – 1,2 – Dichloroethylene	0.01	9/8/1994
Dichloromethane	0.005	9/8/1994
1,3 – Dichloropropene	0.0005	2/25/1989
1,2 – Dichloropropane	0.005	6/24/1990
Ethylbenzene	0.68	2/25/1989
	0.7	9/8/1994
	0.3	6/12/2003
Methyl-tert-butyl ether (MTBE)	0.005[2]	1/7/1999
	0.013	5/17/2000
Monochlorobenzene	0.03	2/25/1989
	0.07	9/8/1994
Styrene	0.1	9/8/1994
1,1,2,2 – Tetrachloroethane	0.001	2/25/1989
Tetrachloroethylene	0.005	5/1989
Toluene	0.15	9/8/1994
1,2,4 – Trichlorobenzene	0.07	9/8/1994
	0.005	6/12/2003
1,1,1 – Trichloroethane	0.2	2/25/1989
1,1,2 – Trichloroethane	0.032	4/4/1989
	0.005	9/8/1994
Trichloroethylene	0.005	2/25/1989
Trichlorofluoromethane	0.15	6/24/1990
1,1,2 – trichloro – 1,2,2 – Trifluoroethane	1.2	6/24/1990
Vinyl Chloride	0.0005	4/4/1989
Xylenes	1.750	2/25/1989
Disinfection Byproduct		
Total Trihalomethanes	0.1	3/14/1983
	0.080	6/17/2006
Haloacetic acids (five)	0.060	6/17/2006
Bromate	0.010	6/17/2006
Chlorite	1.0	6/17/2006

Sources: California Department of Public Health – Maximum Contaminant Levels and Regulatory Dates for Drinking Water. November 2008. Available: http://www.cdph.ca.gov/certlic/drinkingwater/Documents/DWdocuments/EPAandCDPH-11-28-2008.pdf

Table 2: Secondary Drinking Water Regulations

Contaminant	Secondary Drinking Water Regulations
Chloride	250 mg/L
Color	15 Colorunits
Manganese	0.05 mg/L
Iron	0.3 mg/L
Sulfate	250 mg/L
TDS	500 mg/L
Turbidity	0.5 NTU (Nephelometric Turbidity Units)

Source: United States Environmental Protection Agency. Drinking Water Contaminants – Secondary Drinking Water Regulations. Last updated June 5, 2012. Available: http://water.epa.gov/drink/contaminants/index.cfm

Table 3: GAMA Groundwater Wells in DAC Areas with Water Quality Exceedances

Well ID	Water Quality Exceedances
ANT-51	Arsenic
W0601500290	Arsenic
W0601500396	Arsenic
W0601500405	Arsenic, Iron, Manganese
W0601500421	Arsenic
W0601500424	Arsenic, Iron, Manganese
W0601500426	Arsenic
W0601500523	Arsenic
W0601502223	Arsenic, Fluoride
W0601510002	Chloride, Iron, TDS
W0601510052	Fluoride, Iron
W0601900751	TDS
W0601900804	Fluoride, Iron
W0601907029	Sulfate, TDS
W0601910138	Iron
W0601910203	Iron, Nitrate, Nitrite
W0601910023	Aluminum, Chromium, Iron, Manganese
W0601910070	Antimony, Chromium, Iron, Manganese, Nitrate,

Table 4: NWQMC Groundwater Wells in DAC Areas with Water Quality Issues

Well ID	Water Quality Issues
USGS-345215118092401	Chloride, Sulfate, TDS,
USGS-345210118090601	TDS
USGS-345151118090201	TDS
USGS-345149118133201	Iron, TDS
USGS-345148118170101	Fluoride
USGS-345147118153201	Fluoride
USGS-345147118133201	Sulfate, TDS
USGS-345144118170201	Fluoride
USGS-345021118144601	TDS
USGS-344538117583101	TDS
USGS-344457117581001	TDS
USGS-344456118012301	TDS
USGS-344429118030201	Sulfate, TDS
USGS-344404117550001	Iron
USGS-344350117535001	Nitrate
USGS-344256118002301	Sulfate, TDS
USGS-344248118074701	Arsenic, Fluoride
USGS-344240118074301	Turbidity
USGS-344239118074601	Turbidity
USGS-344221118083401	Chromium
USGS-344218118083301	Chromium
USGS-344130118075701	Turbidity, Iron
USGS-344123118080001	Turbidity
USGS-344120118081001	Turbidity
USGS-344112118093201	Chromium, Iron, Manganese
USGS-344104118091101	Nitrate, TDS
USGS-344006118082601	TDS
USGS-344005118081801	Manganese, TDS
USGS-344002118074701	Chromium
USGS-344000118130601	Iron, Manganese
USGS-343951118070001	Turbidity
USGS-343903118074801	Chromium, Turbidity
USGS-343553118053201	Iron
USGS-343244118060501	TDS
USGS-343208117583701	Nitrate, TDS
USGS-343204117584101	Nitrate, Sulfate, TDS
USGS-343150117585501	Nitrate, TDS, Iron
USGS-343148117582901	Nitrate, TDS, Iron
USGS-343142117584901	Iron, Nitrate, Sulfate, TDS
USGS-343117117584401	TDS
USGS-343114117585701	TDS
USGS-343007117540201	TDS

Well ID	Water Quality Issues
USGS-343004117462601	Turbidity

Figure 7: Groundwater Wells Exceeding Arsenic MCL in Relation to DAC Areas

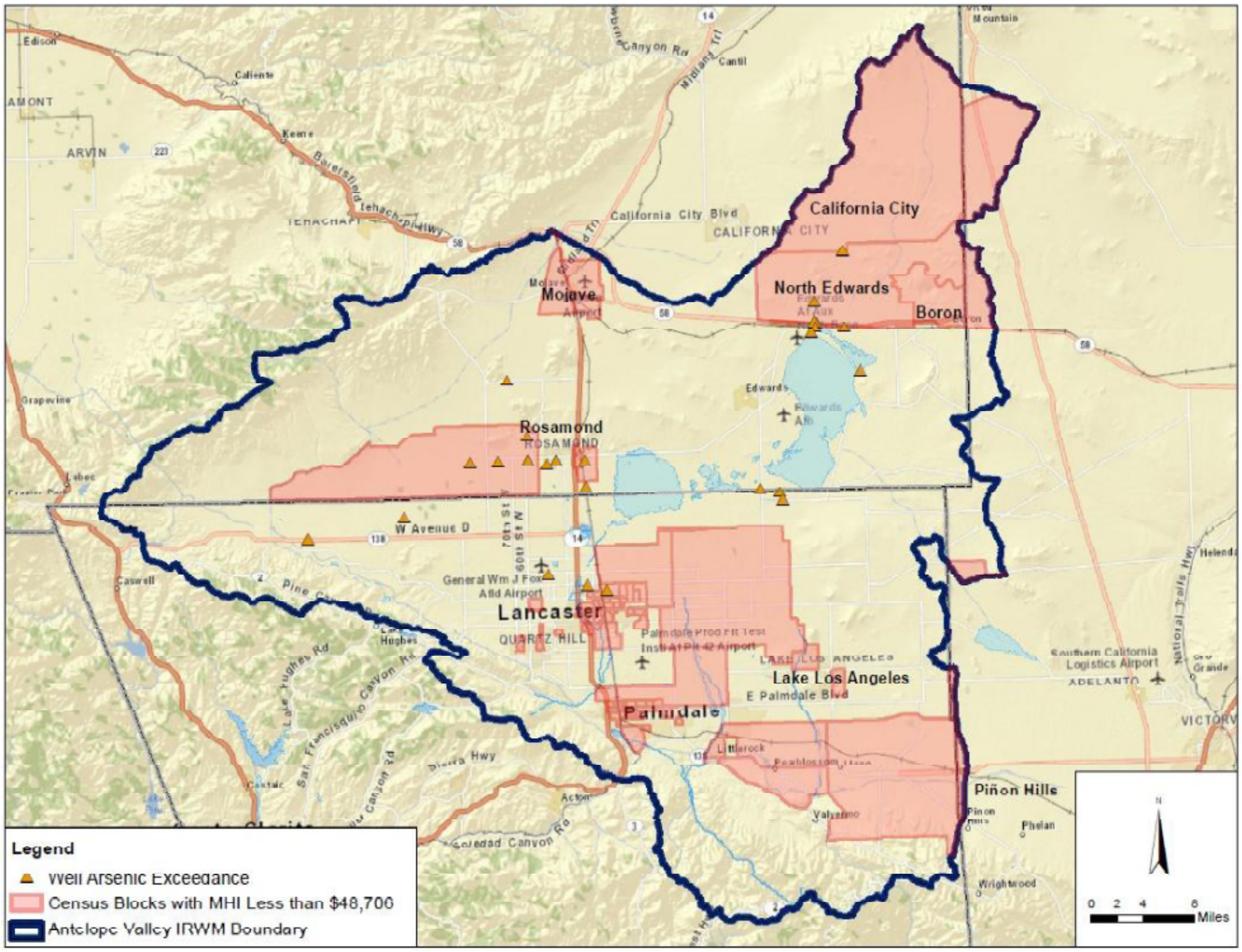


Figure 8: Groundwater Wells Exceeding Metals MCLs in Relation to DAC Areas

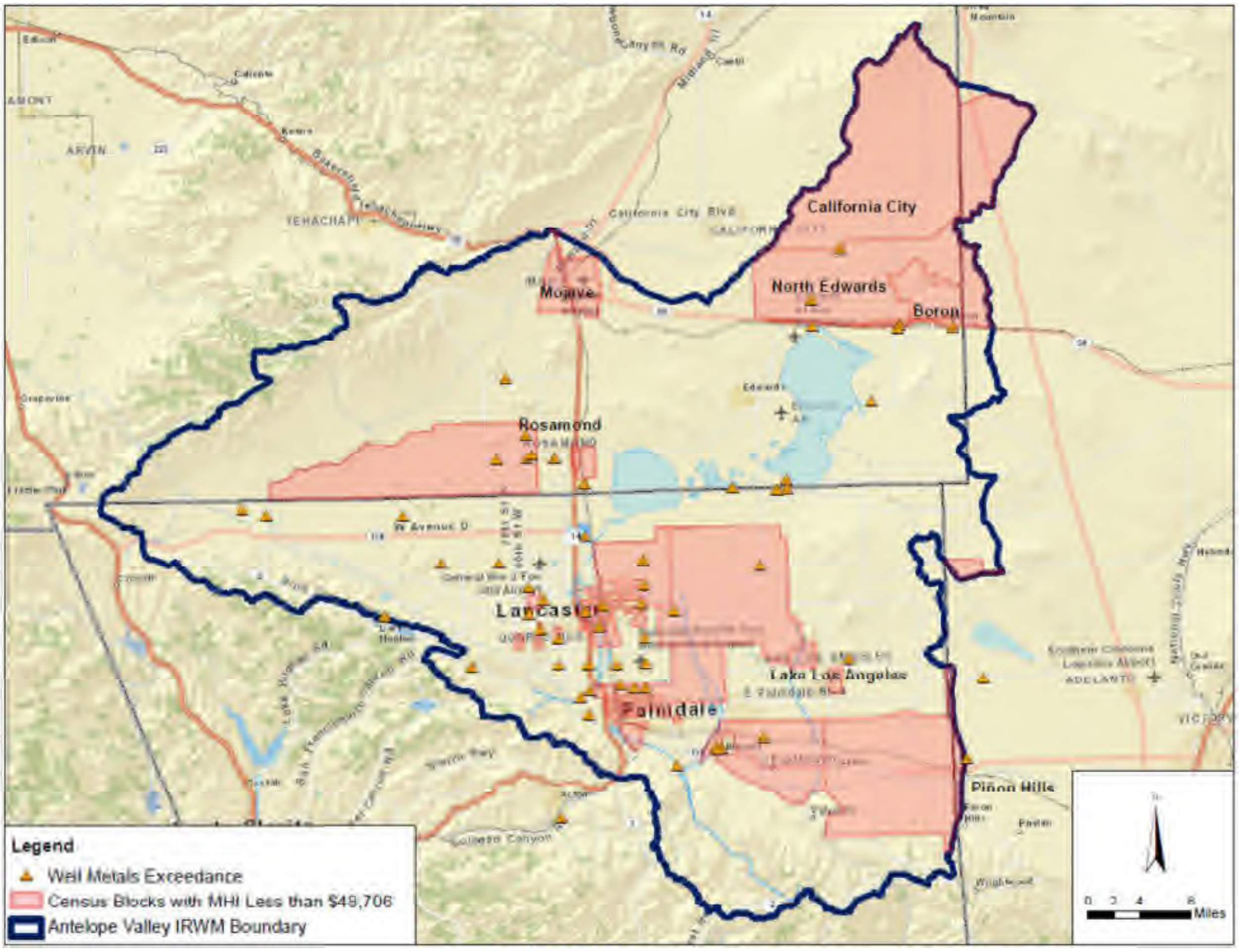


Figure 9: Groundwater Wells Exceeding Nitrate or Nitrite MCLs in Relation to DAC Areas

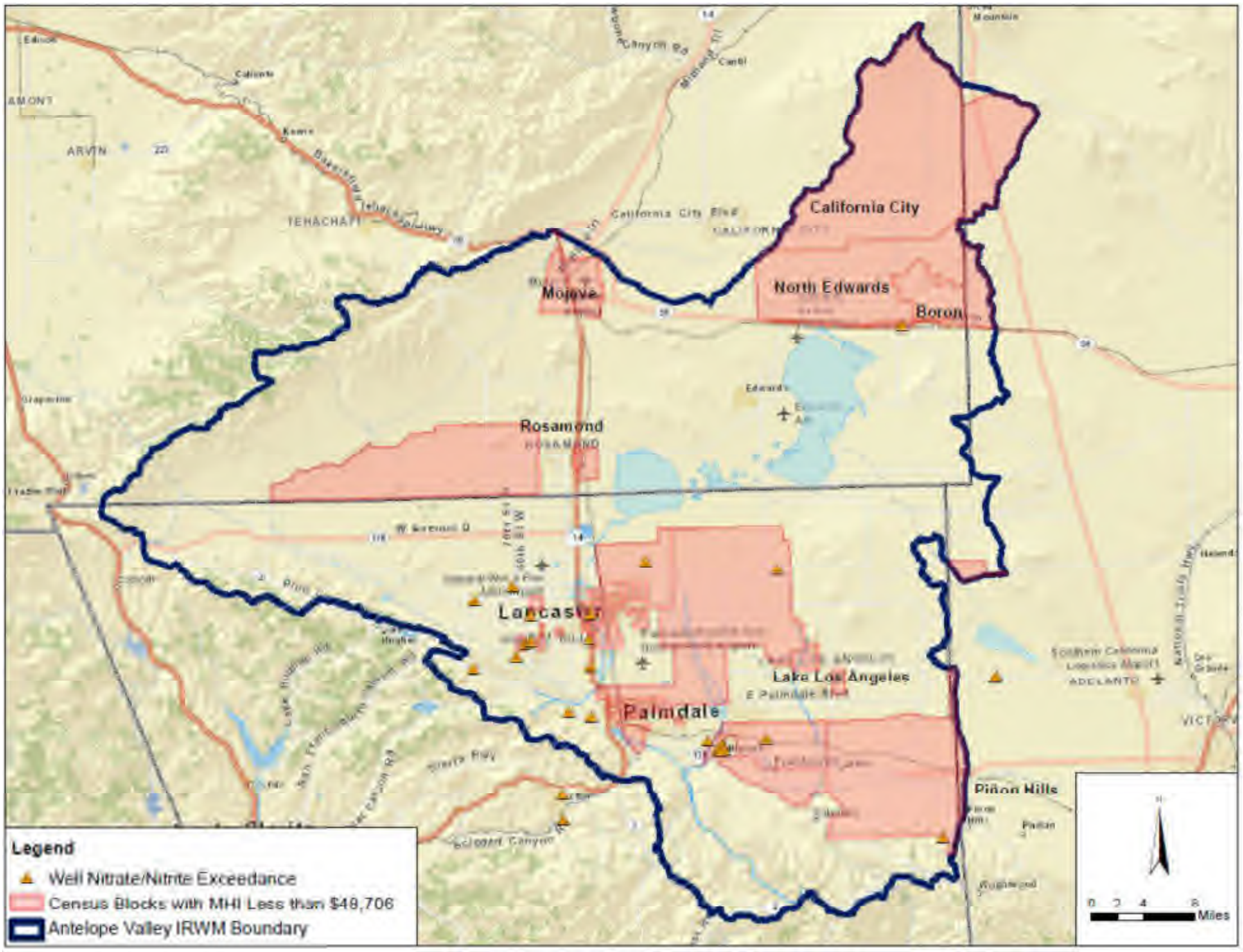
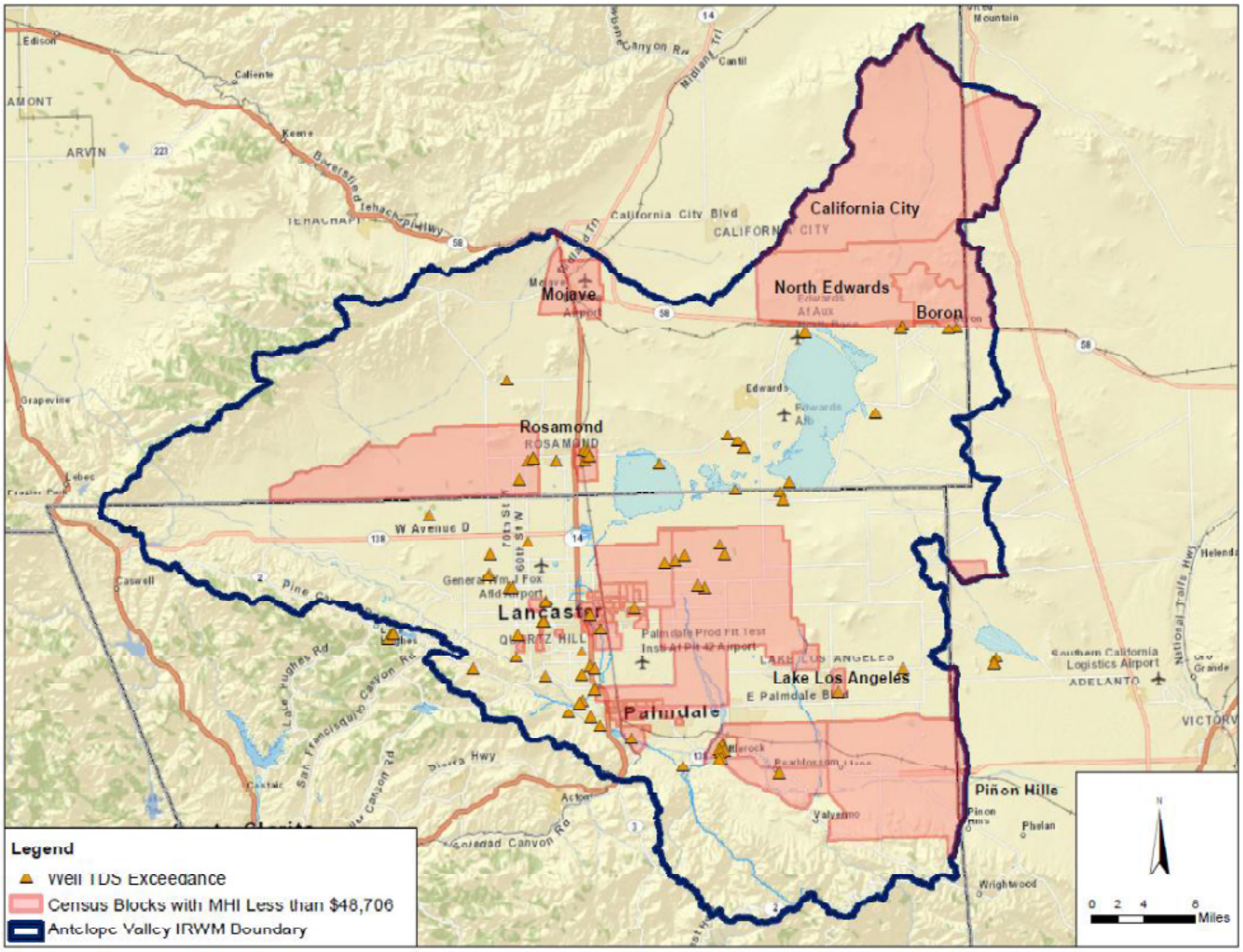


Figure 10: Groundwater Wells Exceeding TDS Secondary MCL in Relation to DAC Areas



A total of 61 groundwater wells located in DAC areas within the Antelope Valley IRWM have documented exceedances of California MCLs and/or the national secondary drinking water standards.

One of the common water quality issues in DAC areas is high arsenic. The Environmental Protection Agency (EPA) replaced the previous standard for arsenic in drinking water of 50 parts per billion (ppb) with a 10 ppb limit (EPA, 2012).[8] This new rule became effective on February 22, 2002 (EPA, 2012). The California Department of Public Health revised the drinking water standard for arsenic (DPH-04-017) and adopted the amended the California Code of Regulations, Title 22, Chapter 15, Section 64431(a) on November 28, 2008 to comply with the new federal MCL of 10 ppb for arsenic (CDPH, 2008).[9] DAC areas in the Antelope Valley IRWM have arsenic concentrations that exceed the maximum contaminant level (mcl) of 10 ppb in much of the groundwater supply and must be reduced by either blending or treatment. Facilities are needed to allow DACs to blend or treat high-arsenic groundwater.

Compliance with the new arsenic standard of 10 ppb has been difficult for Boron Community Services District (BCSD), which serves Boron, a DAC area in the Antelope Valley IRWM region. BCSD is responsible for maintaining and providing customers with provisions of water, sewer, and streetlights. Currently, the local water supply wells have an arsenic concentration that range from 67 ppb to 83 ppb. To address the arsenic MCL violation, BCSD began blending local groundwater well supplies with AVEK water at a 52% AVEK water to a 48% well water ratio. The blended water supply still exceeds the arsenic MCL, with recent arsenic level testing results for blended water at 39 ppb. BCSD cannot come into compliance until it either treats its local groundwater supply to remove arsenic or find a new local water supply with low arsenic concentrations. Compliance with the arsenic MCL has also an issue for

[8] Source: http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/regulations_factsheet.cfm

[9] Source: http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Arsenic.aspx

North Edwards Water District and Desert Lake CSD (between Boron and Mojave) and mutual water companies in the vicinity of Rosamond. These water quality issues in specific DAC areas will be documented in a subsequent DAC TM.

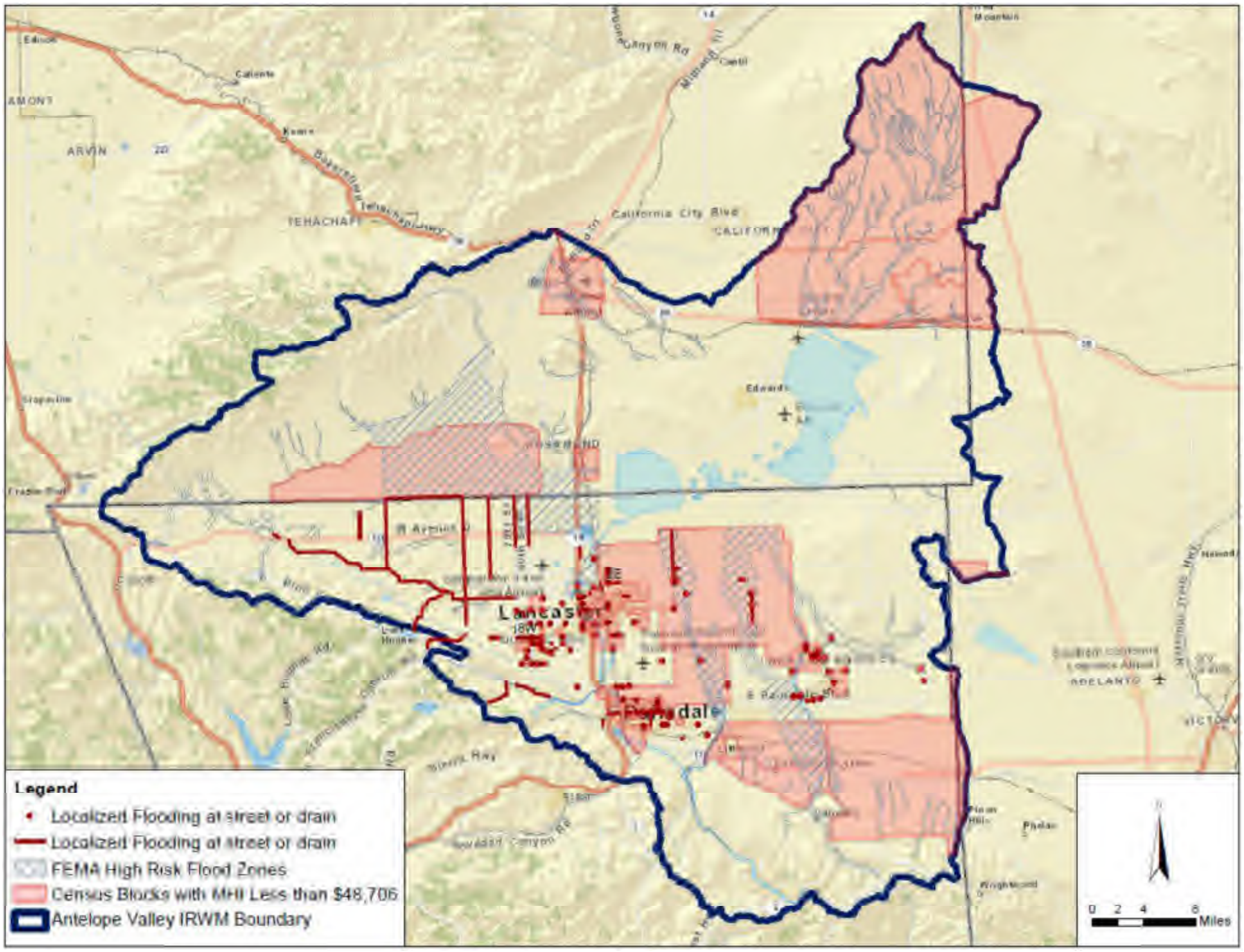
4.3 Flooding

To identify flooding issues in each of the DAC areas, the consultant team contacted water agencies that served each area and substantiated the information with documentation from the State FloodSAFE database as described in the *Flood Protection Needs TM* prepared for the Antelope Valley IRWM Region in 2013. Flooding information was supplemented with localized flood information provided by the City of Lancaster, the City of Palmdale, and the LA County Department of Public Works (LACDPW).

The draft *Flood Protection Needs TM* (RMC, 2013) identifies a number of areas potentially at risk for flooding due to the Valley's unique geographic and meteorologic conditions which are conducive to sudden flooding. As shown in Figure 111, large areas identified as a flood risk, either using FEMA high risk flood zones (areas within the 100-year flood zone) or through local confirmation by LACDPW, overlap with areas identified as DACs. In the southern portion of the Region, the Cities of Lancaster, Palmdale and Lake Los Angeles have many areas identified where localized flooding occurs which may impact areas identified as DACs. In the northern portion of the Region, in California City, Mojave, North Edwards and Boron, FEMA high risk flood zones overlap with areas identified as DACs. As discussed in the draft *Flood Protection Needs TM*, additional studies may be needed in the FEMA high risk flood zones in order to better understand the flood hazard as flooding and sedimentation within the Valley occur in alluvial fans which don't behave as a typical riverine system.

Flooding issues have been problematic for the communities of Littlerock and Lake Los Angeles, both of which experience street flooding in the downstream portions of Littlerock Creek during storm events. These flooding issues in specific DAC areas will be documented in a subsequent DAC TM.

Figure 11: Flood Protection Needs in Relation to DAC Areas



5 Monitoring Studies Needed

This section describes additional monitoring studies that could be performed in DAC areas that would support the implementation of future projects. Studies related to DAC issues are eligible for grant funding under the Proposition 84, Round 2 and 3 Implementation program.

5.1 Water Supply

Monitoring of water supply availability and reliability in DAC areas may be improved by tracking reported supply volumes in the various Urban Water Management Plans (UWMPs) developed for water suppliers that serve 3,000 AFY or more in the Antelope Valley. Water served to DAC areas may be approximated by proportioning the total AFY served inside the various service areas to the percentage of DAC area inside the service areas. For water suppliers that serve less than 3,000 AFY, a survey of supply records may be conducted to approximate the amount of supply provided to DAC areas.

In addition, condition assessments of aging wells, treatment systems, and pipelines may be conducted to determine the needs for new or improved infrastructure to maintain the supply capabilities for service to DAC areas.

5.2 Water Quality

Since the majority of water supplied to DAC areas comes from groundwater, monitoring of water quality issues in DAC areas may be improved by mapping data from the State Water Resources Control Board Groundwater Ambient Monitoring Assessment (GAMA) and National Water Quality Monitoring Council

(NWQMC) databases over time to track changes. These data would provide information about the trends for various water quality parameters in local groundwater supplies.

Water quality data may also be compiled from large and small drinking water purveyors to track the trends in potable water served to DAC customers from both imported and groundwater supplies.

For local surface water supplies, quality may be tracked by agencies already monitoring local surface waters, including PWD (which monitors Littlerock Creek), and the Los Angeles County Watershed Management Division which monitors general surface water quality of surface waters (general minerals).

5.3 Flooding

Monitoring of flooding issues may be improved by developing a Region-wide database of recorded flood incidents that are managed by municipal and county maintenance crews. This type of database could be used to correlate storm intensity to flood locations and flood depths in various parts of the Valley. Maintenance staff at LACDPW, Kern County, and the cities of Lancaster, Palmdale, and Rosamond would need to become partners in this effort. Edwards Air Force Base would also need to be a partner in this effort as this entity has jurisdiction over a large area in the Region and has already collected flood data for storm events that impact activities on the base. Flood management may be improved in DAC areas by incorporating regional integrated flood management strategies, including adaptive management strategies for climate change, into the 2013 IRWMP Update. The Update may also include recommendations for a policy mechanism.

FINAL DRAFT Technical Memorandum

Antelope Valley IRWMP 2007 Update

Subject: **Task 2.1.3 DAC Monitoring Plan**

Prepared For: Antelope Valley State Water Contractors Association

Prepared by: Dawn Flores

Reviewed by: Brian Dietrick

Date: September 25, 2013

1 Purpose

The purpose of this technical memorandum (TM) is to provide an assessment of data gaps that exist in disadvantaged communities (DAC) with regard to water quality, water supply, and flood protection. The document builds upon the information presented in the Task 2.1.2 DAC Water Supply, Quality, and Flooding Data TM. The water resource areas with the most urgent issues are included as a part of this monitoring plan.

2 Background

Historically, the Antelope Valley DAC areas have experienced issues that are similar to other DAC areas throughout the state. Below is a summary of these issues which are described in more detail in the Task 2.1.2 DAC Water Supply, Quality, and Flooding Data TM.

Water Supply

To identify water supply issues in each of the Region's DAC areas, the consultant team contacted water agencies that served each area and verified the information with available 2010 Urban Water Management Plans (UWMPs). In general, DAC areas rely on (1) imported water served from the Antelope Valley East Kern (AVEK) Water Agency, Palmdale Water District (PWD), or Littlerock Creek Irrigation District (LCID); (2) groundwater pumped from wells; or (3) recycled water from water reclamation plants operated by the Los Angeles County Sanitation Districts (LACSD). Water supply issues in specific DAC areas will be documented in a subsequent DAC TM. The outreach and research conducted as part of the Task 2.1.2 DAC Water Supply, Quality, and Flooding Data TM found that the Region faces the following two issues in regards to water supply:

- Suppliers that serve 3,000 AFY or less do not have to submit UWMPs to the state. Therefore, data on supply volumes served to DACs is frequently not readily available.
- Little data is available on the conditions of aging wells, treatment systems, and pipelines, particularly for purveyors in DACs who don't have the staff time or funds to conduct such an assessment

Water Quality

To identify water quality issues in each of the DAC areas, the consultant team contacted water agencies that served each area and documented the information using the Geotracker Groundwater Ambient Monitoring Assessment (GAMA) and National Water Quality Monitoring Council (NWQMC) database. As part of the research conducted under the Task 2.1.2 DAC Water Supply, Quality, and Flooding Data TM, the Antelope Valley IRWM groundwater well water quality data from both the GAMA and NWQMC databases were downloaded into an excel format. The groundwater well water quality data were screened using the California maximum contaminant levels (MCL) for drinking water and national secondary drinking water standards (which match California's secondary maximum contaminant levels for the contaminants examined). This research found that the Region faces the following two issues in regards to water quality:

- Groundwater quality data is available from a number of monitoring efforts, but a mapping analysis of the groundwater quality issues affecting DACs has not been completed
- Analysis of local surface water and imported water quality issues as they relate to DACs has not been conducted

Flood Protection

To identify flooding issues in each of the DAC areas, the consultant team contacted water agencies that served each area and substantiated the information with documentation from the State FloodSAFE database as described in the *Flood Protection Needs TM* prepared for the Antelope Valley IRWM Region in 2013. Flooding information was supplemented with localized flood information provided by the City of Lancaster, the City of Palmdale, and the LA County Department of Public Works (LACDPW). This research found that large areas identified as a flood risk, either using FEMA high risk flood zones (areas within the 100-year flood zone) or through local confirmation by LACDPW, overlap with areas identified as DACs. In the southern portion of the Region, the Cities of Lancaster, Palmdale and Lake Los Angeles have many areas identified where localized flooding occurs which may impact areas identified as DACs. In the northern portion of the Region, in California City, Mojave, North Edwards and Boron, FEMA high risk flood zones overlap with areas identified as DACs. Flooding issues have been problematic for the communities of Littlerock and Lake Los Angeles, both of which experience street flooding in the downstream portions of Littlerock Creek during storm events. In general, this research effort found the following issue in regards to flood protection:

- There is no centralized database of known flooding issues in the Region. Instead, flooding is tracked by municipality.

3 Water Supply Data Collection and Organization

The water supply issues described above have been used to develop two monitoring objectives:

- Track volume of supplies delivered to DACs by water source and supplier
- Assess conditions of aging facilities (wells, treatment systems and pipelines) to determine need for new or improved infrastructure

The data to be collected and analyses performed to achieve these objectives are described below.

3.1 Water Supply Volumes to DACs

Objective: Track volume of supplies delivered to DACs by water source and supplier

Monitoring of water supply availability and reliability in DAC areas may be improved by tracking reported supply volumes in the various Urban Water Management Plans (UWMPs) developed for water suppliers that serve 3,000 AFY or more in the Antelope Valley. Water served to DAC areas may be approximated by proportioning the total AFY served to the various service areas to the percentage of DAC area inside the service areas. For water suppliers that serve less than 3,000 AFY, a survey of supply records may be conducted to approximate the amount of supply provided to DAC areas.

Collection of this data will require tracking of UWMP completion for each water district in Antelope Valley, as well as requests for annual reports submitted to the California Department of Public Health (CDPH) which include the volume of water produced for consumption. The portion of supply delivered to DACs may be estimated by assuming that demand is equivalent to supply delivered, and applying the percentage of demand in DAC areas to total supply. Table X shows the percentage of DAC population making up each water district, as well as supply assumed to be delivered to DAC areas within each district. The DAC populations were estimated based on 2006-2010 American Community Survey data which estimates median household income by block group.

Water supply volumes delivered to DACs could be calculated on an annual basis based on annual CDPH reports, with a more detailed analysis completed every five years based on UWMPs. This data should be organized into a spreadsheet that tracks water supplies delivered to each water district for each year. If possible,

Table 1: Percentage of Population in DAC areas within Region's Water Districts

Water District	2010 Water District Population	2010 DAC Population	Percentage Population in DAC areas
Los Angeles County Waterworks District 40	171,585	57,724	34%
Palmdale Water District	109,395	50,961	47%
Quartz Hill Water District	17,500	3,914	22%
Rosamond CSD	17,700	5,675	32%
Mojave	3,250	3,250	100%
Boron CSD	2,065	823	40%
Littlerock Creek Irrigation District	2,900	2,048	71%

3.2 Water Supply Facility Conditions Assessment

Objective: Assess conditions of aging facilities (wells, treatment systems and pipelines) to determine need for new or improved infrastructure

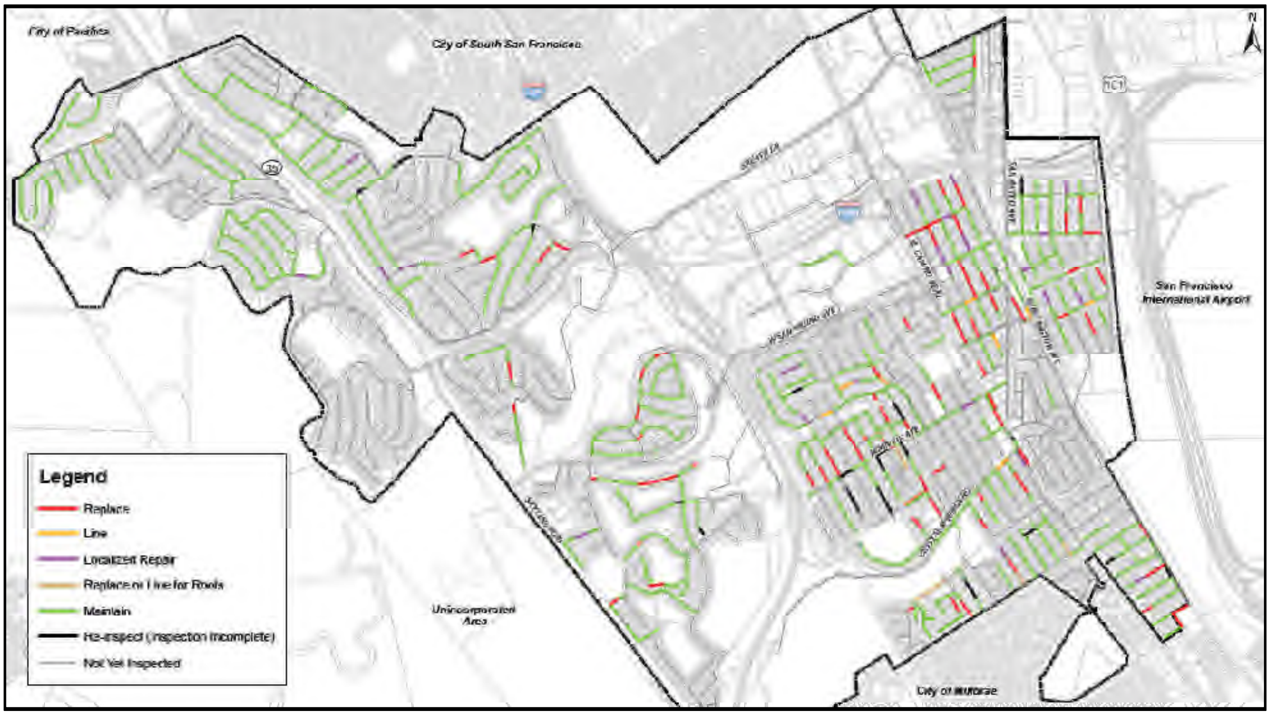
Monitoring of supply facilities can be achieved by conducting condition assessments of aging wells, treatment systems, and pipelines to determine the needs for new or improved infrastructure to maintain the supply capabilities for service to DAC areas. Given that these facilities are managed by individual water suppliers, each supplier will need to complete condition assessments of its own facilities and provide the results to the Region.

Wells and treatment systems can be assessed onsite for their physical condition and functionality. Physical condition relates to the appearance (e.g. apparent wear and corrosion) and operating characteristics (e.g. noise, vibration and temperature) of the facility. Functionality relates to the ability of the piece of equipment to accomplish its purpose.

Pipeline assessment will require CCTV be performed, and the video observed at a later date by a professional trained in pipeline assessment. For example, the National Association of Sewer Service Companies (NASSCO) provides training and standardized methods for assessing sewer pipelines for various structural (e.g. cracks, holes or collapses) operational/maintenance issues (e.g. roots, deposits and infiltration). This same level of assessment can be completed for water supply pipelines.

Once the assessment is completed, the structural and operational/maintenance issues can be prioritized by severity to determine where there is greatest need for new or improved infrastructure. An example of this type of assessment for pipelines is shown in Figure 1. This prioritization can be based on a number of aspects, including: severity of structural issues, severity of operational/maintenance issues, size or flow through the facility, size of area served by the facility, remaining useful life of the facility, and cost to repair or replace.

Figure 1: Sample Pipeline Condition Assessment Map



4 Water Quality Data Collection and Organization

The water quality issues described above have been used to develop two monitoring objectives:

- Track the quality of drinking water delivered to DACs
- Map groundwater quality issues in DACs to determine areas of poor groundwater quality and need for treatment

The data to be collected and analyses performed to achieve these objectives are described below.

4.1 Water Quality Data Tracking

Objective: Track the quality of drinking water delivered to DACs

The quality of drinking water delivered to DACs may be monitored by compiling water quality reports from large and small drinking water purveyors submitted to CDPH on an annual basis. The specific data to be collected is shown in Table 2. The quality data to be collected is based on water supplies (typically groundwater wells) that have exceeded maximum contaminant levels (MCLs) and secondary drinking water standard within the past ten years. It is assumed that the water quality delivered to DACs is equal to the quality of water delivered throughout each water district.

This data should be compiled using a spreadsheet that tracks the quality of finished water delivered to customers, and if possible, the quality of each water supply.

Table 2: Drinking Water Quality Data to be Collected

Constituent concentration data to be collected	MCL or Secondary Standard
Antimony	0.006 mg/L (MCL)
Arsenic	0.010 mg/L (MCL)
Chloride	250 mg/L (secondary standard)
Chromium	0.05 mg/L (MCL)
Fluoride	2 mg/L (MCL)
Iron	0.3 mg/L (secondary standard)
Manganese	0.05 mg/L (secondary standard)
Nitrate	45 mg/L (MCL)
Nitrite	1 mg/L (MCL)
Sulfate	250 mg/L (secondary standard)
TDS	500 mg/L (secondary standard)
Turbidity	0.5 NTU (secondary standard)

4.2 Groundwater Quality Mapping

Objective: Map groundwater quality issues in DACs to determine areas of poor groundwater quality and need for treatment

The data to be collected in order to accomplish the objective of mapping groundwater quality issues involves the collection of the water quality data listed in Table 2 by specific well. The State of California already collects water quality data by well through various databases, and compiles these databases on its GeoTracker GAMA (http://geotracker.waterboards.ca.gov/gama/) website. Detailed instructions for use of this online tool are available on the website, however, the following settings can be used to help narrow the results:

- GIS Layer: "Groundwater Basins"
- Groundwater Basin: "Antelope Valley (6-44)"
- Water quality data: "Wells With Results Above Comparison Concentration" OF "Any Chemical" IN THE PAST "1 YEAR"

The resulting data can then be exported to a .zip file containing a spreadsheet with water quality data available for each well that can then be sorted according to constituent, and mapped using well coordinates also provided in the spreadsheet. Once the well points are mapped, a GIS analysis can be completed using spatial analysis tools available in programs such as ESRI's Spatial Analyst tool that can interpolate data between points to show water quality constituent concentrations across the valley as well as changes in concentration. An example of this type of analysis completed to show changes in groundwater elevation over time is shown in Figure 3.

This level of analysis should be done on an annual basis to track changes in the quality of groundwater. Tracking groundwater quality to this level of detail will allow the Region to create maps of water quality over time throughout the Antelope Valley.

Figure 2: GeoTracker GAMA Sample Query

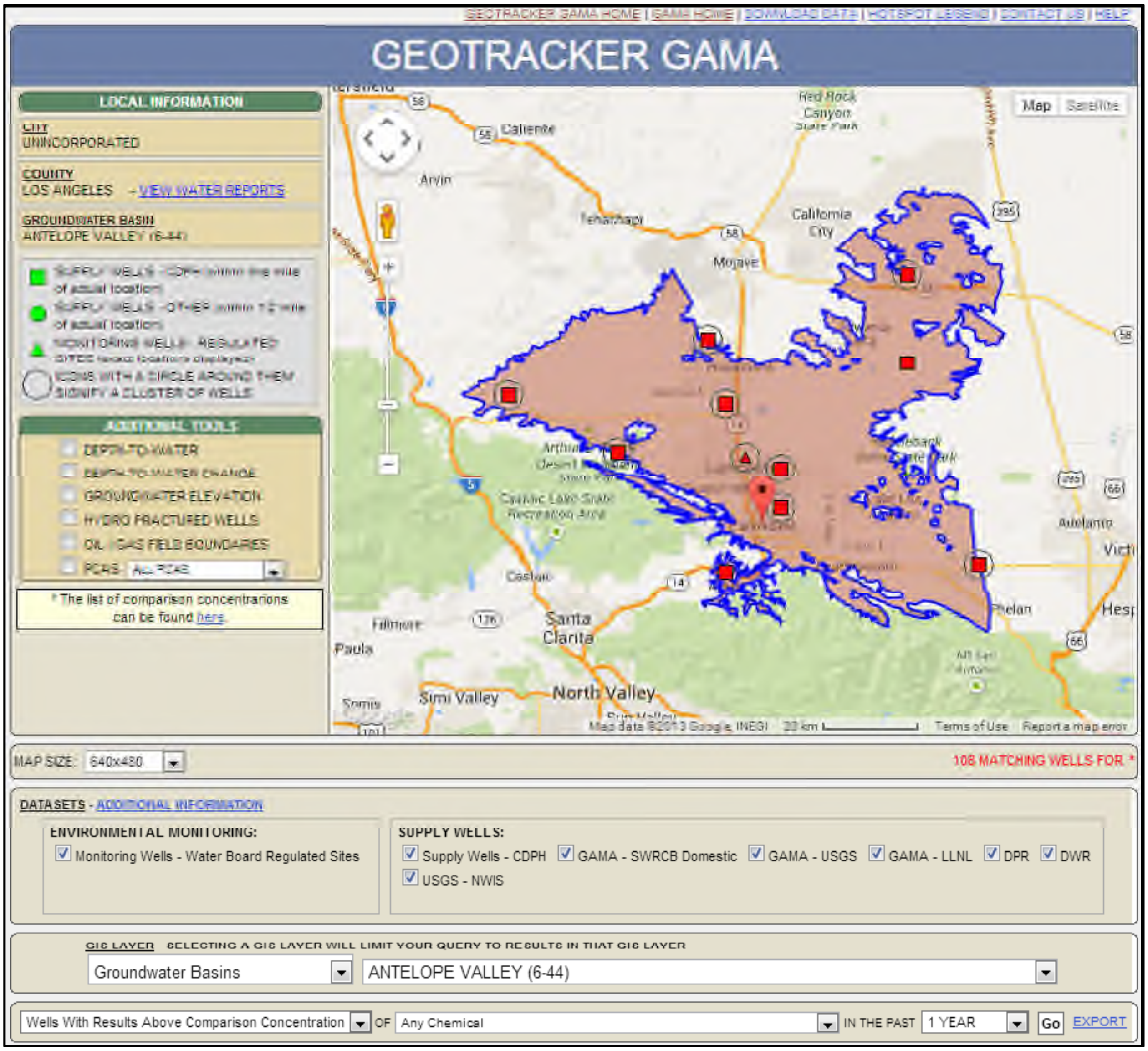
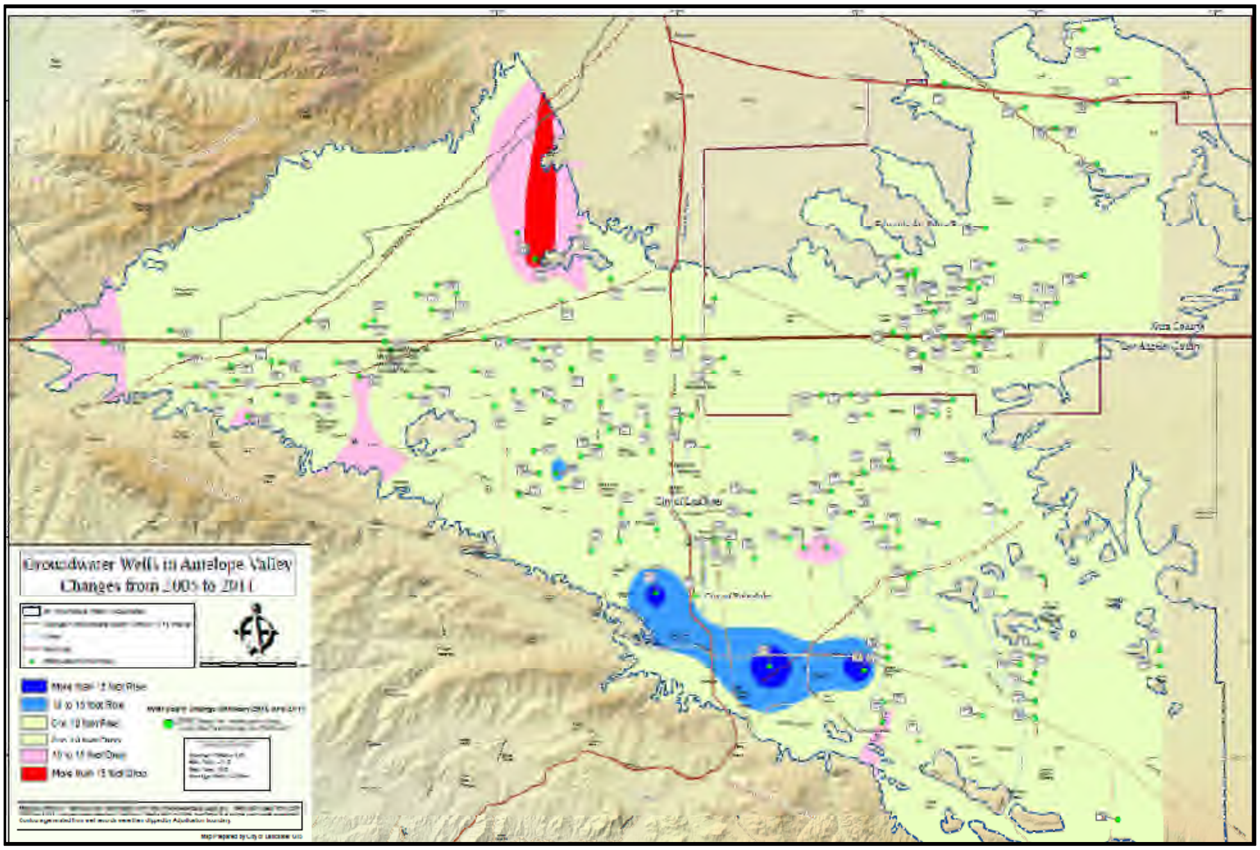


Figure 3: Sample Spatial Analysis of Point Data



5 Flood Monitoring Data Collection and Organization

The flooding issues described above have been used to develop the following objective:

Objective: Track flood incidents in DACs to determine need for flood infrastructure improvements

Monitoring of flooding issues may be improved by developing a Region-wide database of recorded flood incidents that are managed by municipal and county maintenance crews. This type of database could be used to correlate storm intensity to flood locations and flood depths in various parts of the Valley. Maintenance staff at LACDPW, Kern County, and the cities of Lancaster, Palmdale, and Rosamond would need to become partners in this effort. Edwards Air Force Base would also need to be a partner in this effort as this entity has jurisdiction over a large area in the Region and has already collected flood data for storm events that impact activities on the base.

The data collected from each entity would need to include:

- Flood incident date and location
- Storm intensity
- Flood depth, if applicable

It should be noted that there is little to no data available for Kern County, meaning that a part of the flood monitoring effort will involve implementation of a program to track flood issues in the Kern County portion of the Region.

The flood data that is collected can be compiled into a Region-wide database to allow for tracking of incidents over time. Analysis of this data will involve mapping of the flood locations to better understand where the greatest needs are for flood infrasctructure improvements.

6 Data Dissemination and Reporting

The overarching goals of monitoring the above described data is the development of projects to improve the water supply, water quality and flood conditions in DACs, and the incorporation of the analysis results into water resources management. Given these goals, it is important for the Region to make the results of the data analyses available to stakeholders in the Region. The dissemination and reporting of the collected data and associated analyses can be accomplished through the following mechanisms:

- Upload of data and analyses to the AVWATERPLAN.org website (annually)
- Presentation of analysis results at regular stakeholder meetings (annually)
- Incorporation of data into future updates of the Antelope Valley IRWM Plan (every five years)

By disseminating and reporting on the collected data and analyses on an annual basis, water resource management agencies can incorporate the latest regional data into their planning efforts.