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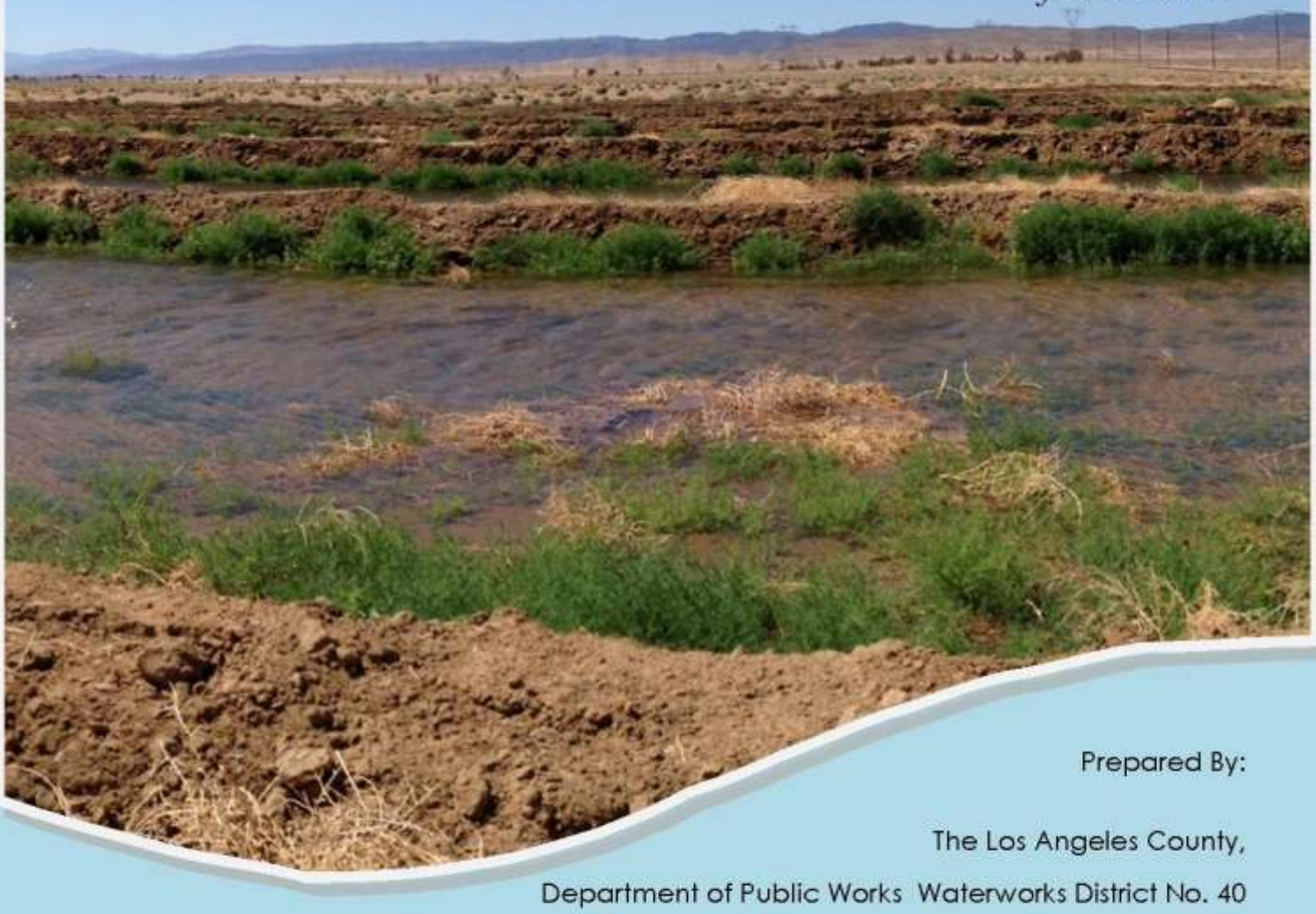
SALT AND NUTRIENT MANAGEMENT PLAN FOR THE ANTELOPE VALLEY

JUNE 2013



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Section 1: Introduction

The Salt and Nutrient Management Plan (SNMP) for the Antelope Valley (AV) has been prepared in cooperation with the water and wastewater agencies, the cities of Lancaster and Palmdale, Edwards Air Force Base, private home owners, and other stakeholders in the Antelope Valley. It fulfills the State Water Resources Control Board (State Board) requirements of the Recycled Water Policy and its amendment,[1] which encourages every region in California to develop an SNMP to address long-term groundwater basin sustainability.

1.1 The Salt and Nutrient Management Plan

In February 2009, the State Board adopted the Recycled Water Policy to provide direction to the Regional Water Quality Control Boards (Regional Boards), proponents of water use and recycled water projects, and the public regarding the appropriate criteria to be used by the State and Regional Boards in issuing permits for recycled water projects. The Recycled Water Policy includes State Board goals for statewide increases in the use of recycled water, which is considered a drought-proof, reliable, and sustainable water resource. The State Board addresses the concern for protecting the beneficial uses of groundwater basins by its intention for every groundwater basin in California to have a SNMP. The Recycled Water Policy expects salt and nutrient loading in groundwater basins/sub-basins to be addressed through the development of a management plan by the collaborative stakeholder process rather than imposing requirements on individual recycled water projects by the regional regulating agency.

In response to the adoption of the Recycled Water Policy, Los Angeles County Waterworks Districts and Sanitation Districts of Los Angeles County, with support of the Lahontan Regional Water Board staff, initiated efforts to organize a stakeholder group to develop a regional SNMP for the Antelope Valley. Stakeholders include, but is not limited to, water importers, purveyors, stormwater management agencies, wastewater agencies, the Lahontan Regional Board, and other significant salt/nutrient contributors, in addition to the recycled water stakeholders. This SNMP is a result of stakeholder collaborations and meets the intentions of the Recycled Water Policy.

1.2 Purpose and Goals of the Salt and Nutrient Management Plan

The purpose of developing a regional SNMP for the Antelope Valley is to address the management of salts and nutrients (and possibly other constituents of concern) from various sources within the basin to maintain water quality objectives and support beneficial uses. The intention is to involve all users of water in the Antelope Valley basin to participate in efforts to minimize the accumulation of salt and nutrients that would degrade the quality of water supplies in the Antelope Valley to the extent that it may limit their use.

Additionally, the SNMP is developed to satisfy the Recycled Water Policy, and thus allow for a streamlined process in getting recycled water projects approved and permitted by the Regional Board. The Antelope Valley is an arid region that requires careful management of its water supplies to meet the needs of its residents. Increasing recycled water use will allow for increased available potable water supplies for the people of the Antelope Valley.

[1] Resolution No. 2009-0011, adopted by the State Water Resources Control Board on February 3, 2009 and Resolution No. 2013-0003, adopted by the State Water Resources Control Board on January 22, 2013.

One goal of the SNMP is to address salt and nutrient loading in the Antelope Valley basin region through the development of a management plan by the collaborative stakeholder process rather than the regional regulating agency imposing requirements on individual water projects. The AV SNMP has been prepared to be included as an appendix to the updated 2013 Antelope Valley Integrated Regional Water Management Plan (AVIRWMP) and to the Lahontan Regional Board's Water Quality Control Plan for the Lahontan Region (Basin Plan). Thus, the process shall involve participation by Lahontan Regional Water Board staff and be in compliance with California Environmental Quality Act (CEQA) regulations. The involvement of local agencies in developing an SNMP may lead to more cost-effective means of protecting and enhancing groundwater quality, quantity, and availability.

Another goal is to assess impacts with potential long-term basin-wide effects on groundwater quality, such as surface water, groundwater, imported water, and recycled water projects, as well as other salt/nutrient contributing activities, through regional groundwater monitoring. The design and implementation of a regional groundwater monitoring program shall involve the stakeholders, including, but not limited to, water importers, purveyors, stormwater management agencies, wastewater agencies, Lahontan Regional Water Board, and other significant salt/nutrient contributors, in addition to the recycled water stakeholders.

The completion and implementation of the SNMP may lead to the potential for enhanced partnering opportunities and potential project funding between water and wastewater agencies, or other stakeholders, for developing and protecting water supplies.

1.3 Stakeholder Participation

The Salt and Nutrient Management Planning Stakeholder meetings were held periodically, since August 2009, to raise awareness and engage stakeholders and other interested parties on salt and nutrient issues and management plan development efforts in the Antelope Valley region. The meetings were open to the public and were geared toward water, groundwater, and wastewater agency representatives, regulators, and community stakeholders.

Members of the stakeholder group have included:

Association of Rural Town Councils (ARTC)
Antelope Acres Town Council
Antelope Valley Building Industry Association (BIA)
Antelope Valley Board of Trade
Antelope Valley Resource Conservation District
Antelope Valley United Water Purveyors/White Fence Farms Mutual Water Co.
Antelope Valley-East Kern Water Agency (AVEK)
Boron Community Services District
Bureau of Reclamation
California Department of Water Resources (DWR)
California Department of Public Health (CDPH)
California Water Services Company
City of California City
City of Lancaster
City of Palmdale
Edwards Air Force Base
GEI Consultants (on behalf of Rosamond Community Services District)
Kennedy Jenks

Kern County Farm Bureau
Los Angeles County Farm Bureau
Los Angeles County Waterworks District No. 40 (Waterworks)
County Sanitation Districts Nos. 14 and 20 of Los Angeles County (Sanitation Districts)
California Regional Water Quality Control Board, Lahontan Region (Regional Board)
Lake Los Angeles Park Association
Lake Town Council
Leona Valley Resident
Leona Valley Town Council
Littlerock Creek Irrigation District
Nation Water Research Institute (NWRI)
Palmdale Water District
Quartz Hill Water District
Rosamond Community Services District (RCSD)
RMC Water and Environment
Sundale Mutual Water
US Bureau of Reclamation (USBR)

1.4 Scope of Work

AV SNMP stakeholders and Regional Board staff developed a Scope of Work detailing tasks to be completed in developing a SNMP for the Antelope Valley (see Appendix A). The Scope of Work was developed using elements described in the Recycled Water *Policy* and suggestions provided by the State Board (SWRCB 2010).

The Regional Board distributed the draft Scope of Work for public comment on August 29, 2011 and no comments were received. Regional Board staff and stakeholder representatives updated Members of the Regional Board on the Antelope Valley SNMP development efforts at the October 2011 Regional Board meeting. Regional Board Members provided positive feedback on the proposed Scope of Work, finding it acceptable, and praised the SNMP development process. As a result, the Regional Board issued an acceptance letter (see Appendix B) for the Scope of Work, which the stakeholders then finalized in the January 24, 2012 stakeholder meeting.

1.5 Stakeholder Definitions

The AV SNMP stakeholder group established the following definitions early in the SNMP process and reached consensus on the definitions below.

Salts: The dissolved ions in water. Observed by measuring total dissolved solids (TDS).

Nutrients: Constituents in the environment that an organism needs to live and grow. While nutrients many include a variety of substances, the nitrogenous species (i.e., nitrate, nitrite, ammonia, organic nitrogen) were considered and nitrate, in particular, is included in this study because it may be found at concerning levels in the groundwater (opposed to substances like potassium and phosphorous, which are not typically observed in the groundwater at levels of concern).

Constituents of Emerging Concern (CECs): Unregulated substances, typically found at trace levels in water supplies, such as endocrine disrupters, personal care products or pharmaceuticals. Particular constituents included in the SNMP monitoring plan were determined by a “blue ribbon”

advisory panel, convened by the State Board, with recommendation from the California Department of Public Health (CDPH). The CEC monitoring requirements are prescribed in the Recycled Water Policy.

Water Quality Objectives: Allowable level of a particular constituent in water that is established for the reasonable protection of beneficial use(s) of water or the prevention of nuisance within a specific area.

Baseline Conditions: Average concentration of a particular constituent measured in the water (e.g., surface or groundwater) from 2001 to 2010. This is also referred to as the historical condition.

Current Ambient Conditions: Average concentration of a particular constituent measured in the water (e.g., surface or groundwater) for the most recent 5-year averaging period.

Assimilative Capacity: Difference between the water quality objective and current ambient condition is the amount of assimilative capacity available for a particular basin, sub-basin, or sub-area. If the current water quality is the same or poorer than the water quality objective, assimilative capacity does not exist. If the current ambient condition is better than the water quality objective, then assimilative capacity exists.

Assimilative Capacity = (water quality objective) – (current ambient condition)

Antidegradation: Defined by the State Board's Antidegradation Policy (Resolution 68-16),[2] which is aimed at maintaining high quality waters to the maximum extent possible. The Antidegradation Policy allows a lowering of water quality if the change will be consistent with the maximum benefit to the people of the State, will not unreasonably affect present and potential beneficial uses and will not result in water quality lower than applicable standards.

Future Planning Period: A 25-year future planning period (2011-2035) was used to simulate current and future basin activities and their impacts to the Antelope Valley Basin.

List of Acronyms:

AF	Acre-Feet
AFY	Acre-Feet per Year
AV	Antelope Valley
AVEK	Antelope Valley East Kern Water Agency
AVIRWMP	Antelope Valley Integrated Regional Water Management Plan
CDPH	California Department of Public Health
CECs	Constituents of Emerging Concern
DPR	Department of Pesticide Regulation
DWR	Department of Water Resources
EIR	Environmental Impact Report
GAMA	Groundwater Ambient Monitoring & Assessment
LACSD	Los Angeles County Sanitation Districts
LACWD	Los Angeles County Waterworks Districts
LCID	Littlerock Creek Irrigation District
LLNL	Lawrence Livermore National Laboratory
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter

[2] Resolution No. 68-16, adopted by the State Water Resources Control Board on October 28, 1968.

mg/L	Milligrams per Liter
MG	Million Gallons
MGD	Million Gallons per Day
M&I	Municipal and Industrial
MWC	Mutual Water Company
ND	Non-Detect
NL	Notification Level
NWIS	National Water Information System
PWD	Palmdale Water District
SMCL	Secondary Maximum Contaminant Level
SNMP	Salt and Nutrient Management Plan
SWP	State Water Project
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WRP	Water Reclamation Plant

Section 2: Characterization of the Basin

2.1 Antelope Valley Groundwater Basin

Figure 2-1 depicts the Antelope Valley Basin, which is located in the Antelope Valley Region and is a closed basin (no outlet to the ocean), 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. The Antelope Valley Basin boundary is defined by the California Department of Water Resources (DWR) in its report, "*California's Groundwater, Bulletin 118, Update 2003*."

The Antelope Valley Basin is comprised of three primary aquifers: (1) the upper, (2) the middle and (3) the lower aquifer. The upper aquifer varies from unconfined, in the south part of the Lancaster sub-basin from Palmdale to Littlerock Wash, to confined, north of Littlerock Wash, depending on the presence and vertical position of the thick lacustrine deposits. The upper aquifer yields most of the current groundwater supplies. Due to the overlying lacustrine deposits and iterbedded aquitards, the middle aquifer is assumed to be confined. The deep aquifer is generally considered to be confined by the overlying lacustrine deposits and discontinuous interbedded aquitards (USGS 2003). A schematic geologic cross-section of the Antelope Valley is depicted in Figure 2-2.

In general, groundwater in the Antelope Valley Basin flows northeasterly from the mountain ranges to the dry lakes. The basin is principally recharged by infiltration of precipitation and runoff from the surrounding mountains and hills in ephemeral stream channels. However, precipitation over the valley floor is generally less than 10 inches per year and evapotranspiration rates, along with soil moisture requirements, are high; therefore, recharge from direct infiltration of precipitation below the root zone is deemed negligible (Snyder 1955; Durbin 1978; USGS 2003). Other sources of recharge to the basin include artificial recharge and return flows from agricultural and urban irrigation. 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.

The Antelope Valley drainage basin is divided into twelve subunits, whose boundaries have been defined by the United States Geological Survey (USGS) based on faults, consolidated rocks, groundwater divides, and, in some cases, arbitrary boundaries (USGS, 1998). The subunits are Finger Buttes, West Antelope, Neenach, Willow Springs, Gloster, Chaffee, Oak Creek, Pearland, Buttes, Lancaster, North Muroc, and Peerless (see Figure 2-1). USGS considers the Antelope Valley groundwater basin as consisting of seven of these sub-basins: Buttes, Finger Buttes, Lancaster, Neenach, North Muroc, Pearland, and West Antelope (USGS 2003). General descriptions of the sub-basins are as follows (USGS 1987):

- *Finger Buttes:* This subunit is bounded on the south, east, and northeast by faults and on the west and northwest by the consolidated rock of the Tehachapi Mountains. Groundwater moves generally from the northwest to the southeast. Inflow is from the surrounding mountains and outflow is into the Neenach subunit. A large part of the subunit is range or forest land. Water use is for agricultural purposes. Depth to water varies, but is commonly more than 300 feet.
- *West Antelope:* This subunit is bounded on the southwest by consolidated rock and on the south, southeast, and north by faults. Groundwater flows southeastward and outflow is into the Neenach subunit. Water use is mostly for agricultural purposes. Depth to water ranges from 250 to 300 feet.

Figure 2-1: Groundwater Sub-Basin Boundary Map

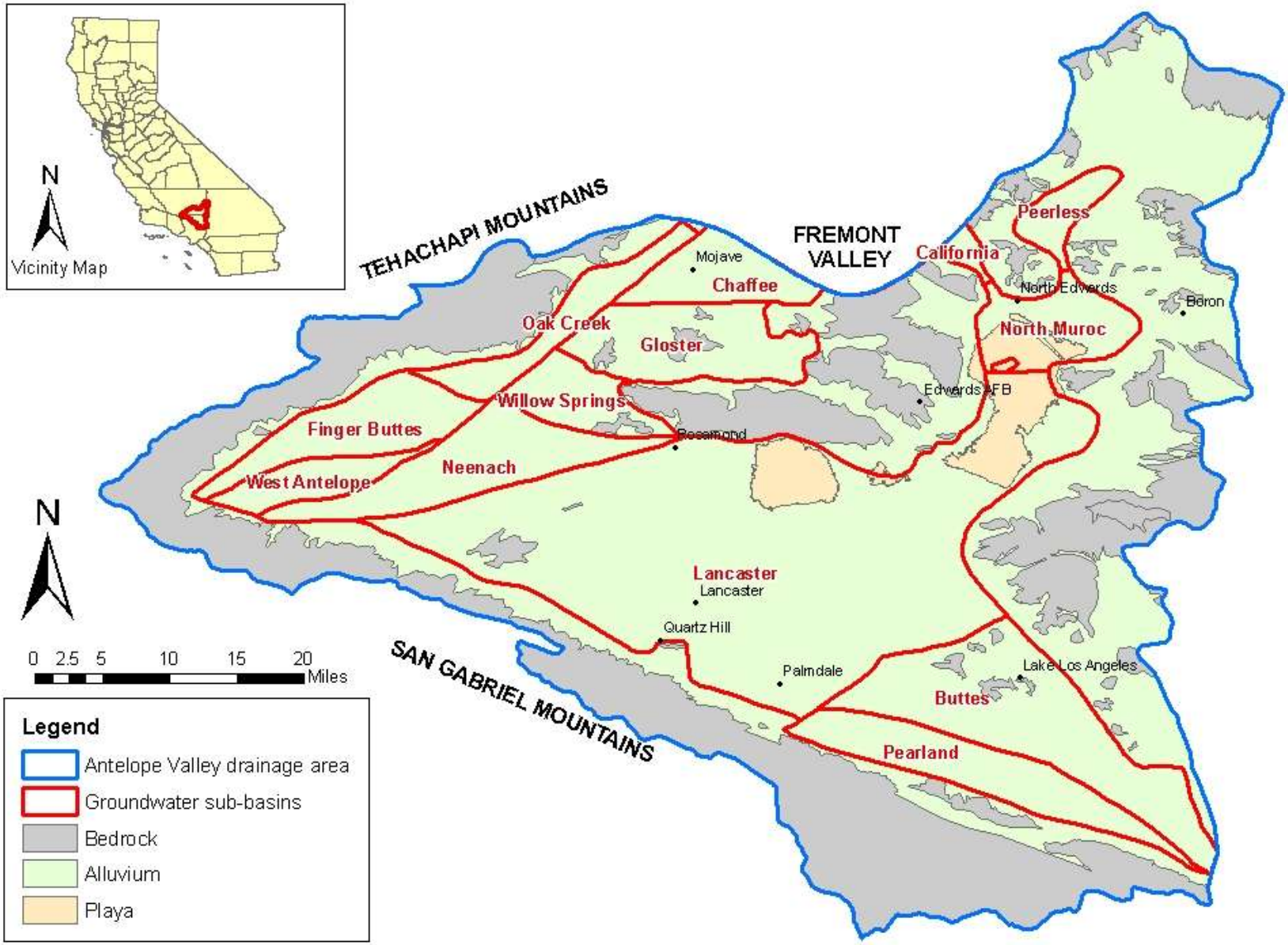
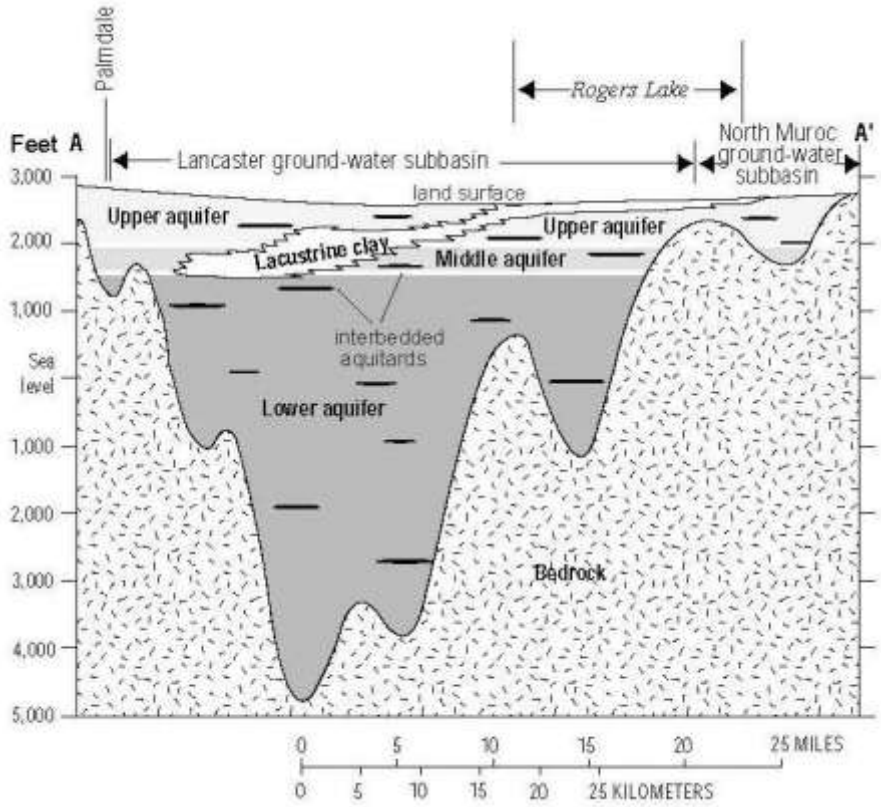
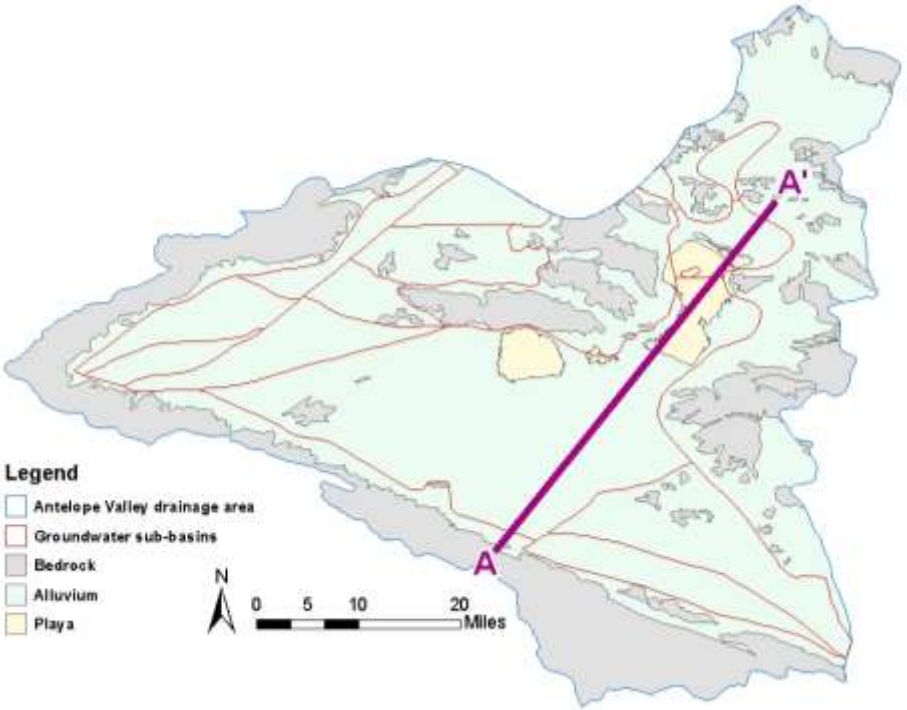


Figure 2-2: General Geologic Cross-Section of the Antelope Valley Basin

(a) Cross Section



(b) Line of Cross-Section



Legend

- Bedrock
- Lacustrine clay deposits
- Continental deposits
- Older alluvium
- Younger alluvium

- *Neenach:* Faults make up the boundaries of this subunit. Groundwater flows generally eastward into the principal and deep aquifers of the Lancaster subunit. Water use is for agricultural purposes. Depth to water ranges from 150 to 350 feet.
- *Willow Springs:* This subunit is bounded on the southwest and a portion of the south by faults. The remaining portion of the southern boundary is the consolidated rock. The northeast boundary is the bedrock of the Rosamond Hills, the buttes 4 miles west of Soledad Mountain, and the groundwater divides which extend northwestward and southeastward from those buttes. Groundwater flows southeast as outflow may eventually enter the Lancaster subunit, although this flow is considered negligible (USGS 2003). Recharge to the area is from intermittent streams of the surrounding mountain areas. Water use in the area is for agricultural and urban land use. Depth to water ranges from 100 to 300 feet.
- *Gloster:* The north boundary of this subunit is the consolidated rock of Soledad Mountain and the general line of scattered hills trending westward through Elephant Butte to the Randsburg-Mojave fault. The east and south boundaries are the consolidated rock of the southern part of the Bissell Hills and the Rosamond Hills. The west boundary of the subunit is partly the Randsburg-Mojave fault and partly the consolidated rock of the butte 4 miles west of Soledad Mountain. Groundwater divides are present along the west and southwest boundaries. Groundwater flows mainly to the east and outflows to the Chaffee subunit. Water use is confined to urban and mining (quarry pits) activity. Data on depth to water in this subunit are sparse; levels for the southeast area of the subunit are 50 and 100 feet.
- *Chaffee:* This subunit is bounded on the northeast and northwest by faults. The east and south boundaries are consolidated rock and the general east-west line of scattered hills. The southern bedrock boundary is discontinuous, thus an arbitrary line (not a hydrological line) separates the Gloster subunit. Inflow to the subunit is from Cache Creek and adjacent fans to the west, and in lesser amounts from the Gloster subunit to the south. Groundwater moves eastward in the western part and northward in the southern part of the subunit, generally toward the town of Mojave. Any outflow would be northward outside of the Antelope Valley. Water use is mainly for the town of Mojave. Depth to water ranges from 50 to 300 feet.
- *Oak Creek:* This subunit is bounded on the southeast and southwest by faults and on the northwest by the consolidated rock of the Tehachapi Mountains. The northeast boundary separating the Koehn Lake area is arbitrarily defined. Recharge is from the Tehachapi Mountains. Groundwater flow is generally southeastward, but some outflow occurs northeastward outside of the Antelope Valley. Water use in the area is nominal except for the mining activity in the central part of the subunit.
- *Pearland:* This subunit is bounded on the north, west, and south by faults. The consolidated rock of the San Gabriel Mountains forms the southeast boundary of the subunit. Substantial recharge occurs to the Pearland and the Buttes subunits from Littlerock and Big Rock Creeks. Groundwater generally flows from the southeast to the northwest and outflows into the Lancaster subunit. Water use is mainly for urban (Pearland, Pearblossom, and Littlerock) and irrigation activities. Depth to water ranges from 100 to 250 feet.
- *Buttes:* This subunit is bounded on the northwest, northeast, and southwest by faults. The southeast boundary of the subunit is a groundwater divide between the Antelope Valley and the El Mirage valley drainage area to the east, but has not been well defined. Groundwater generally flows from the southeast to the northwest and outflows into the Lancaster subunit. Imported California Water Project water became available for irrigation to the subunit in

1972. Water use includes urban (Antelope Center and smaller communities) and agricultural. Depth to water ranges from 50 to 250 feet.

- *Lancaster:* This subunit is the largest and most economically important in both water use and size. The southeast, south, northwest, and a portion of the north are bounded by faults. Consolidated rock and the near-surface bedrock beneath the northern part of Rogers Lake forms the remaining north boundary. The east boundary is consolidated rock. Groundwater generally flows northeasterly toward Rosamond and Rogers dry lakes, but also towards several pumping depressions. Water use is for agricultural, urban, and industrial activities. The area includes Antelope Acres, Quartz Hill, Rosamond, Lancaster, Palmdale, and other smaller communities. Depth to water varies widely, but in general is greatest in the south and west.
- *North Muroc:* This subunit is separated from the Lancaster subunit by a ridge of consolidated rock that is buried beneath the northern part of Rogers Lake. The approximate boundaries of the west, north, east, and southeast sides are discontinuous hills of consolidated rock which flank the subunit. Groundwater flows north and west to a pumping depression located near North Edwards. North of this depression, the direction of flow is generally north into the Fremont basin outside of Antelope Valley and possibly into the Peerless subunit. Water use in the subunit is for urban (North Edwards and smaller communities) and military purposes. Sewage disposal ponds are within and near this subunit. It should be noted that the disposal ponds are of much less concern than ponds located in other subunits of Antelope Valley because the soil structure allows for little percolation. The suggested monitoring networks were designed for this consideration.
- *Pearless:* The south, west, and north boundaries of this subunit are the consolidated rock of bordering hills. The east boundary is the eastern limit of highly developed water-bearing deposits. The general movement of groundwater is centripetal toward a pumping depression. Water is used for agricultural and municipal purposes.

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 region; since 1972, it has provided between 50 and 90 percent (USGS 2003). Groundwater pumping in the region peaked in the 1950s and 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 water for municipal and industrial (M&I) uses 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.

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 and rising in the rural western and far northeastern areas of the 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 region may have reduced rising groundwater trends in these areas (LACSD 2005).

According to the USGS (2003), groundwater extractions have exceeded the estimated natural recharge of the basin since the 1920s. 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 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 the groundwater basin is not currently adjudicated, the adjudication process is underway. There are no existing restrictions on groundwater pumping. However, pumping may be altered or reduced as part of the adjudication process. The adjudication aims to provide clarity for the groundwater users regarding management of groundwater resources.

2.1.1 SNMP Area Boundaries

Figure 2-1 depicts the groundwater basin and sub-basin boundaries for the SNMP. The planning area of the SNMP is the same as that of the AVIRWMP, which was defined as the drainage basin because of its use in several studies and inclusion of key agencies dealing with similar water management issues. Each sub-basin in the Antelope Valley Basin has been addressed in some manner with information and data provided in this SNMP. Further detail and analyses has been provided for the Neenach, Lancaster, Buttes, and Pearland sub-basins because of the greater availability of applicable data for these areas and the locations of current and future projects (discussed in Section 3.5) that have been identified to have the potential to significantly contribute to salt and/or nutrient impacts to the Antelope Valley Basin. Further detail and analyses for any of the remaining sub-basins may be provided in the future, contingent on the availability of sufficient data for analysis and the presence of projects that have the potential to impact salt/nutrient concentrations in the basin.

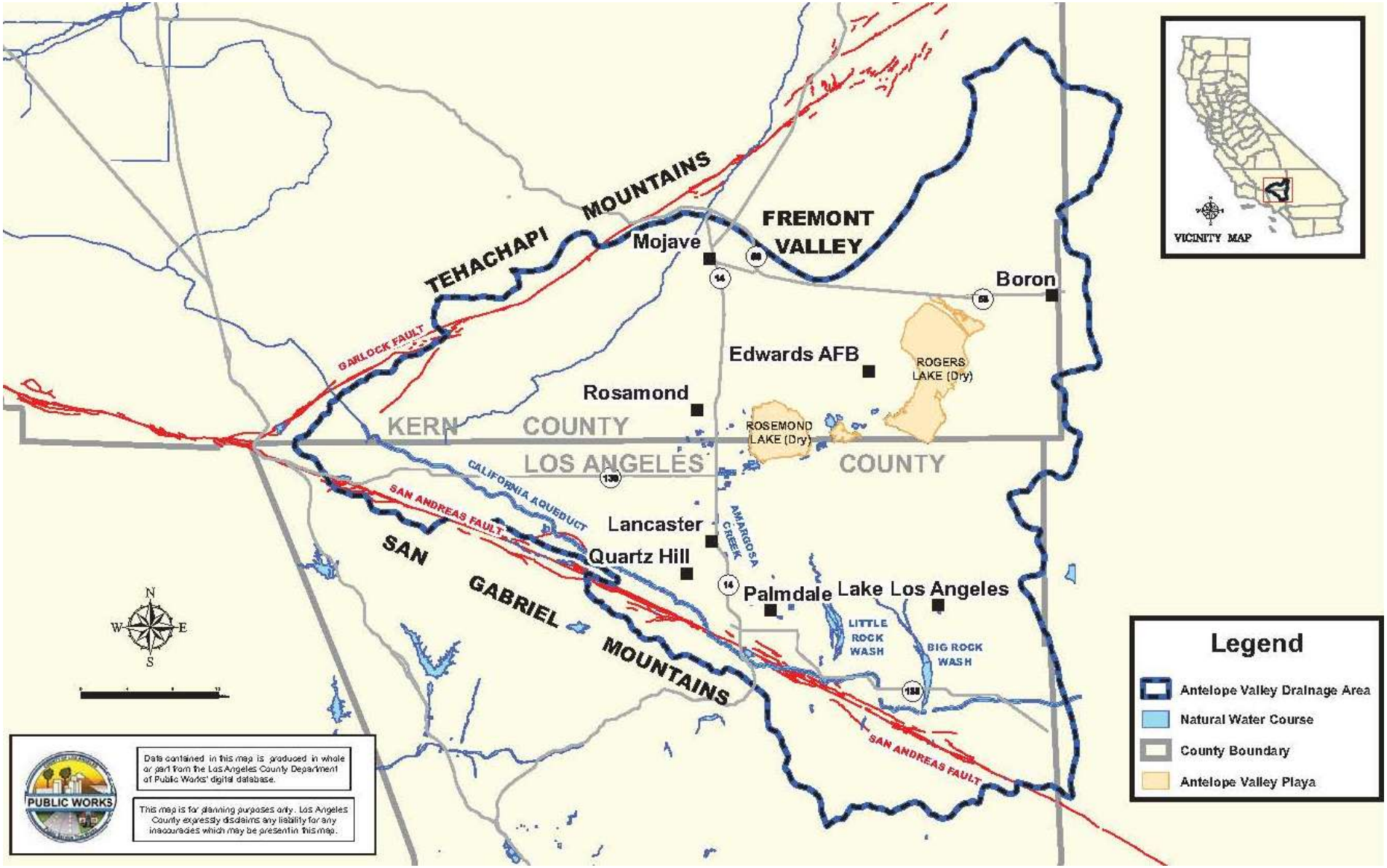
2.1.2 Additional Characterization of the Antelope Valley Region

Surface Water

Comprising the southwestern portion of the Mojave Desert, the Antelope Valley ranges in surface elevation from approximately 2,300 feet to 3,500 feet above sea level. As mentioned earlier, the Antelope Valley is a closed basin with no outlet to the ocean. Water that enters the Valley either infiltrates into the groundwater basin, evaporates, or flows toward the three dry lakes on Edwards Air Force Base—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).

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 and include Big Rock Creek, Littlerock Creek and Amargosa Creek. Oak Creek begins in the Tehachapi Mountains. The hydrologic features are shown on Figure 2-3.

Figure 2-3: Antelope Valley Hydrologic Features



Source: 2007 Antelope Valley Integrated Regional Water Management Plan

Littlerock Creek is the only developed surface water supply in the Antelope Valley. The Littlerock Reservoir collects runoff from the San Gabriel Mountains and is jointly owned by Palmdale Water District (PWD) and Littlerock Creek Irrigation District (LCID). Historically, water stored in the Littlerock Reservoir has been used directly for agricultural uses within LCID's service area and for municipal and industrial (M&I) uses within PWD's service area following treatment at PWD's water purification plant.

Surface water from the surrounding hills and from the Antelope Valley floor flows primarily toward the three dry lakes on Edwards Air Force Base. Except during the largest rainfall events of a season, surface water flows toward the Antelope Valley 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 percolation occurs in the Antelope Valley other than near the base of the surrounding mountains due to impermeable layers of clay overlying the groundwater basin.

Water Supply

Water supply for the region comes from three primary sources: the SWP, local surface water runoff that is stored in Littlerock Reservoir, and the groundwater basin, with recycled water and stormwater used as additional sources of water supply. Development demands on water supply, coupled with the potential curtailments of SWP deliveries due to environmental constraints and prolonged drought periods, have intensified the competition for available water resources. Consequently, an integrated regional water management plan (IRWMP) was developed for the Antelope Valley Region by stakeholders as a strategy to manage water resources and address the needs of the M&I purveyors to reliably provide the quantity and quality of water necessary to serve the expanding Antelope Valley Region, while concurrently addressing the need of agricultural users to have adequate supplies of reasonably-priced irrigation water. One strategy for the region is to increase recycled water use, thus increasing the availability of potable water supplies.

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).

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, 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 2-4 depicts a soil map of the Antelope Valley Region.

Land Use

Figure 2-5 depicts the major existing land use categories within the Antelope Valley Region that are characterized and grouped together according to broad water use sectors. The map was created with City of Lancaster, City of Palmdale, Los Angeles County, and Kern County GIS parcel level data. Table 2-1 depicts the colors used to indicate each land use category. Each major land use category is identified below, including the types of "like water uses" assigned to each category. Additional descriptions for the land use categories provided by the agencies are detailed in Appendix C.

- *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.
- *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.
- *Industrial:* The industrial category includes heavy manufacturing and light industrial uses found in business, research, and development 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.

2.2 Groundwater Quality

Groundwater quality is excellent within the upper or “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 concentrations have been measured in some areas of the basin. Arsenic is emerging as a concern in the region and has been observed in some water purveyor supply wells. Research conducted by Waterworks and USGS has shown the problem to reside primarily in the deep aquifer. It is not anticipated that the existing arsenic concentrations will lead to future loss of groundwater as a water supply resource for the region. Portions of the Basin have experienced nitrate levels above the maximum contamination limit (MCL) of 10 mg/L.

Figure 2-4: Antelope Valley Soils

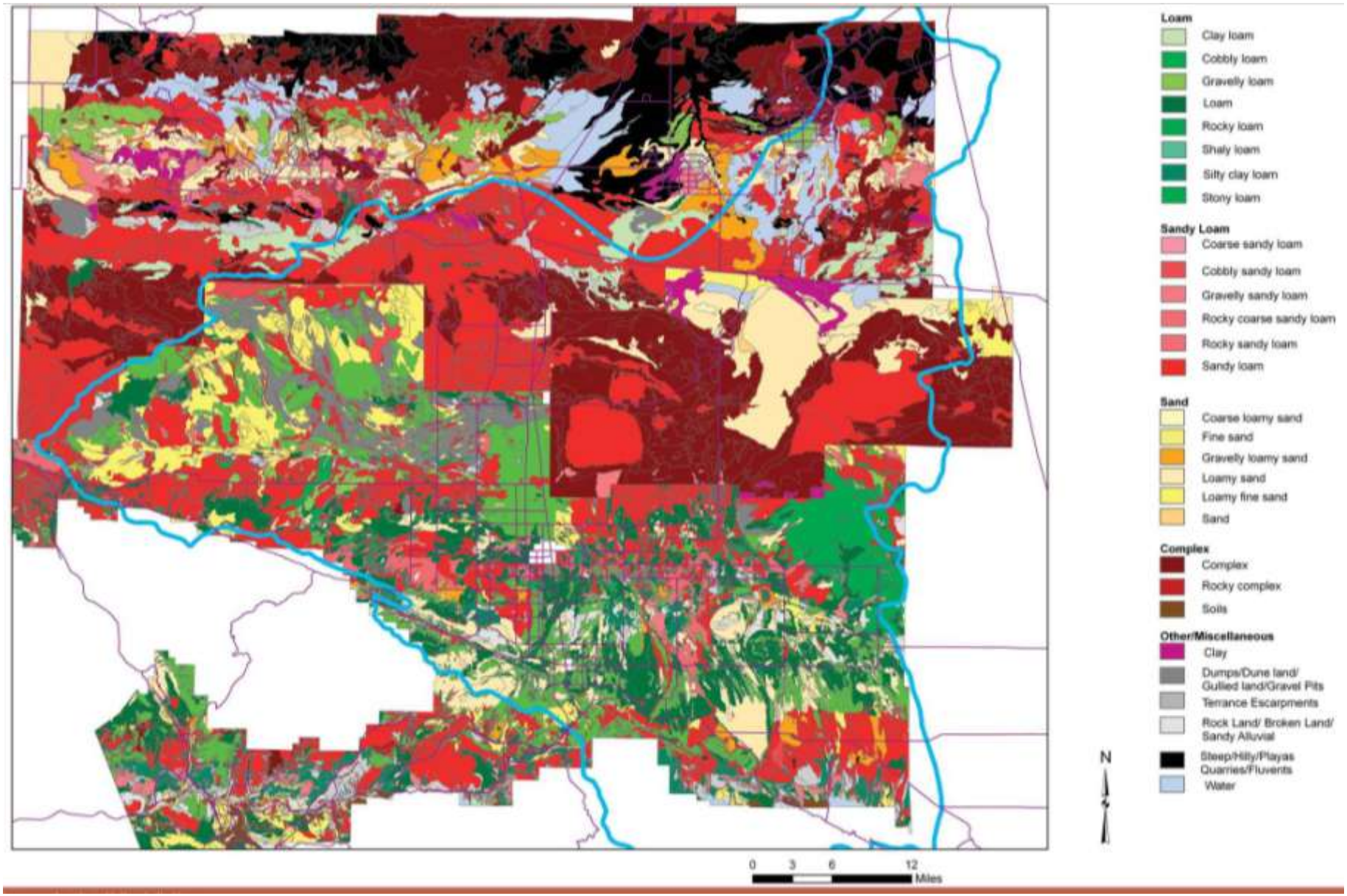


Figure 2-5: Antelope Valley Land Uses

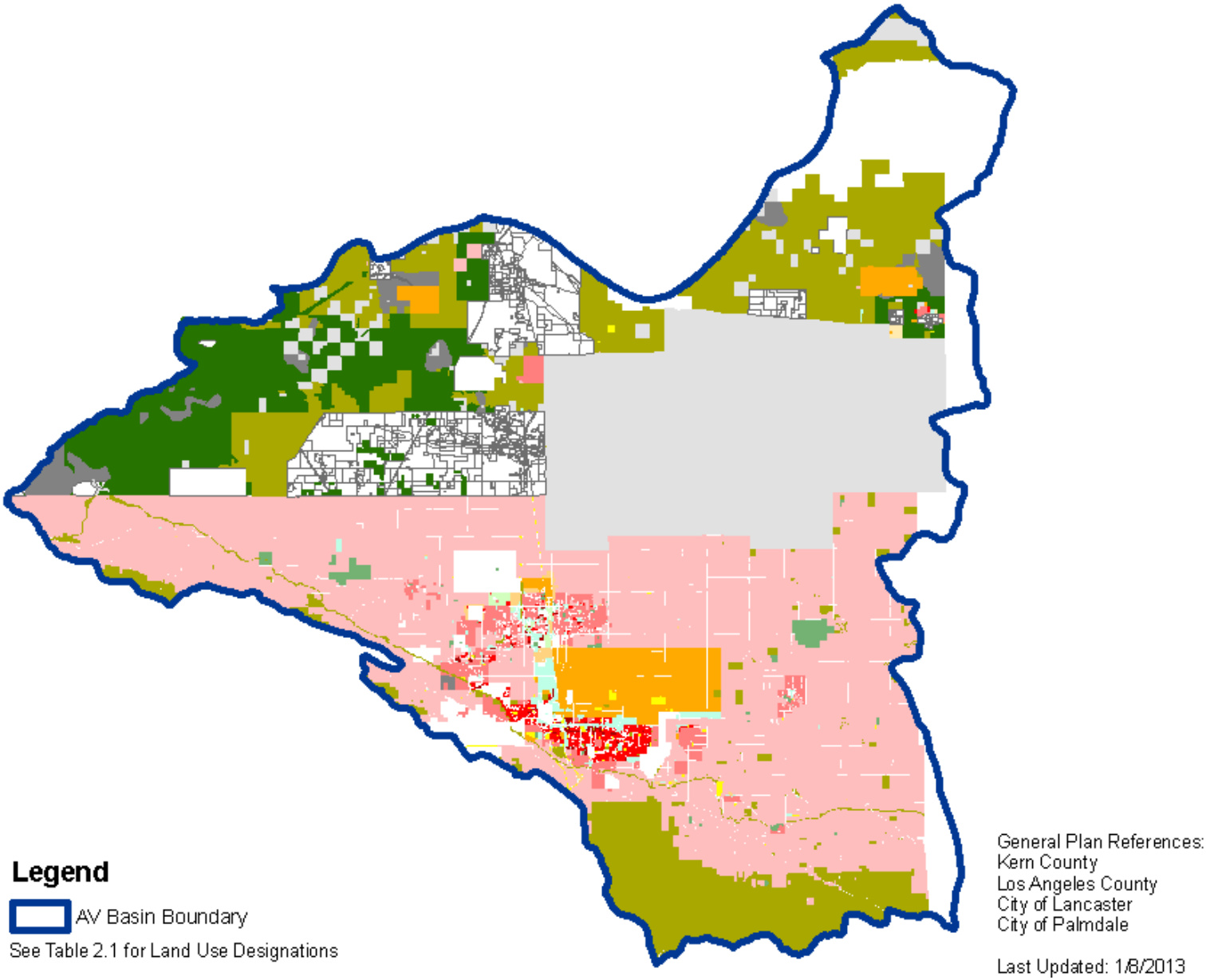


Table 2-1: Antelope Valley Land Use Designations

Los Angeles County	Kern County	Palmdale	Lancaster
General Plan Land Use	**General Plan Land Use**	**General Plan Land Use**	**General Plan Land Use**
RL1 – Rural Land 1	Minimum 5 Gross Acres/Unit	ER – Equestrian Residential	NU – Non-urban Residential
RL2 – Rural Land 2	Minimum 20 Gross Acres/Unit	S – Special Development	
RL5 – Rural Land 5			
RL10 – Rural Land 10			
RL20 – Rural Land 20			
RL40 – Rural Land 40			
H2 – Large Lot Residential	Maximum 1 Unit/Net Acre	LDR – Low Density Residential	
	Minimum 2.5 Gross Acres/Unit	SFR-1 – Single Family Residential 1	
	Interim Rural Community Plan	SFR-2 – Single Family Residential 2	
H5 – Suburban Residential	Maximum 4 Units/Net Acre	SFR-3 – Single Family Residential 3	UR – Urban Residential
H9 – Suburban High Density Residential			
H18 – Medium Density Residential		MR – Medium Residential	MR1 – Multiple Family Residential – Medium Density
H30 – Urban Residential		MFR – Multifamily Residential	MR2 – Multiple Family Residential – High Density
CR – Rural Commercial	Highway Commercial	BP – Business Park	C – Commercial
CM – Major Commercial		CC – Community Commercial	OP – Office/Professional
CR-MU – Rural Commercial / Mixed Use		CM – Commercial Manufacturing	
		DC – Downtown Commercial	
		NC – Neighborhood Commercial	
		OC – Office Commercial	
		RC – Regional Commercial	
IL – Light Industrial	Light Industrial		LI – Light Industry
IH – Heavy Industrial	Service Industrial	IND – Industrial	HI – Heavy Industry
	Heavy Industrial	AR – Airport and Related Uses	
P – Public and Semi-Public		PF – Public Facility	H – Public and Quasi-Public Facilities – Health Care
TC – Transportation Corridor		PF-S – Public Facility-School	P – Public
		PF-TP – Public Facility-Treatment Plant	
		PF-W – Public Facility-Water Treatment	
		PF-P&R – Public Facility-Park and Ride	
		PF-B – Public Facility-Basin	
OS-PR – Parks and Recreation	Solid Waste Disposal Facility	PF-C – Public Facility-Cemetery	
		PF-Landfill – Public Facility-Landfill	
	Intensive Agriculture		
	Extensive Agriculture		
OS-BLM – Bureau of Land Management	Resource Reserve	Aqueduct – California Aqueduct	O – Open Space
OS-C – Conservation	Resource Management	OS – Open Space	
OS-NF – National Forest			
OS-W – Water			
ML – Military Land	State and Federal Land		
	Mineral And Petroleum	MRE – Mineral Resource Extraction	
	Incorporated Cities		MU – Mixed Use
	Accepted County Plan Areas		SP – Specific Plan
	Specific Plan Required		

2.3 Water Quality Control

The Antelope Valley Region falls within the jurisdiction of the Lahontan Regional Water Board, the regulatory agency whose primary responsibility is to protect water quality within its jurisdiction. The Regional Water Board has adopted and implemented the "*Water Quality Control Plan for the Lahontan Region*" (Basin Plan; Lahontan Regional Water Board, 1995), which, among other functions, sets forth water quality standards for the surface and groundwater within the Regional Board's jurisdiction. The Basin Plan includes the designated uses of water and the narrative and numerical objectives which must be maintained or attained to protect those uses.

The Regional Board has designated the following beneficial uses to the Antelope Valley Groundwater Basin (Basin Unit 6-44):

- *Agricultural Supply (AGR):* Beneficial uses of waters used for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- *Freshwater Replenishment (FRSH):* Beneficial uses of waters used for natural or artificial maintenance of surface water quantity or quality (e.g., salinity).
- *Industrial Service Supply (IND):* Beneficial uses of waters used for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization.
- *Municipal and Domestic Supply (MUN):* Beneficial uses of waters used for community, military, or individual water supply systems including, but not limited to, drinking water supply.

The beneficial uses for groundwater listed in the Basin Plan are for each groundwater basin or sub-basin as an entirety. The Regional Board recognizes that, in some areas, useable groundwater occurs above or below an aquifer of highly mineralized groundwater, which can contain concentrations of dissolved solids and metals, such as arsenic, unsuitable for drinking water. Therefore, a beneficial use designation in the Basin Plan does not indicate that all of the groundwaters in that particular location are suitable (without treatment) for a designated beneficial use. However, all waters in the Lahontan Region are designated as MUN unless they have been specifically exempted by the Regional Board through adoption of a Basin Plan amendment after consideration of substantial evidence to exempt such water.

The Regional Board established water quality objectives for the waters within the Lahontan Region that it considers protective of the designated beneficial uses. The general methodology used in establishing water quality objectives involves, first, designating beneficial water uses; and second, selecting and quantifying the water quality parameters necessary to protect the most vulnerable (sensitive) beneficial uses. As additional information is obtained on the quality of the Lahontan Region's waters and the beneficial uses of those waters, certain water quality objectives may be updated to reflect the levels necessary to protect those beneficial uses. Revised water quality objectives would then be adopted as part of the Basin Plan by amendment.

In 1968, the State Water Resources Control Board adopted Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," establishing an Antidegradation Policy for the protection of water quality. The Antidegradation Policy requires continued maintenance of existing high quality waters. Whenever the existing quality of water is

better that the quality of water established in the Basin Plan as objectives (both narrative and numerical), such existing quality shall be maintained unless appropriate findings are made. Further discussion on antidegradation as applicable to in this SNMP is included in Section 4.

The Regional Board has not established water quality objects specific to the Antelope Valley Region. However, water quality objectives have been established that apply to all groundwaters in the Lahontan Region. These objectives are aimed to be protective of the beneficial uses assigned to the groundwater basins. Further discussion on the water quality objectives examined in this SNMP is included in Section 4.

2.4 Antelope Valley Regulatory Groundwater Cleanup Sites

The State and Regional Board's Site Cleanup Program regulates and oversees the investigation and cleanup of non-federally owned sites where recent or historical unauthorized releases of pollutants to the environment, including soil, groundwater, surface water, and sediment, have occurred. Sites in the program include, but are not limited to, pesticide and fertilizer facilities, rail yards, ports, equipment supply facilities, metals facilities, industrial manufacturing and maintenance sites, dry cleaners, bulk transfer facilities, and refineries. The types of pollutants encountered at the sites are numerous and diverse and may include substance such as solvents, pesticides, heavy metals, and fuel constituents.

GeoTracker is the State and Regional Boards' data management system for managing sites that impact groundwater, especially those that require groundwater cleanup as well as permitted facilities such as land disposal sites. GeoTracker data may be accessed via Internet website[3] to allow users to examine information relating to the groundwater cleanup sites.

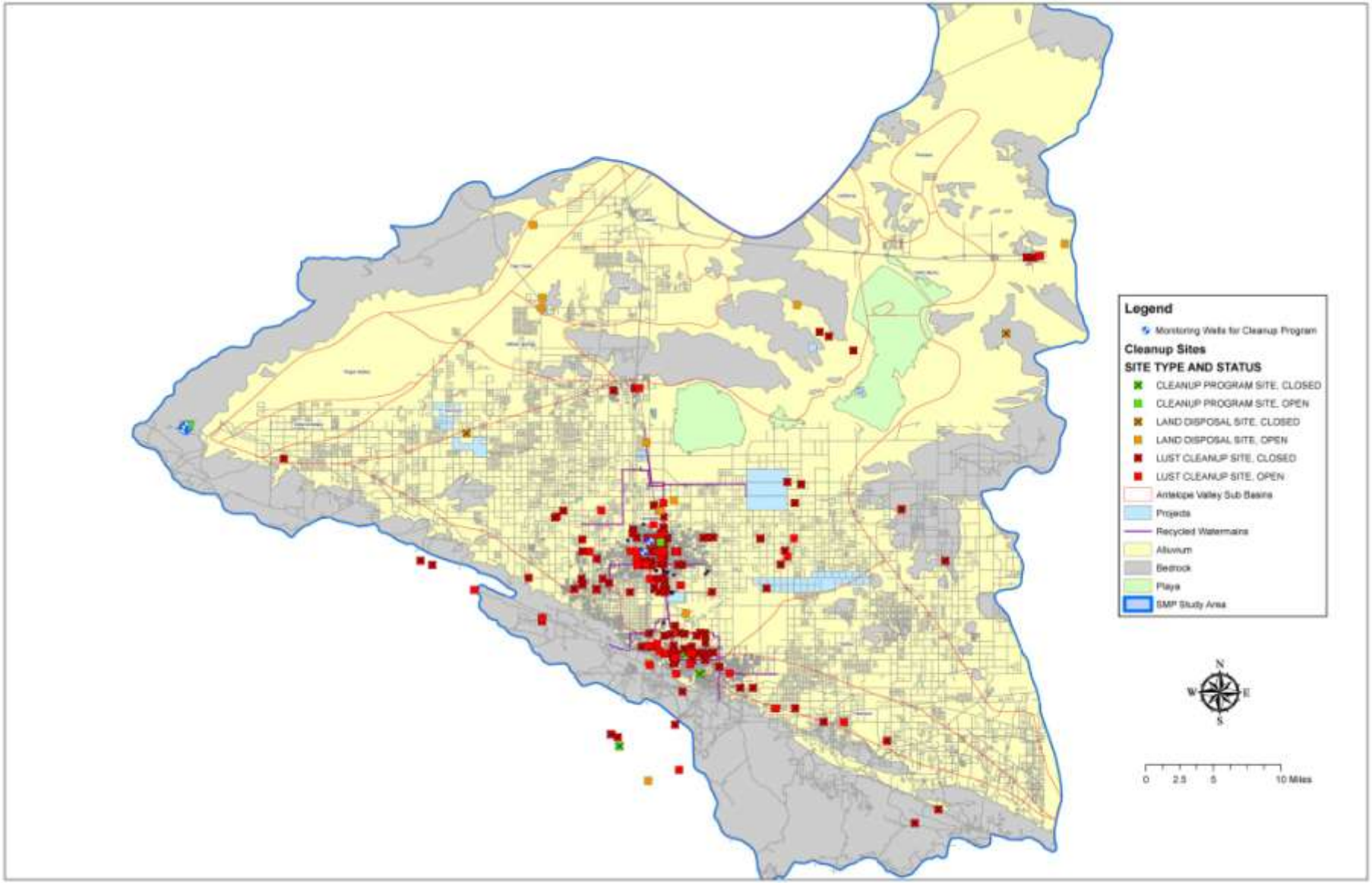
At the request of the Regional Board, the stakeholder group reviewed the cleanup sites located in the Antelope Valley and generated a list of open and closed sites (see Appendix D).[4] The locations of the identified cleanup sites are depicted in Figure 2-6. Of the total 247 cleanup sites in the region, 62 sites are currently open cases. Of these open cases, 3 are Site Cleanup Program sites, 14 are land disposal sites, and 45 are leaking underground storage tank (LUST) sites. For the sites that have a listed potential contaminant(s) of concern, the majority of the contaminants are gasoline and diesel from gas stations. Only one site, the eSolar Sierra SunTower Power Plant, has listed potential contaminants in GeoTracker that are relevant to the SNMP. The potential contaminants are listed as "Nitrate, other inorganic / salt, arsenic, chromium, other metal." This site is listed as a land disposal site; however, it is an eSolar power generating location using solar power. The cleanup case is also listed as inactive, meaning that it is a site that has ceased accepting waste but has not been formally closed or is still within the post closure monitoring period, and the site is considered to not pose a significant threat to water quality. According to City of Lancaster staff, the water used for cooling is discharged to the evaporation ponds. This site is one of the projects identified by SNMP stakeholders as having the potential to contribute to salt and/or nutrient impacts to the Antelope Valley Groundwater Basin, as discussed in Section 3.5.

If in the future, the SNMP monitoring network detects a high concentration of a monitored constituent, the stakeholders may use this map to see if there are any known cleanup sites in the vicinity of the well that may be contributing to the high concentration.

[3] http://geotracker.waterboards.ca.gov/

[4] While the data used in this SNMP may be downloaded from the GeoTracker website, data was accessed from files provided by State Board staff at the GeoTracker Help Desk and downloaded on February 7, 2013.

Figure 2-6: Antelope Valley Regulatory Groundwater Cleanup Sites Listed in GeoTracker



Section 3: Salt & Nutrient Characterization

3.1 Salts and Nutrients

Identification of existing and future sources of salts and nutrients is necessary for assessing constituent loads and analyzing impacts on basin groundwater quality. Sources of salts and nutrients into the basin include imported water, recycled water, and several others, some of which are addressed in the following sections.

3.1.1 Total Dissolved Salts

Salts in groundwater are typically measured by total dissolved solids (TDS), which is the overall mineral content. Most TDS sources are anthropogenic in nature and include agricultural runoff, point source water pollution, and industrial and sewage discharge. Inorganic sources include minerals commonly found in nature through the weathering and dissolution of rocks and organic material from decaying organisms, plants, and animals.

TDS does not pose substantial health risks at drinking water concentrations. Secondary drinking water standards were set for aesthetics (taste, odor, and color) of drinking water. High TDS concentrations can negatively impact sensitive crops and cause corrosion and scaling in pipes.

3.1.2 Chloride

Chlorides are widely distributed in nature as salts of sodium (NaCl), potassium (KCl), and calcium (CaCl2). Chloride is a negatively charged ion, essential for metabolism and body acid-base balance.

Chlorides in groundwater are naturally occurring from weathering of rocks, negligible atmospheric deposition, and as result of human use and wastes. Sources of chloride from human use include food condiment and preservative, potash fertilizers, animal feed additive, production of industrial chemicals, dissolution of deicing salts, and treatment of drinking water and wastewater. Release of brines from industry processes, leaching from landfills and fertilized soils, discharge of wastewater from treatment facilities or septic systems affect chloride in groundwater.

As with TDS, chloride does not pose substantial health risks at drinking water concentrations. Secondary drinking water standards were set for aesthetics as taste is affected by chloride. The human health condition of hypertension, associated with sodium chloride intake, appears to be related to the sodium rather than the chloride ion. Elevated chloride concentrations do, however, have substantial negative impacts on sensitive crops and cause corrosion in pipes.

3.1.3 Nitrogen

Nitrogen is ubiquitous in the environment and an essential nutrient for crops. Nitrate is the primary form of nitrogen found in groundwater and is a principal by-product of fertilizers. Other sources of nitrate include land use activities such as irrigation farming of crops, high density animal operations, wastewater treatment, food processing facilities and septic tank systems.

Nitrogen in the nitrate/nitrite form poses health hazards for infants and pregnant women. High nitrate levels in drinking water can result in methemoglobin, commonly known as "blue baby

syndrome" which is a condition characterized by a reduced ability of the blood to carry oxygen to organs and tissue.

3.1.4 Arsenic

Arsenic is an odorless and tasteless semi-metal element that occurs naturally in rocks and soil, water, air, and plants and animals. It enters drinking water supplies from natural deposits in the earth or from agricultural and industrial practices. Higher levels of arsenic tend to be found more in ground water sources than in surface water sources (i.e., lakes and rivers) of drinking water. The demand on ground water from municipal systems and private drinking water wells may cause water levels to drop and release arsenic from rock formations.

Non-cancer effects of arsenic can include thickening and discoloration of the skin, stomach pain, nausea, vomiting; diarrhea; numbness in hands and feet; partial paralysis; and blindness. Arsenic has been linked to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Drinking water standards have been set to protect consumers served by public water systems from the effects of long-term, chronic exposure to arsenic.

3.1.5 Chromium

Chromium is an odorless and tasteless metallic element found naturally in rocks, plants, soil and volcanic dust, and animals. The most common forms of chromium that occur in natural waters in the environment are trivalent chromium (chromium-3) and hexavalent chromium (chromium-6).

Chromium-3 is an essential human dietary element and is found in many vegetables, fruits, meats, grains and yeast. Chromium-6 occurs naturally in the environment from the erosion of natural chromium deposits, and it can also be produced by industrial processes. There are demonstrated instances of chromium being released to the environment by leakage, poor storage or inadequate industrial waste disposal practices.

Drinking water standards have been set to protect consumers served by public water systems from the effects of exposure to chromium. In 2008, the USEPA began a review of chromium-6 health effects and when this human health assessment is finalized EPA will determine if the current chromium standard should be revised.

3.1.6 Fluoride

Fluoride compounds are salts that form when the element, fluorine, combines with minerals in soil or rocks. Some fluoride compounds, such as sodium fluoride and fluorosilicates, dissolve easily into ground water as it moves through gaps and pore spaces between rocks. Most water supplies contain some naturally occurring fluoride. Fluoride also enters drinking water in discharge from fertilizer or aluminum factories. Also, many communities add fluoride to their drinking water to promote dental health.

Exposure to excessive consumption of fluoride over a lifetime may lead to increased likelihood of bone fractures in adults, and may result in effects on bone leading to pain and tenderness. Children aged 8 years and younger exposed to excessive amounts of fluoride have an increased chance of developing pits in the tooth enamel, along with a range of cosmetic effects to teeth.

3.1.7 Boron

Naturally-occurring boron is usually found in sediments and sedimentary rock formations and rarely exists in elemental form. Other forms of boron include boric acid, borax, borax pentahydrate, anhydrous borax, and boron oxide. The principal uses for boron compounds in the United States include glass and ceramics, soaps and detergents, algicides in water treatment, fertilizers, pesticides, flame retardants, and reagents for production of other boron compounds. The major sources of free boron in the environment are exposed minerals containing boron, boric acid volatilization from seawater, and volcanic material. Anthropogenic inputs of boron to the environment are considered smaller than inputs from natural processes and may include: agriculture, waste and wood burning, power generation using coal and oil, glass product manufacture, use of borates/perborates in the home and industry, borate mining/processing, leaching of treated wood, and sewage/sludge disposal. Contamination of water can come directly from industrial wastewater and municipal sewage, as well as indirectly from air deposition and soil runoff. Borates in detergents, soaps, and personal care products can also contribute to the presence of boron in water.

The available data for boron support its ubiquitous presence in the ambient environment. Based on the concentrations of boron in the groundwater compared to the health risk level, boron does not present a health risk (US EPA 2008).

3.2 Historical Salt and Nutrient Characterization of the Groundwater Basin

3.2.1 Historical Groundwater Basin Water Quality Using USGS Data

In order to assess the Antelope Valley Groundwater Basin historical water quality for the 10-year period of 2001-2010, groundwater monitoring data was downloaded from the United States Geological Survey (USGS) National Water Information System (NWIS) web interface for California groundwater. Historical groundwater observations from 2001-2010 were obtained for the Antelope-Fremont Valleys hydrologic unit (designated by the code 18090206 by USGS) and for the constituents of concern identified in this AV SNMP (total dissolved solids, nitrate, nitrite, chloride, arsenic, boron, fluoride and chromium).

Individual well location coordinates were determined using the USGS site number for each well. The USGS well site-numbering system is based on the grid system of latitude and longitude and provides the geographic location of the well and a unique number for each site. The number consists of 15 digits: the first 6 digits denote the degrees, minutes, and seconds of latitude; the next 7 digits denote degrees, minutes, and seconds of longitude; and the last 2 digits are a sequential number for wells within a 1-second grid. In the event that the latitude-longitude coordinates for a well are the same, a sequential number such as “01,” “02,” and so forth, would be assigned as one would for wells.

The location of each well in terms of sub-basin was determined by using the well coordinates given by the site numbers and identifying the sub-basin location in a map created using ArcGIS software.

The mean concentration for each constituent at each well was calculated for the 10-year period. In instances where an analysis resulted in no detection of a specific constituent, the following approaches were considered:

1. Non-detections considered as the detection level: This highly conservative approach considers all non-detect results as the value of the detection level, which is the largest constituent concentration that could be present but not detected. This method overestimates concentrations below the detection limit and produces a mean concentration which is biased high and could lead to unwarranted mitigation efforts.
2. Non-detections considered as zero: This approach, in which all undetected constituents are assumed absent, is biased low.
3. Non-detections considered as half of the detection level: This approach assumes that on the average all values between the detection level and zero could be present, and that the average value of non-detects could be half the detection limit.

The mean concentration for each well was calculated for two scenarios, where the constituent level was assumed to be A) zero and B) half of the detection limit. A mean concentration was also determined for each sub-basin and for the groundwater basin as a whole (see Table 3-1). In most cases, the mean concentrations for the sub-basins and entire basin did not differ whether considering non-detections as zero or as half the detection limit. The majority of results for nitrite were below the detection limits, so the mean concentrations for the sub-basin and entire basin are considered as less than the highest detection level in the analyses for each constituent. No data were available for the Chaffee, Finger Buttes, Oak Creek, and Pearless sub-basins. Other sub-basins may have not had specific constituents monitored during the 10-year period. In cases where constituents were measured prior to the 10-year time period, the results are noted in the Table 3-1.

Figure 3-1 through Figure 3-7 are maps showing the mean concentration of each constituent for each well. The sub-basin color indicates the mean concentration level for each sub-basin, taking into consideration the mean concentrations of all the wells in the sub-basin. The mean concentration of each constituent for the basin as a whole is indicated. A map was not created for nitrite because all of the mean concentrations were below detection limits. Since monitoring of chromium was only conducted in the Lancaster sub-basin, the map for this constituent only includes the Lancaster sub-basin.

Total Dissolved Solids

From the USGS data available, TDS concentrations in the Antelope Valley groundwater basin ranged from 122 to 1380 mg/L. Average TDS concentrations in five wells within the Lancaster sub-basin and one well within the Gloster sub-basin exceeded 500 mg/L. Only one well in the Lancaster sub-basin had a TDS concentration that exceeded 1000 mg/L.

Nitrogen

Nitrate +nitrite concentrations in the Antelope Valley groundwater basin ranged from no detection (<0.05 mg/L as nitrogen) to 9.87 mg/L as nitrogen. No wells exceeded the nitrate +nitrite MCL of 10 mg/L as nitrogen. As mentioned above, most results for nitrite were below the detection limits.

Chloride

Chloride concentrations in the Antelope Valley groundwater basin ranged 3.53 mg/ to 215 mg/L. No wells exceeded 250 mg/L.

Arsenic

Arsenic concentrations in the Antelope Valley groundwater basin ranged from no detection (<0.2 µg/L) to 60.5 µg/L. Average arsenic concentrations in fourteen wells within the Lancaster sub-basin, two wells within the Gloster sub-basin, and one well within the Willow Springs sub-basin exceeded the arsenic drinking water MCL of 10 µg/L.

Chromium
Total Chromium concentrations in the Antelope Valley groundwater basin ranged from no detection (<0.8 µg/L) to 13.7 µg/L. No wells exceeded the drinking water total chromium MCL of 50 µg/L.

Fluoride
Fluoride concentrations in the Antelope Valley groundwater basin ranged from no detection (<0.17 mg/L) to 4.51 mg/L. Average fluoride concentrations in one well within the Lancaster sub-basin exceeded the fluoride drinking water MCL of 2 mg/L.

Boron
Boron concentrations in the Antelope Valley groundwater basin ranged from 17 to 1730 µg/L. Currently, there is no drinking water MCL for boron. The boron concentration in one well within the Lancaster sub-basin exceeded the State Notification Level (NL) for boron in drinking water of 1000 µg/L. Notification levels are non-regulatory health-based advisory levels established by the California Department of Public Health for chemicals for which MCLs have not been established.

Table 3-1: 2001-2010 Mean Constituent Concentration Levels within the Antelope Groundwater Basin (Using USGS Data)

Sub-basin	Total Dissolved Solids (mg/L)	Nitrate + Nitrite (mg-N/L)	Nitrite (mg-N/L)	Chloride (mg/L)	Arsenic (µg/L)	Total Chromium (µg/L)	Fluoride (mg/L)	Boron (µg/L)
Buttes	372	1.58	< 0.008	20	[2][a]	--	1.97	328
Chaffee	--	--	--	--	--	--	--	--
Gloster	404	--	< 0.008	11.7	28.9	--	0.45	176
Finger Buttes	--	--	--	--	--	--	--	--
Lancaster	320	1.25	< 0.008	32.5	12	6.5	0.61	195
Neenach	[230][b]	[2.25][b]	[< 0.010][b]	[9.78][b]	[< 1][b]	--	[0.15][b]	[32][b]
North Muroc	[603][c]	--	--	--	[39][c]	--	[1][c]	[800][c]
Oak Creek	--	--	--	--	--	--	--	--
Pearland	216	0.83	--	9.3	0.358-0.83[d]	--	0.16	36
Pearless	--	--	--	--	--	--	--	--
West Antelope	403	4.605	< 0.008	22.4	9.4	--	0.41	822
Willow Springs	391	3.82	< 0.008	33.6	20.6	--	0.26	162
AV Groundwater Basin	**321**	**1.34**	**< 0.008**	**31**	**12.8**	**6.5**	**0.61**	**194**

(a) Results of a sample taken in 2000.
(b) Results of samples taken in 1992-1998.
(c) Results of a sample taken in 1990.
(d) Range from considering non-detections as zero to from considering non-detections as half the detection level.

Figure 3-1: Antelope Valley Groundwater Basin 2001-2010 Mean Total Dissolved Solids Concentrations (USGS Wells)

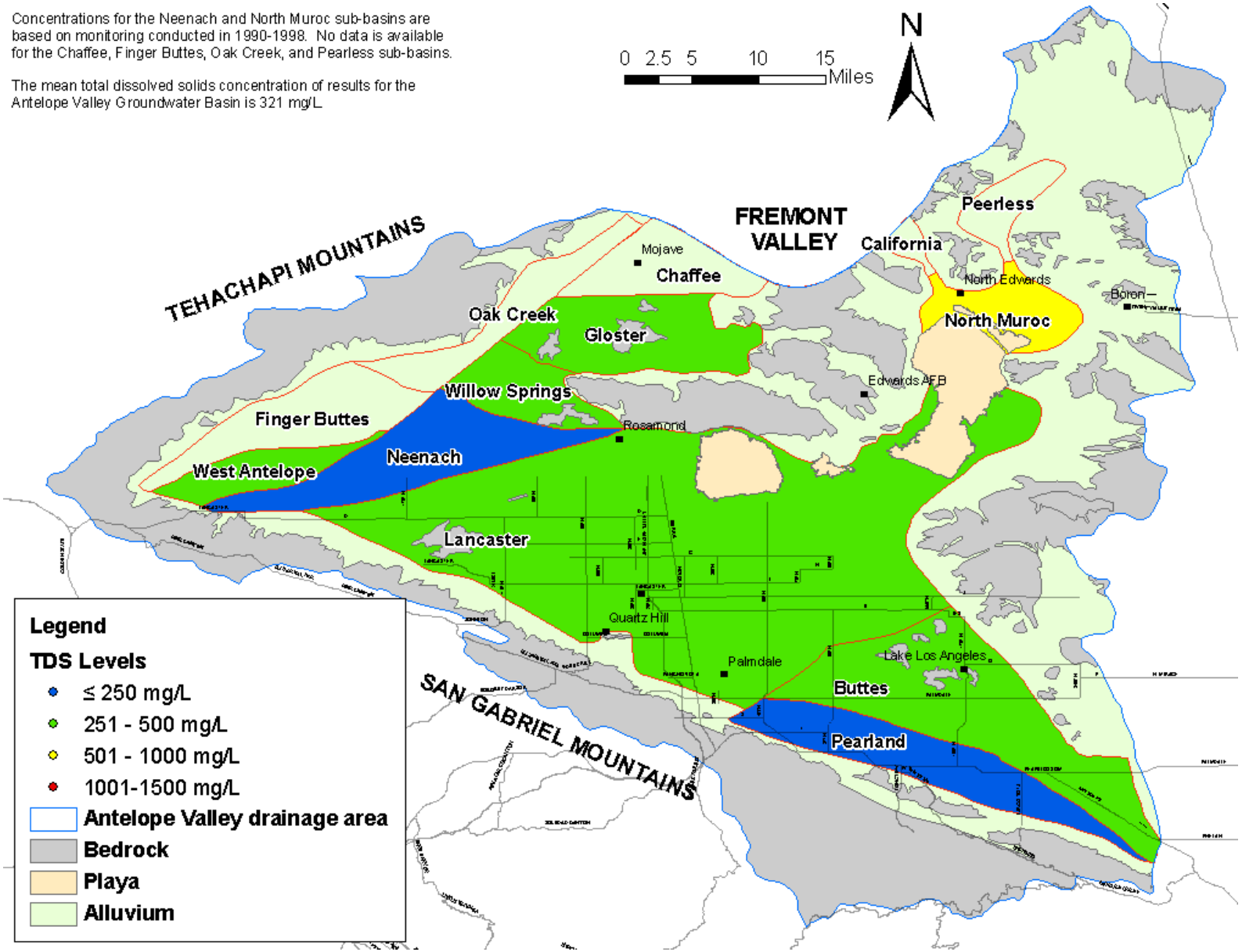


Figure 3-2: Antelope Valley Groundwater Basin 2001-2010 Mean Nitrate + Nitrite Concentrations (USGS Wells)

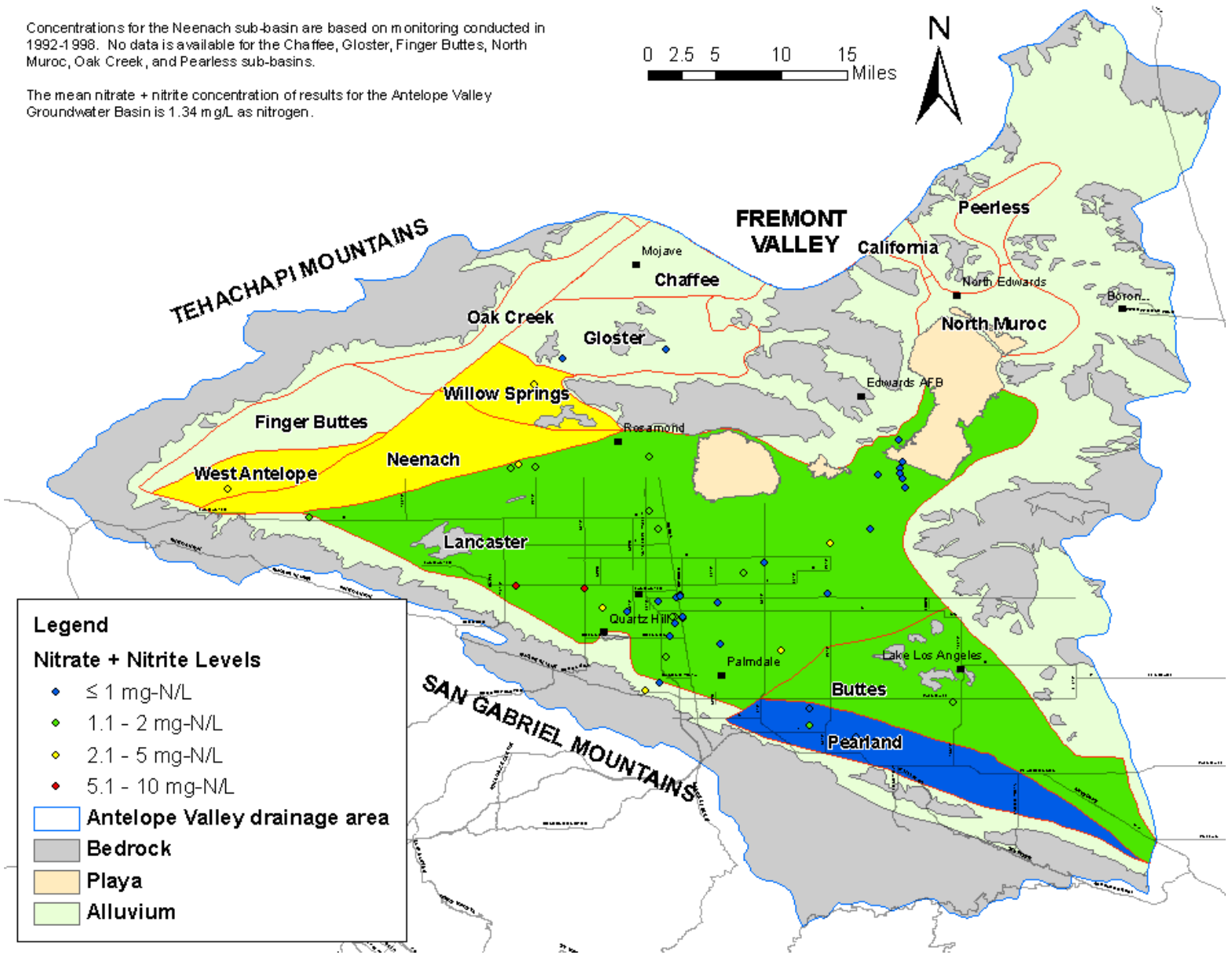


Figure 3-3: Antelope Valley Groundwater Basin 2001-2010 Mean Chloride Concentrations (USGS Wells)

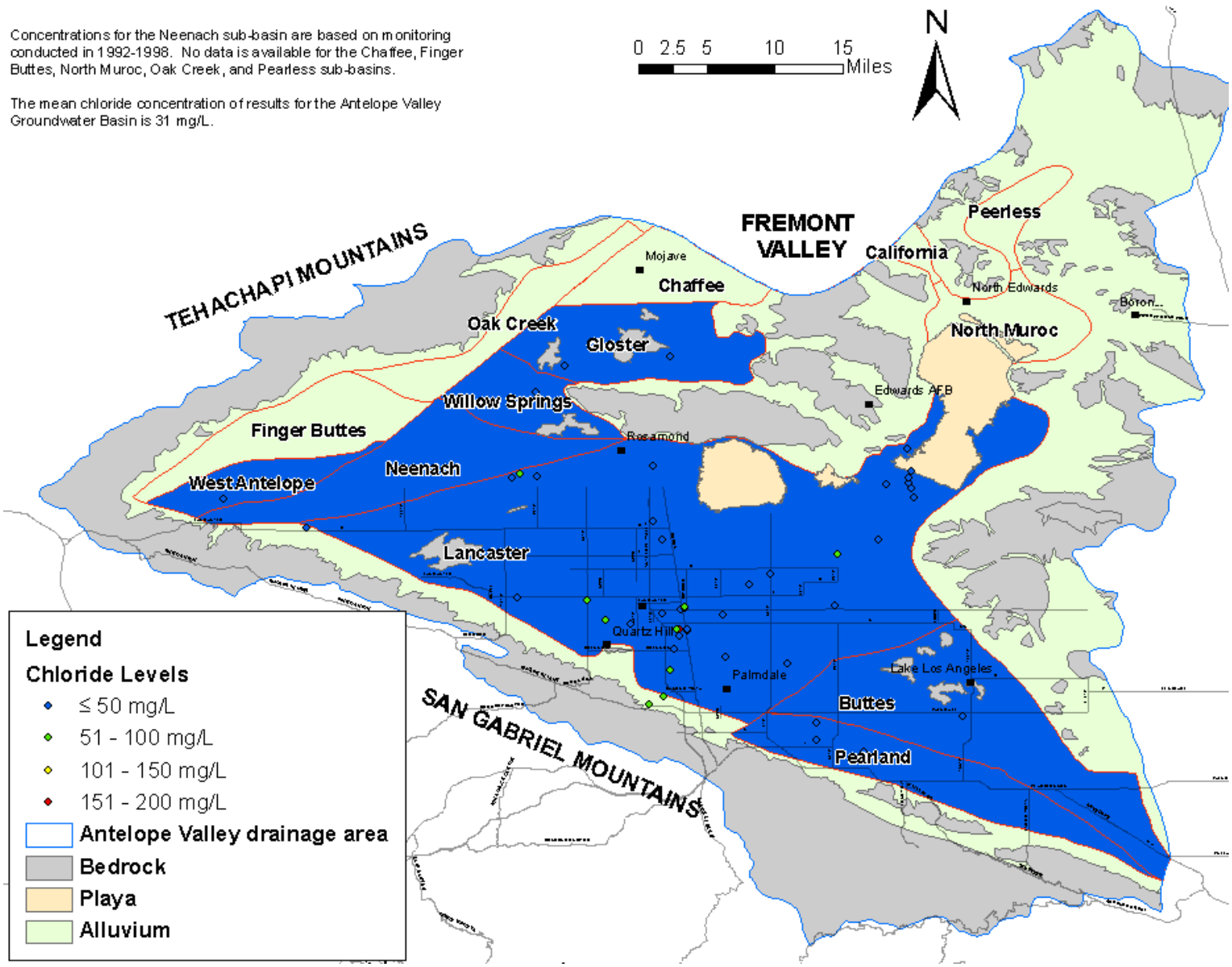


Figure 3-4: Antelope Valley Groundwater Basin 2001-2010 Mean Arsenic Concentrations (USGS Wells)

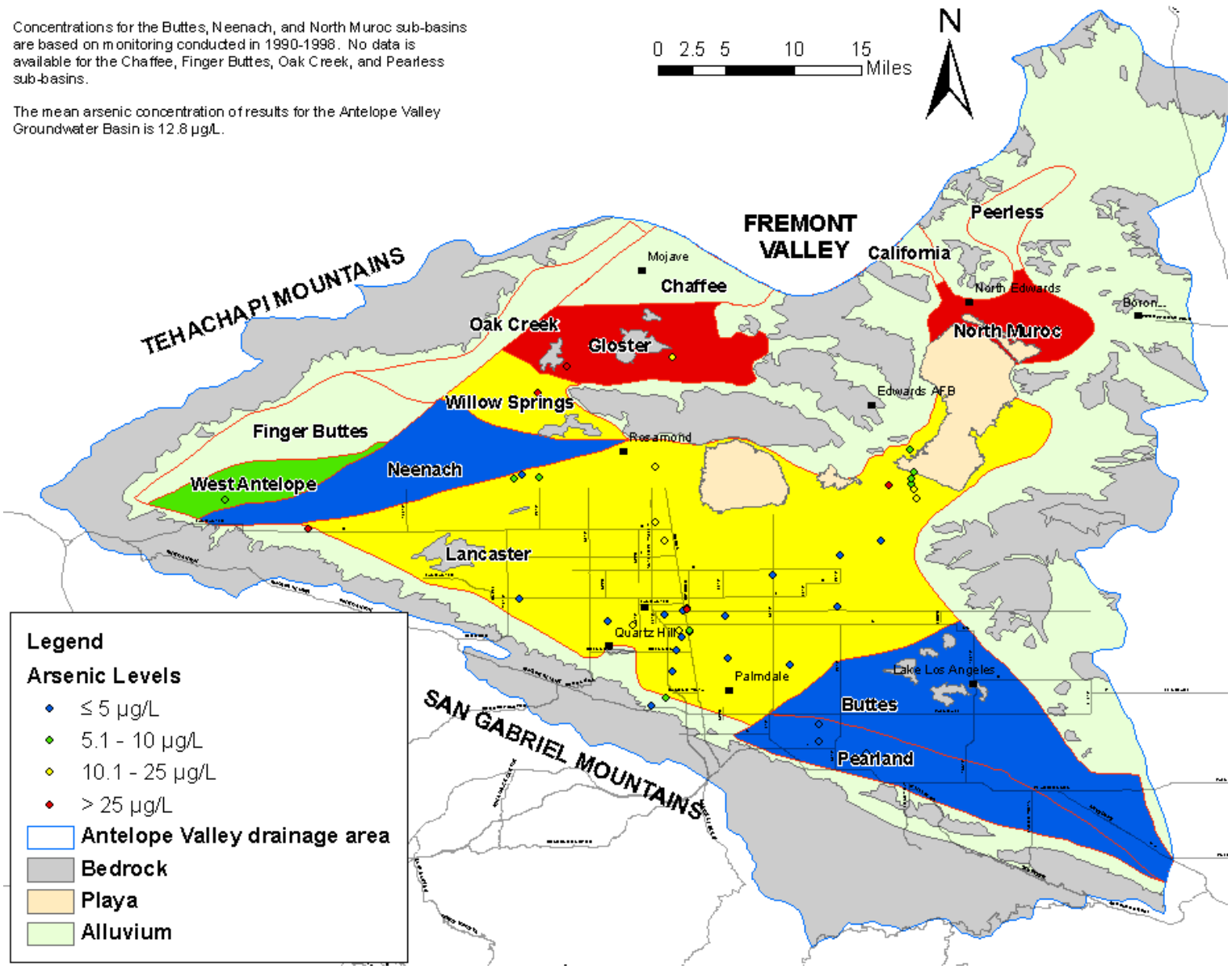


Figure 3-5: Antelope Valley Groundwater Basin 2001-2010 Mean Total Chromium Concentrations (USGS Wells)

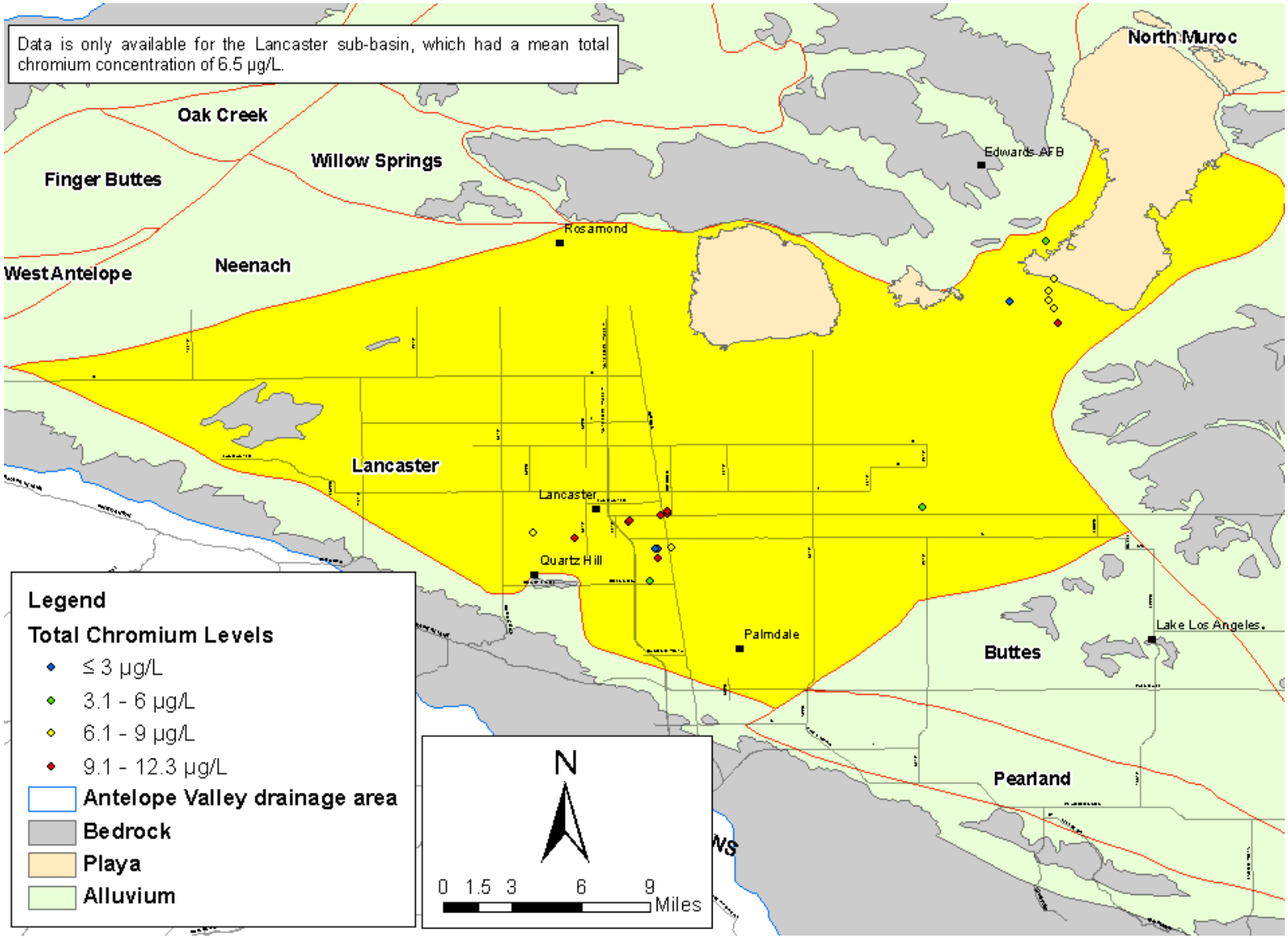


Figure 3-6: Antelope Valley Groundwater Basin 2001-2010 Mean Fluoride Concentrations (USGS Wells)

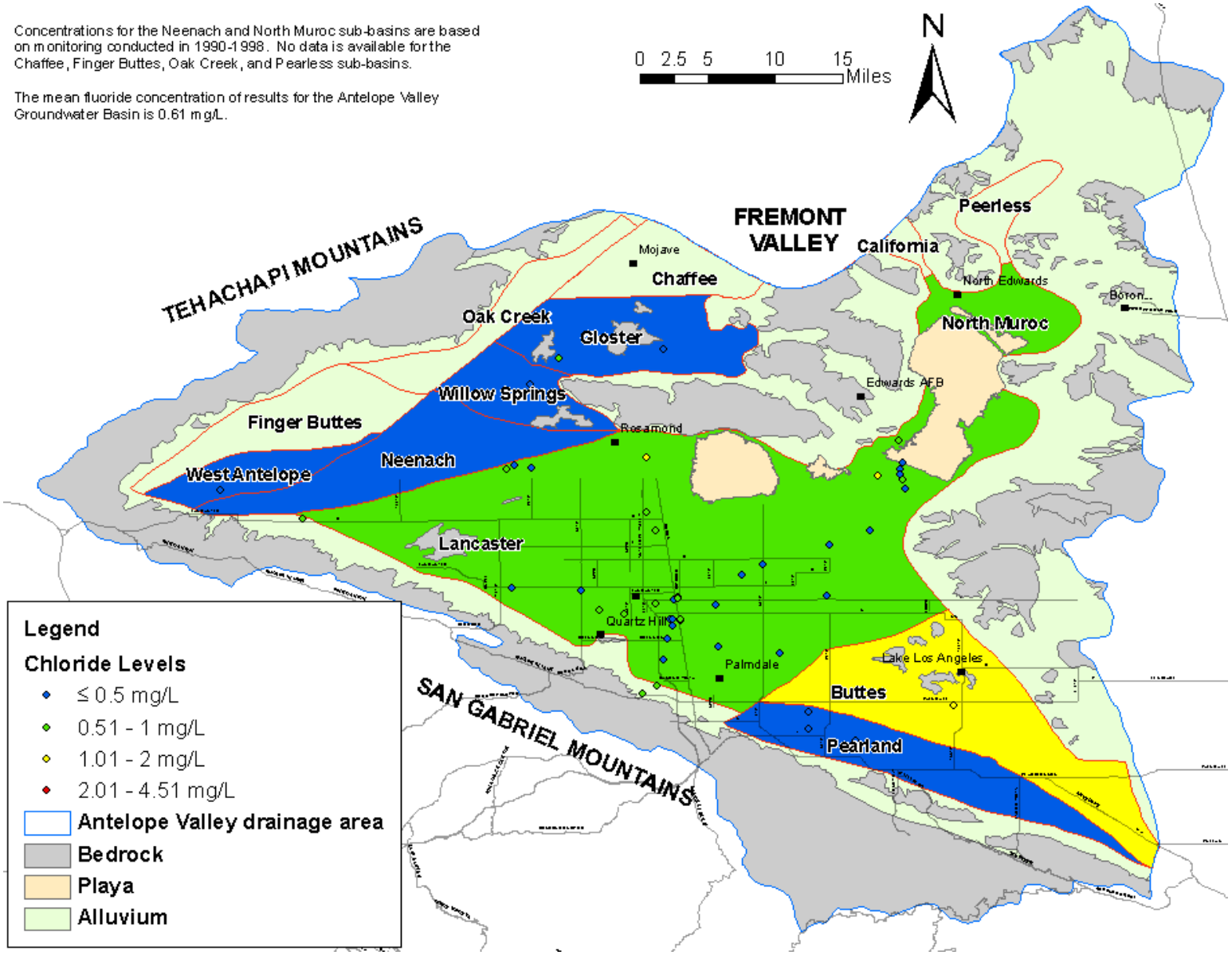
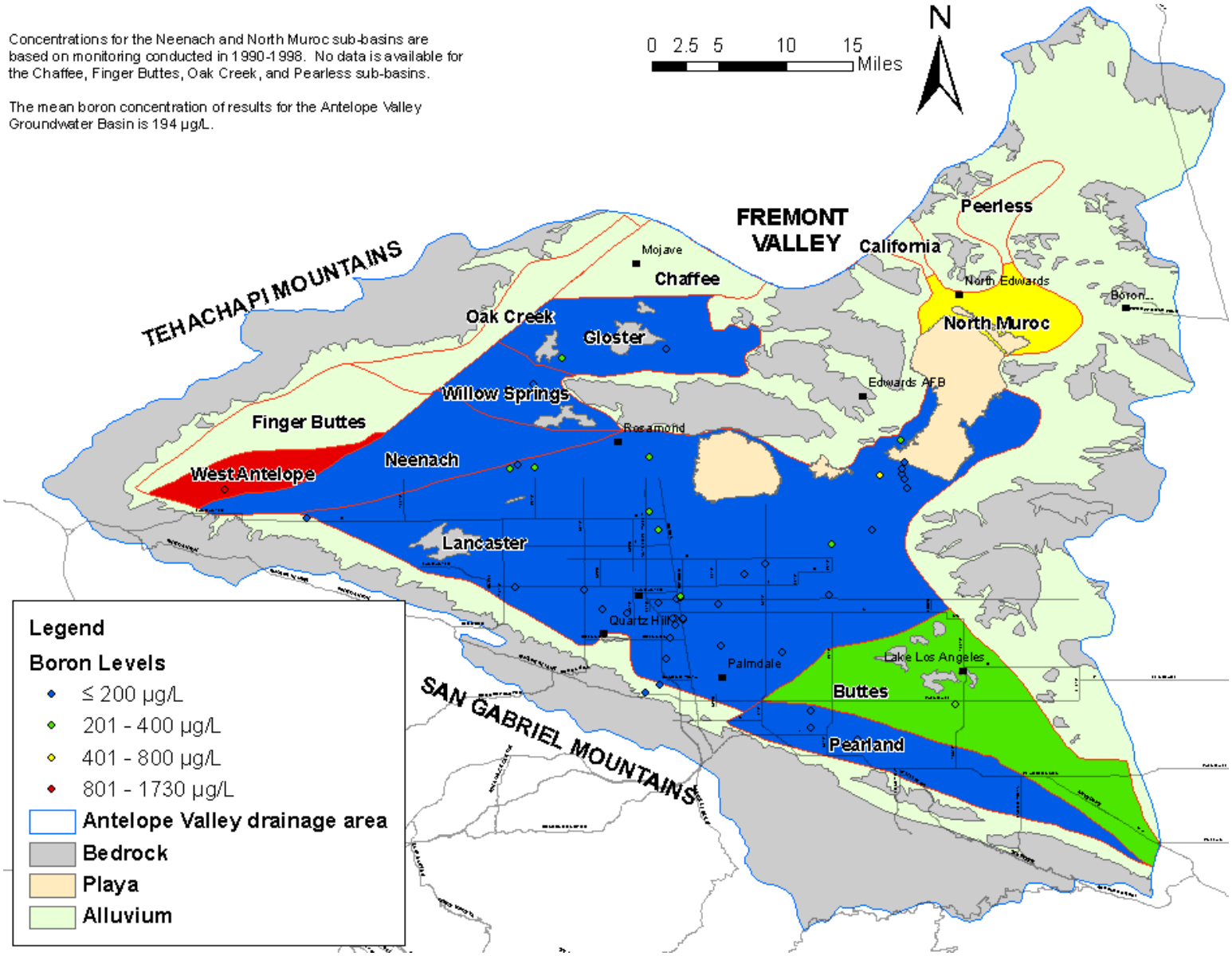


Figure 3-7: Antelope Valley Groundwater Basin 2001-2010 Mean Boron Concentrations (USGS Wells)



3.2.2 Historical Groundwater Basin Water Quality Using GAMA Data

The State Board's Groundwater Ambient Monitoring & Assessment (GAMA) Program GeoTracker database was accessed to further assess the Antelope Valley Groundwater Basin historical water quality and to support the findings from the USGS data described in Section 3.2.1. GeoTracker GAMA currently integrates data from State and Regional Boards, California Department of Public Health (CDPH), Department of Pesticide Regulation (DPR), Department of Water Resources (DWR), USGS, and Lawrence Livermore National Laboratory (LLNL). Historical groundwater quality in the Antelope Valley was downloaded from the GeoTracker GAMA database[5] for all years for the constituents of concern identified in this AV SNMP (total dissolved solids, nitrate, nitrite, chloride, arsenic, chromium, fluoride and boron).

The search perimeters are selected based on the following criteria:

1. Supply wells: CDPH, GAMA-SWRCB domestic, GAMA-USGS, GAMA-LLNL, DPR, DWR and USGS – NWIS
2. GIS layer: groundwater basins
3. Basin name: Antelope Valley (6-44)
4. Wells with results were selected for each constituent of concerns

The exported data included the following fields: well ID, well name, approximate latitude, approximate longitude, qualifier, result, units, sample date, dataset category, dataset source, county, regional board, groundwater basin name.

The approximate locations of the CDPH supply wells are within one mile of the actual locations. The approximate locations of supply wells from other sources are within 0.5 miles of the actual locations. The location of each well in terms of sub-basin was determined by using the approximate well coordinates provided and identifying the sub-basin location in a map using ArcGIS software.

The downloaded data was then verified and filtered. The units for each sample entry was verified to ensure that they were consistent for the same chemical. Only sample dates within the 10-year historical period of 2001-2010 were selected and all sample dates outside the period of interest were excluded.

The lab sample method or detection limits for each constituent are not provided in the GAMA database. Therefore, before calculating the average concentration for each constituent at each well in the 10-year period, analysis results and corresponding qualifiers (e.g., "<" or "ND") in the database were reviewed. In instances where a sample result was listed as "< 0", the result was treated as 0. In instances where a sample had a qualifier as ND (non-detect), the result was treated as 0. In instances where a sample result was listed as greater than (">") a specific number, the result was treated as that specific number.

The mean concentration for each constituent at each well and for each sub-basin was calculated for the 10-year period (see Table 3-2). Figure 3-8 through Figure 3-15 include maps that indicate the mean concentration of each constituent for each well.

[5] http://geotracker.waterboards.ca.gov/gama/, accessed on

Table 3-2: 2001-2010 Mean Constituent Concentration Levels within the Antelope Groundwater Basin (Using GAMA Data)

Sub-basin	Total Dissolved Solids (mg/L)	Nitrate as NO_3 (mg/L)	Nitrite as N (mg/L)	Chloride (mg/L)	Arsenic (µg/L)	Total Chromium (µg/L)	Fluoride (mg/L)	Boron (mg/L)
Buttes	279	6.00	0.0054	19.08	1.23	8.77	0.27	0.05
Chaffee	-	-	-	-	-	-	-	-
Gloster	-	-	-	-	-	-	-	-
Finger Buttes	-	-	-	-	-	-	-	-
Lancaster	323	7.15	0.0367	37.87	7.45	6.10	6.29	0.12
Neenach	501	10.43	0.0258	62.13	11.77	7.64	0.55	0.19
North Muroc	733	8.12	0.1890	154.94	90.88	10.17	342.76	0.69
Oak Creek	-	-	-	-	-	-	-	-
Pearland	264	17.16	0.1245	19.27	0.74	1.99	0.19	0.07
Peerless	547	12.06	0.00	68.83	27.46	4.17	1.48	2.80
West Antelope	-	-	-	-	-	-	-	-
Willow Springs	279	8.60	0.0189	18.08	14.95	4.00	0.20	0.00

Figure 3-8: Antelope Valley Groundwater Basin 2001-2010 Mean Total Dissolved Solids Concentrations (GAMA)

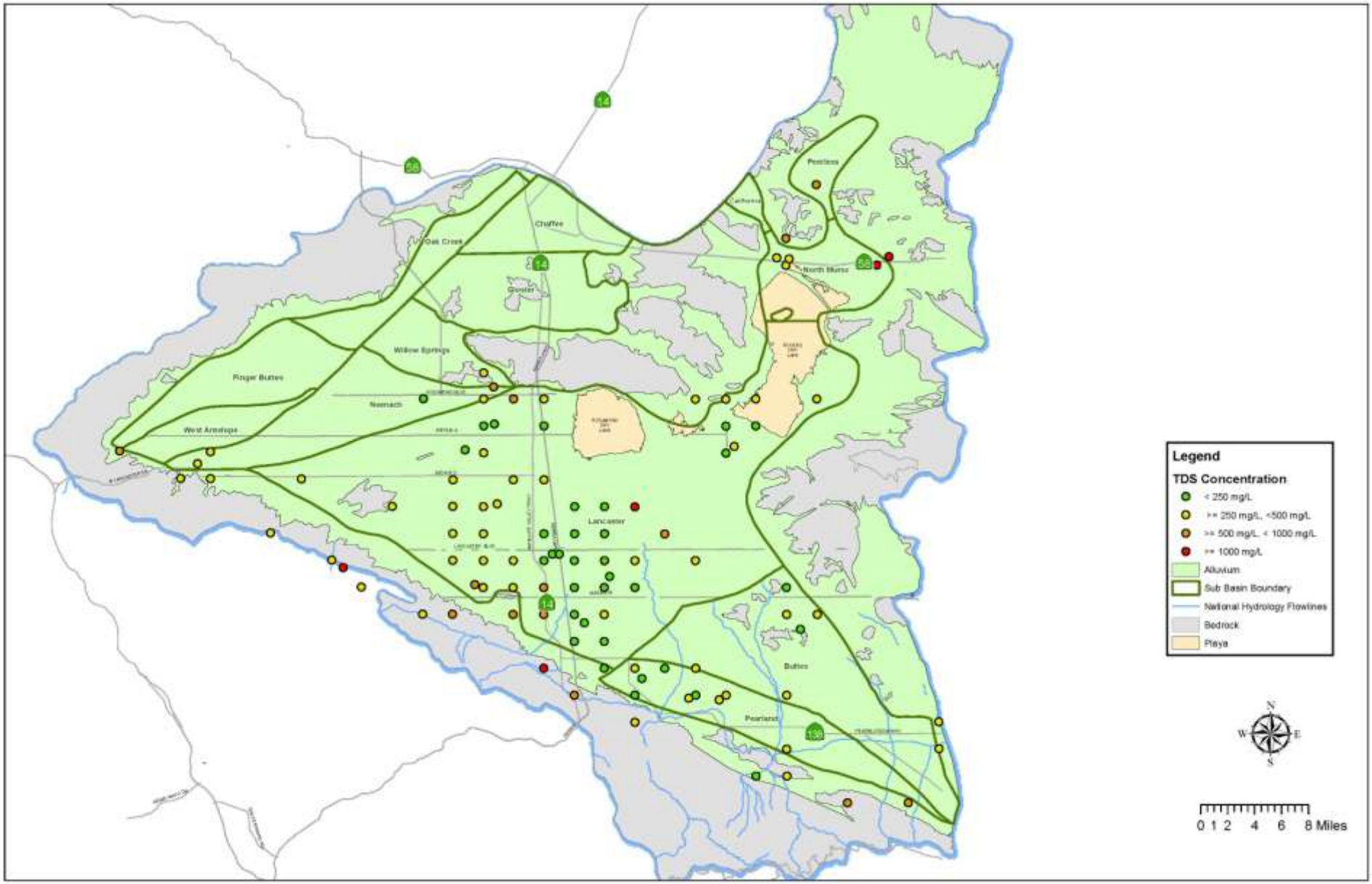


Figure 3-9: Antelope Valley Groundwater Basin 2001-2010 Mean Nitrate Concentrations (GAMA)

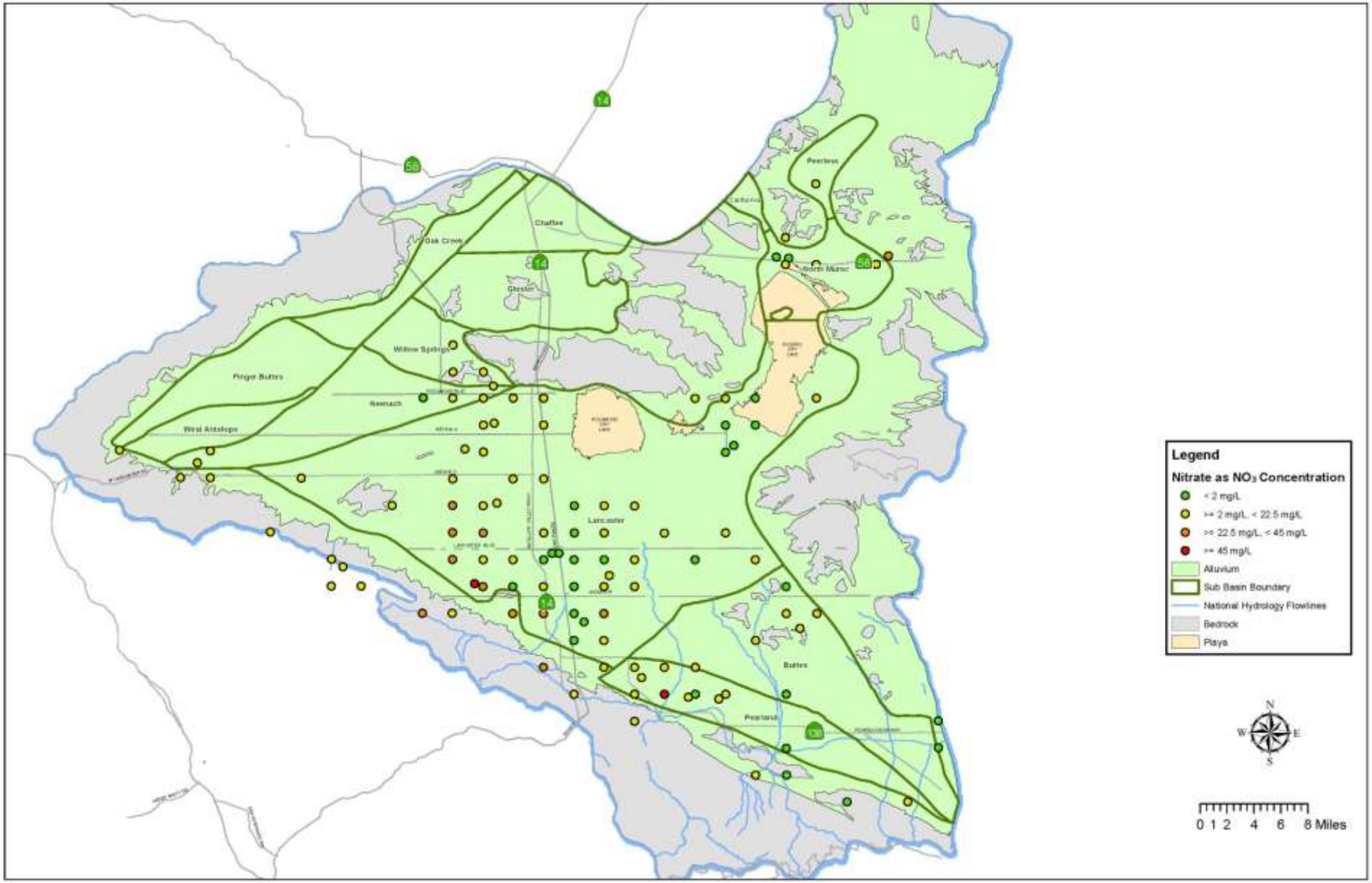


Figure 3-10: Antelope Valley Groundwater Basin 2001-2010 Mean Nitrite Concentrations (GAMA)

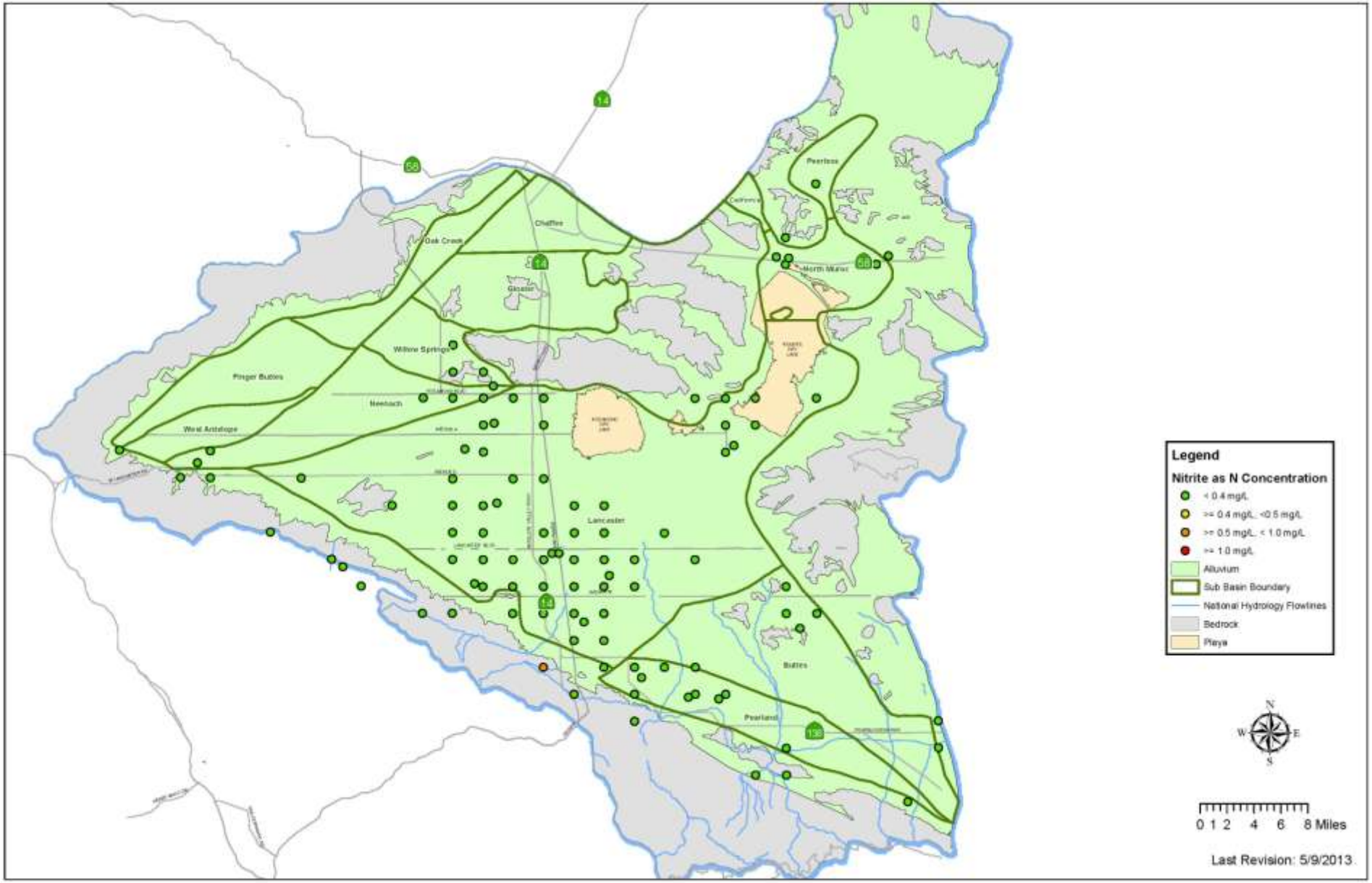


Figure 3-11: Antelope Valley Groundwater Basin 2001-2010 Mean Chloride Concentrations (GAMA)

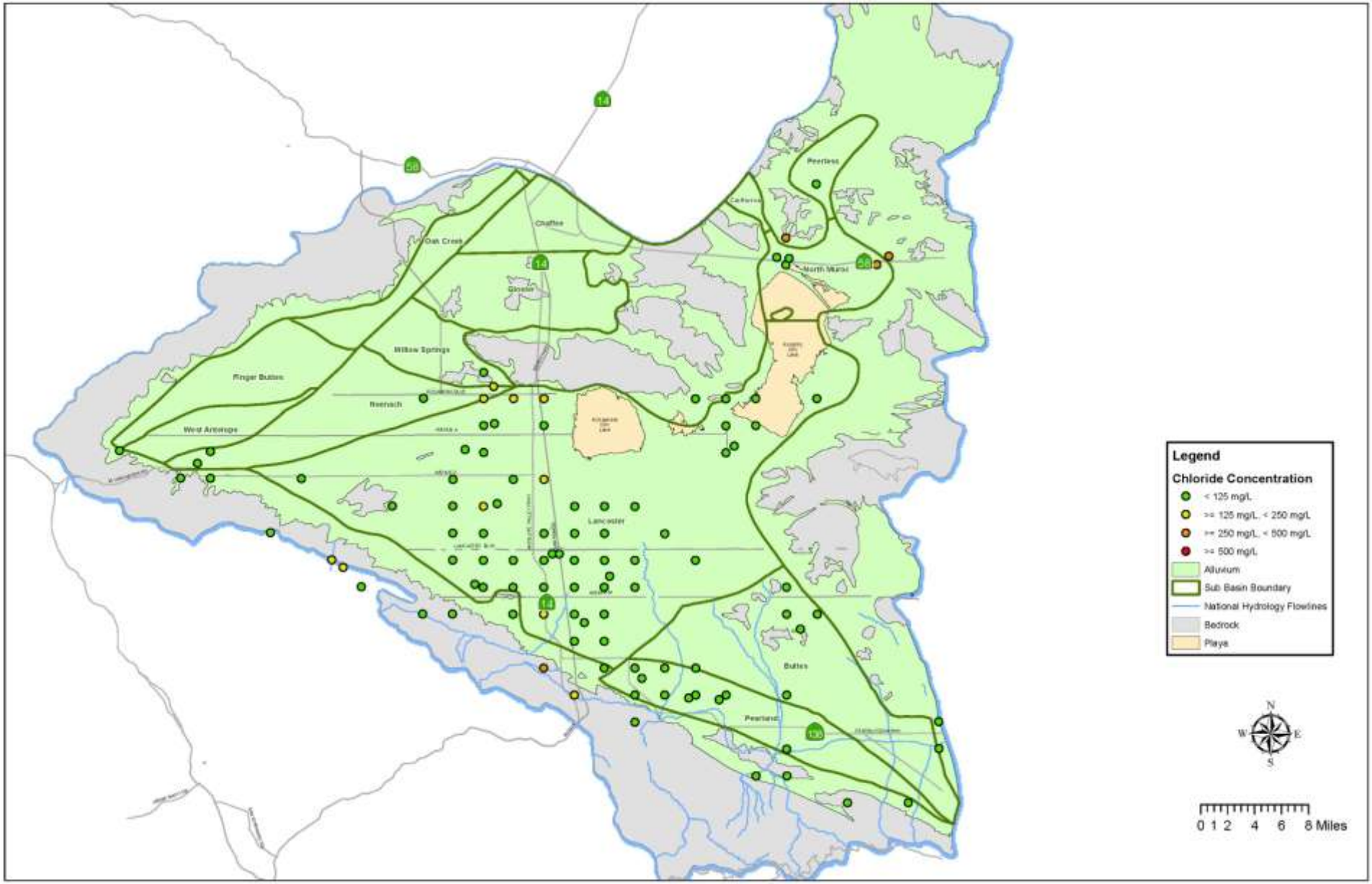


Figure 3-12: Antelope Valley Groundwater Basin 2001-2010 Mean Arsenic Concentrations (GAMA)

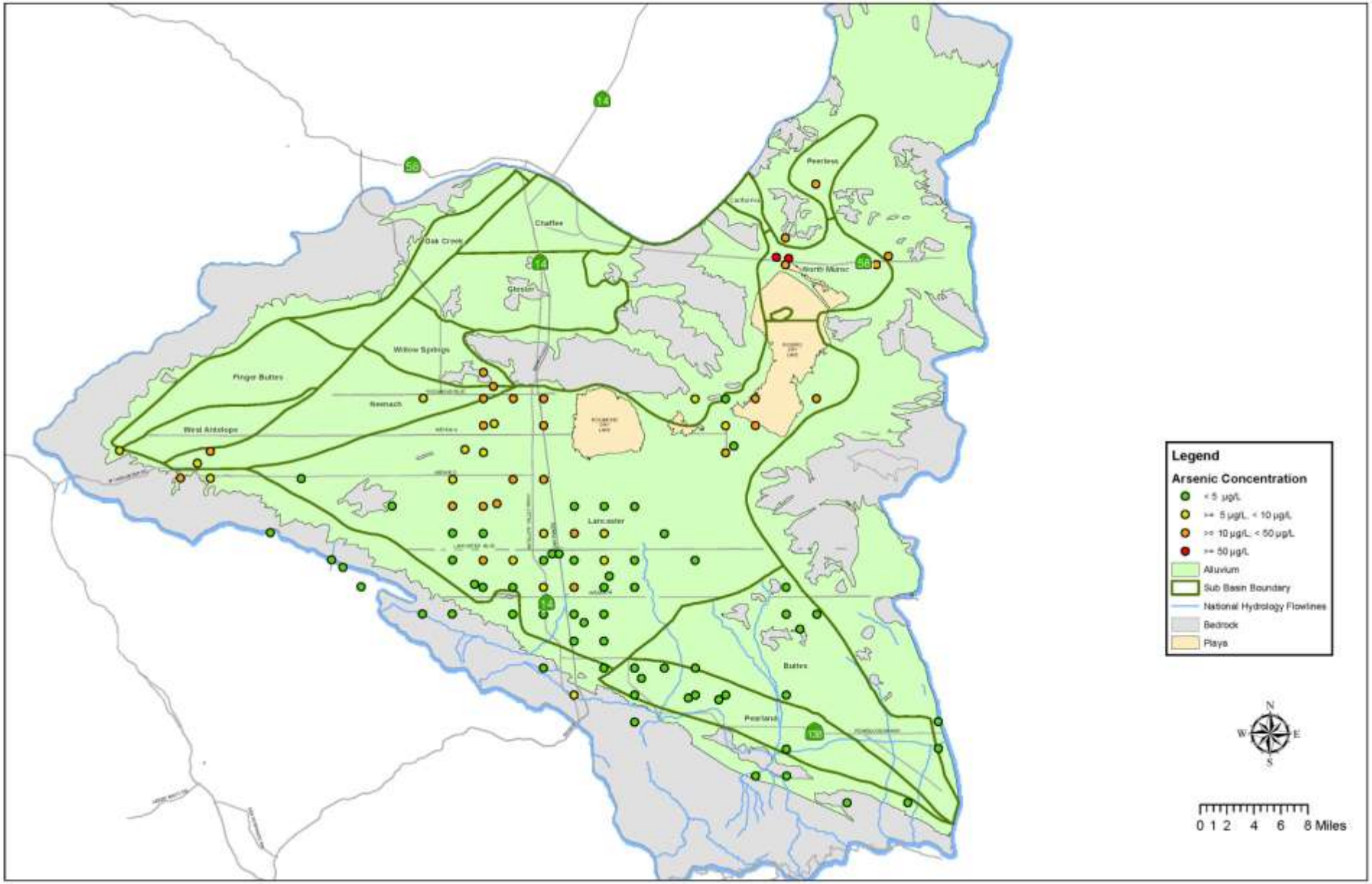


Figure 3-13: Antelope Valley Groundwater Basin 2001-2010 Mean Chromium Concentrations (GAMA)

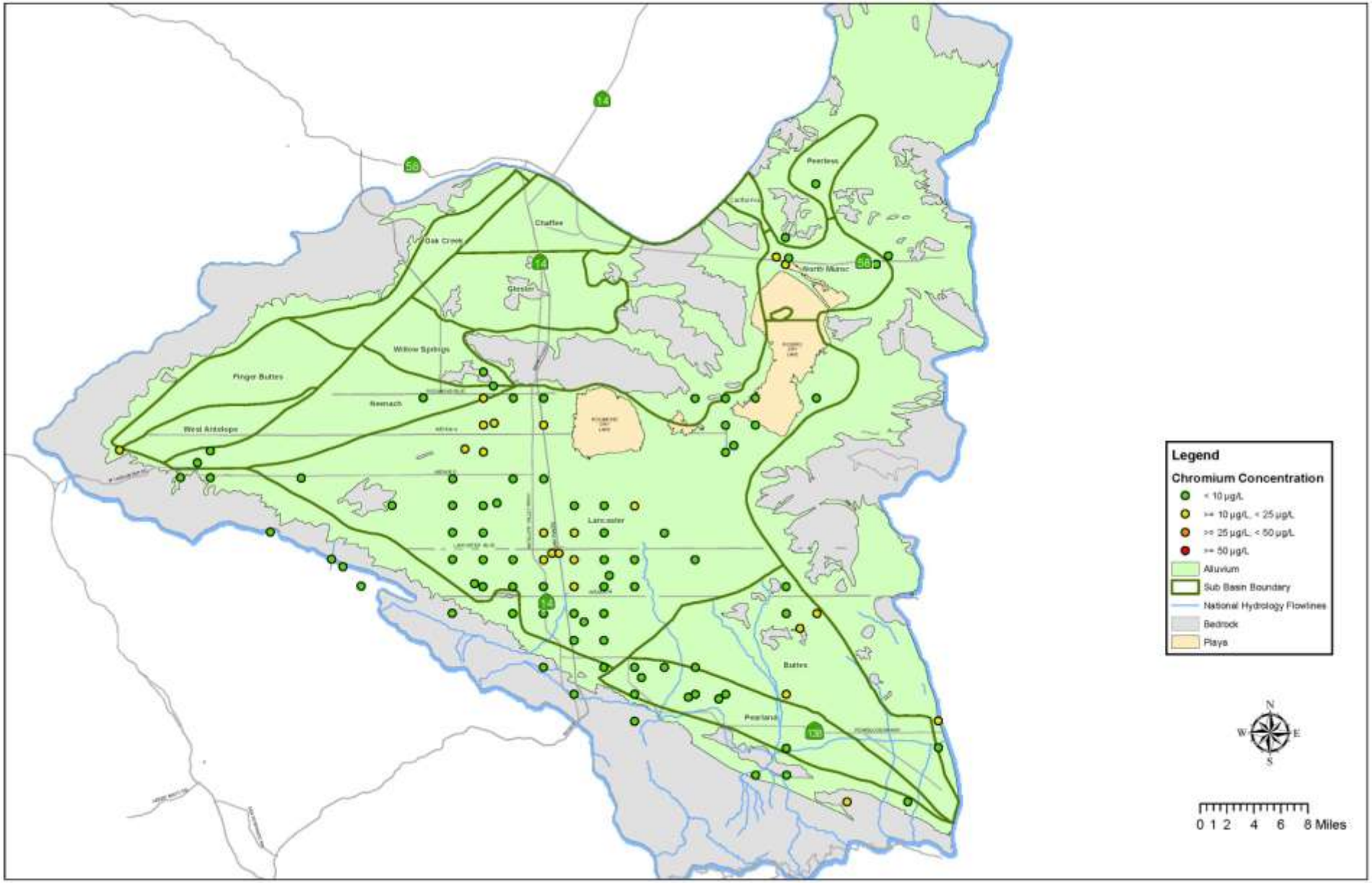


Figure 3-14: Antelope Valley Groundwater Basin 2001-2010 Mean Fluoride Concentrations (GAMA)

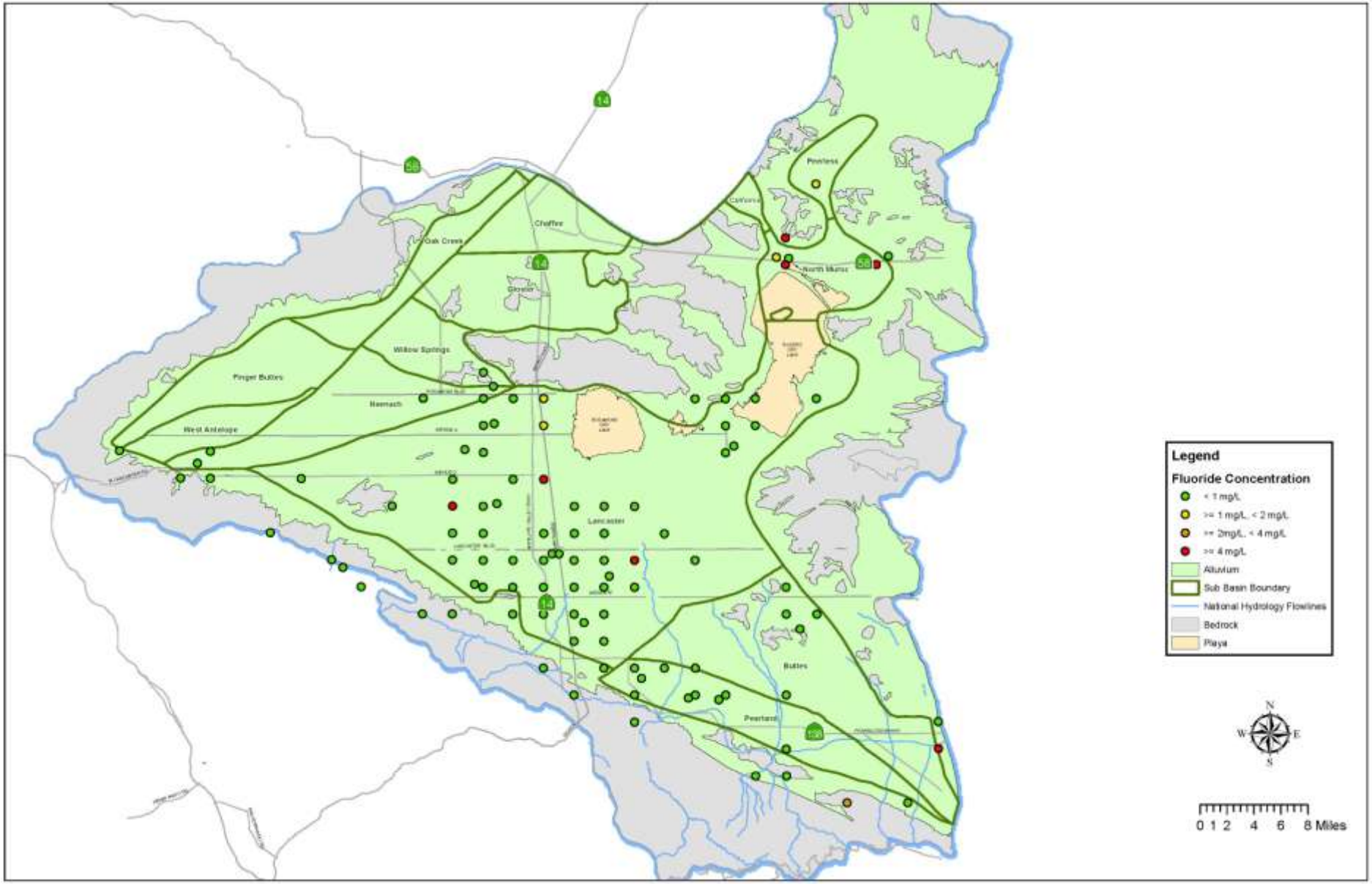
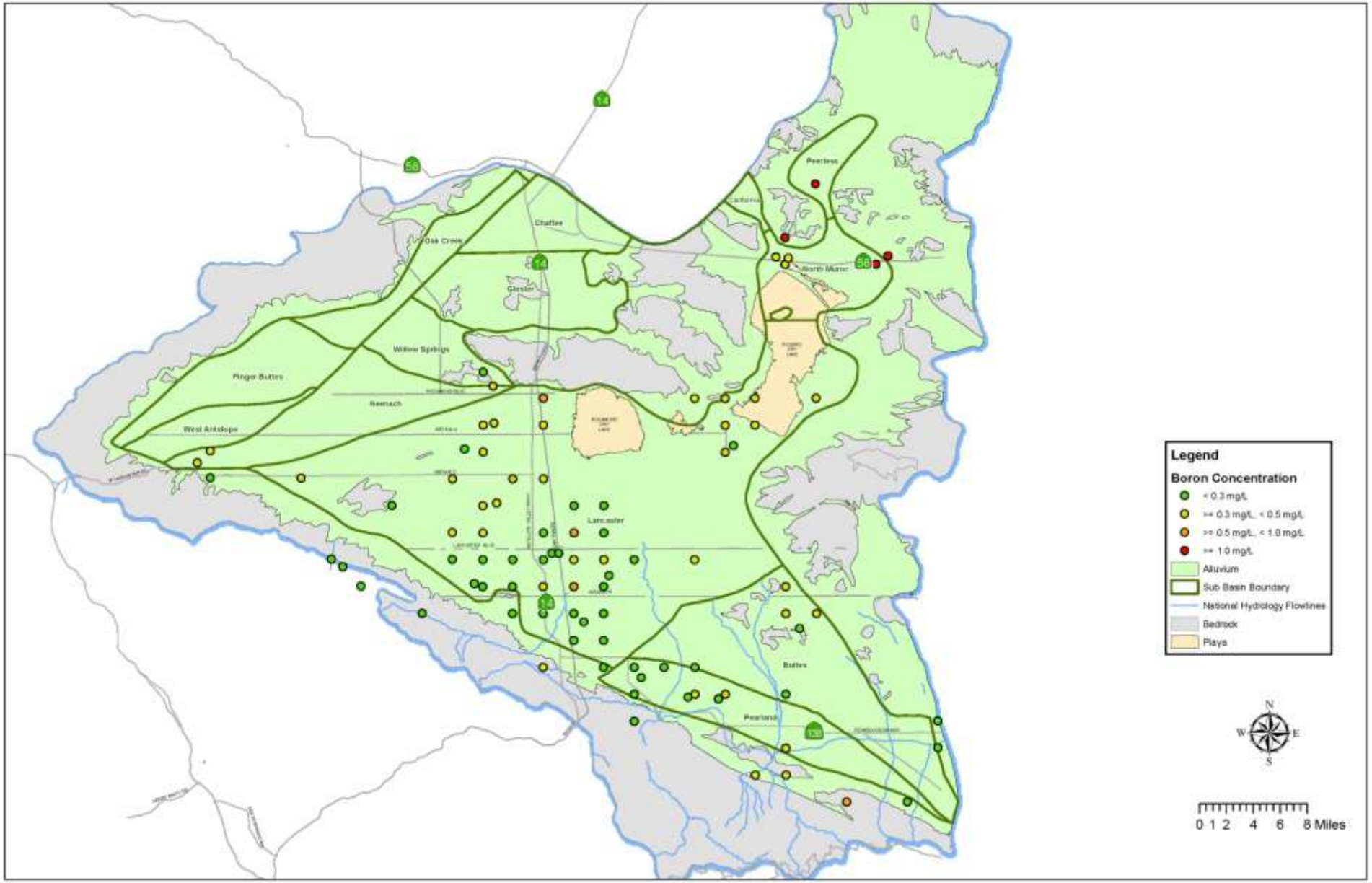


Figure 3-15: Antelope Valley Groundwater Basin 2001-2010 Mean Boron Concentrations (GAMA)



3.3 Current Salt and Nutrient Characterization of the Groundwater Basin

To determine the existing or current water quality in the groundwater basin, the Recycled Water Policy suggests using the average concentration of a particular constituent measured in the most recent 5-year period. At the completion of this plan, the current water quality is assumed to be equivalent to the baseline (2001-2010 mean) water quality. Figure 3-16 depicts the locations of existing groundwater wells that are representative of the baseline water quality of the basin and will be used for water quality comparisons in the future.

GeoTracker GAMA water quality was used for establishing the baseline water quality and will continue to be the water quality data source due to the reluctance of private well owners to share their groundwater well information. Many well owners have serious concerns regarding privacy issues, although assurances could be made that the well information would remain anonymous and used solely for the purpose of baseline water quality determinations. The stakeholder group determined that it would be more practical to use water quality information from publicly available databases.

The following agencies within Antelope Valley basin area provided water quality data: Sanitation Districts of Los Angeles County, Los Angeles County Waterworks District No. 40, Rosamond Community Services District, Palmdale Water District, Antelope Valley-East Kern Water Agency, Quartz Hill Water District, Edwards Air Force Base, City of Palmdale, and City of Lancaster. Most wells are located in the Lancaster sub-basin, while others are located in the Pearland and Buttes sub-basins.

The water quality provided by the participating agencies will be used to determine GeoTracker GAMA Well IDs which will facilitate future water quality information gathering.

3.4 Salt and Nutrient Characterization of the Source Water

Imported and surface water used for potable supply may undergo treatment at one of the region's four water treatment plants. Recycled water may originate from five different wastewater treatment plants in the Antelope Valley. provides source water quality information for the potential constituents of concern identified. Along with water quantity projections, this information was used in determining the basin's salt/nutrient loadings for the 25-year projection period.

Figure 3-16: Project and Monitoring Well Locations

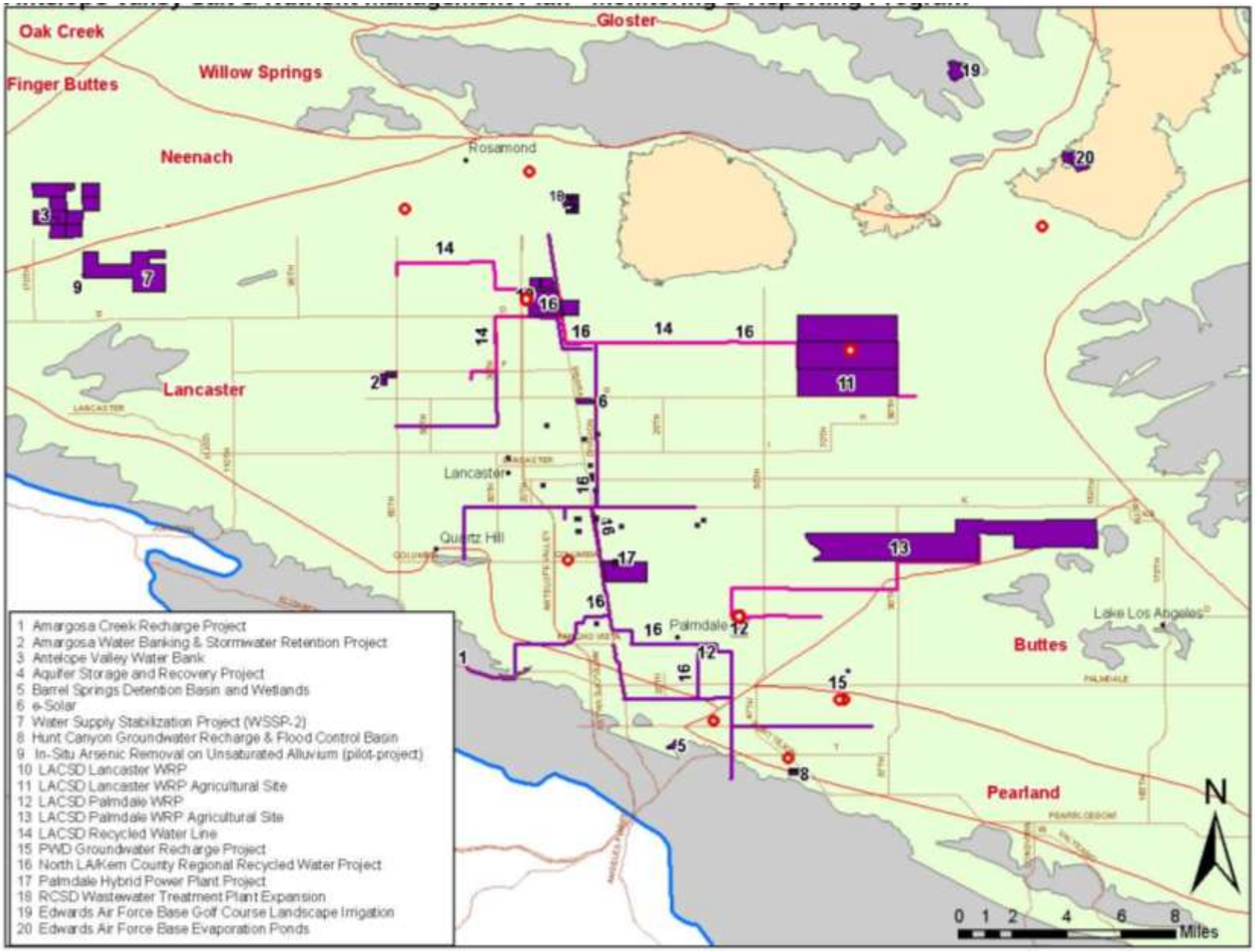


Table 3-3: Source Water Quality

Constituent	Average Concentration (mg/L)										
	Imported Water					Recycled Water					Stormwater
	Raw	Treated									
	California Aqueduct [a]	Acton Plant [a]	Eastside Plant [a]	Quartz Hill Plant [a]	Rosamond Plant [b]	LACSD 20 Palmdale WRP [c]	LACSD 14 Lancaster WRP [d]	EAFB AFRL WWTP [e]	EAFB Main Base WWTP [f]	RCSD WTP [g]	Littlerock Reservior [h]
Total Dissolved Solids	300	274	284	293	290	463	472	430	815		152
Nitrate - N	0.90	0.90	0.97	0.91	0.92	2.41	8.41	3.3	16	6	0.08
Nitrite - N [i]	ND	ND	ND	ND	ND	0.17	0.041	.	.		ND
Nitrate+Nitrite - N	1.0	0.8	1.0	1.0	1.0	.	.	.	.		0.02
Chloride	85	83	83	86	84	149	121	50	330		3.7
Fluoride	0.1	0.1	0.1	0.1	0.1	.	.	.	0.36		0.3
Arsenic [j]	0.0038	0.0014	0.0012	0.0012	0.0012	ND	.	0.0072	0.0023		ND
Boron [k]	0.162	0.240	0.180	0.170	0.160	.	.	0.25	0.67		ND
Chromium [l]	ND	ND	ND	ND	ND	.	.	ND	ND		ND

(a) Antelope Valley-East Kern Water Agency Annual Water Quality Report (2001-2010) - Los Angeles County System
(b) Antelope Valley-East Kern Water Agency Annual Water Quality Report (2001-2010) - Kern County System
(c) Average 2012 water quality for tertiary treatment at LACSD 20 Plamdale WRP
(d) Average Aug-Dec 2012 water quality for tertiary treatment at LACSD 14 Lancaster WRP
(e) EAFB Air Force Research Laboratory (AFRL) secondary wastewater treatment plant 2011 Annual Monitoring Report
(f) 2012 Annual Report EAFB Main Base Wastewater Treatment Facility (WDID 6B150700001)
(g) Rosamond Community Services District Wastewater Treatment Plant (Average in May 2013). The rest of the constituents will be tested after receiving permit from the RWQCB.
(h) Palmdale Water District provided Littlerock Reservior water quality data to be used as stormwater water quality (2001-2010)
(i) Detection limit = 0.4 mg/L
(j) Detection limit for LACSD WRP is 0.001 mg/L. Detection limit for Littlerock Reservior is 0.002 mg/L.
(k) Value is from 2009 AVEK Annual Water Quality Report. Concentrations are not available any other year during the 2001-2010 period. There is no drinking water standard for boron.
(l) Detection limit = 0.01 mg/L

3.5 Current and Future Projects

To assess salt and nutrient impacts in the Antelope Valley, current and future projects having the potential to significantly contribute to salt and/or nutrient impacts to the Antelope Valley Groundwater Basin were identified. Table 3-4 includes a list and summarizes details of these projects, which are also described below. Initially, projects having the potential to impact the salt and nutrient content of Antelope Valley Groundwater Basin were identified from the projects listed in the 2007 AVIRWMP. The SNMP stakeholder group added and deleted projects to and from the project list, as necessary and as a result of meeting discussions. Deletion of a project from the list could be due to its projected implementation date being beyond the SNMP's future planning period (2010-2035), was not considered to have the potential to impact the basin with respect to salts and/or nutrients, or other reason deemed not applicable to the SNMP. At the time of development of this SNMP, some projects were in the early stages of development, such as the concept phase, and were not included due to insufficient information to assess impact. Inclusion of additional projects in future updates to the SNMP necessitates evaluation of project details for relevance, such as those listed in the SNMP "*Project Identification Form*" (see Appendix E).

Figure 3-17 is a map showing the locations of the identified current and future projects within each sub-basin.

3.5.1 Project Summary Descriptions

1. *Amargosa Creek Recharge Project*
   Proposed by the City of Palmdale, this project consists of multiple proposed improvements (overall project is the Upper Amargosa Creek Flood Control, Recharge, and Habitat Restoration Project), one of which includes expanding the size and capacity of spreading grounds to increase the natural recharge of the underlying aquifer. The recharge component includes the construction of eight basins (six "off-channel" and two "in-channel") to recharge groundwater within an area of about 20 acres along Amargosa Creek. The project will use two sources of water to recharge the underlying aquifer: 1) untreated SWP water and 2) stormwater runoff from the Amargosa Creek Watershed. It is anticipated the project would recharge 14,600 to 53,600 acre-feet per year (AFY) of SWP water depending on available supply, with an average of approximately 24,300 AFY. It is anticipated the project will capture and recharge approximately 400 AFY of stormwater, depending on annual precipitation and rainfall patterns. (City of Palmdale, 2011)

2. *Antelope Valley Water Bank*
   At full build-out, this water banking project will provide up to 500,000 acre-feet of storage of imported water in the Neenach sub-basin and the ability to recharge and recover up to 100,000 AFY of water for later use when needed. The project is owned and operated by the Valley Mutual Water Company (Valley Mutual). Valley Mutual operates the bank within the structure of the Semitropic-Rosamond Water Bank Authority (SRWBA), a Joint Powers Authority (JPA) formed by Semitropic Water Storage District (Semitropic), Rosamond Community Services District (RCSD) and Valley Mutual. The project recharges water from the East Branch of the California Aqueduct, which is part of the SWP, into storage using recharge basins and will use new and existing wells to recover water for delivery into local (Antelope Valley East Kern Water Agency (AVEK) West Feeder) and regional conveyances (returning recovered water back to the California Aqueduct). The project is being constructed in phases; the first phase was completed in 2008 (NWRI, 2011). The Antelope Valley Water Bank currently has 320 acres of operational percolation pond capacity.

3. *Apollo Community Regional Park (Apollo Park)*
   Disinfected tertiary recycled water produced by the County Sanitation District No. 14 of Los Angeles County (LACSD 14) at its Lancaster Water Reclamation Plant (WRP) is conveyed to Apollo Park where it is used to maintain a series of polyethylene-lined recreational impoundments, or lakes. Los Angeles County Department of Parks and Recreation operate the lakes as a fishing and boating facility that is open to the public (swimming is prohibited). Water from the lakes is used for landscape irrigation within the park. Deliveries of recycled water to Apollo Park began in 1972 after the construction of tertiary wastewater treatment and effluent conveyance facilities. (LACSD, 2004)

4. *Edwards Air Force Base (EAFB) Air Force Research Laboratory Treatment Plant*
   It is a secondary wastewater treatment plant and all of the effluent is discharged to the evaporations ponds at the EAFB.

5. *EAFB Evaporation Ponds*
   The evaporation ponds receive effluent from the EAFB Main Base WWTP when the excess amount of effluent cannot be used for irrigation or when the irrigation demand is low.

6. *EAFB Landscape Irrigation*
   The golf course is the largest user of recycled water at the EAFB. It receives the tertiary effluent from the EAFB Main Base WWTP as irrigation water during warmer months of the year.

7. *EAFB Main Base Wastewater Treatment Plant*
   The EAFB Main Base WWTP discharges treated domestic wastewater. The facility collects, treats and disposes of a design 24-hour daily average flow of 2.5 million gallons per day (mgd) and a design peak daily flow of 4.0 mgd from the housing, main base, north base and south base areas. The facility is designed to produce tertiary treated effluent and has the capacity to hold up to 3,000 gallons per day of seepage.

8. *e-Solar Sierra SunTower Power Plant*
   Located in the City of Lancaster, the e-Solar Power Plant is a pilot project that includes power generation by concentrated solar thermal power. The project currently uses potable water supplies and discharges waste to on-site evaporation ponds. In the future, it is proposed that the project will use recycled water from LACSD 14's Lancaster WRP.

9. *Lancaster WRP Upgrade and Expansion*
   The Lancaster WRP is owned and operated by LACSD 14 and has recently undergone upgrades and expansion. The major components of the project are upgraded wastewater treatment facilities, recycled water management facilities, and municipal reuse. Wastewater treatment processes were upgraded in 2012 from secondary oxidation ponds to activated sludge and nitrification-denitrification treatment with filtration and disinfection to meet tertiary recycled water requirements prescribed in CDPH's Title 22.

10. *Lancaster WRP Eastern Agricultural Site*
    LACSD 14 has acquired land for agricultural operations using recycled water produced by the Lancaster WRP. Per Regional Board requirements, recycled water is applied to the crops at agronomic rates, based on the needs of the crop plant, with respect to water and nitrogen. The intention is to minimize deep percolation from the root zone to the groundwater table of the applied recycled water.

11. *North Los Angeles/Kern County Regional Recycled Water Project*
    The Los Angeles/Kern County Regional Recycled Water Project (also referred to as the "AV Recycled Water Project") is the backbone for a regional recycled water system in the Antelope Valley. The proposed system is sized for capacity to distribute recycled water throughout the service area and also deliver recycled water for recharge areas. Components of the system include: recycled water supply, a main pump station, booster pump stations, storage reservoirs, and distribution system. The construction of the recycled water supply system would be phased over time. Recycled water users would include municipal medians, agriculture, commercial, golf courses, school yards, and parks as allowed by California Department of Public Health (CDPH), Division 4, Title 22 (Title 22). (IRWMP, 2007)

12. *Palmdale Hybrid Power Plant Project*
    This project involves the construction of a 570 mega-watt (MW) electricity generating facility. The power plant will be a hybrid design, utilizing natural gas combined cycle technology and solar thermal technology. The power plant is projected to use approximately 3,200 AFY of recycled water and discharge waste to on-site evaporation ponds. (IRWMP, 2007)

13. *Palmdale Water District Groundwater Recharge*
    This project would involve groundwater recharge using a blend of recycled water with treated imported water. (IRWMP, 2007)

14. *Palmdale WRP Upgrade and Expansion*
    The Palmdale WRP is owned and operated by the County Sanitation District No. 20 of Los Angeles County (LACSD 20) and has recently undergone upgrades and expansion. The major components of the project are upgraded wastewater treatment facilities, recycled water management facilities, and municipal reuse. Wastewater treatment processes were upgraded in 2011 from secondary oxidation ponds to activated sludge and nitrification-denitrification treatment with filtration and disinfection to meet tertiary recycled water requirements prescribed in CDPH's Title 22.

15. *Palmdale WRP Agricultural Site*
    Currently, LACSD leases land from Los Angeles World Airports (LAWA) for agricultural operations using recycled water produced by the Palmdale WRP. LACSD 20 has acquired additional land further east for future agricultural operations and the property is not currently using recycled water. However, recycled water storage reservoirs and conveyance facilities have been constructed and implemented. As with the Lancaster WRP Eastern Agricultural Site, the Regional Board requires that recycled water is applied to the crops at agronomic rates, with respect to water and nitrogen, to minimize deep percolation from the root zone to the groundwater table of the applied recycled water.

16. *Piute Ponds*
    Recycled water produced by LACSD 14 at its Lancaster Water Reclamation Plant (WRP) is conveyed to Piute Ponds where it is used to maintain a marsh-type habitat and wildlife resources at Piute Ponds, located on EAFB property. Piute Ponds was created when a dike was built in 1961 across Amargosa Creek along Avenue C for the purpose of impounding Lancaster WRP secondary treatment oxidation pond effluent and preventing overflow onto Rosamond Dry Lake, also located on EAFB. In 1991, Ducks Unlimited and EAFB built a series of shallow impoundments just south of Piute Ponds for recreational duck hunting. In late 2012, Piute Ponds began to receive tertiary recycled water from the upgraded Lancaster WRP.

17. *Rosamond Community Services District Wastewater Treatment Plant Expansion*
    Rosamond Wastewater Treatment Plant (WWTP), located in the City of Rosamond, is owned and operated by RCSD. Rosamond WWTP, which has a treatment capacity of 1.3 mgd, disinfects to secondary standards for landscape irrigation on-site. RCSD planned to increase the capacity to 1.8 mgd in 2006 through the addition of 0.5 mgd tertiary treatment facility. The tertiary treatment facility will then be upgraded to 1.0 mgd in 2010. Design for the proposed treatment plant improvements is complete and has been approved by the State of California. Construction was delayed due to lack of funding. (IRWMP, 2007)

18. *RCSD WWTP Evaporation Ponds*

19. *RCSD WWTP Recycled Water Use*
    The wastewater treatment plant expansion will provide tertiary treated recycled water for landscape irrigation at median strips, parks, schools, senior complexes and new home developments.

20. *Water Supply Stabilization Project (WSSP-2)*
    Imported water stabilization program that utilizes SWP water delivered to the Antelope Valley Region's west side for groundwater recharge during wet years for supplemental supply required during summer peaking demand and anticipated dry years. This project includes facilities necessary for the delivery of untreated water for direct recharge (percolation basins) and for wells and pipeline for raw water and treated water conveyance. This project may also be used for indirect (in-lieu) recharge. (IRWMP, 2007)
    water and treated water conveyance. (IRWMP, 2007)

Additional projects that were considered, but are planned for implementation dates beyond the SNMP planning horizon (2035) include:

- *Barrel Springs Detention Basin and Wetlands*
  Proposed by the City of Palmdale, this project will provide flood control for the City of Palmdale and provide for wetland enhancement and habitat protection. The project Includes the construction of an 878 AF detention basin in the Barrell Springs area. (IRWMP, 2007)

- *City of Lancaster Amargosa Water Banking and Stormwater Retention Project*
  This project would recharge a blend of recycled water from the Lancaster WRP with stormwater and/or treated imported water at a 100-acre stormwater basin in the City of Lancaster. The pilot project would allow of extraction of 2,500 AFY. Ultimately, this recharge project would recharge 50,000 AFY of blend water, consisting of 40,000 AFY of imported water and 10,000 AFY of recycled water. The baseline project would extract an average of 48,000 AFY of recharged water via a new well field and deliver the water to wholesaler/retailer distribution system(s) and private agricultural users. (IRWMP, 2007)

- *Hunt Canyon Groundwater Recharge & Flood Control Basin*
  Proposed by the Palmdale Water District, this project entails construction of a new 3,000 AF detention/recharge basin. The basin would be used to store raw aqueduct water to allow recharge into the aquifer and would act as a detention basin during severe storms. (IRWMP, 2007)

3.5.2 Project Water Volume Projections

Table 3-5 shows the water volume projections, associated with current and future projects, for the planning period (the next 25 year, 2010-2035). This planning period matches the projection

timeline for the 2010 Integrated Regional Urban Water Management Plan for the Antelope Valley (LACWD, June 2011). These projections will allow the stakeholder group to analyze the salt and nutrient impacts the projects may have on the basin.

Table 3-4: Current and Future Projects With the Potential to Contribute to Salt/Nutrient Impacts

	Project Name	Project Type	Sub-Basin	Type of Water	Projected Implementation Date
1	Amargosa Creek Recharge Project	Groundwater Recharge	[2]	imported / stormwater	2015
2	Antelope Valley Water Bank	Groundwater Banking	Neenach	imported	implemented
3	Apollo Community Regional Park	Recreational Impoundments/Landscape Irrigation	Lancaster	recycled	implemented
4	EAFB AFRL Treatment Plant	Wastewater Treatment Plant – recycled water production		recycled	implemented
5	EAFB Evaporation Ponds	Evaporation Ponds/ RW Management	Lancaster	recycled	implemented
6	EAFB Golf Course Landscape Irrigation	Landscape Irrigation	[1]	recycled	implemented
7	EAFB Main Base Treatment Plant	Wastewater Treatment Plant – recycled water production		recycled	implemented
8	eSolar Sierra SunTower Power Plant	Evaporation Ponds/ RW Management	Lancaster	recycled	2015
9	Lancaster Water Reclamation Plant	Wastewater Treatment Plant – recycled water production	Lancaster	recycled	implemented (2012)
10	Lancaster WRP Eastern Agricultural Site	Agricultural Irrigation	Lancaster	recycled	implemented
11	North LA/Kern County Regional Recycled Water Project	M&I Reuse, including Landscape Irrigation	Lancaster/Buttes/ Pearland	recycled	2009-2020
12	Palmdale Hybrid Power Plant Project	Evaporation Ponds	Lancaster	recycled	2015
13	Palmdale Water District Groundwater Recharge	Groundwater Recharge	Buttes	recycled / imported	2015
14	Palmdale Water Reclamation Plant	Wastewater Treatment Plant – recycled water production	Lancaster	recycled	implemented (2011)
15	Palmdale WRP Agricultural Site	Agricultural Irrigation	Lancaster/Buttes	recycled	implemented
16	Piute Ponds	Recreational Impoundments/Environmental Maintenance	Lancaster	recycled	implemented
17	RCSD Wastewater Treatment Plant Expansion	Wastewater Treatment Plant – recycled water production	Lancaster	recycled	2012
18	RCSD WTP Evaporation Ponds	Evaporation Ponds/ RW Management	Lancaster	recycled	implemented
19	RCSD WTP Recycled Water Use	M&I Reuse, including Landscape Irrigation	Lancaster	recycled	2015
20	Water Supply Stabilization Project (WSSP-2 Project)	Groundwater Banking	Lancaster	imported	implemented (2012)

[1] Located above bedrock
[2] Located outside, but upstream of the Lancaster sub-basin

Figure 3-17: Current and Future Projects Map

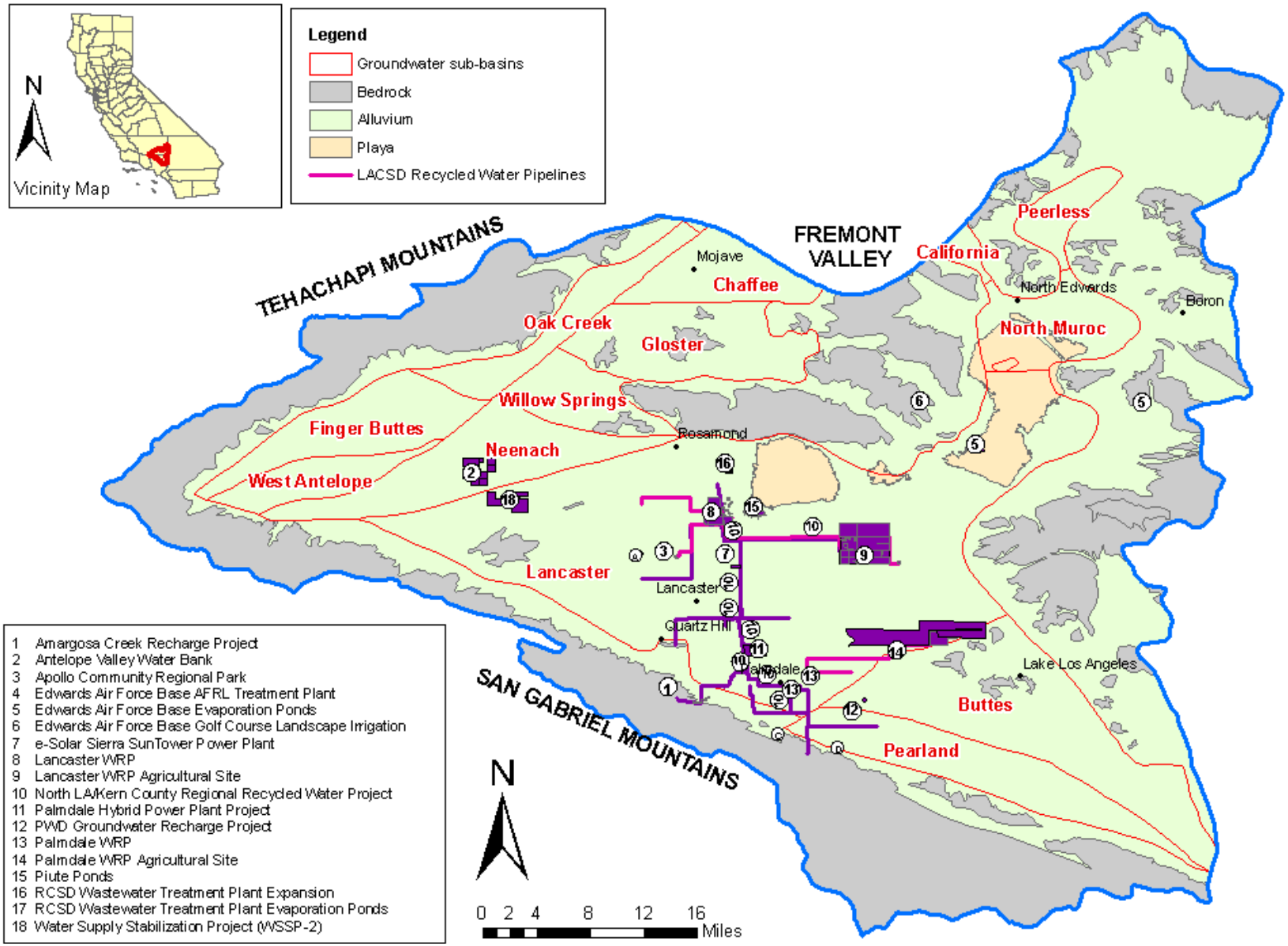


Table 3-5: Water Volume Projections for Current and Future Projects

Projects	Source of Water	Expected Implementation Date	Water Volume Projection (AFY)					
			2010	2015	2020	2025	2030	2035
Treatment Plants								
EAFB AFRL Treatment Plant (secondary)[a]	Recycled	Implemented	37	37	37	37	37	37
EAFB Main Base Wastewater Treatment Plant (tertiary)[b]	Recycled	Implemented	448	448	448	448	448	448
Lancaster WRP Expansion	Recycled	Implemented 2012	-	20,000	22,000	24,000	26,000	28,000
Palmdale WRP Expansion	Recycled	Implemented 2012	-	15,000	16,500	18,000	19,500	21,000
RCSD WTP Expansion	Recycled	Implemented 2012	560	560	560	560	560	560
Reuse								
Apollo Community Regional Park	Recycled	Implemented	250	250	250	250	250	250
EAFB Golf Course Landscape Irrigation	Recycled	Implemented	336	336	336	336	336	336
Lancaster WRP Eastern Agricultural Site[c]	Recycled	Implemented	1,100	9,500	10,500	11,500	12,500	13,500
North LA/Kern County Regional Recycled Water Project	Recycled	2015	-	7,121	8,673	10,225	11,777	13,330
Palmdale WRP Agricultural Site[d]	Recycled	Implemented	8,500	9,500	10,500	11,500	12,500	13,500
Piute Ponds	Recycled	Implemented	5,000	5,000	5,000	5,000	5,000	5,000
RCSD WTP Recycled Water Use[e]	Recycled	2015	-	-	100	100	100	100
Evaporation/Export								
EAFB Evaporation Ponds	Recycled	Implemented	149	149	149	149	149	149
eSolar Power Plant	Recycled	2015	-	80	80	80	80	80
Palmdale Hybrid Power Plant Project	Recycled	2015	-	3,400	3,400	3,400	3,400	3,400
RCSD Wastewater Treatment Plant Evaporation Ponds	Recycled	Implemented	560	560	460	460	460	460
Groundwater Recharge/Banking								
Amargosa Creek Recharge Project	Imported	2015	-	25,000	25,000	25,000	25,000	25,000
Antelope Valley Water Bank	Imported	Implemented	1,300	22,000	22,000	22,000	22,000	22,000
PWD Groundwater Recharge Project[f]	Recycled/Imported	2015	-	-	-	-	3,000	6,000
Water Supply Stabilization Project (WSSP-2 Project)	Imported	Implemented	10,000	25,000	25,000	25,000	25,000	25,000

a) All the effluent goes to the EAFB evaporation ponds.
(b) For three months (winter) out of the year, the effluent goes to the EAFB evaporation ponds. The rest of the year, the effluent is used to irrigate the EAFB golf course.
(c) Estimated Flow = (recycled water produced at Lancaster WRP) - (M&I use) - (Apollo Park flow) - (Piute Ponds flow)
(d) Estimated Flow = (recycled water produced at Palmdale WRP) - (M&I use)
(e) Irrigation for various parks and schools
(f) Palmdale Water District Urban Water Management Plan 2010 Table 4-11. Amount of imported and stormwater that will be used for this project will be determined after the feasibility study is conducted.

Section 4: Basin and Antidegradation Analysis

4.1 Water Quality Objectives

Section 13240 of the Porter-Cologne Water Quality Control Act requires each Regional Board to formulate and adopt water quality control plans, or basin plans, and to establish water quality objectives to ensure the reasonable protection of beneficial uses. As described in Section 2.3, beneficial uses for the Antelope Valley Groundwater Basin, as designated in the Lahontan Region Water Quality Control Plan, are municipal and domestic water supply, agricultural supply, industrial service supply, and freshwater replenishment. The Water Quality Objectives (WQO) that apply to groundwater designated as municipal and domestic water supply are based on California Code of Regulations, Title 22 drinking water standards. As such, groundwater shall not contain concentrations of chemical constituents in excess of the Maximum Contaminant Level or Secondary Maximum Contaminant Level. Quantitative WQO for other Antelope Valley Groundwater Basin beneficial uses are not established in the Basin Plan. However, per the California Department of Water Resources' guidelines, two constituents that are commonly considered with regard to agricultural supply are Total Dissolved Solids and Boron. Considering the regulations and recommendations discussed, the stakeholder group set the WQO for constituents associated with salts and nutrients, as shown in Table 4-1 below.

Table 4-1: Water Quality Objectives

Constituent	Units	Water Quality Objective	Reference
Total Dissolved Solids	mg/L	1000	SMCL in 22 CCR 64449
Arsenic	mg/L	0.01	MCL in 22 CCR 64431
Boron	mg/L	1	CA DWR Bulletin 118-03, Ch 6
Chromium, total	mg/L	0.05	MCL in 22 CCR 64431
Chloride	mg/L	500	SMCL in 22 CCR 64431
Fluoride	mg/L	2	MCL in 22 CCR 64431
Nitrate	mg/L as NO_3	45	MCL in 22 CCR 64431
Nitrite	mg/L as N	1	MCL in 22 CCR 64431
Nitrate + Nitrite	mg/L as N	10	MCL in 22 CCR 64431

4.2 Assimilative Capacity

Per the Recycled Water Policy, the assimilative capacity shall be the difference between the Water Quality Objective and the mean concentration of the basin or sub-basin. The constituents' Baseline Assimilative Capacity (BAC) for this SNMP is based on the baseline water quality from

the GeoTrackerGAMA data set for the period from 2001 through 2010. The BAC was established for sub-basins that have planned projects within the planning period and wells that will be monitored per this plan. Baseline water quality and baseline assimilative capacities for the Lancaster, Neenach, and Pearland sub-basins are shown in Table 4-2. Negative numbers indicate that the baseline water quality is already exceeding the WQO and there is no assimilative capacity for that constituent.

4.3 Antidegradation Policy

The state's Antidegradation Policy, SWRCB Resolution No. 68-16, is intended to regulate waters of the state to achieve the highest water quality consistent with the maximum benefit to the people of the state. When the ambient water quality is better than the water quality objective, existing water quality must be maintained, unless conditions are found to satisfy the policy. The policy, along with state and federal water quality laws, find groundwater recharge with recycled water for later extraction as a benefit to the people, but with a potential to degrade water quality within the basin. To satisfy the policy, a project shall utilizes less than 10 percent of the baseline assimilative capacity in the basin/sub-basin and multiple projects, collectively, shall utilize less than 20 percent of the baseline assimilative capacity.

If project source water quality is better than the baseline water quality, the project would not result in the lowering of water quality and no antidegradation analysis will be required. If project source water is of lower quality than the baseline water quality, projects can demonstrate compliance with the Antidegradation Policy by verifying the use of assimilative capacity. The projects listed in Table 3-4 were analyzed using the methods described in section 4.6. Potential impacts of the projects were calculated over a 25-year projection period. In addition, use of assimilative capacity will be verified as part of the Monitoring Plan described in Section 5 of this plan.

Table 4-2: **Baseline Water Quality and Baseline Assimilative Capacities**

			Lancaster Sub-basin		**Neenach Sub-basin**		**Pearland Sub-basin**	
Constituent	**Units**	**Water Quality Objective**	**Baseline Water Quality**	**Baseline Assimilative Capacity**	**Baseline Water Quality**	**Baseline Assimilative Capacity**	**Baseline Water Quality**	**Baseline Assimilative Capacity**
Total Dissolved Solids	mg/L	1000	323	677	501	499	264	736
Arsenic	mg/L	0.01	0.0075	0.0026	0.0118	-0.0018	0.0007	0.0093
Boron	mg/L	1	0.12	0.88	0.19	0.81	0.07	0.93
Chromium, total	mg/L	0.05	0.0061	0.0439	0.0076	0.0424	0.0020	0.0480
Chloride	mg/L	500	37.87	462.13	62.13	437.87	19.27	480.73
Fluoride	mg/L	2	6.29	-4.29	0.55	1.45	0.19	1.81
Nitrate	mg/L as $N0^3$	45	7.15	37.85	10.43	34.57	17.16	27.84
Nitrite	mg/L as N	1	0.0367	0.9633	0.0258	0.9742	0.1245	0.8755
Nitrate + Nitrite	mg/L as N	10	1.62	8.38	2.36	7.64	3.88	6.12

4.4 Source Water Quality

Project source water quality was compared with baseline water quality to determine which constituents to incorporate into the monitoring plan, due to their potential for degrading water quality. If source water constituent concentrations are higher than the baseline water quality, there is an increased likelihood for that constituent concentration in groundwater to increase over the planning period. The constituents that will be incorporated into the monitoring plan due to their potential for degrading water quality are TDS, nitrate, and chloride. These are the same constituents that will be analyzed further in this plan.

shows baseline water quality and source water quality for constituents associated with salts and nutrients for the three sub-basins with projects. The source water data is the mean concentration for the period of 2001 to 2010, unless otherwise indicated in the table footnotes. In comparing project source water quality to baseline water quality, recycled water was found to potentially degrade groundwater due to high concentrations of TDS, Chloride, and Nitrate.

Arsenic was evaluated closely due to its high mean concentration in the California Aqueduct. However, for nine out of the ten years of the baseline period, arsenic was non-detect. The high average is caused by a dry year in which high arsenic groundwater from a water bank was pumped into the California Aqueduct. Although the situation may reoccur, it is not a concern because source water from the California Aqueduct, for use in projects such as recharging, will not be available during dry years and as a result will not have an impact.

Boron and Fluoride were also found in higher concentrations in project source water than in the baseline groundwater quality. However, according to the Department of Water Resources, 1000 µg/L concentration for boron is acceptable for most boron-sensitive crops, leaving plenty of assimilative capacity. shows the maximum constituent concentration for Boron and Fluoride, after accounting for the use of 20 percent assimilative capacity per the Antidegradation Policy. As shown, source water quality does not have potential to exceed the maximum constituent concentrations for these constituents.

Since TDS, chloride and nitrate are the constituents of concern with potential to degrade groundwater quality and exceed Antidegradation Policy allowances, they are the only constituents that were analyzed further for determining each project's salt/nutrient potential impact over the 25-year projection period and for generating the overall basin salt and nutrient mass balances.

4.5 Fate and Transport

4.5.1 Total Dissolved Solids

TDS fate and transport is influenced by groundwater flow which is governed by hydraulic gradients. The general direction can be assumed from groundwater level contours (see Figure 4-1). In the Neenach sub-basin, groundwater flows to the northeast. In the Pearland subbasin, groundwater generally moves from the southeast to northwest. In the Lancaster sub-basin, groundwater flows from areas of natural recharge to the low water altitude areas in the south-central part of the subbasin.

Antelope Valley Basins' TDS levels are well within the SMCL standards. If monitoring reveals a trend of increasing TDS concentration, models will be used to determine appropriate implementation measures. The definition of increasing trend of TDS concentration and trigger for further analysis will be defined by the SNMP stakeholders.

Table 4-3: Source Water Quality

Constituent	Average Concentration (mg/L)													
	Baseline Water Quality			Imported Water					Recycled Water					Storm water
				Raw	Treated									
	Lancaster Subbasin	Neenach Sub-basin	Pearland Sub-basin	CA Aqueduct [a]	Acton Plant [a]	Eastside Plant [a]	Quartz Hill Plant [a]	Rosamond Plant [b]	LACSD 20 Palmdale WRP [c]	LACSD 14 Lancaster WRP [d]	EAFB AFRL WWTP [e]	EAFB Main Base WWTP [f]	RCSD WTP [g]	Littlerock Reservoir [h]
Total Dissolved Solids	323	501	264	300	274	284	293	290	463	472	430	815		152
Nitrate* - N	1.62	2.36	3.88	0.90	0.90	0.97	0.91	0.92	2.41	8.41	3.3	16	6	0.08
Nitrite - N [i]	0.037	0.026	0.125	ND	ND	ND	ND	ND	0.17	0.041	.	.		ND
Nitrate+Nitrite - N	1.62	2.36	3.88	1.0	0.8	1.0	1.0	1.0	.	.	.	.		0.02
Chloride	38	62	19	85	83	83	86	84	149	121	50	330		3.7
Fluoride	6	1	0	0.1	0.1	0.1	0.1	0.1	.	.	.	0.36		0.3
Arsenic [j]	0.0075	0.0118	0.0007	0.0038	0.0014	0.0012	0.0012	0.0012	ND	.	0.0072	0.0023		ND
Boron [k]	0.12	0.19	0.07	0.162	0.240	0.180	0.170	0.160	.	.	0.25	0.67		ND
Chromium [l]	0.0061	0.0076	0.002	ND	ND	ND	ND	ND	.	.	ND	ND		ND

*Convert nitrate as NO3 to nitrate as N: molecular weight of NO_3 = 62, atomic weight of N = 14, 62/14=4.42

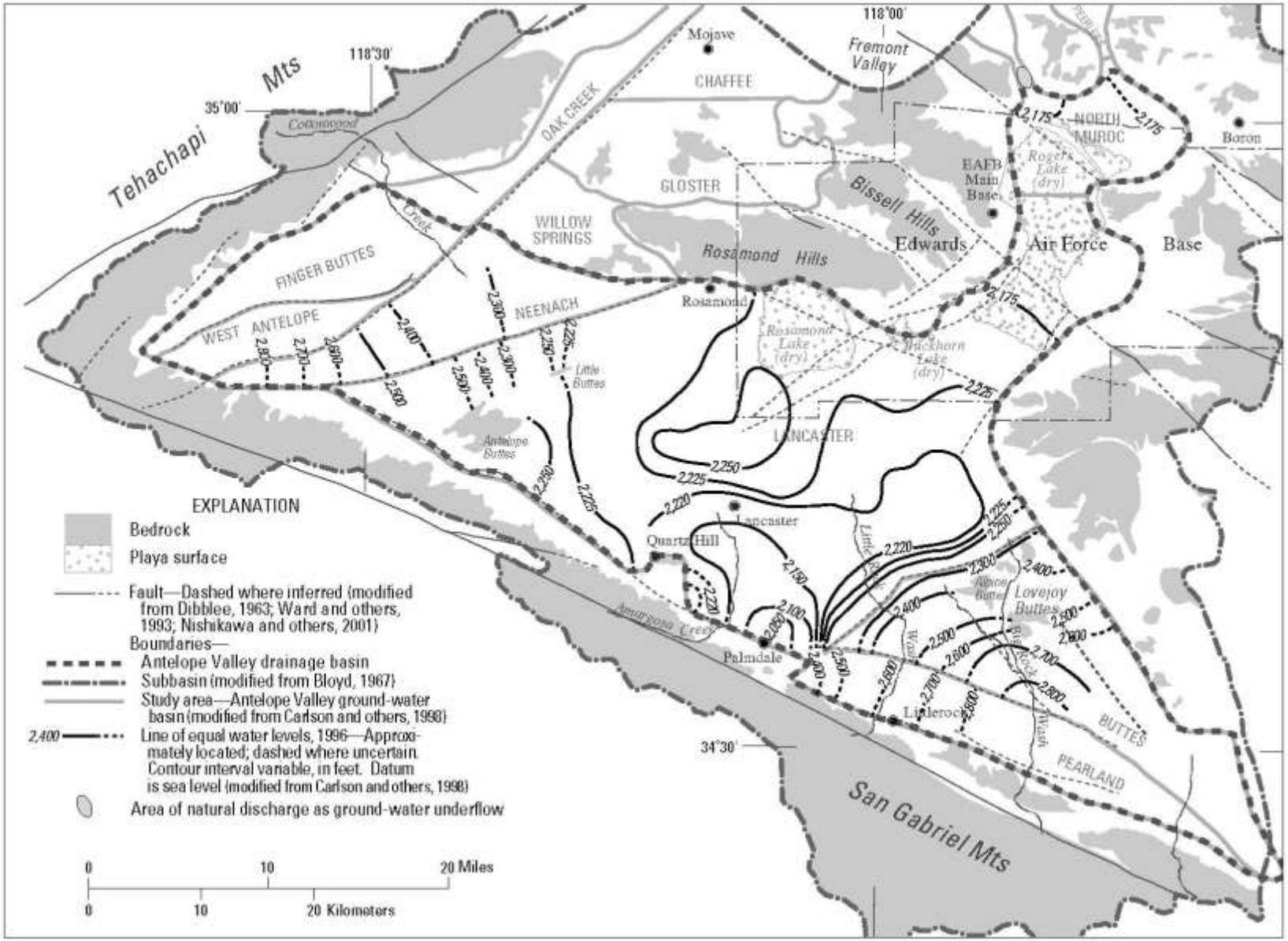
(a) Antelope Valley-East Kern Water Agency Annual Water Quality Reports - Los Angeles County System
(b) Antelope Valley-East Kern Water Agency Annual Water Quality Reports - Kern County System
(c) Average 2012 water quality for tertiary treatment at Palmdale WRP (LACSD)
(d) Average Aug-Dec 2012 water quality for tertiary treatment at Lancaster WRP (LACSD)
(e) Air Force Research Laboratory (AFRL) 2010 Annual Monitoring Report (average values provided)
(f) Predicted water quality for tertiary treatment at the Rosamond Community Services District (RCSD) Treatment Plant **Need to find contact for updates on the plant**
(g) Los Angeles County Integrated Water Quality Database System, Santa Clara River Station (S29)
(h) Boron is not tested regularly in drinking water because it is not a regulated constituent, only 2009 info is available from Antelope Valley-East Kern Water Agency

Table 4-4: Maximum Constituent Concentration for Boron and Fluoride

Constituent	Average Concentration (mg/L)													
	BWQ+20% Assim Capacity			Imported Water					Recycled Water					Storm water
				Raw	Treated									
	Lancaster Subbasin	Neenach Sub-basin	Pearland Sub-basin	California Aqueduct [(a)]	Acton Plant [(a)]	Eastside Plant [(a)]	Quartz Hill Plant [(a)]	Rosamond Plant [(b)]	LACSD 20 Palmdale WRP [(c)]	LACSD 14 Lancaster WRP [(d)]	EAFB AFRL WWTP [(e)]	EAFB Main Base WWTP [(f)]	RCSD WTP [(g)]	Littlerock Reservoir [(h)]
Boron [(k)]	0.296	0.352	0.256	0.162	0.240	0.180	0.170	0.160	.	.	0.250	0.670		ND
Fluoride	2	1	1	0.10	0.11	0.08	0.09	0.09	.	.	.	0.36		0.40

(a) Antelope Valley-East Kern Water Agency Annual Water Quality Reports - Los Angeles County System
(b) Antelope Valley-East Kern Water Agency Annual Water Quality Reports - Kern County System
(c) Average 2012 water quality for tertiary treatment at Palmdale WRP (LACSD)
(d) Average Aug-Dec 2012 water quality for tertiary treatment at Lancaster WRP (LACSD)
(e) Air Force Research Laboratory (AFRL) 2010 Annual Monitoring Report (average values provided)
(f) Predicted water quality for tertiary treatment at the Rosamond Community Services District (RCSD) Treatment Plant **Need to find contact for updates on the plant**
(g) Los Angeles County Integrated Water Quality Database System, Santa Clara River Station (S29)
(h) Boron is not tested regularly in drinking water because it is not a regulated constituent, only 2009 info is available from Antelope Valley-East Kern Water Agency

Figure 4-1: Antelope Valley Groundwater Levels, Spring 1996



4.5.2 Chloride

Chloride is very soluble in water and moves freely with water through soil and rock. Chloride is not readily consumes by microorganisms, so it is more persistent than nitrate and likely to leach into groundwater (USGS, 2004).

Currently, Antelope Valley Basins have good water quality in terms of chloride levels. If monitoring reveals a trend of increasing chloride concentration, implementation measures will be evaluated and proposed as appropriate. As with TDS, a decrease of assimilative capacity requiring further analysis will be determined by the SNMP stakeholders.

4.5.3 Nitrate

Elevated concentrations of Nitrate are more commonly found in shallow water-table depths. However, studies show that water and nitrate transport from the root zone to the water table follow preferential flow paths with potential to reach deeper portions of the soil vadose zone and the water table, with limited denitrification. Geologic and hydraulic parameters vary substantially causing high spatial variability of nitrate transport. But in general, nitrate is soluble and mobile at the concentrations typically found in soil and may leach into groundwater. NH_4^+ is strongly adsorbed by most soils and thus is not a concern.

Although movement of nitrate with percolating water through the unsaturated zone may take many years to reach groundwater, long-term increases are possible where aquifers are recharged by nitrate-rich water such as recycled water. In the saturated zone, groundwater movement is generally slow and there is little mixing. Therefore, any nitrate contamination would tend to remain localized and possibly persist for decades after contaminant input sources were eliminated because of the slow rate of movement and lack of dilution.

Fortunately, Antelope Valley Basins' nitrate levels are well within health standards. If monitoring reveals a trend of increasing nitrate concentration, use of nitrogen budgets, mass balance approach, and/or fate and transport model will be necessary to determine appropriate implementation measures.

4.6 Salt and Nutrient Balance

Due to the limited data availability and analytical methodology, a simplified salt balance was created to give a worst case scenario for modeling the basin. Here is how the method is simplified. The four sources of water supply in the basin are imported, groundwater, stormwater and recycled water. Groundwater and stormwater are native to the basin while recycled and imported water are not. Since the Antelope Valley groundwater basin is a closed basin and there is no outlet, the two major non-native sources of waters that contain salts and nutrients are used in the salt balance to demonstrate potential impacts. Rather than assuming it takes years for the applied water to travel through soil and reach the aquifer, immediate mixing of the waters is assumed. Furthermore, existing available groundwater volume of 55 million AF (CA DWR 1980) is assumed to stay constant based on the assumption that the existing groundwater pumping rate equals the natural recharge rate. Any year-to-year change in groundwater volume, compared to the existing volume, is considered negligible for calculating the constituent concentration in the groundwater. Various salt and nutrient contributing sources, such as fertilizer, manure, septic tanks, mining, soil amendments, and mineral weathering are not included in this analysis due to lack of such data. However, as additional data becomes available, the salt balance will be revised.

Figure 4-2 is a flow chart depicting the mass balance methodology used in this analysis. Normal year conditions were assumed, whereby 60% of the total contracted water from the SWP would be available as imported water. Calculations were done to determine the potential constituent concentrations in groundwater and remaining assimilative capacity. Table 4-5 lists the amounts of imported water projected for Municipal and Industrial (M&I) and agricultural use, based on the 2010 Urban Water Management Plans (UWMP) from AVEK, PWD, RCSD and LACWD 40 & QHWD. To illustrate the calculation process, intermediate calculated results are also listed in the table, for TDS only.

Figure 4-2: Mass Balance Flow Chart

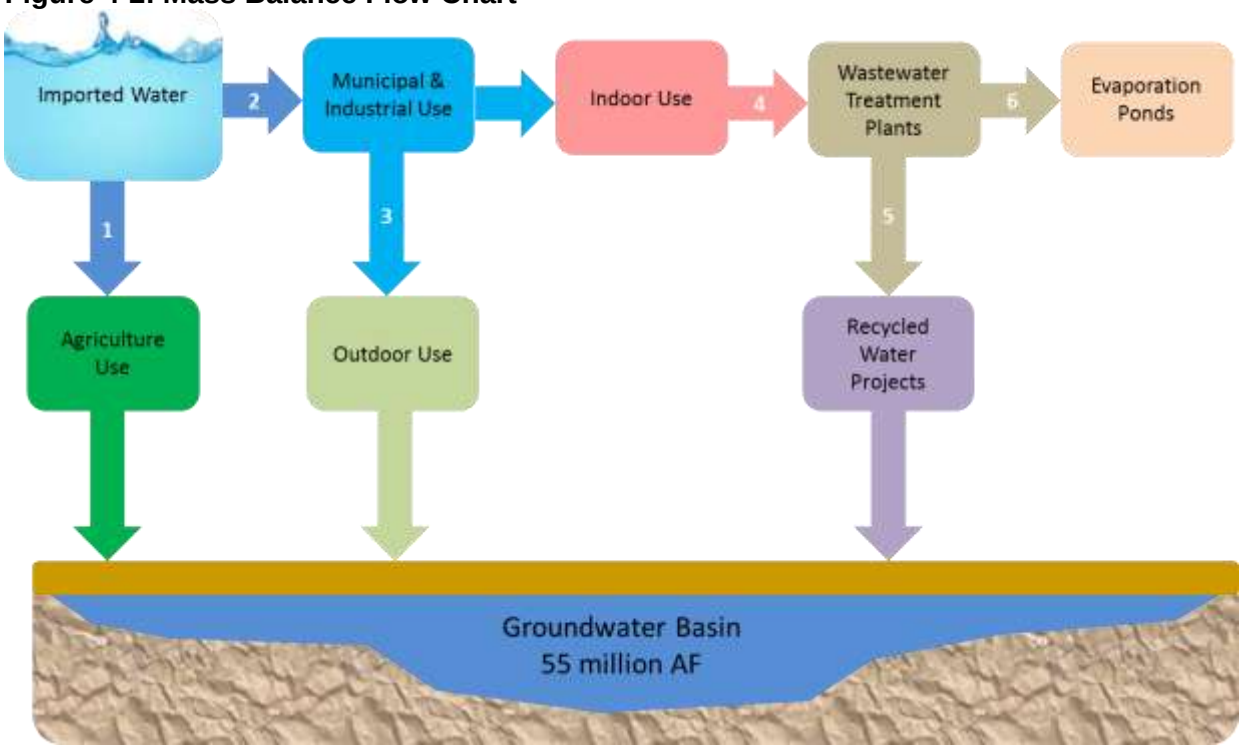


Table 4-5: Salt Balance Calculations

	2010	2015	2020	2025	2030	2035
60% of contracted SWP water (AF)	99,000	99,000	99,000	99,000	99,000	99,000
Imported water used in M& I (AF)	64,242	95,885	97,585	99,236	101,203	103,170
Imported water used in agriculture (AF)	6,612	3,115	1,415	-	-	-
TDS from Step 1 (tons/year)	2,697	1,271	577	-	-	-
TDS from Step 3 (tons/year)	14,052	20,973	21,345	21,706	22,137	22,567
TDS from Step 5 (tons/year)	9,623	20,213	22,480	24,747	27,015	29,283
Cumulative TDS in aquifer (tons)	24,031,187	24,212,604	24,430,726	24,658,893	24,899,255	25,153,106
TDS concentration in groundwater (mg/L)	321	324	327	330	333	336
Assimilative capacity (mg/L)	679	676	673	670	667	664

Following are the steps used for the TDS, nitrate, and chloride mass balance calculations: Step 1: Multiply agricultural imported water supply by the California Aqueduct raw water concentration (Table 3-3) to determine the amount of constituent going into the groundwater. Step 2: for raw water that is imported and treated for use in M&I, the percentages of outdoor and indoor water use in the valley are estimated to be 55% and 45%, respectively (Antelope Valley Adjudication technical report 2008). Step 3: the amount of water used outdoors is multiplied by the constituent concentration from the imported water treatment plants (Table 3-3) to determine the potential constituent contribution. Step 4: it was assumed that all M&I indoor usage is sewered and goes to the wastewater treatment plants, resulting in the projected wastewater volume shown in Table 3-5. Step 5: amount of potential TDS generated from the various recycled water projects is listed in Table 4-6, below. Table 4-7 and Table 4-8 list the potential nitrate and chloride generated. Step 6: recycled water is also used in locations where the water evaporates and the salts do not enter the aquifer, such as evaporation ponds as described in Section 3.5.

The existing amount, in tons, of constituent in the aquifer is estimated by multiplying the volume of groundwater by the baseline groundwater constituent concentration from Table 3-3. The amount of constituent generated from Steps 1, 3 and 5 is then added to the existing total constituent in the aquifer and divided by the available groundwater volume to calculate the potential constituent concentration in the groundwater. The gradual increase in constituent concentration in the groundwater was then plotted. See Figure 2-1 for potential TDS concentrations projected through 2035. The results for Nitrate and Chloride are shown in Figure 2-1 and Figure 2-1, respectively. As illustrated in the figures, during the planning period of 2010 to 2035, the assimilative capacities for TDS, nitrate and chloride in the groundwater were not found to have the potential of going below the 80% baseline assimilative capacities.

Figure 4-3: Potential TDS Concentrations

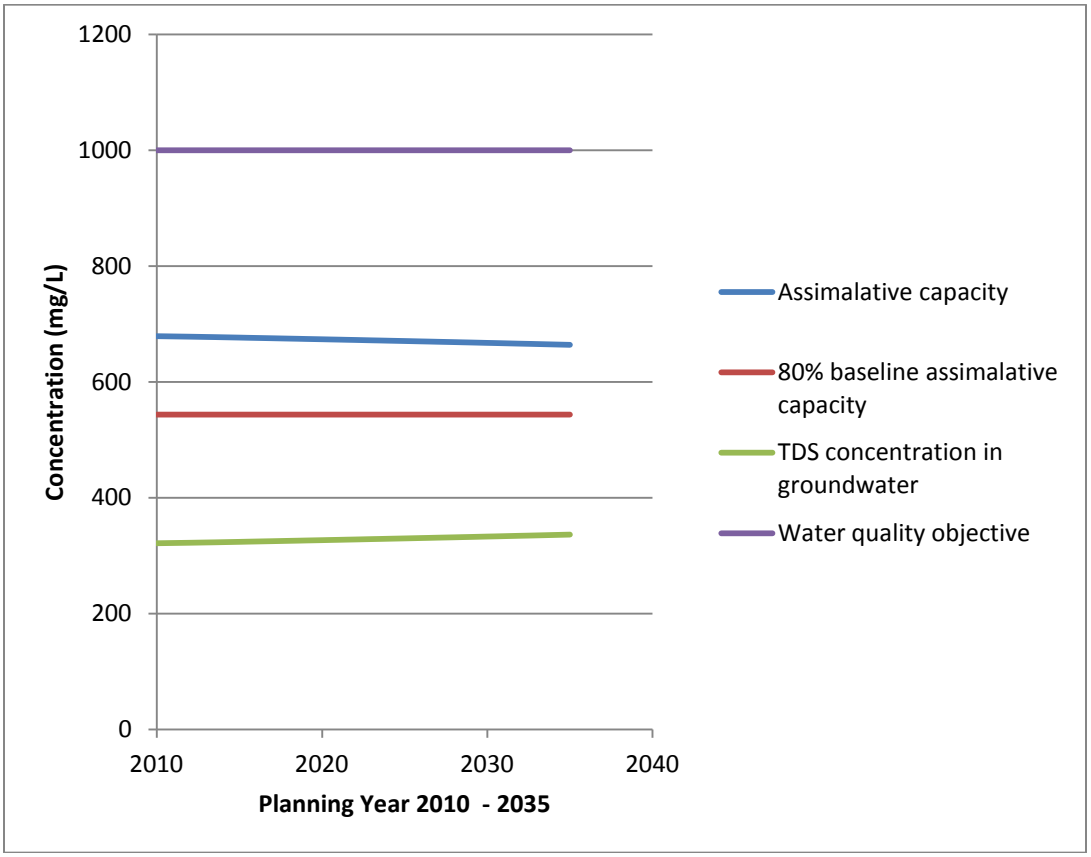


Figure 4-4: Potential Nitrate Concentrations

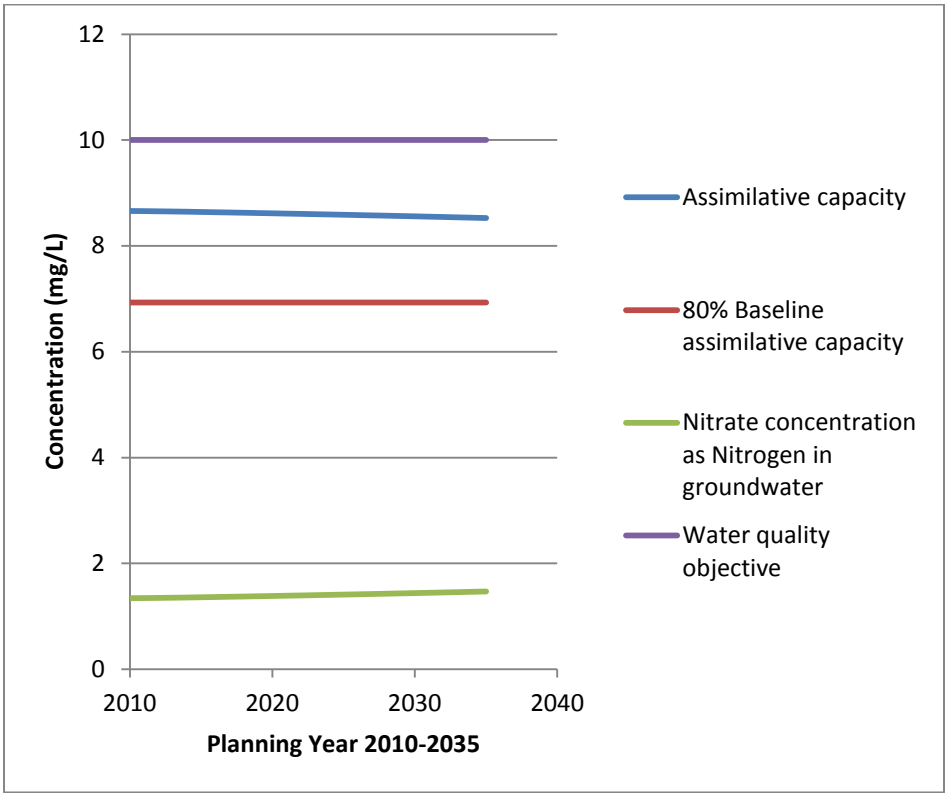


Figure 4-5: Potential Chloride Concentrations

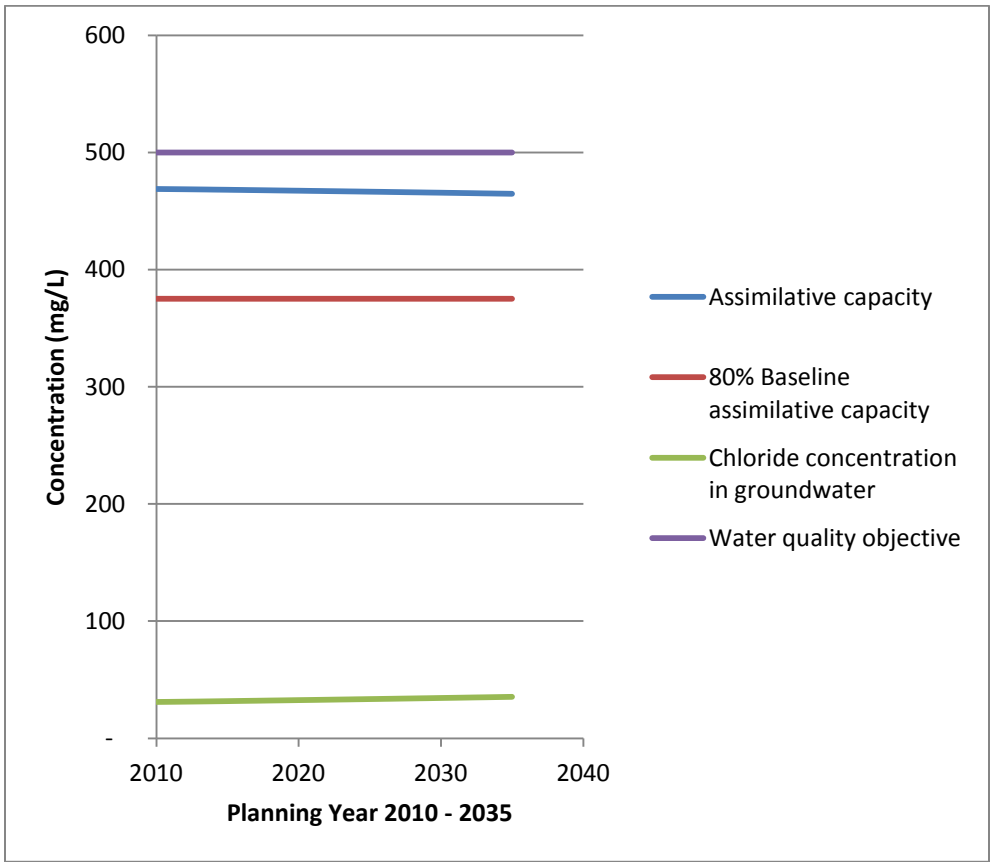


Table 4-6: Potential Salt/Nutrient Impacts – Total Dissolved Solids

Projects	Source of Water	Water Quality Source	Total Dissolved Solids (tons/year)					
			2010	2015	2020	2025	2030	2035
Treatment Plants								
EAFB AFRL Treatment Plant (secondary)	Recycled	EAFB AFRL WWTP	22	22	22	22	22	22
EAFB Main Base Wastewater Treatment Plant (tertiary)	Recycled	EAFB MB WWTP	-	-	-	-	-	-
Lancaster WRP Expansion	Recycled	LACSD 14 WRP	-	12,835	14,119	15,402	16,686	17,969
Palmdale WRP Expansion	Recycled	LACSD 20 WRP	-	9,443	10,387	11,331	12,276	13,220
RCSD WTP Expansion	Recycled	RCSD WTP	-	-	-	-	-	-
Reuse								
Apollo Community Regional Park	Recycled	LACSD 14 WRP	160	160	160	160	160	160
EAFB Golf Course Landscape Irrigation	Recycled	EAFB WWTP	196	196	196	196	196	196
Lancaster WRP Eastern Agricultural Site	Recycled	LACSD 14 WRP	706	6,097	6,738	7,380	8,022	8,664
North LA/Kern County Regional Recycled Water Project	Recycled	LACSD 14 WRP	-	4,570	5,566	6,562	7,558	8,555
Palmdale WRP Agricultural Site	Recycled	LACSD 20 WRP	5,351	5,980	6,610	7,240	7,869	8,499
Piute Ponds	Recycled	LACSD 14 WRP	3,209	3,209	3,209	3,209	3,209	3,209
RCSD WTP Recycled Water Use	Recycled	RCSD WTP	-	-	-	-	-	-
Evaporation/Export								
EAFB Evaporation Ponds	Recycled	EAFB WWTP	87	87	87	87	87	87
eSolar Power Plant	Recycled	LACSD 14 WRP	-	51	51	51	51	51
Palmdale Hybrid Power Plant Project	Recycled	LACSD 20 WRP	-	2,140	2,140	2,140	2,140	2,140
RCSD Wastewater Treatment Plant Evaporation Ponds	Recycled	RCSD WTP	-	-	-	-	-	-
Groundwater Recharge/Banking								
Amargosa Creek Recharge Project	Imported	Quartz Hill Plant	-	9,943	9,943	9,943	9,943	9,943
Antelope Valley Water Bank	Imported	CA Aqueduct	530	8,974	8,974	8,974	8,974	8,974
PWD Groundwater Recharge Project	Recycled/Imported	LACSD 20 WRP	-	-	-	-	1,889	3,777
Water Supply Stabilization Project (WSSP-2 Project)	Imported	CA Aqueduct	4,079	10,197	10,197	10,197	10,197	10,197

Table 4-7: Potential Salt/Nutrient Impacts – Nitrate

Projects	Source of Water	Water Quality Source	Nitrate as Nitrogen (tons/year)					
			2010	2015	2020	2025	2030	2035
Treatment Plants								
EAFB AFRL Treatment Plant (secondary)	Recycled	EAFB AFRL WWTP	0.17	0.17	0.17	0.17	0.17	0.17
EAFB Main Base Wastewater Treatment Plant (tertiary)	Recycled	EAFB MB WWTP	-	-	-	-	-	-
Lancaster WRP Expansion	Recycled	LACSD 14 WRP	-	229	252	274	297	320
Palmdale WRP Expansion	Recycled	LACSD 20 WRP	-	49	54	59	64	69
RCSD WTP Expansion	Recycled	RCSD WTP	5	5	5	5	5	5
Reuse								
Apollo Community Regional Park	Recycled	LACSD 14 WRP	2.86	2.86	2.86	2.86	2.86	2.86
EAFB Golf Course Landscape Irrigation	Recycled	EAFB WWTP	1.51	1.51	1.51	1.51	1.51	1.51
Lancaster WRP Eastern Agricultural Site	Recycled	LACSD 14 WRP	13	109	120	131	143	154
North LA/Kern County Regional Recycled Water Project	Recycled	LACSD 14 WRP	-	81	99	117	135	152
Palmdale WRP Agricultural Site	Recycled	LACSD 20 WRP	28	31	34	38	41	44
Piute Ponds	Recycled	LACSD 14 WRP	57	57	57	57	57	57
RCSD WTP Recycled Water Use	Recycled	RCSD WTP	-	-	1	1	1	1
Evaporation/Export								
EAFB Evaporation Ponds	Recycled	EAFB WWTP	1	1	1	1	1	1
eSolar Power Plant	Recycled	LACSD 14 WRP	-	1	1	1	1	1
Palmdale Hybrid Power Plant Project	Recycled	LACSD 20 WRP	-	11	11	11	11	11
RCSD Wastewater Treatment Plant Evaporation Ponds	Recycled	RCSD WTP	5	5	4	4	4	4
								Groundwater Recharge/Banking
Amargosa Creek Recharge Project	Imported	Quartz Hill Plant	-	31	31	31	31	31
Antelope Valley Water Bank	Imported	CA Aqueduct	2	27	27	27	27	27
PWD Groundwater Recharge Project	Recycled/Imported	LACSD 20 WRP	-	-	-	-	4	7
Water Supply Stabilization Project (WSSP-2 Project)	Imported	CA Aqueduct	12	31	31	31	31	31

Table 4-8: Potential Salt/Nutrient Impacts – Chloride

Projects	Source of Water	Water Quality Source	Chloride (tons/year)					
			2010	2015	2020	2025	2030	2035
Treatment Plants								
EAFB AFRL Treatment Plant (secondary)	Recycled	EAFB AFRL WWTP	2.52	2.52	2.52	2.52	2.52	2.52
EAFB Main Base Wastewater Treatment Plant (tertiary)	Recycled	EAFB MB WWTP	-	-	-	-	-	-
Lancaster WRP Expansion	Recycled	LACSD 14 WRP	-	3,290	3,619	3,948	4,277	4,607
Palmdale WRP Expansion	Recycled	LACSD 20 WRP	-	3,039	3,343	3,647	3,950	4,254
RCSD WTP Expansion	Recycled	RCSD WTP	-	-	-	-	-	-
Reuse								
Apollo Community Regional Park	Recycled	LACSD 14 WRP	41	41	41	41	41	41
EAFB Golf Course Landscape Irrigation	Recycled	EAFB WWTP	23	23	23	23	23	23
Lancaster WRP Eastern Agricultural Site	Recycled	LACSD 14 WRP	181	1,563	1,727	1,892	2,056	2,221
North LA/Kern County Regional Recycled Water Project	Recycled	LACSD 14 WRP	-	1,172	1,427	1,682	1,938	2,193
Palmdale WRP Agricultural Site	Recycled	LACSD 20 WRP	1,722	1,925	2,127	2,330	2,532	2,735
Piute Ponds	Recycled	LACSD 14 WRP	823	823	823	823	823	823
RCSD WTP Recycled Water Use	Recycled	RCSD WTP	-	-	-	-	-	-
Evaporation/Export								
EAFB Evaporation Ponds	Recycled	EAFB WWTP	10	10	10	10	10	10
eSolar Power Plant	Recycled	LACSD 14 WRP	-	13	13	13	13	13
Palmdale Hybrid Power Plant Project	Recycled	LACSD 20 WRP	-	689	689	689	689	689
RCSD Wastewater Treatment Plant Evaporation Ponds	Recycled	RCSD WTP	-	-	-	-	-	-
Groundwater Recharge/Banking								
Amargosa Creek Recharge Project	Imported	Quartz Hill Plant	-	2,923	2,923	2,923	2,923	2,923
Antelope Valley Water Bank	Imported	CA Aqueduct	151	2,553	2,553	2,553	2,553	2,553
PWD Groundwater Recharge Project	Recycled/Imported	LACSD 20 WRP	-	-	-	-	348	696
Water Supply Stabilization Project (WSSP-2 Project)	Imported	CA Aqueduct	1,160	2,901	2,901	2,901	2,901	2,901

Section 5: Monitoring

5.1 Monitoring Plan Development

The AV SNMP monitoring plan is designed to determine water quality in the basin and focus on the water quality in water supply wells and areas proximate to large water projects, as discussed in the Recycled Water Policy. Results will be used to determine whether the concentrations of salt and nutrients are consistent with applicable water quality objectives.

5.2 Monitoring Locations

Groundwater wells are located in proximity to the projects listed in Section 3 and shown in Figure 3-16. Per the Recycled Water Policy, the preferred approach to selecting well locations is to target existing wells, as feasible and appropriate. If an additional project, that has not been considered in this plan, is to be implemented, the responsible agency shall designate a groundwater well (existing or new), as appropriate, to be included in the SNMP monitoring program. Source waters to the region, such as imported and recycled waters are typically monitored at the applicable treatment plant.

5.3 Monitoring Frequency

Supply (e.g., raw imported and treated potable) and recycled waters are monitored annually. Groundwater wells are monitored every three years. The appropriate agency or well owner is responsible for monitoring water quality. For example, AVEK monitors raw imported water and the Sanitation Districts monitor the recycled water that they produce.

5.4 Constituents to be Monitored

As appropriate and necessary, the program will include monitoring of: total dissolved solids (TDS), nitrogen species (ammonia, nitrate, and nitrite), chloride, arsenic, chromium, fluoride, boron, and constituents of emerging concern (CECs; e.g., endocrine disrupters, personal care products or pharmaceuticals) consistent with the actions by the State Water Resources Control Board (State Board) taken pursuant to the Recycled Water Policy.

In January 2013, the State Board adopted an amendment to the Recycled Water Policy and prescribed requirements for monitoring CECs in recycled water. The Recycled water policy does not designate CEC monitoring requirements for recycled water used for landscape irrigation due to the low risk for ingestion of the water. However, the CEC monitoring requirements prescribed in the Recycled Water Policy pertain to the production and use of recycled water for groundwater recharge by surface and subsurface application methods. Only one of the listed projects in Section 3.4, the Palmdale Water District Groundwater Recharge Project, proposes to use recycled water for groundwater recharge. Prior to the implementation of this project, or any other future proposed groundwater recharge with recycled water project, the appropriate agency (or agencies) will monitor the water for CECs as prescribed in the Recycled Water Policy, as applicable, unless an alternative monitoring plan is proposed and approved by the Regional Board. The Recycled Water

Policy does not prescribe CEC monitoring requirements for other uses of recycled water, but may in the future, at which time stakeholders may revisit and revise the monitoring plan as applicable and appropriate.

5.5 Reporting

Public supply wells are monitored and reported to the California Department of Public Health (CDPH). The Groundwater Ambient Monitoring and Assessment (GAMA) Program compiles these monitoring results into a publicly-accessible internet database, GeoTracker GAMA.[6] GeoTracker GAMA currently integrates data from State Board, Regional Water Quality Control Boards (Regional Boards), CDPH, Department of Pesticide Regulation, Department of Water Resources, United States Geological Survey, and Lawrence Livermore National Laboratory.

The Antelope Valley SNMP Report (Report) to the Lahontan Regional Water Board shall include relevant monitoring data, comparisons to historical/baseline values, comparisons to applicable water quality objectives, and an update of relevant projects and implementation information. The Report shall be submitted to the Lahontan Regional Water Board every three years.

The AVIRWMP group may take on the reporting responsibilities. It has been discussed at an AV SNMP stakeholder meeting that reporting responsibilities could potentially be a duty of the eventual Antelope Valley Groundwater Watermaster.

[6] Accessible at http://www.waterboards.ca.gov/gama/geotracker_gama.shtml.

Section 6: Implementation Measures

6.1 Manage Salt/Nutrient Loadings on a Sustainable Basis

Based on the Antelope Valley Groundwater Basin's baseline water quality and project source water quality, managing salt and nutrient loadings on a sustainable basis is feasible with minimal implementation measures. Best Management Practices (BMPs) and public outreach are logical first-choice implementation measures. If necessary, based on future monitoring results, the implementation measures identified in the following sub-sections will be evaluated and most appropriate measures will be recommended for implementation.

6.2 Implementation Measures

6.2.1 Total Dissolved Solids

Implementation measures to reduce TDS concentrations in groundwater that would be considered include:

- Reducing the amount of salts imported into the sub-basins – imported water treatment/processes
- Reducing the amount of salts added to groundwater via source water - wastewater treatments, modified processes such as increased retention time, or blending prior to use for irrigation or basin recharge
- Reducing the amount of salts added to water via anthropogenic sources – BMPs, public outreach, land management guidelines
- Natural treatment such as a wetland systems
- Transporting and exporting salts to a landfill
- Disposing of salts via brine sales or deep well injection

6.2.2 Chloride

Implementation measures to reduce chloride concentrations in groundwater that would be considered include:

- Reducing the amount of chlorides added to water via anthropogenic sources – BMPs, public outreach, land management guidelines
- Evaluating industry processes
- Water softener ordinance or ban
- Reducing the amount of chlorides in wastewater - modified processes such as incorporating UV and MF/RO to remove chlorides

6.2.3 Nitrate

Implementation measures to reduce nitrate concentrations in groundwater that would be considered include:

- Developing Best Management Practices (BMPs) such as limiting excess fertilizing (set realistic goals for maximum crop yield) and eliminating over-irrigation to curtail the leaching transport process

- Developing nutrient management programs and crop-specific nutrient application rates to improve crop fertilizer efficiency (decrease the total residual mass of nitrogen in the soil by using nitrification inhibitors or delayed release forms of nitrogen)
- Evaluating activities such as animal operations, food operations, and septic system discharges

Section 7: Adoption of the SNMP

7.1 Approval/Adoption/Acceptance

This SNMP was originally drafted by stakeholders of the Antelope Valley SNMP. Once drafted, the SNMP was reviewed by stakeholders until it was agreed that the SNMP was ready to be presented to the Antelope Valley Regional Water Management Group. Upon approval/adoption/acceptance by the members of the Antelope Valley Regional Water Management Group (AVRWMG), the SNMP may be ready for inclusion as an appendix to the Antelope Valley Integrated Regional Water Management Plan (AVIRWMP) update. Approval by the members of the AVRWMG typically involves formal approval by the Board of each member.

Upon approval by the AVRWMG, stakeholders will seek adoption of the SNMP by the Lahontan Regional Water Board. Stakeholders will collaborate as necessary with the Regional Board staff to prepare the SNMP for adoption into the Water Quality Control Plan for the Lahontan Region (Basin Plan). The process may include a public hearing process, an environmental analysis, presentation of SNMP to the Lahontan Regional Water Board, and other related activities.

7.2 California Environmental Quality Analysis

SNMP stakeholders, with guidance from the Lahontan Regional Water Board, shall draft the appropriate California Environmental Quality Analysis (CEQA) documents as they relate to the SNMP, for inclusion into the Basin Plan. The CEQA documents shall be adopted by the Lahontan Regional Water Board and filed with the State Clearinghouse.

Section 8: References

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http://waterdata.usgs.gov/nwis/current/?type=quality
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/crops/?cid=nrcs143_014202
http://ucanr.org/sites/groundwater/Research/gw_205/

October 3, 2011

SCOPE OF WORK
Salt/Nutrient Management Plan for the Antelope Valley

PURPOSE

To develop a regional Salt/Nutrient Management Plan (SMP) for the Antelope Valley (AV) to manage salts and nutrients (and possibly other constituents of concern) from all sources within the basin to maintain water quality objectives and support beneficial uses. The intention is to involve all surface water and groundwater users and wastewater dischargers in the Antelope Valley basin to participate in efforts to protect these waters from accumulating concentrations of salt and nutrients that would degrade the quality of water supplies in the Antelope Valley to the extent that it may limit their use.

BACKGROUND

On February 3, 2009, the State Water Resources Control Board (State Board) adopted a Recycled Water Policy (Policy) that addresses the concern for protecting the quality of California's groundwater basins. In response to this Policy, Los Angeles County Waterworks Districts and Sanitation Districts of Los Angeles County have, with support of the Lahontan Regional Water Quality Control Board (Lahontan Water Board) staff, initiated efforts to organize a group to develop a regional SMP for the Antelope Valley.

Activities, such as irrigation using imported water, groundwater or recycled water can potentially add salts, typically measured as total dissolved solids (TDS), and nutrients to groundwater basins. Other sources of salts/nutrients can include natural soil conditions, atmospheric deposition, discharges of waste, soil amendments and water supply augmentation using surface water or recycled water.

The SMP shall be completed and proposed to the Lahontan Water Board by May 14, 2014; an extension of up to two years may be allowed if the Lahontan Water Board finds that the stakeholders are making substantial progress toward completion of the plan. In no case shall the period for the completion of the plan exceed seven years.

GOALS

One goal is to address salt/nutrient loading in the Antelope Valley basin region through the development of a management plan by the collaborative stakeholder process rather than the regional regulating agency imposing requirements on individual water projects. The process shall involve participation by Lahontan Water Board staff and be in compliance with California Environmental Quality Act (CEQA) regulations. The involvement of local agencies in a SMP may lead to more cost-effective means of protecting and enhancing groundwater quality, quantity, and availability.

Another goal is to assess impacts resulting from all activities with potential long-term basin-wide effects on groundwater quality, such as surface water, groundwater, imported water, and recycled water irrigation projects and groundwater recharge projects, as well as other salt/nutrient contributing activities through regional groundwater monitoring.

The design and implementation of a regional groundwater monitoring program must involve all stakeholders, including, but not limited to, water importers, purveyors, stormwater management agencies, wastewater agencies, Lahontan Water Board, and other significant salinity/nutrient contributors, in addition to the recycled water stakeholders.

The completion of the SMP may lead to the potential for enhanced partnering opportunities and potential project funding between water and wastewater agencies, or other stakeholders, for developing and protecting water supplies.

PLAN REQUIREMENTS

Data Collection and Assessment

1. Stakeholder Participation
    a. Outreach to the Lahontan Water Board staff and the stakeholders.
    b. Convene stakeholder meetings.
    c. Receive and review stakeholder input.

2. Determine SMP Area Boundaries
    a. The AV Integrated Regional Water Management (IRWM) Plan efforts cover the Antelope Valley groundwater basin. SMP stakeholders have determined that, while the scope of the AV SMP will include the groundwater sub-basins within the AV IRWM geographic boundaries, the Lancaster, Buttes, Neenach, and Pearland sub-basins, for which data has been provided to the AV SMP effort and relevant projects overlay, will be specifically addressed in detail. Additional sub-basins may be further addressed in the AV SMP depending on the willingness of users, purveyors, wastewater agencies, regulators, significant salt/nutrient contributors, and other stakeholders to participate and provide data. Surface water resources are defined using a watershed approach and are categorized based on a hierarchy of hydrologic systems including basins, units, areas, and subareas, which may or may not coincide with groundwater basin nomenclature defined by the CA Department of Water Resources (DWR). The surface waters within the Antelope Valley IRWM geographic boundary fall within the Antelope Hydrologic Unit of the South Lahontan Hydrologic Basin. There are a total of eight hydrologic areas within the Antelope Hydrologic Unit. For clarity and consistency, surface water hydrologic areas and hydrologic subareas will be identified and correlated, to the extent practical, with the groundwater basins as identified by DWR nomenclature within SMP area.
    b. Within the determined scope, identify land uses, surface water resources, groundwater basins and sub-basins, well locations, and hydrogeologic conditions including confined and unconfined aquifer systems, and current water quality.

3. Understand Current and Future Basin Uses
    a. Collect data from counties and participating cities regarding past/historic, current and potential future land uses contributing, or that could contribute, to potential salt/nutrient impacts.
    b. Identify existing surface/groundwater data collection efforts throughout the region.
    c. Create a map(s) with land uses and sites related to salts and nutrients, such as: irrigation (agricultural, commercial, residential); wastewater treatment and disposal (including septic and water softening systems); water recycling; groundwater augmentation and recharge, water treatment, applicable alternative energy; imported water; land application of solids; animal wastes (dairy, confined animal, and ranching) and other potential sources of salinity/nutrient contributions to the groundwater supply.

4. Create Groundwater Quality Database for Sub-basin
    a. Determine groundwater characteristics, recharge areas, and background water quality.
    b. Compile data and determine existing water quality, defined as the average concentration of salts/nutrients and other constituents of concern measured at each well.

5. Data Analysis
    a. Conduct a regional analysis of available groundwater quality databases to determine whether sufficient data and ongoing monitoring are available for the sub-basin.
    b. Collect data regarding other factors (such as atmospheric deposition, mixing of imported water with native basin water, natural sources) contributing, or that could contribute, to potential salt/nutrient impacts.
    c. If necessary, chose an appropriate model for data analysis and run the model. Provide rationale for selection of the specific model, if used. Calibrate the model used to analyze the data (including de-bugging of the chosen model) and verify the input data. Compare various model runs to observed values for each basin, as applicable.

<u>Characterization of Basin</u>

6. Salt and Nutrient Characterization
    a. Identify the current and projected sources and loadings of salts/nutrients. Include water balance/budget (volumetric analysis) and consider atmospheric nitrogen as a source.
    b. Determine the basin's assimilative capacity of salts/nutrients. Identify and include rationale for the assimilative capacity determination (e.g., selection of maximum TDS limit, etc.). Assimilative capacity will not be necessarily assumed based on Maximum Contaminant Levels, but rather based on a reasonably achievable objective derived from site-specific characteristics and source water quality.
    c. Determine the fate and transport of salt/nutrients.

d. Include other constituents of concern as necessary and appropriate (include naturally occurring constituents such as fluoride, boron, arsenic, chromium as well as constituents from anthropogenic sources, such as those concerned with cleanup sites).
e. Identify potential salt sinks.
f. Develop future planning scenarios for future users/uses that would include expected requests for projected recycled water production, reuse, discharges to Antelope Valley basins, and expected quality for each wastewater treatment facility (existing and projected). Planning scenarios could include appropriate planning spans, including, for example, a 5-year plan, 10-year plan, 25-year plan and a 50-year projected plan, or some combination as determined by the stakeholders.
g. Prepare a draft report to the stakeholders to present the data collected during basin characterization and the results for assimilative capacity (by sub-basin). Include rationale for selection of sub-basins (e.g., current uses, at risk basins, water quality, hydrogeology).
h. Consider the effects of importation of water and transferring recycled water sources between sub-basins. For example, consider the effects of source water derived from the Lancaster sub-basin that is recycled and subsequently transferred to the Buttes sub-basin (Buttes Hydrologic Area) for reuse as irrigation.

<u>Monitoring</u>

7. Develop a Monitoring Plan
    a. Define the scale of the monitoring plan component, dependent on site-specific conditions.
    b. Monitor for salts, nutrients, and other constituents of concern that potentially could adversely affect the water quality of the basin.
    c. Determine appropriate monitoring by targeting basin water quality at existing water supply and monitoring wells and areas proximate to large water recycling projects, and groundwater recharge projects.
    d. The monitoring plan should be designed to evaluate and track the long-term impacts to groundwater quality resulting from past, current, future, and transitioning land uses.
    e. Identify stakeholders responsible for conducting, compiling, and reporting the monitoring data.

8. Monitoring Implementation and Data Management
    a. Monitor each location at a determined frequency to assess impacts and take into account changes in all significant sources.
    b. Establish criteria for concentrations above ambient conditions based on statistical evaluation of data to trigger additional investigations.
    c. Conduct monitoring of constituents of concern (CECs), as recommended by the “blue-ribbon” Advisory Panel and approved by the State Board. CEC monitoring will be conducted in a manner consistent with the Policy.

d. Data submitted to the State Board for GAMA (Groundwater Ambient Monitoring & Assessment Program) shall follow the guidelines for "electronic submittal of information" outlined on the website: http://www.waterboards.ca.gov/ust/electronic_submittal/index.shtml
e. Report data to the Lahontan Water Board staff every 3 years.

Implementation Measures

9. Manage Salt/Nutrient Loadings on a Sustainable Basis
    a. Identify potential methods and best management practices to reduce and/or maintain salt and nutrient loadings—such as disposal and/or reducing methods.
    b. Recommend most appropriate methods and best management practices for reducing and/or maintaining salt and nutrient loadings.
    c. Include cost estimates for implementation and other economic information as required by state water law.
    d. Identify goals and objectives for water recycling and stormwater use/recharge and recommend management measures and ways to make the best use of these water resources.

Antidegradation Analysis

10. Demonstrate that the projects included in the SMP will satisfy the requirements of the State Antidegradation Policy (Resolution No. 68-16).

Preparation of the SMP, Adoption by the members of the Antelope Valley Regional Water Management Group and Submittal to Lahontan Regional Water Board

11. Draft the Salt and Nutrient Management Plan. At a minimum, plan will include the required elements as described in the State Board's Recycled Water Policy and as detailed in this Scope of Work.

12. Obtain approval/adoption/acceptance of the SMP by the members of the Antelope Valley Regional Water Management Group.

13. California Environmental Quality Analysis (CEQA)
    a. Draft appropriate CEQA documents related to the SMP.
    b. Adopt or file CEQA document.

14. Adoption of SMP by Lahontan Regional Board
    a. Collaborate as necessary with the Lahontan Regional Water Board staff to prepare the SMP for adoption into the Lahontan Region's Basin Plan (could include public hearing process, additional CEQA, presentation of SMP to the Lahontan Regional Water Board).
    b. Submit final SMP along with final CEQA document(s) to the Lahontan Regional Water Board for adoption.

Proposed Schedule

Task	Description	Estimated Completion Date
1a	Outreach to RWQCB and Stakeholders	July 2009
1b	Convene Initial S/N Management Plan Meeting	August 2009
2	Determine SMP Area Boundaries	January 2010
3	Current and Future Basin Uses	January 2011
4	Create Groundwater Quality Database	July 2010
5	Data Analysis	December 2011
6	Characterization of Basin	January 2012
7	Develop Monitoring Plan	March 2012
8	Monitoring Implementation	Every three years
9	Identify Implementation Measures	July 2012
10	Antidegradation Analysis	July 2012
11	Draft S/N Management Plan	January 2013
12	Adoption of SMP by members of AV RWM Group	May 2013
13	Completion of CEQA Documents	August 2013
14	Submit Final SMP to RWQCB	October 2013

California Regional Water Quality Control Board
Lahontan Region

Matthew Rodriquez
Secretary for
Environmental Protection

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Edmund G. Brown Jr.
Governor

April 18, 2012

Antelope Valley Integrated Regional Water Management (IRWM) Stakeholder Group
Antelope Valley State Water Contractors Association
Palmdale Water District
2029 East Ave. Q
Palmdale, CA 93550

Attention: Matt Knudson

ACCEPTANCE OF SCOPE OF WORK FOR SALT AND NUTRIENT MANAGEMENT PLAN FOR ANTELOPE VALLEY IRWM REGION

Please send my thanks to Ms. Jessica Bunker and Ms. Erika de Hollan of the Antelope Valley IRWM Region Stakeholder Group for their effective presentation to the Lahontan Water Board on the Scope of Work (SOW) for the Antelope Valley IRWM proposed Salt and Nutrient Management Plan (SMP). As you know, a key element of the State Water Board's Recycled Water Policy (Resolution No. 2009-0011) is the development of a SMP for every groundwater basin in California by 2014.

Ms. Bunker and Ms. De Hollan explained to the Water Board the process that the Antelope Valley IRWM Stakeholder Group will use to develop its SMP, and that the development of the SMP will be controlled and funded by local stakeholders with participation from Water Board staff. As shown in the enclosed summary (October 12, 2011 Minutes from Regular Meeting of the Lahontan Water Board), the Water Board members were pleased with the initiative and collaboration demonstrated by the Antelope Valley IRWM Stakeholder Group in starting to develop its SMP. The Water Board did not express any concerns with the SOW or the process being used by the Antelope Valley IRWM Stakeholder Group.

Water Board staff appreciate the efforts of the Antelope Valley IRWM Stakeholder Group in its development of the SMP and look forward to continued participation in the process. Please contact me at (530) 542-5408 or Jan Zimmerman at (760) 241-7376 if you have questions or need more information.

Cindy Wise

Cindy Wise
Staff Environmental Scientist

Enclosure (1)

CC: Waterworks and Sanitation Districts

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Edmund G. Brown Jr.
Governor

MINUTES
October 12, 2011

Regular Meeting

Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392

Chairman Clarke called the meeting to order at 1:00 p.m. on October 12, 2011.

Board Members Present
Jack Clarke, Apple Valley
Mike Dispenza, Palmdale
Keith Dyas, Rosamond
Amy Horne, Ph.D., Truckee
Peter C. Pumphrey, Bishop
Don Jardine, Markleeville
Eric Sandel, Truckee

Board Member Absent
None

Legal Counsel

Kimberly Niemeyer, Office of Chief Counsel, State Water Resources Control Board
Laura Drabandt, Office of Chief Counsel, State Water Resources Control Board

Staff Present

Harold Singer, Executive Officer
Lauri Kemper, Assistant Executive Officer
Scott Ferguson, Senior WRCE
Patrice Copeland, Senior Eng. Geologist
Keith Elliott, Senior WRCE
Cindy Wise, Staff Environmental Scientist
Cindi Mitton, Senior WRCE
Jan Zimmerman, Engineering Geologist
John Morales, Water Resources Control Eng
Mike Coony, Water Resources Control Eng
Eric Taxer, Water Resources Control Eng
Rebecca Phillips, Office Technician
Vanessa Ramirez, Student Assistant
Christopher White, Student Assistant

Addressing the Board

Dr. James Hart, Adelanto City Manager; Betsy Elzufon, Larry Walker and Assoc.; John Fogerty, Executive Office, San Bernardino Sheriff's Department; Mark Hagan, USAF; Raymond Tremblay, LA Co. Sanitation District; Stafford Lehr, CA Dept. of Fish and Game; Jessica Bunker, LA Co. Water Works District No. 40; Erika de Hollan, LA Co. Sanitation Districts

INTRODUCTIONS

Chairman Clarke introduced the Board members. Mr. Singer introduced the Water Board staff and Kimberly Niemeyer legal counsel.

1. **PUBLIC FORUM** – Item moved to Page 6, following No. 9 continuation of Executive Officer's Report

2. **MINUTES**

Minutes of the Regular Meeting of September 14 – 15, 2011 in Kings Beach (Amber Wike)

- **Motion**: Moved by Mike Dispenza seconded by Dr. Horne and **unanimously carried** to adopt the September 14 – 15, 2011 minutes as written.

3. **ADOPTION OF UNCONTESTED CALENDAR**

Note: Items denoted by (*) appears next to items adopted by the Board on the uncontested calendar.

RESCISSION OF WASTE DISCHARGE REQUIREMENTS

*4. Rescission of Waste Discharge Requirements for Desert Terrace Apartments, San Bernardino County

- **Motion**: Moved by Dr. Horne, seconded by Peter Pumphrey and **unanimously carried** to adopt the Rescission Order as proposed.

STATUS REPORTS

5. Adelanto Public Utility Authority Cease and Desist Order Status Report, San Bernardino County

   Mr. Singer made introductory comments on this item. He informed the Board that this is just an information item and workshop. Mr. Singer also informed the Board that the City and Water Board prosecution team submitted additional information which was added in their packets.

   Dr. James Hart, Adelanto City Manager, gave a general update on this item. He informed the Board that Larry Walker and Associates have been retained to help with reporting on the Water Board Orders. The three year extension has been finalized with VVWRA for diversion. Testing on Ponds 3, 4, 5 and 9 have been completed. Pond 5 construction is complete and is receiving discharge. Also Pond 9 construction is complete. Pond 4 will be completed by October 15.

   Betsy Elzufon, with Larry Walker and Associates made a presentation to the Water Board to assist with answering comments from Water Board staff regarding the report that was submitted last week. The Water Board and Mr. Singer asked questions after Ms. Elzufon's presentation.

   Eric Taxer, commented on the presentation made by Dr. Hart and said that the City of Adelanto has worked very hard to address the Regional Board's concerns. He also stated that there are still a few outstanding issues that have not been complied with which were provided to the Board in a table. Chairman Clarke and Dr. Horne had questions for Mr. Taxer.

   Laura Drabandt, State Water Board, Staff Counsel, reported to the Water Board on the enforcement options. Due to the separation of functions, she informed the Board that she could not be more specific. She also informed the Board that the City of Adelanto is not yet in compliance.

   Chairman Clarke had concerns with the amount of beds at the prisons in the presentation. He said the numbers were not adding up. Mr. Singer suggested that the City and Prosecution team should review the information and provide more clarity to the Board at a future meeting.

6. County Sanitation District No. 14 of Los Angeles County, Lancaster Water Reclamation Plant, Los Angeles County Cease and Desist Order Status Report

   Mike Coony, Water Resources Control Engineer with the Victorville office gave the staff presentation. Mr. Coony answered questions from the Board.

RENEWAL OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

7. California Department of Fish and Game; Fish Springs Fish Hatchery, Inyo County
Note: This item has been postponed to a future Board Meeting.

Mr. Singer informed the Water Board that this item has been removed from the agenda.

8. California Department of Fish and Game; Mojave River Fish Hatchery, San Bernardino County

Keith Elliott, Senior Engineer gave the staff presentation. Dr. Horne suggested additional changes regarding the rain event in the Order.

Board discussion

Dr. Horne commented on the professionalism that the Fish and Game is showing and thanked them. Mr. Elliott answered questions from the Water Board.

- **Motion**: Moved by Eric Sandel, seconded by Keith Dyas and **unanimously carried** to adopt the Order with the late revisions and correction, and additional changes as proposed.

OTHER BUSINESS

9. **Executive Officer's Report**

Mr. Singer discussed items from the April 1, 2011 - June 31, 2011 Executive Officer's Report and answered questions from the Board.

Mr. Singer informed the Board that the Hinkley residents have requested that the Board have a Public Forum regarding PG&E. Mr. Singer suggested they do this at 7:00 p.m. this evening. He will discuss the PG&E Executive Officer's Report before the Public Forum. A Cleanup and Abatement Order (CAO) was issued on October 11, 2011 and Mr. Singer will give the Board a briefing on the CAO which was placed in the Board's folders. Ms. Kemper will give the Board a briefing on the status of other Water Board activities associated with PG&E's groundwater cleanup.

Mr. Singer went over the Draft Board Meeting schedule for 2012.

Note: Executive Officer's Report to be continued at 7:00 p.m.

10. **Reports by Water Board Chair and Board Members**

Dr. Horne commented on the Water Quality Coordinating Committee meeting that she attended. At the meeting, they discussed having the Water Boards working together as one Board. She also informed the Board about an art exhibit that she attended in Reno regarding altered landscapes that are in the Lahontan and Colorado Region. Dr. Horne handed out the brochure from this exhibit.

Mr. Pumphrey commented on the Water Quality Coordinating Committee meeting that he attended. He was very impressed by the talents and skills of the agency and made him more aware of the work and efforts of the Water Board staff.

Chairman Clarke gave a report regarding the Chair's conference call. He informed the Board that the discussion of the Water Board working together as one Board has been brought up before several times during the Chair's conference calls.

11. **CLOSED SESSION***

The Board met in closed session from 4:30 p.m. to 4:41 p.m. to consider Item k. Discussion of Personnel Matters. Authority: Government Code section 11126. The Board reconvened in open session at 4:45 p.m.

The Board recessed for dinner at 4:45 p.m.

Regular Meeting continued
7:00 p.m., October 12, 2011

Chairman Clarke called the meeting to order at 7:00 p.m.

Board Members Present	**Board Member Absent**
Jack Clarke, Apple Valley	None
Mike Dispenza, Palmdale	
Keith Dyas, Rosamond	
Amy Horne, Ph.D., Truckee	
Don Jardine, Markleeville	
Peter C. Pumphrey, Bishop	
Eric Sandel, Truckee	

INTRODUCTIONS

Chairman Clarke introduced the Board members.
Mr. Singer introduced the Water Board staff.

9. Executive Officer's Report (continued)

Mr. Singer discussed the CAO that was issued yesterday, October 11, 2011 to PG&E on replacement of water. The Water Board delegated Mr. Singer to issue the CAO. Mr. Singer gave a summary of the CAO and asked if the Board had questions.

Ms. Kemper discussed the 2008 CAO that required PG&E to develop a comprehensive strategy to clean up the ground water in the Hinkley Valley which included the submittal of a feasibility study to the Board last September.

Ms. Kemper informed the Board and Public that staff will have a public meeting later this year at the Hinkley School. They will be discussing the responses from the Peer Review on the background study, the status of the EIR, and current status of the plume investigation and the ground water cleanup.

1. **PUBLIC FORUM** *(continued)*

Carmela Spasojevich, Hinkley resident, expressed her relief that a CAO has been issued to PG&E, and also expressed her dismay at the length of time that PG&E is being given to comply with this CAO.
Robert Conaway, Helphinkley.org, voiced concern that Hinkley / Barstow area need representation on the Water Board.
James Dodd, PG&E Advisory Board Committee: He commends the Water Board for getting something done but not moving fast enough. He believes PG&E needs to help the people who want to move out of the area.
Karen Dodd, Hinkley resident: Where is the legal Administrative Civil Liability for PG&E?
Elaine Kearney, Hinkley resident: Built their retirement home in Hinkley and was not aware of the water problems. She is concerned that her property and home is poisoned and worthless.
Daron Banks, Hinkley resident: Private wells need to be added to the total and complete plume map. Suggest Water Board staff test their water not PG&E personnel.
Patti Dickman, Hinkley resident: Thanks the Water Board for issuing the CAO to PG&E, but disappointed in staff for the length of time that it took and the 10 months that the CAO gives PG&E to comply.
Jackie Conaway, Hinkley resident: Ms. Conaway thanks Mr. Singer for all he has done. Ms. Conaway asked if the Water Board knows the source of the Culligan Water being provided to the residences by PG&E and if it has been tested?

Dr. Horne thanked all the residents from Hinkley for coming to the Water Board meeting and making their presentations.

PLANS AND POLICIES

12. **Discussion of Proposed Scope of Work and Development of a Salt and Nutrient Management Plan (SMP) for the Antelope Valley, Antelope Valley Regional Water Management Group, Los Angeles and Kern Counties**

Jan Zimmerman, from the Victorville office and Cindy Wise from the South Lake Tahoe office each made a presentation to the Board. Also Jessica Bunker and Erika de Hollan, representing the Antelope Valley Group, described the efforts of the Antelope Valley Group.

Ms. Zimmerman, Ms. Wise, Ms. De Hollan and Ms. Bunker answered questions from the Board.

Mr. Sandel commented on the great insight that the presenters gave the Board. The presentation was very organized and well thought through.

Mr. Dispenza congratulated the Antelope Valley Group and is very proud of them.

Mr. Pumphrey is very impressed by the collaborated effort and it is great how they have involved all the stakeholders. The Group should really be commended.

Dr. Horne commented on how excited she is about this project.

Chairman Clarke agrees with all the Board Member's comments. Projects which are the result of collaboration of multiple agencies are great and can work.

Board members did not express any concerns with the workplan or the process being followed by the Antelope Valley Group.

ADJOURNMENT

With no further business to come before the Board, the meeting adjourned at 9:22 p.m. on October 12, 2011.

Prepared by: Rebecca Phillips
Rebecca Phillips, Office Technician

Adopted: **December 6, 2011**

Rp/h/BOInfo/Minutes/Final _MINUTES_OCT12-2011rp

Antelope Valley Land Use Designations

Data Sources

City of Lancaster
Files from City of Lancaster Planning Department staff, January 2010.

Land Use Codes:
http://www.cityoflancasterca.org/Modules/ShowDocument.aspx?documentid=9333
http://www.cityoflancasterca.org/Modules/ShowDocument.aspx?documentid=9323
GENERAL PLAN 2030 web page: http://www.cityoflancasterca.org/index.aspx?page=427

City of Palmdale
Files from City of Palmdale Traffic Division/GIS Section staff, May 2010.

Land Use Codes: http://www.cityofpalmdale.org/departments/planning/general_plan/03-LandUse.pdf

Los Angeles County
Files from Los Angeles County Waterworks staff, April 2012.

Land Use Codes: 2012 Draft General Plan 2035
http://planning.lacounty.gov/assets/upl/project/gp_2035_Appendices_C_2012.pdf
http://planning.lacounty.gov/assets/upl/project/gp_2035_Part2_Chapter3_2012.pdf

Kern County
General Plan Map (updated 1-13-2012): http://www.co.kern.ca.us/gis/Files/GeneralPlan.zip
General Plan document: http://pcd.kerndsa.com/planning/planning-documents/general-plans

Floor Area Ratio (FAR) is the ratio of the total covered area on all floors of all buildings to the area of the project site. As a formula, FAR = (total covered area on all floors of all buildings)/ (area of the project site).

du/ac = dwelling unit(s) per acre

City of Palmdale Land Uses

Code	General Plan Land Use	Permitted Density	Population Density (Persons/Acre)	Purpose
CM	Major Commercial	Residential or Mixed Use: 30-150 du/net ac Maximum FAR 3.0		Large and intense commercial uses, such as regional and destination shopping malls and centers, tourist and recreation related commercial services, hotels, and amusement activities; multifamily residences; and residential and commercial mixed uses.
CR	Rural Commercial	Maximum FAR 0.5		Limited commercial uses that are compatible with rural, agricultural, and low-intensity visitor-serving recreational activities, including: retail, personal, and professional services; restaurants; general stores; and professional offices.
CR-MU	Rural Commercial / Mixed Use	0-5 du/net ac Maximum FAR 0.5	13	Limited commercial uses that are compatible with rural, agricultural, and low-intensity visitor-serving recreational activities, including: retail; personal, and professional services; restaurants; general stores; and professional offices; and residential and commercial mixed uses.
H2	Large Lot Residential	0–2 du/net ac	6	Low-density, single family residences
H5	Suburban Residential	0–5 du/net ac	15	Low-density, single family residences
H9	Suburban High Density Residential	0–9 du/net ac	26	Single family residences.
H18	Medium Density Residential	0–18 du/net ac	52	Transitional single family and small-scale multifamily residences, including duplexes, triplexes, fourplexes, rowhouses, small lot subdivisions, and townhomes
H30	Urban Residential	0–30 du/net ac	61	Medium-scale, multifamily residences, and single family residences.
IH	Heavy Industrial	Maximum FAR 1.0		Heavy industrial uses, including heavy manufacturing, refineries, and other labor and capital intensive industrial activities.
IL	Light Industrial	Maximum FAR 1.0		Light industrial uses, such as industrial park activities, warehouses, distribution, assembly, disassembly, fabricating, finishing, manufacturing, packaging, and repairing or processing of materials, printing, commercial laundry, photographic film processing, vehicle repair garages, building maintenance shops, metal work, millwork, and cabinetry work.
ML	Military Land			Military installations and land controlled by U.S. Department of Defense.
OS-BLM	Bureau of Land Management			Areas managed by the Federal Bureau of Land Management.

City of Palmdale Land Uses

Code	General Plan Land Use	Permitted Density	Population Density (Persons/Acre)	Purpose
OS-C	Conservation			For the preservation of open space areas and scenic resource preservation in perpetuity. Applies only to land that is legally dedicated for open space and conservation efforts.
OS-NF	National Forest			Areas within the national forest and managed by the National Forest Service.
OS-PR	Parks and Recreation			Open space recreational uses, such as regional and local parks, trails, athletic fields, community gardens, and golf courses.
OS-W	Water			Bodies of water, such as lakes, reservoirs, natural waterways, and man-made infrastructure, such as drainage channels, floodways, and spillways. Includes active trail networks within or along drainage channels.
P	Public and Semi-Public	Maximum FAR 3.0		Public and semi-public facilities and community-serving uses, including: public buildings and campuses, schools, hospitals, cemeteries, government buildings, and fairgrounds. Airports and other major transportation facilities. Major facilities, including landfills, solid and liquid waste disposal sites, multiple use stormwater treatment facilities, and major utilities.
RL1	Rural Land 1	Maximum 1 du/1 gross ac Maximum FAR 0.5	4	Single family residences; equestrian and limited animal uses; and limited agricultural and related activities.
RL2	Rural Land 2	Maximum 1 du/2 gross ac Maximum FAR 0.5	2	Single family residences; equestrian and limited animal uses; and limited agricultural and related activities.
RL5	Rural Land 5	Maximum 1 du/5 gross ac Maximum FAR 0.5	1	Single family residences; equestrian and limited animal uses; and limited agricultural and related activities.
RL10	Rural Land 10	Maximum 1 du/10 gross ac Maximum FAR 0.5	0.4	Single family residences; equestrian and animal uses; and agricultural and related activities.
RL20	Rural Land 20	Maximum 1 du/20 gross ac Maximum FAR 0.5	0.2	Single family residences; equestrian and animal uses; and agricultural and related activities.
RL40	Rural Land 40	Maximum 1 du/40 gross ac Maximum FAR 0.5	0.1	Single family residences; equestrian and animal uses; and agricultural and related activities.
TC	Transportation Corridor			

City of Palmdale Land Uses

Code	General Plan Land Use	Permitted Density	Purpose
Aqueduct	California Aqueduct		Open space
AR	Airport and Related Uses		Intended for public and private airfields and support facilities, aerospace-related industries, transportation-related industries, and commercial facilities necessary to support military and commercial air traffic. Primarily applies to U.S. Air Force Plant 42 and the Palmdale Regional Airport site. While industrial development related to the aerospace industry has occurred at Air Force Plant 42, the airport property is largely vacant, supporting minor agricultural uses and sewage treatment facilities.
BP	Business Park		Intended for a variety of office, research and development, light assembly and fabrication, and supportive commercial uses within an environment characterized by master-planned complexes maintaining a high quality of design and construction. Development in this designation is expected to provide enhanced landscaping and outdoor amenities to create a campus setting. Operations and storage activities are to be confined to enclosed buildings.
CC	Community Commercial	Maximum FAR of 1.0.	Intended for retail and service uses, such as restaurants, apparel stores, hardware stores, grocery markets, banks, offices, and similar uses.
CM	Commercial Manufacturing		Intended for mixed use development of lighter industrial uses and the more intensive service, retail and wholesale commercial uses. Uses include research and development, distribution, manufacturing and wholesale or retail sale of industrial supplies, transportation equipment, building equipment and materials, and similar uses. Supportive commercial uses such as restaurants or convenience markets, which serve consumers within the industrial/commercial area, may be allowed. However, this designation is not intended for general commercial uses, either of a retail or service nature, which will attract non-industrial users. Areas shall have or plan to have adequate sewer, water, transportation, drainage, utilities and public services available. The designation may be used as a transitional use between more intensive industrial uses and less intensive commercial uses.
DC	Downtown Commercial		Intended for the City's traditional retail/service core area, located in proximity to Palmdale Boulevard. Representative uses are designed to produce high levels of social or commercial activity in the downtown area and include entertainment uses, institutional uses, pedestrian oriented retail and service uses, and support community commercial uses.
ER	Equestrian Residential	maximum gross density of 0.40 du/ac (1 unit per 2½ acres)	Intended for single family residential uses where equestrian and related animal keeping activities are permitted. Areas are rural in nature with parcel sizes of 2½ acres or larger. Full urban services such as community water and sewer may not be available to these areas. Estimated population: 800 persons/mi^2.
IND	Industrial		Includes a variety of industrial uses, including the manufacturing and assembly of products and goods, warehousing, and distribution. May include some limited commercial uses which are incidental to and supportive of the primary industrial uses. Areas shall have or plan to have adequate sewer, water, transportation, drainage, utilities and public services.
LDR	Low Density	maximum gross	This designation is appropriate to hillside areas and as a transition between rural and suburban areas. It is

City of Palmdale Land Uses

Code	General Plan Land Use	Permitted Density	Purpose
	Residential	density of 1 du/ac	generally expected that urban services such as community sewer and water will be provided to new development proposed within this designation. Minimum lot sizes will generally be one acre or larger, although clustering may be permitted to encourage preservation of natural resources and steep slopes. Estimated population: 1,600 persons/mi^2.
MFR	Multifamily Residential	10.1-16 du/ac	Housing types may include a variety of attached and detached dwelling unit types. Estimated population: 26,000 persons/mi^2.
MR	Medium Residential	maximum gross densities of 6.1 to 10 du/ac	Housing types may include single family detached, single family attached, townhouses, condominiums, duplexes, triplexes, apartments, or manufactured housing developments. Minimum lot size is 7,000 ft^2 for single family residential uses. Equestrian and large animal uses are not intended within these areas. Estimated population: 16,200 persons/mi^2.
MRE	Mineral Resource Extraction		Intended for extraction and processing of mineral resources, including sand, gravel and decomposed granite. Activities include mining, crushing and sales of mineral products; asphalt and concrete batching.
NC	Neighborhood Commercial	Maximum FAR is 0.50	Intended for convenience type retail and service activities designed to serve the daily and short-term needs of the immediate neighborhood.
OC	Office Commercial	Maximum FAR is 1.0	Intended for a variety of professional office uses, including medical, personal, business, legal, insurance, real estate, financial, and other similar uses. May include limited retail, service, child care and eating establishments to support the primary office users within this designation. May include vocational, technical and trade schools, private or public college or universities, and supportive commercial uses. This designation is appropriate between more intensive commercial uses and residential designations, or within commercial areas serving the administrative and professional service needs of businesses and the general public.
OS	Open Space		Intended to identify and reserve land for both natural and active open space uses, including City parks. The designation identifies existing and acquired but not yet built park sites within the community, as well as lands dedicated for open space purposes. This designation is appropriate to protect sites with physical limitations such as flood plains, very steep terrain (slopes steeper than 50 percent), or significant natural resources. Typical uses include recreational uses, horticulture, agriculture, animal grazing or similar uses.
PF	Public Facility	Maximum FAR is 1.0.	Intended for various types of public facilities, including but not limited to schools, parks, libraries, hospitals, public safety and governmental facilities, sewer and water treatment plants, and landfills. Within the PF designation, uses are specifically identified by use type:
			PF-B Public Facility-Basin PF-C Public Facility-Cemetery PF-Landfill Public Facility-Landfill PF-P&R Public Facility-Park and Ride PF-S Public Facility-School PF-TP Public Facility-Treatment Plant PF-W Public Facility-Water Treatment

City of Palmdale Land Uses

Code	General Plan Land Use	Permitted Density	Purpose
RC	Regional Commercial	Maximum FAR is 1.0.	Intended for retail and service uses attracting consumers from a regional market area. Goods and services provided are typically long-term in nature, rather than convenience goods. Uses include department stores, regional shopping malls, automobile dealerships, hotel/motels, and large retail outlets. Supportive commercial uses serving a community commercial function, such as financial institutions, retail and food services, may also be included, provided that such uses are not primarily oriented to the convenience market.
SD	Special Development		Intended for areas which, due to lack of infrastructure and public services, topography, environmental sensitivity, and development constraints, require comprehensive planning beyond that normally associated with the General Plan. This planning could be accomplished through the Specific Plan process. Development is primarily intended to be residential in nature, with a gross density of 0-2 dwelling units per acre. However, supportive commercial uses are anticipated within this designation. Higher residential density and the location and intensity of supportive commercial uses may be established based upon environmental, topographic, and infrastructural capacity of the land.
SFR-1	Single Family Residential 1	0-2 du/ac	Intended for single family residential uses with net lot sizes generally one half acre or larger, creating a semi-rural environment with horse/animal keeping possible. Full urban services are expected in these areas, although larger lot subdivisions may be developed. Estimated population of 3,600 persons/mi^2.
SFR-2	Single Family Residential 2	0-3 du/ac	Intended for single family residential uses with net lot sizes generally 10,000 ft^2 or larger, although clustering may be permitted to preserve steeper terrain or significant physical features. Full urban services will be required in new development areas. Estimated population of 5,600 persons/mi^2.
SFR-3	Single Family Residential 3	3.1-6 du/ac	Intended for single family residential uses with subdivisions containing a 7,000 ft^2 minimum lot size. Estimated population of 9,700 persons/mi^2.

City of Palmdale Specific Plans

General Plan Land Use
Antelope Valley Auto Center Specific Plan (SP-16)
Antelope Valley Business Park Specific Plan
City Ranch Specific Plan (SP-2)
Foothill Ranch Specific Plan (SP-17)
Hillside Residential Specific Plan (SP-7)
Joshua Hills Specific Plan (SP-4)
Lockheed Specific Plan (SP-11)

General Plan Land Use
Palmdale Trade and Commerce Specific Plan (SP-13)
Palmdale Transit Village Specific Plan (SP-??)
Quarry and Reclamation Specific Plan (SP-14)
Quarry and Reclamation Specific Plan
Rancho Vista Specific Plan (SP-5)
Ritter Ranch Specific Plan (SP-3)

City of Lancaster Land Uses

Code	General Plan Land Use	Permitted Density	Description	SNMP Designation
NU	Non-urban Residential	0.4 - 2.0 dwellings per acre (DU/AC)	Density ranges from one dwelling unit per 2.5 acres to two dwelling units per acre.	
UR	Urban Residential	2.1 - 6.5 DU/AC		
MR1	Multiple Family Residential – Medium Density	6.6 - 15.0 DU/AC		
MR2	Multiple Family Residential – High Density	15.1 - 30.0 DU/AC		
C	Commercial	Floor area ratios (FARs) ranging from 0.5 to 1.0.	Includes a broad spectrum of uses, including regional, community, neighborhood, and highway-oriented uses.	
OP	Office/Professional	Maximum FAR of 0.75.	Includes office and professional uses and supporting commercial uses.	
LI	Light Industry	Maximum FAR of 0.5.	Clean, non-polluting industrial and office uses with support commercial.	
HI	Heavy Industry	Maximum FAR of 0.5.	Includes a range of industrial uses in a less restrictive setting.	
H	Public and Quasi- Public Facilities – Health Care		Includes public and private hospitals, health care facilities, and related independent or assisted-living residential facilities.	
P	Public	Maximum FAR of 1.0.	Uses and lands in public ownership, including governmental administration and service facilities. Includes public schools and educational institutions.	
O	Open Space		Includes publicly owned parks and recreation facilities. Existing parks are specifically delineated; future parks may be represented symbolically. Includes cemeteries, funeral homes, mausoleums, crematoriums, and columbariums.	
SP	Specific Plan		Specific Plans and planned developments.	
MU	Mixed Use	Average density: 21 dwelling units/acre Average FAR: 1.0 Unit density and floor area rations may vary depending on the purpose and design.	This category combines retail, service and office uses with higher density residential uses in the same building or on the same site with residential potentially located above commercial activities. Development typically functions as the center of activity for the surrounding area and emphasizes integrated design with strong pedestrian/transit connections. Areas considered for mixed-use development will typically require development under the guidance of a specific plan.	

Kern County Land Uses

General Plan Land Use	Description
State and Federal Land	Applied to all property under the ownership and control of the various State and federal agencies operating in Kern County (military, U.S. Forest Service, Bureau of Land Management, Department of Energy, etc.).
Incorporated Cities	Cities responsible for the preparation and maintenance of their own General Plans.
Solid Waste Disposal Facility	Public, semi-public, or private municipal solid waste facilities, organic waste disposal facilities, and segregated waste stream disposal facilities.
Accepted County Plan Areas	A designation of areas for which specific land use plans have already been prepared and approved.
Interim Rural Community Plan	Settlements in the County that have individual character which, in past plans, have been broadly merged with the surrounding countryside. These settlements are recognized as unique communities; each with its own character, special advantages, and problems which should more appropriately be addressed at a specific plan level of detail.
Specific Plan Required	Areas wherein large-scale projects have been previously proposed by the project landowner(s). The project proponent bears the burden of demonstrating the suitability of the property for the conceptual uses and densities. The Maximum Allowed Land Use Density tables (Appendix C) showing acreages and densities are conceptual and shall be used as guidelines should a specific plan be developed. Actual land uses and densities shall be based on consistency with the General Plan goals, policies and environmental review and may require reduction or elimination.
Maximum 4 Units/Net Acre	This category is designed to accommodate urban single-family development on lots with a minimum average size of 1/4 net acre (10,890 Sq. Ft. Site Area/Unit).
Maximum 1 Unit/Net Acre	Single-family designation with rural service needs in the valley and desert regions, while in the mountain region, residential uses of this density will require urban service provision (43,560 Sq. Ft. Site Area/Unit).
Minimum 2.5 Gross Acres/Unit	Single family designation with rural service needs in the valley and desert regions, while in the mountain region residential uses of this density will require urban service provision.
Minimum 5 Gross Acres/Unit	Designated in the outlying, less densely settled areas, often characterized with physical constraints and not requiring connections to public water and sewer infrastructure.
Minimum 20 Gross Acres/Unit	Designated in the outlying, less densely settled areas, often characterized by physical constraints and not requiring connections to public water and sewer infrastructure.
Highway Commercial	Uses which provide services, amenities, and accommodations at key locations along major roadways to visitors and through traffic. Uses include, but are not limited to: Hotels, motels, restaurants, garages, service stations, recreational vehicle parks, fast-food restaurants, truck stops, and truck washes.
Light Industrial	Unobtrusive industrial activities that can be located in close proximity to residential and commercial uses with a minimum of environmental conflicts. Industries are characterized as labor-intensive and nonpolluting and do not produce fumes, odors, noise, or vibrations detrimental to nearby properties. Uses may include: wholesale businesses, storage buildings and yards, warehouses, manufacturing, and assembling.
Service Industrial	Commercial or industrial activities which involve outdoor storage or use of heavy equipment. Such uses produce significant air or noise pollution and are visually obtrusive. Uses include, but are not limited to: Automobile and truck parking, storage and repair shops, freighting or trucking yards, bottling plants, breweries, welding shops, cleaning plants, and other manufacturing and processing activities.

Kern County Land Uses

General Plan Land Use	Description
Heavy Industrial	Large-scale industrial activities that are incompatible with other land uses because of potential severe environmental impacts and/or high employee densities. Uses include, but are not limited to: Manufacturing, assembling and processing activities, transportation facilities, material and equipment storage, sawmills, foundries, refineries, and petroleum product storage.
Intensive Agriculture (Min. 20-Acre Parcel Size)	Areas devoted to the production of irrigated crops or having a potential for such use. Other agricultural uses, while not directly dependent on irrigation for production, may also be included. Uses may include: Irrigated cropland; orchards; vineyards; horse ranches; raising of nursery stock ornamental flowers and Christmas trees; fish farms' bee keeping' ranch and farm facilities and related uses; one single-family dwelling unit; cattle feed yards; dairies; dry land farming; livestock grazing; water storage; groundwater recharge acres; mineral; aggregate; and petroleum exploration and extraction; hunting clubs; wildlife preserves; farm labor housing; public utility uses; and land within development areas subject to significant physical constraints.
Resource Reserve (Min. 20- Or 80- Acre Parcel Size)	Areas of mixed natural resource characteristics, such as rangeland, woodland, and wildlife habitat which occur within an established County water district. Uses may include: Livestock grazing; dry land farming; ranching facilities; wildlife and botanical preserves; and timber harvesting; one single-family dwelling unit; irrigated croplands; water storage or groundwater recharge areas; mineral; aggregate; and petroleum exploration and extraction; recreational activities, such as gun clubs and guest ranches; and land within development areas subject to significant physical constraints.
Extensive Agriculture (Min. 20- Or 80-Acre Parcel Size)	Agricultural uses involving large amounts of land with relatively low value-per-acre yields, such as livestock grazing, dry land farming, and woodlands. Uses may include: Livestock grazing; dry land farming; ranching facilities; wildlife and botanical preserves; and timber harvesting; one single-family dwelling unit; irrigated croplands; water storage or groundwater recharge areas; mineral; aggregate; and petroleum exploration and extraction; and recreational activities, such as gun clubs and guest ranches; and land within development areas subject to significant physical constraints.
Mineral And Petroleum (Min. 5-Acre Parcel Size)	Areas which contain producing or potentially productive petroleum fields, natural gas, and geothermal resources, and mineral deposits of regional and Statewide significance. Uses are limited to activities directly associated with the resource extraction. Uses may include: Mineral and petroleum exploration and extraction, including aggregate extraction; extensive and intensive agriculture; mineral and petroleum processing (excluding petroleum refining); natural gas and geothermal resources; pipelines; power transmission facilities; communication facilities; equipment storage yards; and borrow pits.
Resource Management (Min. 20- Or 80-Acre Parcel Size)	Primarily open space lands containing important resource values, such as wildlife habitat, scenic values, or watershed recharge areas. Other lands may include undeveloped, non-urban areas that do not warrant additional planning within the foreseeable future because of current population (or anticipated increase), marginal physical development, or no subdivision activity. Uses may include: Recreational activities; livestock grazing; dry land farming; ranching facilities; wildlife and botanical preserves; and timber harvesting; one single-family dwelling unit; irrigated croplands; water storage or groundwater recharge areas; mineral; aggregate; petroleum exploration and extraction; open space and recreational uses; one single-family dwelling; land within development areas subject to significant physical constraints; State and federal lands which have been converted to private ownership.

Antelope Valley Regulatory Groundwater Cleanup Sites

Data Source: Files provided by State Board staff at the GeoTracker Help Desk and downloaded on February 7, 2013.

Global ID	Site/ Facility Name	Site/ Facility Type	Site Status	Address	City	Zip Code	Latitude	Longitude	Potential Contaminants of Concern
T0603700327	7-11 #15127	LUST Cleanup Site	Completed - Case Closed	02873 AVE R E	Palmdale	93550	34.5728202	-118.0767946	Gasoline
T0603700316	7-11 #17837	LUST Cleanup Site	Completed - Case Closed	44011 Sierra HWY	Lancaster	93534	34.6823980	-118.1344900	Gasoline
T0603700315	7-11 #18020	LUST Cleanup Site	Completed - Case Closed	304 AVE I E	Lancaster	93535	34.7038868	-118.1259727	Gasoline
T0603700349	7-11 #19597	LUST Cleanup Site	Completed - Case Closed	00844 AVE J E	Lancaster	93535	34.6894476	-118.1157708	Gasoline
T0603720023	7-Eleven/ Southland CORP #19597	LUST Cleanup Site	Open - Site Assessment	844 E AVE J	Lancaster	93535	34.6892585	-118.1142122	MTBE / TBA / Other Fuel Oxygenates
T0603700392	76 Product Facility #1016	LUST Cleanup Site	Completed - Case Closed	38405 Sierra HWY N	Palmdale	93550	34.5796309	-118.1167388	Gasoline
T10000000154	A V Mall Shell #135730	LUST Cleanup Site	Completed - Case Closed	1127 Rancho Vista	Palmdale	93551	34.6019800	-118.1097930	
T0603700260	A V Ready Mix	LUST Cleanup Site	Completed - Case Closed	37815 6TH ST E	Palmdale	93551	34.5690440	-118.1175620	Diesel
L10002290051	Acton Clay Quarries	Land Disposal Site	Open - Verification Monitoring	31375 Aliso Canyon Road	Acton		34.4435210	-118.1503210	
L10007240290	Air Force Plant 42 FFTF	Land Disposal Site	Open	2503 E AVE P	Palmdale	93550	34.6228258	-118.1019974	
T060297388	AM/PM #6150	LUST Cleanup Site	Completed - Case Closed	2101 Rosamond BLVD	Rosamond	93560	34.8641630	-118.1687910	Gasoline
T0603731985	Antelope Hill Center	LUST Cleanup Site	Open - Site Assessment	13100 E Pearblossom HWY	Pearblossom	93553	34.5064620	-117.8965470	Gasoline, MTBE / TBA / Other Fuel Oxygenates, Xylene
T0603709494	Antelope Valley Auto Mall/Carwash	LUST Cleanup Site	Open - Site Assessment	38935 N 5TH ST West	Palmdale	93550	34.5902450	-118.1395500	Gasoline
T0603700402	Antelope Valley Bus	LUST Cleanup Site	Completed - Case Closed	660 AVE L W	Lancaster	93552	34.6602812	-118.1427903	Gasoline
T0603700223	Antelope Valley Bus INC	LUST Cleanup Site	Completed - Case Closed	44706 Yucca AVE N	Lancaster	93535	34.6952740	-118.1341490	Other Solvent or Non-Petroleum Hydrocarbon
T0603700252	Antelope Valley Cattle & Mill	LUST Cleanup Site	Completed - Case Closed	42164 N 40TH ST E	Lancaster	93534	34.6553048	-118.2012770	Gasoline
T0603700362	Antelope Valley Dairy	LUST Cleanup Site	Completed - Case Closed	9753 AVE F-8 E	Lancaster	93535	34.7415435	-117.9601688	Gasoline
T0603759979	Antelope Valley Distribution	LUST Cleanup Site	Completed - Case Closed	43851 North Division Street	Lancaster	93535	34.6792790	-118.1326610	Gasoline
T0603700329	Antelope Valley Fairground	LUST Cleanup Site	Completed - Case Closed	155 AVE I E	Lancaster	93535	34.7040396	-118.1278653	Gasoline
SL184471430	Antelope Valley Freeway Spill	Cleanup Program Site	Completed - Case Closed	7600 Block Escondido Canyon RD	Acton		34.4802415	-118.1877786	
T0603700300	Antelope Valley Mosquito ABAT	LUST Cleanup Site	Completed - Case Closed	127 Oldfield ST W	Lancaster	93534	34.6925890	-118.1313380	Gasoline
L10009605384	Antelope Valley Recycling # 1	Land Disposal Site	Open	1200 W City Ranch RD	Palmdale	93550	34.5697297	-118.1496763	

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L10004594296	Antelope Valley Recycling #2	Land Disposal Site	Open	1200 City Ranch	Palmdale	93550	34.5698550	-118.1498370	
T0603799270	Antelope Valley Recycling And Disposal Former UST	LUST Cleanup Site	Open - Site Assessment	1200 W City Ranch	Palmdale	93550	34.5674945	-118.1483030	
T0603700274	Antelope Valley Refrigerating	LUST Cleanup Site	Completed - Case Closed	602 AVE R E	Palmdale	93550	34.5725569	-118.1170434	Diesel
T0603749395	Antelope Valley SCH TRANSP Agency	LUST Cleanup Site	Open - Site Assessment	670 AVE L-8	Lancaster	93534	34.6532350	-118.1085280	Diesel
T0603700333	Antelope Valley Schools TRANS	LUST Cleanup Site	Completed - Case Closed	670 AVE L8 W	Lancaster	93535	34.6511670	-118.1426430	Gasoline
T0603700305	Antelope Valley Trucking	LUST Cleanup Site	Completed - Case Closed	37900 6TH ST E	Palmdale	93590	34.5715342	-118.1176778	Diesel
T10000001483	ARCO # 1369	LUST Cleanup Site	Open - Site Assessment	411 W Palmdale BLVD	Palmdale	93551	34.5826779	-118.1361526	Gasoline
T0603732754	ARCO #05579	LUST Cleanup Site	Completed - Case Closed	41923 N Sierra HWY	Palmdale	93551	34.6454360	-118.1287660	Gasoline
T0603700255	ARCO #1369	LUST Cleanup Site	Completed - Case Closed	411 Palmdale BLVD W	Palmdale	93550	34.5872290	-118.1474700	Gasoline
T0603700281	ARCO #1917	LUST Cleanup Site	Completed - Case Closed	1326 AVE K	Lancaster	93534	34.6750010	-118.1066251	Gasoline
T0603700342	ARCO #1917	LUST Cleanup Site	Open - Remediation	1326 AVE K	Lancaster	93534	34.6746351	-118.1548047	Gasoline
T0603700302	ARCO #3030	LUST Cleanup Site	Open - Remediation	918 Lancaster ST W	Lancaster	93534	34.6967964	-118.1476164	Gasoline
T0603792973	ARCO #5495	LUST Cleanup Site	Completed - Case Closed	33488 Crown Valley ROAD	Acton	93510	34.4900000	-118.1900000	Gasoline
T0603700331	ARCO #5678	LUST Cleanup Site	Completed - Case Closed	2008 AVE I W	Lancaster	93534	34.7039676	-118.1659598	Gasoline
T0603726941	ARCO #5686	LUST Cleanup Site	Completed - Case Closed	111 West AVE K	Lancaster	93534	34.6754470	-118.1306490	Gasoline
T0602900898	ARCO #6150	LUST Cleanup Site	Completed - Case Closed	2101 Rosamond BLVD	Rosamond	93560	34.8643925	-118.1671755	Waste Oil / Motor / Hydraulic / Lubricating
T0603728960	ARCO #6180	LUST Cleanup Site	Completed - Case Closed	44407 10TH Street East	Lancaster	93535	34.6897820	-118.1130910	Gasoline
T0603700298	ARCO #6180	LUST Cleanup Site	Completed - Case Closed	44407 10TH ST N	Lancaster	93535	34.6897440	-118.1483880	Gasoline
T0603799273	ARCO #9636	LUST Cleanup Site	Completed - Case Closed	2354 E Palmdale BLVD	Palmdale	93550	34.5797990	-118.0855190	Gasoline
T0602999271	ARCO Products	LUST Cleanup Site	Completed - Case Closed	42420 N N 60TH Street West	Lancaster	93536	34.6537090	-118.2361320	Gasoline
T0603789190	ARCO Products #05265	LUST Cleanup Site	Completed - Case Closed	2353 E Palmdale BLVD	Palmdale	93550	34.5805330	-118.0855800	Gasoline
T0603769180	ARCO Products #06180	LUST Cleanup Site	Completed - Case Closed	44407 N 10TH Street East	Lancaster	93535	34.6897820	-118.1130910	Gasoline

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T0603700257	Arrow Rock Materials	LUST Cleanup Site	Completed - Case Closed	37790 75TH ST E	Palmdale	93550	34.6498686	-117.9968880	Diesel
L10002848267	Asphalto, All Sumps	Land Disposal Site	Open	Near HWY 33	Kern County		34.8062800	-118.1538020	
T0603700292	AV Ready Mix	LUST Cleanup Site	Completed - Case Closed	42201 Division ST N	Lancaster	93534	34.6496750	-118.1308680	Waste Oil / Motor / Hydraulic / Lubricating
T0602999270	B-52 Market	LUST Cleanup Site	Open - Site Assessment	3000 N SIERRA HWY	Rosamond	93560	34.8646350	-118.1628070	Diesel, Gasoline
T0602900886	Beery Ranch	LUST Cleanup Site	Completed - Case Closed	T13W/R3S/S20	Kern County	93560	34.8619628	-118.1963573	Gasoline
T0603799274	Big Nine Market	LUST Cleanup Site	Completed - Case Closed	8841 E AVE J	Lancaster	93534	34.6902636	-117.9730409	
L10009721950	BIO-GRO Systems-Lancaster	Land Disposal Site	Completed - Case Closed	140TH ST West and AVE A	Lancaster	93534	34.8154680	-118.3879400	
T0603700235	Black Gold Service Station	LUST Cleanup Site	Open - Site Assessment	8157 Pearblossom HWY E	Littlerock	93543	34.5211969	-117.9846055	Gasoline
T0602999268	BLDG 221	LUST Cleanup Site	Completed - Case Closed	BLDG 221	Edwards AFB	93524	34.9250000	-117.9277780	Heating Oil / Fuel Oil
T0602900932	BLDG 4221	LUST Cleanup Site	Completed - Case Closed	Edwards AFB	Edwards AFB	93523	34.9049990	-117.8836140	Diesel
T0602900872	BLDG 4982	LUST Cleanup Site	Completed - Case Closed	Edwards AFB	Edwards AFB	93523	34.9204350	-117.9155599	Diesel
T060294911	BLDG 8352	LUST Cleanup Site	Completed - Case Closed	BLDG 8352	Edwards AFB	93523	34.9250000	-117.9278000	Diesel
T0603784586	Boeing Gray Butte Facility	LUST Cleanup Site	Completed - Case Closed	25000 East AvenuE R-8	Palmdale	93591	34.5656390	-118.0583110	Gasoline, Diesel
T060299521	Boron Maintenance Facility	LUST Cleanup Site	Completed - Case Closed	26653 Prospect Avenue	Boron	93516	35.0045322	-117.6573652	Diesel, Gasoline
T0603761830	BP West Coast Products, LLC	LUST Cleanup Site	Completed - Case Closed	111 W. AVE K	Lancaster	93534	34.6754470	-118.1306490	Gasoline
T0603700248	Buckner Wilson Fabricators	LUST Cleanup Site	Completed - Case Closed	3033 AVE I E	Lancaster	93539	34.7044483	-118.0764675	Diesel
T0603799280	Butler Scales	LUST Cleanup Site	Completed - Case Closed	43859 N Sierra HWY	Lancaster	93534	34.6881425	-118.1354553	
T0603700384	CA DWR	LUST Cleanup Site	Completed - Case Closed	34534 116TH ST N	Pearblossom	93553	34.5065652	-117.9228252	Diesel
T0603700230	Callas Brothers	LUST Cleanup Site	Completed - Case Closed	44854 10TH ST N		93534	34.6983211	-118.1480290	
T0603700352	CALTRANS Lancaster	LUST Cleanup Site	Completed - Case Closed	44023 Sierra HWY N	Lancaster	93534	34.6832746	-118.1341762	Gasoline
T0603706128	CALTRANS Maintenance Station	LUST Cleanup Site	Open - Site Assessment	44023 Sierra Highway	Lancaster	93534	34.6828090	-118.1341090	
T0603700263	Chandler Lumber CO	LUST Cleanup Site	Completed - Case Closed	39531 15TH ST E	Palmdale	93550	34.6009852	-118.1032078	Gasoline
T0603700285	Chevron #9-2870	LUST Cleanup Site	Completed - Case Closed	2850 Palmdale BLVD E	Palmdale	93550	34.5798790	-118.0767250	Gasoline
T0603700304	Chevron #9-5509	LUST Cleanup Site	Completed - Case Closed	1004 AVE I W	Lancaster	93534	34.7039288	-118.1481655	Gasoline

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T0603700334	Chevron #9-7932	LUST Cleanup Site	Completed - Case Closed	100 AVE J E	Lancaster	93534	34.6894253	-118.1306979	Gasoline
T0603700291	Chevron #9-7989	LUST Cleanup Site	Completed - Case Closed	857 AVE K W	Lancaster	93534	34.6748833	-118.1457802	Gasoline
T0603791232	Chevron Bulk Fuel Facility #1001488	LUST Cleanup Site	Completed - Case Closed	45218 Sierra HWY AVE I	Lancaster		34.7391870	-118.1434910	Gasoline
T0603700397	Chevron USA SS # 094189	LUST Cleanup Site	Completed - Case Closed	103 Palmdale BLVD W	Palmdale	93551	34.5791398	-118.1293652	Gasoline
T0603700336	Circle K #748	LUST Cleanup Site	Completed - Case Closed	42124 N 50TH ST W	Quartz Hill	93534	34.6481800	-118.2180680	Gasoline
T0602900961	Circle K #749	LUST Cleanup Site	Completed - Case Closed	12366 Boron AVE	Boron	93516	35.0042450	-117.6493790	Gasoline
T0603705457	Circle K Stores #5608	LUST Cleanup Site	Completed - Case Closed	38405 Sierra HWY N	Palmdale	93550	34.5796652	-118.1166238	Gasoline
T10000001662	City of Lancaster	LUST Cleanup Site	Completed - Case Closed	45640 N 23RD ST West	Lancaster	93536	34.7128689	-118.1706861	Diesel, Waste Oil / Motor / Hydraulic / Lubricating
T10000000538	City of Lancaster	LUST Cleanup Site	Open - Site Assessment	44801 N Sierra HWY	Lancaster	93534	34.6895094	-118.1357012	
T0603760069	City of Lancaster	LUST Cleanup Site	Completed - Case Closed	540 AVE J W	Lancaster	93534	34.6893950	-118.1369550	Diesel, Gasoline, Waste Oil / Motor / Hydraulic / Lubricating
T0603700290	City of Lancaster Former Mobil	LUST Cleanup Site	Open - Site Assessment	NW Corner Avenue J and Sierra Highway	Lancaster	93534	34.6895176	-118.1357020	Gasoline
T10000004354	City of Lancaster, Maintenace Center	LUST Cleanup Site	Open - Site Assessment	46008 N 7TH ST WEST	Lancaster	93534	34.7187917	-118.1439778	
T0603784358	City of Palmdale Community Redevelopment	LUST Cleanup Site	Completed - Case Closed	38405 N Sierra HWY	Palmdale	93550	34.5799760	-118.1166770	Gasoline
T0603700229	Clay Street Properties	LUST Cleanup Site	Open - Verification Monitoring	2033 AVE J	Lancaster	93535	34.6898099	-118.1661344	Gasoline
T0603700278	Continental Baking	LUST Cleanup Site	Completed - Case Closed	44117 Division ST N	Lancaster	93454	34.6845700	-118.1309190	
T0603700303	Crystalaire Farms	LUST Cleanup Site	Completed - Case Closed	32907 165TH ST	Llano	93544	34.4860990	-117.8405380	Gasoline
T10000001601	Dairy, The	LUST Cleanup Site	Open - Site Assessment	44419 North Division Street	Lancaster	93534	34.6900216	-118.1304717	
L10005924923	Debord Septage Ponds	Land Disposal Site	Open	2 MI North of Boron	Boron	93516	35.0190315	-117.6073551	
T0603700261	Desert Market Corp	LUST Cleanup Site	Completed - Case Closed	48406 N 90TH ST E	Lancaster	93535	34.7637532	-117.9697866	Gasoline
T0603700356	Dewey Pest Control	LUST Cleanup Site	Completed - Case Closed	45440 23RD ST N	Lancaster	93535	34.7089684	-118.1713486	Benzene
T0603700295	DRC Pump Systems	LUST Cleanup Site	Completed - Case Closed	3604 AVE I E	Lancaster	93535	34.7044984	-118.0664431	Gasoline

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L10003261293	Drum Storage Area (Lebec Cement Plant)	Cleanup Program Site	Completed - Case Closed	PO BOX 1247	Lebec	93243	34.8233420	-118.7491340	
L10003257539	Edwards Air Force Base- 4 - Site 13 - Research Lab Class III LF	Land Disposal Site	Completed - Case Closed	Eastern Side of Mars Boulevard	Edwards AFB	93523	34.9229720	-117.6844320	
T0603958004	Elite Car Wash	LUST Cleanup Site	Completed - Case Closed	44267 N Division ST	Lancaster	93535	34.6983787	-118.1304267	Diesel, Gasoline, Waste Oil / Motor / Hydraulic / Lubricating
T10000000182	Enduro Plumbing CO	LUST Cleanup Site	Open - Site Assessment	1055 W AVE L-12	Lancaster	93534	34.6604030	-118.1487100	Diesel, Gasoline
T10000001103	ERIC'S PLACE	LUST Cleanup Site	Open - Site Assessment	48406 N 90TH ST East	Lancaster	93535	34.6841852	-117.9696835	
T0603700385	Everest Economy Gas, Former	LUST Cleanup Site	Open - Remediation	610 West Avenue I	Lancaster	93534	34.7037067	-118.1406921	Gasoline
T0603700317	EXXON #7-1501	LUST Cleanup Site	Completed - Case Closed	400 Palmdale BLVD W	Palmdale	93550	34.5868159	-118.1461298	Gasoline
T0603700375	FAA DEPT OF Transportation	LUST Cleanup Site	Completed - Case Closed	2555 AVE P E	Palmdale	93550	34.6023036	-118.0833853	Diesel
T0603700246	FENNER CYN YOUTH CONSERV CAMP	LUST Cleanup Site	Completed - Case Closed	25900 Bigrock Creek DR	Valyermo	93563	34.3976860	-117.8045664	
T0603700360	Fire Station #129	LUST Cleanup Site	Completed - Case Closed	421 Avenue M W	Lancaster	93534	34.6458290	-118.1370376	Other Solvent or Non-Petroleum Hydrocarbon
T0603791233	Formal Rental Services CORP	LUST Cleanup Site	Completed - Case Closed	44110 Yucca AVE	Lancaster		34.6843590	-118.1321570	Kerosene
T0603700391	Former 76 (Circle K S #5715)	LUST Cleanup Site	Completed - Case Closed	100 Palmdale BLVD W	Palmdale	935514 236	34.5868173	-118.1461349	Gasoline
T0603700395	Former UNOCAL SS # 0773	LUST Cleanup Site	Completed - Case Closed	44856 Sierra HWY N	Lancaster	93534	34.6981080	-118.1369370	Gasoline
T0603748207	Frank McHugh	LUST Cleanup Site	Completed - Case Closed	310 West I AVE	Lancaster		34.7036540	-118.1332300	Benzene, Xylene, Gasoline
T0603700238	Fuson Farms INC / USDA	LUST Cleanup Site	Completed - Case Closed	28041 AVE C-6 W	Lancaster	93534	34.7874097	-118.6254310	Diesel
T0603700364	GAS CO - High Desert STA #055	LUST Cleanup Site	Completed - Case Closed	38627 Sierra HWY N	Palmdale	93550	34.5838607	-118.1173188	Other Solvent or Non-Petroleum Hydrocarbon
T0603700376	GEMCO Store #521 Former	LUST Cleanup Site	Open - Remediation	1333 AVE K W	Lancaster	93534	34.6750088	-118.1543686	Gasoline
T0603700338	Gifford Cole Property	LUST Cleanup Site	Completed - Case Closed	46402 100TH ST NE	Lancaster	93535	34.7614625	-117.9520417	Gasoline
T0603700311	Goodyear Tire	LUST Cleanup Site	Completed - Case Closed	43729 15TH ST W	Lancaster	93534	34.6792229	-118.1568821	Gasoline
T0603700341	Gorrindo Texaco	LUST Cleanup Site	Completed - Case Closed	44339 Sierra HWY N	Lancaster	93534	34.6886101	-118.1356645	Gasoline
T0603700340	Green Pastures Dairy	LUST Cleanup Site	Completed - Case Closed	1661 AVE K W	Lancaster	93534	34.6752880	-118.1609845	Gasoline

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T0603700268	H W Hunter INC / Crysler Dodge	LUST Cleanup Site	Completed - Case Closed	44733 Sierra HWY N	Lancaster	93534	34.6959070	-118.1369710	Waste Oil / Motor / Hydraulic / Lubricating
T10000000321	Haddad Mobil	LUST Cleanup Site	Open - Site Assessment	505 W. AVE J	Lancaster	93534	34.6896908	-118.1358777	
T0603700358	HDOC #055	LUST Cleanup Site	Completed - Case Closed	38627 Sierra HWY N	Palmdale	93550	34.5871658	-118.1178223	Gasoline
T0603700294	Henry Walsma	LUST Cleanup Site	Completed - Case Closed	44354 Sierra HWY N	Lancaster	93534	34.6888665	-118.1352106	Gasoline
T0602900832	Iarussi Ranch	LUST Cleanup Site	Completed - Case Closed	HCR 3	Rosamond	93560	34.8619628	-118.1963573	Gasoline
T0603700289	J G Cole and Sons	LUST Cleanup Site	Completed - Case Closed	42406 N 100TH ST E	Lancaster	93535	34.6607432	-118.3063288	Gasoline
T0603700297	Jacobs Oil CO	LUST Cleanup Site	Completed - Case Closed	221 AVE J W	Lancaster	93534	34.6895353	-118.1327899	Gasoline
T0603700267	Jacobs Oil CO	LUST Cleanup Site	Completed - Case Closed	1518 Palmdale BLVD E	Palmdale	93550	34.5796081	-118.1023999	Gasoline
T0603700330	Jana Store Fixtures	LUST Cleanup Site	Completed - Case Closed	123 AVE J-5 W	Lancaster	93535	34.6855577	-118.1311262	Gasoline
T0603760955	Jasons Auto Parts	LUST Cleanup Site	Completed - Case Closed	415 Sierra HWY	Palmdale	93550	34.5034130	-118.1156770	Tetrachloroethylene (PCE), Waste Oil / Motor / Hydraulic / Lubricating
T0602900888	JC Fennel & Sons	LUST Cleanup Site	Open - Inactive	27401 20 Mule Team RD	Boron	93516	35.0061006	-117.6400740	Gasoline
T0603700286	Jill R Ratcliffe	LUST Cleanup Site	Completed - Case Closed	36200 Sierra HWY, N	Palmdale	93550	34.5389259	-118.1060841	Gasoline
T0603759407	K-20 MINI Mart	LUST Cleanup Site	Open - Site Assessment	1850 W Avenue K	Lancaster	93536	34.6746000	-118.1651980	Gasoline, Diesel
T0603700283	Kaufman & Board OF SO CAL INC	LUST Cleanup Site	Completed - Case Closed	6000 AVE J W	Lancaster	93550	34.6892626	-118.2366888	Diesel
T0603700284	Kaufman & Board OF SO CAL INC	LUST Cleanup Site	Completed - Case Closed	2721 Elizabeth Lake RD E	Palmdale	93550	34.5871363	-118.1590006	Gasoline
T0602900831	Kern CO DWP Rosamond Road Yard	LUST Cleanup Site	Completed - Case Closed	Locust ST	Rosamond	93560	34.8619628	-118.1963573	Diesel
T0603799271	LA CO DPW J Fox Airfield	LUST Cleanup Site	Open - Site Assessment	4555 W AVE G	Lancaster	93536	34.7332370	-118.2117660	
T0603700322	LA CO DPW Lancaster Yard	LUST Cleanup Site	Completed - Case Closed	419 AVE J W	Lancaster	935343360	34.6895298	-118.1341630	Gasoline
T10000002697	LA CO DPW Road Division 555	LUST Cleanup Site	Completed - Case Closed	17341 E AVE J	Lancaster	93535	34.7348762	-117.8212055	
T10000002835	LA CO DPW Road MD5 Palmdale	LUST Cleanup Site	Completed - Case Closed	38126 N Sierra HWY	Palmdale	93550	34.5752110	-118.1150280	
T0603782011	LA CO DPW Road RD DIV 555A	LUST Cleanup Site	Completed - Case Closed	45122 N 70TH ST East	Lancaster	93535	34.7034140	-118.0050550	Gasoline
T10000002817	LA CO DPW Sewer Lake Hughes	LUST Cleanup Site	Completed - Case Closed	17201 W Elizabeth Lake RD	Lake Hughes	93532	34.6743450	-118.4315920	

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T10000000556	LA CO FD Fire Camp #014	LUST Cleanup Site	Open - Site Assessment	35100 W San Francisquito Canyon RD	Elizabeth Lake	91390	34.6477290	-118.3771903	
T0603700400	LA CO FD Fire Camp #016	LUST Cleanup Site	Open - Site Assessment	26652 N Angeles Forest HWY	Palmdale	93550	34.4551499	-118.1102983	
T0603705145	LA CO FD STA #084	LUST Cleanup Site	Completed - Case Closed	5030 AVE W	Lancaster	93536	34.6890089	-118.2275586	Aviation
T0603700380	LA CO Fire Station #037	LUST Cleanup Site	Completed - Case Closed	38318 9TH ST E	Palmdale	93550	34.5781280	-118.1138900	
T0603700382	LA CO Fire Station #24	LUST Cleanup Site	Completed - Case Closed	1050 Rancho Vista BLVD, W	Palmdale	93550	34.6016430	-118.1494970	
T0603795150	LA CO Sheriff Lancaster Station	LUST Cleanup Site	Open - Site Assessment	1010 W AVE J	Lancaster	93534	34.6893763	-118.2268824	Gasoline
T0603799275	LA CO Sheriffs DEPT Mira Loma	LUST Cleanup Site	Completed - Case Closed	45100 N 60TH ST W	Lancaster	93535	34.7021643	-118.2366677	
T0603774842	LA County Sanitation Districts Palmdale WRP	LUST Cleanup Site	Completed - Case Closed	39300 30TH Street EAST	Palmdale	93550	34.5914350	-118.0763340	Diesel
T0603700320	LADPW Lancaster Subyard	LUST Cleanup Site	Completed - Case Closed	45712 Division ST N	Lancaster	93534	34.7131904	-118.1305328	Diesel
T0603700318	LADPW MD-5	LUST Cleanup Site	Completed - Case Closed	38126 Sierra HWY	Palmdale	93550	34.5754090	-118.1158027	Gasoline
T0603700319	LADPW RD 551	LUST Cleanup Site	Completed - Case Closed	4859 AVE L-12 W	Quartz Hill	93534	34.6491436	-118.2185926	Gasoline
T0603700323	Lancaster Community Hospital	LUST Cleanup Site	Completed - Case Closed	43830 10TH ST N	Lancaster	93534	34.6789680	-118.1467730	Gasoline
T0603700307	Lancaster Ford CO	LUST Cleanup Site	Completed - Case Closed	44614 Sierra HWY N	Lancaster	93534	34.6934350	-118.1357950	Waste Oil / Motor / Hydraulic / Lubricating
T0603700306	Lancaster Ford CO	LUST Cleanup Site	Completed - Case Closed	44614 Sierra HWY N	Lancaster	93534	34.6930962	-118.1361220	Waste Oil / Motor / Hydraulic / Lubricating
T0603700262	Lancaster Landfill	LUST Cleanup Site	Open - Site Assessment	600 AVE F E	Lancaster	93535	34.7416452	-118.1309668	Diesel
L10009466231	Lancaster LF & GW TRTMT DSCHRG	Land Disposal Site	Open	600 E AVE F	Lancaster	91325	34.7442573	-118.1175971	
T0603700253	Lancaster Moving And Storage	LUST Cleanup Site	Completed - Case Closed	44813 N Yucca AVE	Lancaster	93535	34.6971170	-118.1349540	Gasoline
T0603700293	Lancaster Rentals	LUST Cleanup Site	Completed - Case Closed	43631 Sierra HWY N	Lancaster	93534	34.6760340	-118.1346460	Waste Oil / Motor / Hydraulic / Lubricating
T0603709572	Leona Valley Garage	LUST Cleanup Site	Open - Inactive	8854 Elizabeth Lake RD. W	Leona Valley	93551	34.6170400	-118.2882220	Gasoline
T0603713440	Little Oil Company	LUST Cleanup Site	Completed - Case Closed	44125 N Yucca AVE	Lancaster	93535	34.6845480	-118.1333090	Gasoline, Diesel
T10000000631	Littlerock Mini & Gas	LUST Cleanup Site	Open - Site Assessment	7225 E Pearblossom HWY	Littlerock	93543	34.5210930	-117.9858905	Diesel, Gasoline
T0603700288	Lockheed Air Terminal	LUST Cleanup Site	Completed - Case Closed	1011 Lockheed Way	Palmdale	93550	34.6095640	-118.1159450	Aviation
T0603700273	Lockheed Air Terminal BLDG 617	LUST Cleanup Site	Completed - Case Closed	1011 Lockheed Way	Palmdale	93550	34.6095640	-118.1159450	Aviation

Global ID	Site/ Facility Name	Site/ Facility Type	Site Status	Address	City	Zip Code	Latitude	Longitude	Potential Contaminants of Concern
T0603700355	Lockheed Air Terminal CMPLX 10	LUST Cleanup Site	Completed - Case Closed	1011 Lockheed Way E	Palmdale	93550	34.6095640	-118.1159450	Aviation
SLT6V0073834	Lockheed Martin-Related Work	LUST Cleanup Site	Completed - Case Closed	1101 Lockheed Way	Palmdale	93599	34.5848468	-118.1037033	
L10003043139	Main Base Class III Landfill	Land Disposal Site	Open	W of Edwards Main Base	Edwards AFB	93523	34.9540559	-117.9571152	
SL206063824	Maintenance Shop (Lebec Cement Plant)	Cleanup Program Site	Open - Remediation	HWY. 138 APPROX 5 MI E. OF HWY. 5	Lebec	93243	34.8212950	-118.7495440	
T0603700383	Massariai	LUST Cleanup Site	Completed - Case Closed	39500 SIERRA HWY	Palmdale	93550	34.6005520	-118.1208488	Gasoline
T0603700264	Mayflower Gardens	LUST Cleanup Site	Completed - Case Closed	6570 AVE L-12 W	Lancaster	93536	34.6491056	-118.2470688	Gasoline
L10002272084	Middle Buttes Project	Land Disposal Site	Open	8941 W Backus RD	Mojave	93501	34.9614773	-118.2897091	
T0603704814	Minute Serve Dairy	LUST Cleanup Site	Open - Site Assessment	41940 N 50TH ST West	Palmdale	93550	34.5682864	-118.0961131	Gasoline
T10000000550	Minute Service Dairy INC	LUST Cleanup Site	Open - Site Assessment	1159 E AVE I	Lancaster	93535	34.7037880	-117.9612890	
T0603700270	Mission Industries	LUST Cleanup Site	Completed - Case Closed	619 AVE I W	Lancaster	93534	34.7039573	-118.1411627	
T0603700271	Mission Industries	LUST Cleanup Site	Completed - Case Closed	44926 Yucca AVE N	Lancaster	93534	34.6994020	-118.1347990	
T10000003229	Mission Linen Supply	Cleanup Program Site	Open - Site Assessment	44926 North Yucca Avenue	Lancaster	93535	34.6994020	-118.1347990	Tetrachloroethylene (PCE), Trichloroethylene (TCE)
T0603700308	Mobil #11-MM8 (FORMER)	LUST Cleanup Site	Completed - Case Closed	861 AVE I W	Lancaster	93534	34.7039696	-118.1464218	Gasoline
T0603700386	Mobil Mini Mart	LUST Cleanup Site	Open - Assessment & Interim Remedial Action	101 East Avenue J	Lancaster	93535	34.6898981	-118.1298065	MTBE / TBA / Other Fuel Oxygenates, Gasoline
T10000000559	Mobil Oil CORP S/S #18-DX9	LUST Cleanup Site	Open - Site Assessment	2343 W AVE J	Lancaster	93536	34.6898540	-118.1742454	
T0603700224	Mobil Service Station #10-MMW	LUST Cleanup Site	Completed - Case Closed	44358 10TH ST N	Lancaster	93535	34.6891130	-118.1476720	Gasoline
T0603781670	Mobil/Liquor King	LUST Cleanup Site	Completed - Case Closed	5564 Fort Tejon Road	Palmdale	91356	34.5431090	-118.0312810	Gasoline
L10009509578	Mojave Plant-Calif Portland	Land Disposal Site	Open	9350 Oak Creek RD	Mojave	93501	35.0392910	-118.3016480	
T0603734102	Monahans Electric	LUST Cleanup Site	Completed - Case Closed	45318 N Sierra HWY	Lancaster	93534	34.6915918	-118.1355143	Gasoline
T0603700388	Monte Vista Alta Dena Dairy	LUST Cleanup Site	Open - Verification Monitoring	44949 N 10TH Street West	Lancaster	93534	34.6995769	-118.1481183	Benzene, Gasoline

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T0603700280	Mr Ralph Parsons Company	LUST Cleanup Site	Completed - Case Closed	39516 N Division ST E	Palmdale	93550	34.5989830	-118.1296320	
T0603704440	Newcomb's Ranch	LUST Cleanup Site	Completed - Case Closed	Angeles Crest HWY	Mt Waterman	93563	34.4125716	-117.7741190	Aviation
T0603735589	Northridge Equipment Rentals	LUST Cleanup Site	Completed - Case Closed	38860 N Sierra HWY	Palmdale	93550	34.5883830	-118.1179480	Gasoline
T0603700254	Northrop Corporation	LUST Cleanup Site	Completed - Case Closed	3500 AVE M E	Palmdale	93550	34.6459836	-118.0678585	Aviation
T0603700259	NU-EASE INC	LUST Cleanup Site	Completed - Case Closed	42644 Valley Line RD N	Lancaster	93534	34.6575046	-118.1291289	
SL206083826	Old Industrial Landfill (Lebec Cement Plant)	Cleanup Program Site	Open - Remediation	HWY. 138 Approx 5 MI E. OF HWY. 5	Lebec	93243	34.8233420	-118.7491340	Other Chlorinated Hydrocarbons, Tetrachloroethylene (PCE), Trichloroethylene (TCE)
T0603700357	Pacific Bell	LUST Cleanup Site	Completed - Case Closed	9550 Pearblossom HWY	Littlerock	93543	34.5211491	-117.9596948	Diesel
T0603700332	Pacific Bell Palmdale	LUST Cleanup Site	Completed - Case Closed	9000 Leona AVE	Palmdale	93551	34.6142224	-118.2888825	Gasoline
T0603789329	Palmdale Car Wash	Cleanup Program Site	Completed - Case Closed	1520 E. Palmdale BLVD	Palmdale	93550	34.5791310	-118.1021660	Gasoline, Diesel
T0603700269	Palmdale H20 Reclamation Plant	LUST Cleanup Site	Completed - Case Closed	39300 30TH ST E	Palmdale	93550	34.5947974	-118.0763241	
T0603700251	Palmdale High School	LUST Cleanup Site	Completed - Case Closed	2137 AVE R E	Palmdale	93550	34.5727291	-118.0930363	Gasoline
T0603700231	Palmdale Regional Airport	LUST Cleanup Site	Completed - Case Closed	39441 N 25TH ST E	Palmdale	93550	34.5989660	-118.0877040	
T0603700296	Palmdale Water District	LUST Cleanup Site	Completed - Case Closed	2005 AVE Q E	Palmdale	93550	34.5874792	-118.0941364	Gasoline
T0603700233	Palmdale/CALMAT	LUST Cleanup Site	Completed - Case Closed	6851 AVE T E	Littlerock	93543	34.5427738	-118.0143618	Waste Oil / Motor / Hydraulic / Lubricating
T0603700393	Pep Boys # 772	LUST Cleanup Site	Completed - Case Closed	3054 PALMDALE BLVD E	Palmdale	93550	34.5799660	-118.0748654	Gasoline
T0603700335	Perry Morgan	LUST Cleanup Site	Completed - Case Closed	7362 AVE G W	Lancaster	93536	34.7329451	-118.2614040	Gasoline
T060370409	Petro Lock, Main Bulk Facility	LUST Cleanup Site	Open - Remediation	45315 N Trevor Avenue	Lancaster	93534	34.7074020	-118.1346690	Gasoline, Diesel
T0603700266	Petro-Lock INC	LUST Cleanup Site	Open - Site Assessment	38206 Sierra HWY N	Palmdale	93534	34.5755810	-118.1156967	Gasoline
SL0603710027	Quality Cleaners	Cleanup Program Site	Completed - Case Closed	2531 East Avenue S Suite 20	Palmdale	93550	34.5583900	-118.0836700	* Chlorinated Solvents - PCE, * Chlorinated Solvents - TCE, * Volatile Organic Compounds (VOC)
T0603700247	Quartz Hill High School	LUST Cleanup Site	Completed - Case Closed	6040 AVE L W	Quartz Hill	93524	34.6599231	-118.2372250	Gasoline

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T0603700363	Ralph Miller Property	LUST Cleanup Site	Completed - Case Closed	42851 Sierra HWY N	Lancaster	93535	34.6611535	-118.1308270	Gasoline
T0603700396	Ranchers Market	LUST Cleanup Site	Completed - Case Closed	9001 Elizabeth Lake Road	Leona Valley	93551	34.6180277	-118.2887594	Other Solvent or Non-Petroleum Hydrocarbon
T0603700361	Rau/Suzuki Property	LUST Cleanup Site	Completed - Case Closed	3505 Palmdale BLVD E	Palmdale	92211	34.5808390	-118.0660430	Gasoline
T0603700256	Rockwell Intern'l CORP	LUST Cleanup Site	Completed - Case Closed	2825 AVE P E	Palmdale	93550	34.6018460	-118.0765910	
T0603700314	Rottman Drilling CO	LUST Cleanup Site	Completed - Case Closed	46471 Division ST N	Lancaster	93534	34.7267858	-118.1310208	Gasoline
T0603783297	Shell Service Station	LUST Cleanup Site	Open - Eligible For Closure	1853 Palmdale Boulevard, East	Palmdale	93550	34.5800460	-118.0945470	Gasoline
T0603722400	Shell Service Station	LUST Cleanup Site	Open - Eligible For Closure	44015 20TH Street	Lancaster	93534	34.6824346	-118.1661129	Benzene, Diesel, Gasoline
T0603731628	Shell Service Station	LUST Cleanup Site	Open - Site Assessment	37204 E. 47TH Street	Palmdale		34.5585190	-118.0447540	Diesel
T0603712120	Shell Service Station	LUST Cleanup Site	Completed - Case Closed	43620 Challenger Way	Lancaster	93535	34.6755330	-118.1117660	Gasoline
T0603700351	Shell Station	LUST Cleanup Site	Open - Eligible For Closure	866 AVE I W	Lancaster	93534	34.7038107	-118.1464763	Gasoline
T0603704603	Sheppard Muffler Services	LUST Cleanup Site	Completed - Case Closed	2003 AVE I W	Lancaster	93536	34.7041225	-118.1660094	Gasoline
T0603700239	Sheppards Muffler	LUST Cleanup Site	Completed - Case Closed	2003 AVE I W	Lancaster	93536	34.7041225	-118.1660094	Gasoline
L10003439498	Shumake Project	Land Disposal Site	Open	8941 W Backus RD	Mojave	93501	34.9508910	-118.2906930	
T0603700245	Sierra HWY & AVE S	LUST Cleanup Site	Open - Verification Monitoring	37205 SIERRA HWY	Palmdale	93550	34.5581197	-118.1143287	Waste Oil / Motor / Hydraulic / Lubricating
T10000000544	Sierra HWY Antelope Valley S Convience Plaza	LUST Cleanup Site	Completed - Case Closed	37167 N Sierra HWY	Palmdale	93550	34.6895094	-118.1357012	
T10000002837	Sierra SunTower LLC Sierra SunTower Generating Station	Land Disposal Site	Open - Inactive	405 West Avenue G	Lancaster	93534	34.7330251	-118.1356645	Nitrate, Other inorganic / salt, Arsenic, Chromium, Other Metal
T0603704849	Sierra View Apartments	LUST Cleanup Site	Completed - Case Closed	3927 Sierra HWY	Acton	93510	34.4930290	-118.1988177	Gasoline
SL206123828	Silver Hanger Dry Cleaners	Cleanup Program Site	Completed - Case Closed	2331 AVE S	Palmdale		34.6885718	-118.1597161	
T0603700344	Site 2 Tank 2-11 BLDG 211	LUST Cleanup Site	Completed - Case Closed	2500 AVE M E	Palmdale	93550	34.6456299	-118.1743803	Diesel
L10001287451	Smith & Thompson WTF	Land Disposal Site	Open	230 West AVE J-9	Lancaster		34.6894110	-118.1314380	

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T0603700301	SNAPPS SERVICE CENTER	LUST Cleanup Site	Completed - Case Closed	44209 Division ST N	Lancaster	93534	34.6856240	-118.1306350	
T0603753474	Southern California Gas Company	LUST Cleanup Site	Open - Site Assessment	44416 N Division ST	Lancaster	93534	34.6899180	-118.1303650	Gasoline
T0603700236	Southern Pacific - Palmdale	LUST Cleanup Site	Completed - Case Closed	38021 Sierra HWY	Palmdale	93550	34.5728231	-118.1155067	Gasoline
L10009130679	Summerdale Landfill	Land Disposal Site	Open	HWY 41	Sierra		34.6901250	-118.1356920	
T0603796587	Super Kwik Dairy	LUST Cleanup Site	Completed - Case Closed	4358 W. Avenue L	Lancaster	93536	34.6598990	-118.2098510	Gasoline
T0603700343	Texaco Service Station	LUST Cleanup Site	Completed - Case Closed	221 AVE J W	Lancaster	93534	34.6895337	-118.1316710	Gasoline
T0603700348	The Dairy	LUST Cleanup Site	Completed - Case Closed	44419 Division ST N	Lancaster	93534	34.6899483	-118.1305619	
T0603700242	Timber Properties	LUST Cleanup Site	Completed - Case Closed	46400 80TH ST	Lancaster	93536	34.7266280	-118.2700650	
T0603700243	Timber Properties	LUST Cleanup Site	Completed - Case Closed	46401 80TH ST	Lancaster	93536	34.7255039	-118.2722826	
T0603704765	TOSCO - 76 Station #0781	LUST Cleanup Site	Completed - Case Closed	3807 Sierra HWY W	Acton	93510	34.4929210	-118.1981407	Toluene
T0603799309	TOSCO - 76 Station #5570 (FORMER)	LUST Cleanup Site	Completed - Case Closed	43559 W N 10TH Street	Lancaster	93534	34.6744990	-118.1482980	Gasoline
T0603700250	TOSCO - 76 STATION #5570 (FORMER)	LUST Cleanup Site	Completed - Case Closed	43559 W N 10TH Street	Lancaster	93534	34.6744990	-118.1482980	Gasoline
T0603700326	TOSCO/UNOCAL Bulk Plant #345	LUST Cleanup Site	Completed - Case Closed	44141 N Yucca AVE	Lancaster	93534	34.6850965	-118.1331420	Gasoline
T0603700258	Tri-County Trucking	LUST Cleanup Site	Completed - Case Closed	7656 AVE T-8 E	Littlerock	93543	34.5211491	-117.9598278	Diesel
T0603700282	Tuneup Masters	LUST Cleanup Site	Completed - Case Closed	1244 AVE I W	Lancaster	93534	34.7039500	-118.1521918	Waste Oil / Motor / Hydraulic / Lubricating
T0603762214	Tupack's Liquor	LUST Cleanup Site	Completed - Case Closed	2802 East Avenue I	Lancaster		34.7038420	-118.0790810	Gasoline
T10000003000	United Parcel Service	LUST Cleanup Site	Completed - Case Closed	290 W Avenue L	Lancaster	93534	34.6599517	-118.1345728	Diesel
T0603700277	Unknown	LUST Cleanup Site	Completed - Case Closed	41021 38TH ST W	Lancaster	93536	34.6813953	-118.2176823	
T0603700310	Unknown	LUST Cleanup Site	Completed - Case Closed	44633 Sierra HWY N	Lancaster	93534	34.6938104	-118.1362267	Gasoline
T0603700279	Unknown	LUST Cleanup Site	Completed - Case Closed	8506 AVE K E	Lancaster	93454	34.6754636	-117.9784303	
T0603700244	Unknown	LUST Cleanup Site	Completed - Case Closed	20544 AVE J-12 E	Lancaster	93536	34.6791775	-117.7644497	
T0603700240	Unknown	LUST Cleanup Site	Completed - Case Closed	42142 Valley Line RD N	Lancaster	93535	34.6485620	-118.1273620	
T0603700378	UNOCAL #0773	LUST Cleanup Site	Completed - Case Closed	44856 Sierra HWY	Lancaster	93534	34.6975738	-118.1367832	Waste Oil / Motor / Hydraulic / Lubricating

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T0603700337	UNOCAL #4295, Former	LUST Cleanup Site	Completed - Case Closed	1354 AVE J W	Lancaster	93534	34.6889982	-118.1564999	Gasoline
T0603799268	US Gas & Mini Mart	LUST Cleanup Site	Open - Site Assessment	105 E Palmdale BLVD	Palmdale	93550	34.5800370	-118.1288790	Gasoline
T0603757002	USA Gasoline CORP #186	LUST Cleanup Site	Open - Site Assessment	38821 N 10TH ST West	Palmdale	93551	34.5879533	-118.1480777	Gasoline
T0603704276	USDA Forest\Emigrant Landing	LUST Cleanup Site	Completed - Case Closed	Pyramid Lake T7N R18W S22	Angeles Natl Forest	93532	34.6788130	-118.4470364	Gasoline
T0603726285	Vallarta Station	LUST Cleanup Site	Completed - Case Closed	470 East Palmdale BLVD	Palmdale	93550	34.5793970	-118.1210200	Diesel, Gasoline
T0603700249	W A Thompson INC	LUST Cleanup Site	Completed - Case Closed	45819 Division ST N	Lancaster	93534	34.7154640	-118.1312420	Gasoline
T0603700325	Weston Builders Supply CO	LUST Cleanup Site	Completed - Case Closed	37822 N 6TH ST E	Palmdale	93550	34.5689410	-118.1163970	Gasoline
T0603700381	Wilson Ambulance Service	LUST Cleanup Site	Completed - Case Closed	38241 6TH ST E	Palmdale	93550	34.5761370	-118.1184600	
T0603799269	Woodland HILLS HONDA	LUST Cleanup Site	Completed - Case Closed	43607 10TH ST W	Lancaster	93534	34.6750518	-118.1479008	Gasoline

Antelope Valley Salt and Nutrient Management Plan
Project Identification Form

Project Name:_____

Project Sponsor:_____

Project Contact Person:_____

Project Contact Phone:_____

Project Contact Email: _____

Project Location (include name of sub-basin):_____

_____

Project Description: _____

_____

_____

_____

_____

Source Water for the Project (check all that apply):

___Recycled water; _____Acre-Feet/Year

___Groundwater; _____Acre-Feet/Year

___Stormwater; _____Acre-Feet/Year

___Imported water (raw); _____Acre-Feet/Year

___Imported water (treated); _____Acre-Feet/Year

___Surface water; _____Acre-Feet/Year

Project Implementation Year:_____

Project Status:

___Concept

___Planning

___Design

___Construction