RECEIVED
06 MAR 17 AM 9:12
CALIFORNIA REGIONAL WATER
QUALITY CONTROL BOARD
LOS ANGELES REGION

Draft

Literature Review and Data Acquisition

Task 1A – Evaluate Existing Models, Literature, and Data Upper Santa Clara River Chloride TMDL Collaborative Process

Prepared for

Sanitation District of Los Angeles County
Los Angeles Regional Water Quality Control Board

March 2006

CH2MHILL

in association with

5-1061

This Page Intentionally
Left Blank

Contents

Page

Acronyms and Abbreviations vii

Section

1.0 Introduction 1-1
- 1.1 Background 1-1
- 1.2 Report Objectives 1-3

2.0 Data Acquisition Approach 2-1
- 2.1 Identification of Data Needs 2-1
- 2.2 Data Acquisition Process 2-1

3.0 Existing Models, Literature, and Data 3-1
- 3.1 Existing Models 3-1
- 3.2 Physical Setting 3-1
  - 3.2.1 Geographic Area and Topography 3-2
  - 3.2.2 Soils 3-3
  - 3.2.3 Vegetation and Land Use 3-5
- 3.3 Climate 3-5
  - 3.3.1 Rainfall 3-5
  - 3.3.2 Evapotranspiration 3-6
- 3.4 Surface-water Flow and Quality 3-6
  - 3.4.1 General Hydrology and Hydraulics 3-6
  - 3.4.2 Reservoir Operations and Hydrology 3-7
  - 3.4.3 Applied Water 3-8
  - 3.4.4 Hydrologic Trends 3-8
- 3.5 Hydrogeology 3-9
  - 3.5.1 Santa Clara River Valley East Subbasin 3-10
  - 3.5.2 Piru Subbasin 3-11
- 3.6 Groundwater Flow and Quality 3-12
  - 3.6.1 Santa Clara River Valley East Subbasin Groundwater Trends 3-12
  - 3.6.2 Piru Subbasin Groundwater Trends 3-13
- 3.7 Salt Loading and Transport 3-14
  - 3.7.1 Water and Salt Budget 3-14
  - 3.7.2 Transport Properties 3-14

4.0 Task 1A Data Gaps 4-1
- 4.1 GSWI Database 4-1
- 4.2 Key Data Gap Area for Phase 1B 4-1
- 4.3 Potential Additional Data Gap Areas 4-2

5.0 Works Cited 5-1

5-1063

Contents, Continued

Appendices

A Annotated Bibliography

B Historical Precipitation Trends

C Historical Evapotranspiration Trends

D Historical Reservoir Release Trends

E Historical Treatment Plant Effluent Discharge Trends

F Historical Streamflow Trends

G Historical Chloride Concentration Trends in Surface Water

H Historical Total Dissolved Solids Concentration Trends in Surface Water

I Historical Groundwater Level Trends

J Historical Groundwater Pumping Trends

K Historical Chloride Concentration Trends in Groundwater

L Historical Total Dissolved Solids Concentration Trends in Groundwater

Tables
(located at the end of each section)

3-1 Summary of Existing Computer Models Developed within the SCR Watershed

3-2 Summary of Precipitation Measurement Counts

3-3 Summary of Point Source Discharge Measurement Counts

3-4 Summary of Streamflow Measurement Counts

3-5 Summary of Chloride Sample Counts in Surface Water

3-6 Summary of TDS Sample Counts in Surface Water

3-7 Summary of Groundwater Level Measurement Counts

3-8 Summary of Annual Groundwater Pumping Measurement Counts

3-9 Summary of Chloride Sample Counts in Groundwater

3-10 Summary of TDS Sample Counts in Groundwater

3-11 Water Budget Components for the GSWI Study Area

Contents, Continued

Figures
(located at the end of each section)

1-1 GSWI Study Area and Surrounding Vicinity

3-1 Land Surface Elevations

3-2 Soil Infiltration Capacity Map

3-3 2000 Land Use

3-4 Isohyetal Map Showing Average Annual Rainfall Pattern from 1900 to 1960

3-5 Point Source Locations

3-6 Stream Gage Locations

3-7 Surface Water Sampling Locations at which Chloride Concentration Data Are Available

3-8 Surface Water Sampling Locations at which TDS Concentration Data Are Available

3-9 Numerical Model Grids Used by the Upper Basin Water Purveyors and UWCD

3-10 Groundwater Basins

3-11 Geologic Map for Portions of Los Angeles and Ventura Counties

3-12 Well Locations at which Well Construction Is Known

3-13 Well Locations at which Aquifer Property Data Are Available Electronically

3-14 Well Locations at which Groundwater Level Data Are Available

3-15 Well Locations at which Pumping Estimates Are Available

3-16 Groundwater Sampling Locations at which Chloride Concentration Data Are Available

3-17 Groundwater Sampling Locations at which TDS Concentration Data Are Available

3-18 Schematic of Routing Processes for Water and Salts

This Page Intentionally
Left Blank

Acronyms and Abbreviations

AMEC	AMEC Earth & Environmental
ASR	aquifer storage and recovery
CaSIL	California Spatial Information Library
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CLWA	Castaic Lake Water Agency
DEM	Digital Elevation Model
Districts	County Sanitation Districts of Los Angeles County
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
ET	evapotranspiration
FCGMA	Fox Canyon Groundwater Management Agency
ft msl	feet above mean sea level
GIS	geographic information system
GPX	geophysics
GSWI	groundwater/surface-water interaction
HGL	HydroGeoLogic
ID	identifier
in/hr	inches per hour
Kh:Kv	horizontal to vertical hydraulic conductivity
LA Water Board	California Regional Water Quality Control Board – Los Angeles Region
LA	Los Angeles
LACSD	County Sanitation Districts of Los Angeles County
LADPW	Los Angeles County Department of Public Works
LADWP	Los Angeles Department of Water and Power
LSCE	Luhdorff and Scalmanini Consulting Engineers

mg/L	milligrams per liter
mgd	million gallons per day
mi^2	square miles
NCWD	Newhall County Water District
NRCS	Natural Resources Conservation Service
PRISM	Parameter-Elevation Regressions on Independent Slopes Model
RASA	Regional Aquifer System Analysis
RCS	Richard C. Slade and Associates
SCAG	Southern California Association of Governments
SCR	Santa Clara River
SCWC	Santa Clarita Water Company
SSURGO	Soil Survey Geographic
SWP	State Water Project
SWRM	Surface Water Routing Model
TDS	total dissolved solids
TMDL	total maximum daily load
TWG	Technical Working Group
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
USWS	U.S. Weather Service
UWCD	United Water Conservation District
VCWPD	Ventura County Watershed Protection District
VWC	Valencia Water Company
WARMF	Watershed Analysis Risk Management Framework
WRP	Water Treatment Plant

SECTION 1.0

Introduction

1.1 Background

On May 6, 2004, the Los Angeles Regional Water Quality Control Board (LA Water Board) adopted an amendment to the Water Quality Control Plan for the Los Angeles Region (LA Water Board, 1994) to revise the interim waste-load allocations and the Implementation Plan of the Upper Santa Clara River (SCR) Total Maximum Daily Load (TMDL). The Implementation Plan identified the following four major studies:

1. Agriculture Chloride Threshold Study
2. Groundwater/Surface-water Interaction Model
3. Endangered Species Chloride Threshold Study
4. Site-specific Objectives and Anti-degradation Analysis

This evaluation is a component of the second of the four major studies (hereafter referred to as the GSWI study). The County Sanitation Districts Nos. 26 and 32 of Los Angeles County (LACSD or Districts) and LA Water Board are working jointly on these studies.

Within the Upper SCR, avocado, strawberry, and some nursery crops have been identified as the most chloride- and salt-sensitive crops that are currently grown. The first study (Phase 1) focused on chloride effects on these three crop types and on many other factors related to chloride effects, such as salinity, ion interactions, and management through a comprehensive literature evaluation (CH2M HILL, 2005a).

For the GSWI study, the Districts and the LA Water Board wish to develop a groundwater/surface-water interaction (GSWI) model for a portion of the SCR watershed. The Districts own and operate two water reclamation plants (WRP) (Valencia and Saugus) in Los Angeles (LA) County that discharge tertiary-treated effluent to the Upper SCR. This computer model will be used to simulate the groundwater/surface-water interactions along Reaches 4, 5, and 6 (as designated by the LA Water Board) of the Upper SCR and assess the assimilative capacity of the surface-water and groundwater systems in those reaches with respect to chloride and total dissolved solids (TDS). Portions of Reach 7 will likely be included in the study area to account for groundwater and surface-water conditions upstream of the Saugus WRP. Reaches 4, 5, 6, and 7 are defined as follows:

- Reach 4 extends from the A Street bridge (Highway 23) in Fillmore, California, to Blue Cut near the Ventura-LA County boundary.
- Reach 5 extends from Blue Cut in Ventura County to the west pier of the Highway 99 bridge in LA County.
- Reach 6 extends from the west pier of the Highway 99 bridge to the west pier of Bouquet Canyon Road in LA County.
- Reach 7 extends from the west pier of Bouquet Canyon Road to the Lang stream gage in LA County.

Figure 1-1 shows the GSWI study area and the locations of Reaches 4, 5, 6, and 7 in relation to the overall SCR watershed (tables and figures are located at the end of each section). These LA Water Board reach designations roughly correspond to Reaches 6, 7, 8, and 9 as designated by the U.S. Environmental Protection Agency (EPA). References made to Upper SCR reach numbers in the remainder of this report follow the convention of the LA Water Board.

The GSWI model study includes the following principal tasks:

- **Task 1A – Evaluate Existing Models, Literature, and Data** – Compile and evaluate available information from which to develop the GSWI model – this is the subject of this report.
- **Task 1B – Conduct Additional Studies/Monitoring and Enhance Monitoring Network, as Necessary** – Address data gaps identified in Task 1A and subsequent tasks.
- **Task 2A – Conceptual Model Development** – Use the information compiled in Task 1A to develop a physical description of the area of study and processes governing the sources, fate, and transport of chloride and TDS.
- **Task 2B – Numerical Model Development and Calibration** – Develop a numerical model that is based on the conceptual model to simulate the concentration and movement of chloride and TDS in surface water and groundwater in the study area, historically since 1980, and projected to 2015.
- **Task 3 – Public Review Strategy** – Ensure that all information and analyses are made available to stakeholders in the watershed.
- **Task 4 – Reporting, Presentations, and Documentation** – Document and present information, analyses, and results of the GSWI modeling study and to get appropriate input from the Technical Working Group (TWG) and reviews from a Technical Advisory Panel. Reports will be prepared for each of Tasks 1A, 1B, 2A, 2B, and 3, with a final summary report covering all tasks at the end of the study.

The GSWI model will be built using a code called MODHMS (HydroGeoLogic [HGL], 2001), which has its origins from the popular U.S. Geological Survey (USGS) Modflow model (McDonald and Harbaugh, 1988), but which has been enhanced and further developed by HGL, to include a number of features that are not included in the USGS model. This GSWI model will be calibrated and verified against measured hydrologic data from calendar year 1980 to 2005. Model simulations under a set of yet-to-be-determined hydrologic conditions will be made for calendar years 2005 to 2015. Modeling results will be used by the LA Water Board to evaluate the chloride concentration distribution under a set of hydrologic conditions between the Districts' WRPs and downstream receiving water stations. In addition, the results will be used to reassess the chloride water quality objective of 100 milligrams per liter (mg/L) and/or to develop a site-specific chloride objective for the affected reaches of the Upper SCR.

1.2 Report Objectives

This report describes the results of Task 1A of the Upper SCR GSWI Model Project for the Districts, LA Water Board, and group of stakeholders collectively referred to as the GSWI TWG. Task 1A includes the following subtasks:

1. Compiling, reviewing, and evaluating groundwater and surface-water models already developed in the project area to determine the extent of how these existing models and/or information obtained from these models can be used in the development of a GSWI model that meets the project needs.
2. Compiling, reviewing, and evaluating existing literature and relevant climate, land use, hydrogeological, hydrological, groundwater level, groundwater pumpage, groundwater quality, and surface-water quality data to determine data gaps and other project needs and whether additional data acquisition (i.e., through additional monitoring wells/surface-water stations, and additional hydrogeological investigations) is necessary.

The main objectives of Task 1A are as follows:

1. Compile a comprehensive data set that incorporates input from a variety of stakeholders and data providers in the Upper SCR area.
2. Identify relevant data, previously constructed computer models, and literature that will be used to aid in development of both a conceptual model and the eventual GSWI model.
3. Identify preliminary data gaps that will need to be filled throughout the GSWI study to improve the future GSWI model's simulation capabilities.

This page intentionally left blank.

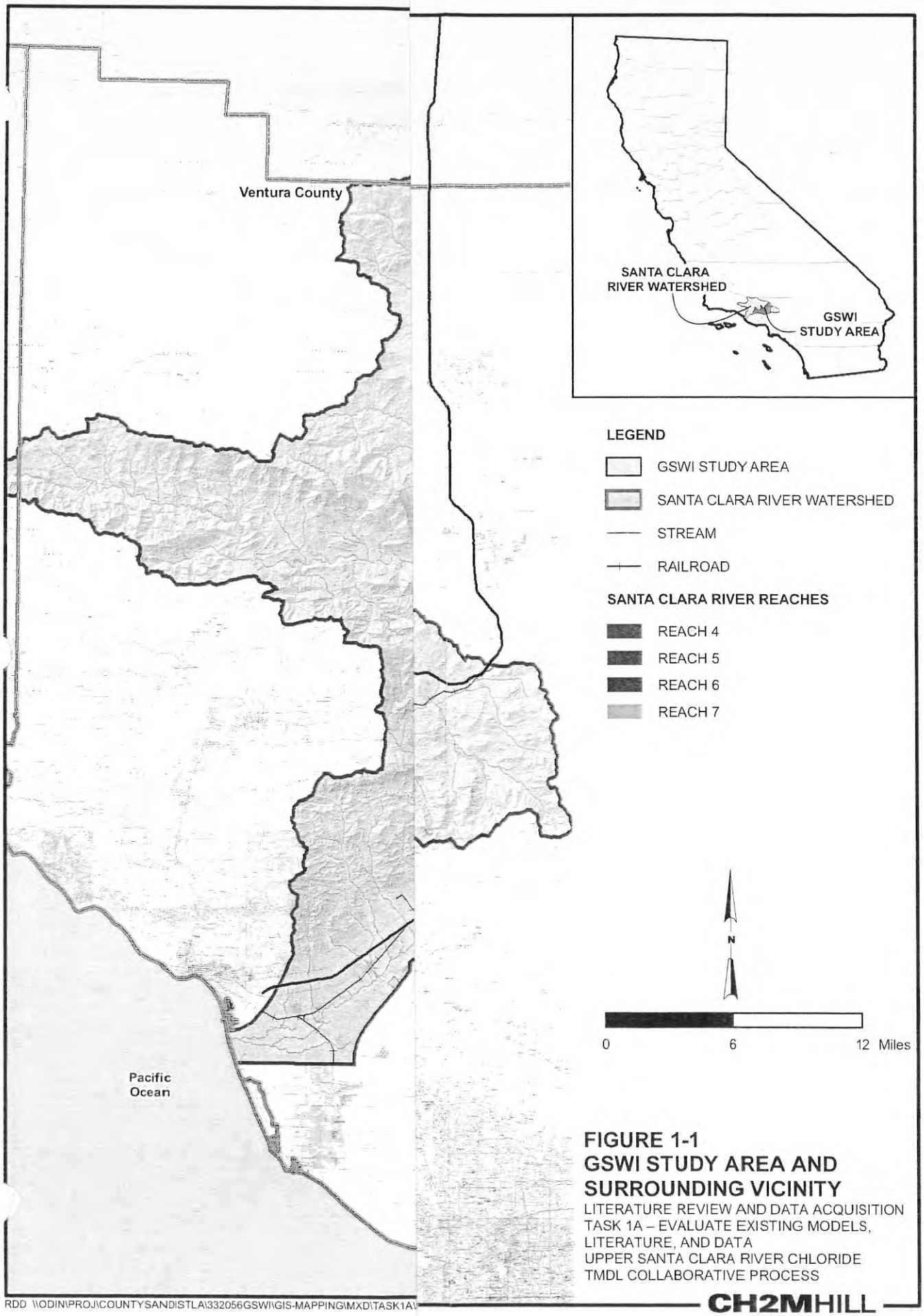


FIGURE 1-1
GSWI STUDY AREA AND SURROUNDING VICINITY
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

RDD \\ODIN\PROJ\COUNTYSAND\STLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\

CH2MHILL

This Page Intentionally
Left Blank

SECTION 2.0

Data Acquisition Approach

2.1 Identification of Data Needs

To satisfy the Task 1A objectives, key data groups were identified to facilitate organization of data to be requested. The key data groups include the following:

1. Physical data, such as data relating to well locations and construction, stream gages, rainfall gages, geology and structure, stream channel characteristics, soil and aquifer properties, vegetation and land use, locations of septic systems, stream diversion locations, locations of reservoirs and other significant surface-water bodies, and treatment plant locations.
2. Historical water quantity data, such as data relating to groundwater levels, streamflow, reservoir releases to streams, treatment plant discharges to streams, rainfall, pumping, diversions from streams, and subsurface point discharges to septic systems.
3. Historical water quality data, such as data relating to chloride and TDS concentrations in groundwater, surface-water, and point discharges.

2.2 Data Acquisition Process

Data needs identified under each data group, along with past reports and previously constructed computer models, were requested from multiple stakeholders and organizations located within the SCR watershed including the Districts, LA Water Board, Ventura County Watershed Protection District (VCWPD), United Water Conservation District (UWCD), USGS, Upper Basin Water Purveyors[1], LA County Department of Public Works (LADPW), AMEC Earth & Environmental (AMEC) (specifically data from AMEC database and AMEC, 2005), Fillmore Fish Hatchery, U.S. Army Corps of Engineers (USACE), Systech Engineering, Ventura Regional Sanitation District, LA Department of Water and Power (LADWP), and Geomatrix Consultants. Pertinent data received from these organizations were compiled into a comprehensive database and formed the basis for the figures, tables, appendices, and discussion presented in this report. These data and the previously constructed computer models will provide a valuable foundation from which to develop a conceptual model and GSWI model that will aid in the Upper SCR Chloride TMDL Collaborative Process.

[1]The Upper Basin Water Purveyors consist of the Castaic Lake Water Agency (CLWA), the Newhall County Water District (NCWD), the Santa Clarita Water Division of CLWA, and the Valencia Water Company (VWC), The Santa Clarita Water Division of CLWA was acquired by CLWA in 1999. It was formerly called the Santa Clarita Water Company (SCWC).

5-1075

This Page Intentionally
Left Blank

SECTION 3.0

Existing Models, Literature, and Data

Discussions presented in this section are based on a combination of existing computer models, literature, and data that were compiled under Task 1A activities. For convenience, the information is collated into subsections that will ultimately facilitate the development and documentation of the conceptual model during Task 2A activities. This section is intended to provide a basic understanding of the information sources for the various subsection headings. Appendix A provides annotated bibliographies of those reports considered to be significant in terms of providing key data or other information that will be useful for the current study. However, the list of references provided in Appendix A is not intended to represent a final reference list. It is anticipated that additional sources of information will be discovered during the process of conceptual and numerical model development.

3.1 Existing Models

Several computer models have been developed over the years through portions of the SCR watershed to simulate either groundwater or surface-water conditions, or some combination thereof. Table 3-1 lists the more recent major modeling efforts in portions of the project study area along with a brief description of how each model was applied. Models listed in Table 3-1 have associated documentation that has been reviewed by their individual project stakeholders and regulatory contacts. Furthermore, the majority of the proprietary models listed in Table 3-1 were developed by CH2M HILL, and data from those models are readily available. Therefore, the only additional review that the CH2M HILL/HGL team conducted was an internal review of any model not developed by CH2M HILL that could provide data for the GSWI model. The CH2M HILL/HGL team coordinated with Systech Engineering directly to review the Watershed Analysis Risk Management Framework (WARMF) Model, and with UWCD to review their spreadsheet model.

3.2 Physical Setting

Previous studies have described the physical setting of portions of the SCR including the following:

- Mann (1959)
- Richard C. Slade and Associates (RCS) (1986, 1988, and 2002)
- Densmore et. al. (1992)
- California Department of Water Resources (DWR) (1933, 1989, and 1993)
- LA Water Board (1994)
- USGS (1998, 1999, and 2003a,b,c)
- LACSD (1998 and 1999)
- Systech Engineering (2002a and 2002b)
- Luhdorff and Scalmanini Consulting Engineers (LSCE) (2005)

- CH2M HILL (2004a and 2005b)
- UWCD (2005)

The SCR drains an area of approximately 1,600 square miles (mi^2) along its 100-mile course from the San Gabriel Mountains in the east, through LA and Ventura Counties, where it empties into the Pacific Ocean at its western limit. As previously stated, the focus of the GSWI study is on groundwater/surface-water interactions along Reaches 4, 5, 6, and 7 of the Upper SCR in western LA County and eastern Ventura County. The basis for the extent of the GSWI study area, as shown on Figure 1-1, is discussed in Section 3.2.1.

3.2.1 Geographic Area and Topography

Natural hydrologic divides such as watershed boundaries provide for appropriate locations to delineate the geographic extent of the domain for a hydrologic modeling study. Thus, data compilation efforts for the GSWI study began by targeting the portion of the SCR watershed that contributes water to Reaches 4, 5, 6, and 7.

3.2.1.1 Western Boundary

During GSWI TWG meetings, it was agreed that the downstream location, at which GSWI model calibration will be focused, will coincide with the Piru-Fillmore Groundwater Basin boundary in Reach 4 of the Upper SCR. This particular area coincides with locations of significant groundwater pumpage from local irrigators and from Fillmore Fish Hatchery operations. To simulate responses of groundwater levels to this nearby pumping in the GSWI model and to minimize model (numerical) effects at this location, the western boundary of the GSWI study area (and future GSWI model boundary) was located about 2 miles west of the A Street bridge, set to correspond to a location just upstream of the SCR-Sespe Creek confluence, as shown on Figure 1-1. Data obtained for locations west of this boundary were not compiled into the comprehensive GSWI database in an effort to maintain a streamlined database that only contains data that will be pertinent to hydrologic conditions in Reaches 4, 5, 6, and 7.

3.2.1.2 Northern Boundary

A portion of the SCR watershed located north of Reaches 4, 5, 6, and 7 contains such features as constructed reservoirs. The larger reservoirs include Bouquet Reservoir, Pyramid Lake, and Castaic Lake and Lagoon in LA County, and Piru Lake in Ventura County. These surface-water bodies accumulate water that is drained from a larger portion of the SCR watershed and, in some cases, serve as terminal reservoirs on the State Water Project (SWP; Pyramid Lake and Castaic Lake and Lagoon). A detailed understanding of the hydrology and hydraulics in areas tributary to these reservoirs is not considered necessary for the GSWI study because the timing, magnitude, and quality of water downstream of these reservoirs is controlled and/or measured. Therefore, to further refine the GSWI study domain, the areas upstream of Bouquet Reservoir, Pyramid Lake, Castaic Lake and Lagoon, and Piru Lake were removed from the GSWI study area. This approach of removing areas tributary to these reservoirs is consistent with the approach taken by Systech Engineering (2002b) during development of the WARMF model.

3.2.1.3 Eastern Boundary

As previously stated, Reach 6 of the Upper SCR begins at the west pier of Bouquet Canyon Road in LA County near the Saugus WRP. Selection of an eastern boundary for the GSWI study area considered the upstream distance and extent of the drainage area east of Reach 6, up to the headwaters of the Upper SCR, and the locations of stream gages in the Upper SCR upstream of Reach 6. To further refine the GSWI study area, the portion of the SCR watershed east of the Lang community in LA County, where a USGS stream gage exists in the Upper SCR, was removed from the GSWI study area. The selection of an eastern boundary that corresponds to the location of the Lang stream gage also coincides with the beginning of Reach 7 and is consistent with a previous modeling study conducted by CH2M HILL (2004a,b and 2005b). Streamflow data recorded at the Lang gage will be used to account for streamflow entering the modeling area from the Acton portion of the SCR watershed located east of the stream gage.

3.2.1.4 Southern Boundary

The southern boundary of the GSWI study area was extended to the southern boundary of the SCR watershed. The GSWI study area shown on Figure 1-1 represents an area of approximately 425 mi^2.

3.2.1.5 Land Surface Elevations

Land surface elevations in the GSWI study area range from approximately 5,200 feet above mean sea level (ft msl) near Bouquet Reservoir to 350 ft msl at the downstream end of Reach 4, at the A Street bridge in Fillmore (Figure 3-1). Digital Elevation Model (DEM) data obtained from the National Elevation Dataset[2] formed the basis for the watershed and study area delineations shown on figures in this report. The difference in land surface elevation between the Valencia WRP (beginning of Reach 5) and the A Street bridge in Fillmore (end of Reach 4) is approximately 630 feet over approximately 20 river miles, for an average river slope of about 30 feet per mile.

3.2.2 Soils

Soils play an important role in groundwater/surface-water interaction studies. An understanding of physical soil characteristics of various soil types and their geographic distribution is an important data need for the GSWI study.

As a starting point, the GSWI model will take advantage of soil property and distributions provided in the WARMF model (Systech Engineering, 2002b). WARMF represents soils by layers, where each layer has a thickness, field capacity, porosity, hydraulic conductivity, and slope.

Soil Survey Geographic (SSURGO) data are produced, maintained, and distributed by the National Resources Conservation Service (NRCS) within the U.S. Department of Agriculture (USDA). SSURGO is the most detailed level of soil mapping done by the NRCS, with mapping scales generally ranging from 1:12,000 to 1:63,360. This level of mapping is designed for use by landowners, townships, and county natural resource planning and

[2] http://ned.usgs.gov/

management. SSURGO data will also be investigated for possible use in the development of the GSWI model.

The SSURGO dataset provides much detailed information on soil properties. One of the most important soil characteristics for the GSWI study is a soil's capability to infiltrate surface water during storm events. The Hydrologic Soil Group code, provided in the SSURGO geographic information system (GIS), groups soils having similar runoff potential under similar storm and cover conditions. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties include depth to a seasonally high water table and saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. The influence of ground cover is treated independently[3].

The soils in the United States are placed into four groups – A, B, C, and D, and three dual classes – A/D, B/D, and C/D. Definitions of the classes are as follows:

A. Low runoff potential. These soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well-drained to excessively drained sands or gravels. They have a high rate of water transmission (greater than 0.30 inch per hour [in/hr]).

B. These soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well drained to well drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission (0.15 to 0.30 in/hr).

C. These soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission (0.05 to 0.15 in/hr).

D. High runoff potential. These soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission (0 to 0.05 in/hr).

Soil infiltration capacities illustrated on Figure 3-2 were inferred using the Hydrologic Soil Group codes provided in the SSURGO GIS, which was obtained from the NRCS[4]. Soil infiltration capacities illustrated on Figure 3-2 were inferred as follows:

- Hydrologic Soil Group A = High Infiltration Capacity
- Hydrologic Soil Group B = Moderate Infiltration Capacity
- Hydrologic Soil Group C = Low Infiltration Capacity
- Hydrologic Soil Group D = Very Low Infiltration Capacity
- No Hydrologic Soil Group Code Provided = Unknown Infiltration Capacity

[3] http://soils.usda.gov/technical/handbook/contents/part618p2.html#35

[4] http://soildatamart.nrcs.usda.gov/County.aspx?State=CA

These mapping data will be used, in conjunction with geologic mapping and other studies of infiltration, for estimating surficial soil properties where more specific information is unavailable.

3.2.3 Vegetation and Land Use

GIS mapping that defines portions of the GSWI study area by vegetation and land use will be important for assigning appropriate applied water rates throughout the GSWI modeling domain. Rules will be developed during calibration of the GSWI model to assign appropriate applied water rates based on vegetation type and land use code. Year 2000 land use GIS data were obtained from LADPW and are shown on Figure 3-3. Land use codes, which were originally defined by the Southern California Association of Governments (SCAG), were simplified into five groups for Figure 3-3, including Agriculture, Golf Course, Retail/Industrial, Residential, and Native Vegetation.

The land use coverages that were obtained during development of the WARMF model include the following:

- 1980 data from BASINS[5] (EPA)
- 1993 data from SCAG[6]
- 2000 data for Ventura County from DWR[7]

During development of the conceptual and GSWI models, the necessity for collection of these or other land use data for other time periods and/or further subdividing the land use codes will be evaluated.

3.3 Climate

3.3.1 Rainfall

Rainfall data were collected largely from LADPW and Ventura County. Table 3-2 summarizes the number of precipitation measurement counts for each station location shown on Figure 3-4. Locations listed in Table 3-2 but not shown in Figure 3-4 indicate that location coordinates were not available in time to incorporate into this report. Appendix B shows plots of annual precipitation through time for locations at which at least one precipitation measurement was recorded from 1980 to 2005 (the calibration period established for the GSWI model). Locations at which precipitation was measured, but only prior to 1980, are not included in this report.

Also shown on Figure 3-4 is the average annual rainfall pattern (isohyets) for the period 1900 to 1960. The isohyetal data were obtained from the California Spatial Information Library (CaSIL)[8]. As shown on the CaSIL Web site, the isohyetal map is based on long-term mean annual precipitation data compiled from USGS, DWR, and California Division of Mines map and information sources. Source maps were based primarily on U.S. Weather Service (USWS) data for approximately 800 precipitation stations. In the Los Angeles and

[5] http://www.epa.gov/ost/basins/

[6] http://www.scag.ca.gov/

[7] http://www.landwateruse.water.ca.gov/basicdata/landuse/counties/survey_years/vector_quads/00ve.cfm

[8] http://gis.ca.gov/meta.epl?oid=286

5-1081

San Francisco Bay areas the USWS data were supplemented by county and local agency precipitation data. The minimum mapping unit is 1,000+ acres. The isohyetal contour intervals are variable because of the degree of variation of annual precipitation with horizontal distance from the ocean and elevation.

The coverage of rainfall stations shown on Figure 3-4, coupled with the availability of measurements between 1980 and 2005, as indicated in Table 3-2 and Appendix B, suggest that there is sufficient rainfall data available for use in developing conceptual and numerical models in the GSWI study area. Additionally, other sources of spatial rainfall data exist that might be used during the development of the GSWI model (e.g., Parameter-Elevation Regressions on Independent Slopes Model [PRISM][9] data provided by the Oregon Climate Service).

3.3.2 Evapotranspiration

Evapotranspiration (ET) is defined as the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). ET can be computed from data collected and organized by the California Irrigation Management Information System (CIMIS). The CIMIS is a program of the Office of Water Use Efficiency within DWR, which manages a network of over 120 automated weather stations within California. CIMIS was developed in 1982 by DWR and the University of California, Davis.

Only one CIMIS station is located in the GSWI study area. Its station name is Piru #101, and its location is shown on Figure 3-4 (because it is also a rain gage location). CIMIS reference ET data were downloaded from the Internet[10] and plotted in Appendix C as annual reference ET. The reference ET data from the Piru #101 CIMIS station will be used to calculate ET for specific crop types during development of the conceptual and numerical models in the GSWI study area.

3.4 Surface-water Flow and Quality

3.4.1 General Hydrology and Hydraulics

Many historical studies have described the surface hydrology of the Upper SCR including Mann (1959), RCS (1986, 1988, and 2002), Densmore et. al. (1992), DWR (1933, 1989, and 1993), LA Water Board (1994), USGS (1998, 1999, and 2003a,b,c), LACSD (1998 and 1999), Systech Engineering (2002a and 2002b), LSCE (2005), CH2M HILL (2004a and 2005b), and UWCD (2005). It is anticipated that surface hydrology data that are not readily available via the Internet, but incorporated into the WARMF model, will be used as a starting point for development of the conceptual and GSWI models in terms of the surface hydrology. This includes stream channel characteristics, soil properties, vegetative cover, and locations of septic systems.

9 http://www.ocs.orst.edu/prism/

10 http://wwwcimis.water.ca.gov/cimis/data.jsp

5-1082

3.4.2 Reservoir Operations and Hydrology

Reservoir operations in the GSWI study area directly affect the timing and magnitude of streamflow and the transport of salts. Data on reservoir operations were obtained from the following organizations:

- **LADWP.** Reservoirs operated by LADWP include Bouquet Reservoir, Dry Canyon Reservoir, and Drinkwater Reservoir in LA County (see Figure 1-1). Bouquet Reservoir is part of the LA Aqueduct system located in Bouquet Canyon. Dry Canyon Reservoir is located in Dry Canyon, which is a tributary to Bouquet Canyon. Drinkwater Reservoir is located in San Francisquito Canyon. Both Dry Canyon and Drinkwater Reservoir are stormwater detention basins. Daily release data for Bouquet Reservoir were provided by LADWP. Measured release data are not available for the calibration period of 1980 to 2005 for the other two reservoirs. Consistent with the WARMF model (Systech Engineering, 2002b), the presence and operation of both Drinkwater Reservoir and Dry Canyon Reservoir will not be simulated in the GSWI model.

- **USGS and CLWA.** Pyramid Lake and Castaic Lake and Lagoon are SWP reservoirs in LA County. CLWA is the SWP Contractor in the GSWI study area that provides SWP water to the Upper Basin Water Purveyors. Water is withdrawn from Castaic Lake through an intake tower just north of the main dam. From the dam, the water flows through underground pipelines, as large as 244 inches in diameter, to supply CLWA's two treatment plants, the Earl Schmidt Filtration Plant and the Rio Vista Water Treatment Plant[11]. Measurement data of releases from these reservoirs were obtained from USGS and CLWA. Treated water flows and quality from the CLWA treatment plant were not available in time for this deliverable. These data will be useful for evaluating chloride and TDS in the SWP water that is imported by the Upper Basin Water Purveyors.

- **UWCD.** Piru Lake is owned and operated by UWCD. The reservoir was built to store winter runoff from the Piru Creek subwatershed for later release into Piru Creek where it infiltrates the streambed as it flows downstream to the Upper SCR mainstem. The infiltration of released water is an intended outcome whereby the aquifer system beneath the Upper SCR system benefits from groundwater recharge, which improves the availability of groundwater for municipalities, industry, and agricultural entities that pump groundwater.

Appendix D contains daily mean reservoir releases, in cubic feet per second (cfs), from Bouquet Reservoir, Castaic Lagoon, and Piru Lake. Release data for Pyramid Lake and Castaic Lake are not provided because these reservoirs are located in areas that are tributary to Piru Lake and Castaic Lagoon and are not required for addressing streamflow and water quality of water being fed into Piru and Castaic Creeks.

[11] http://www.clwa.org/about/h2owhere.cfm

5-1083

3.4.3 Applied Water

3.4.3.1 Irrigation

Estimates for applied irrigation water for both agricultural and urban areas are available from previous modeling studies including USGS (2003a), UWCD, Upper Basin Water Purveyor's model (CH2M HILL, 2004a,b and 2005b), and the WARMF model (Systech Engineering, 2002b). These estimates will be re-evaluated using available land use mapping as part of the GSWI model development and calibration. Pumping and imported water are discussed in later sections of this report.

3.4.3.2 Point Discharges

The two largest point source dischargers in the study area are the Saugus and Valencia WRPs, which are operated by the Districts in LA County. However, several other entities are permitted as point source dischargers.

The WARMF model of Systech Engineers (2002b) simulated locations and flow estimates for point source discharges to the Upper SCR for water years 1990 to 2000. Figure 3-5 shows the locations of point sources from the WARMF model within the GSWI study area. Point source discharge data were not available for all point source locations in time to be incorporated into this report. However, Appendix E contains daily mean discharges from the Saugus WRP, Valencia WRP, and Piru Treatment Plant. The Piru Treatment Plant discharges to percolation ponds south of and adjacent to State Highway 126. Table 3-3 summarizes the number of point discharge measurement counts for each station location shown in Appendix E.

3.4.4 Hydrologic Trends

3.4.4.1 Streamflow

Streamflow data provided by USGS, LADPW, Ventura County, LADWP, Systech Engineers, and UWCD will be used to develop the surface-water flow components in the GSWI model. Table 3-4 summarizes the number of streamflow measurements by location, and Figure 3-6 shows the stream gage locations in the GSWI study area where measurement of streamflow has resulted in data from 1980 to 2005. Table 3-4 also lists locations at which visual estimates of streamflow have been recorded. Appendix F contains annual streamflow trends using readily available data from stream gages.

The coverage of stream gage stations shown on Figure 3-6, coupled with the availability of measurements between 1980 and 2005, as indicated in Table 3-4, suggests that there is sufficient stream gage data available for the more prominent canyons. However, streamflow and water quality data for the less prominent and nongaged streams is not readily available.

Additionally, flow rate data associated with diversions from the Upper SCR were not available in time for incorporation into this report. It is anticipated that such data will need to be made available or estimated for at least three diverters, including Rancho Camulos and Newhall Land and Farming Company from the Upper SCR, and the Piru Spreading Grounds diversion from Piru Creek.

3.4.4.2 Surface-water Quality

Water quality (chloride and TDS) data provided by the Districts, LA Water Board, UWCD, USGS, and Upper Basin Water Purveyors will be used to aid in the development of the conceptual and numerical GSWI model.

Chloride. Figure 3-7 shows the surface-water sampling locations at which collection of water quality samples has resulted in chloride concentration data from 1980 to 2005 in the GSWI study area. Location symbols displayed on Figure 3-7 (and some later figures) are proportionally sized to the number of samples collected at a particular location to easily spot data-rich and data-poor measurement locations. Table 3-5 summarizes the number of chloride samples collected by location, and Appendix G contains chloride chemographs.

The coverage of surface sampling locations shown on Figure 3-7 and availability of measurements between 1980 and 2005, as indicated in Table 3-5, suggest that additional surface-water quality sampling for chloride is warranted. Data gaps are discussed in more detail in Section 4.0.

Total Dissolved Solids. Figure 3-8 shows the surface-water sampling locations at which collection of water quality samples has resulted in TDS concentration data from 1980 to 2005 in the GSWI study area. Table 3-6 summarizes the number of TDS samples collected by location, and Appendix H contains TDS chemographs.

The coverage of surface sampling locations shown on Figure 3-8 and availability of measurements between 1980 and 2005, as indicated in Table 3-6, suggest that additional surface-water quality sampling for TDS is warranted.

3.5 Hydrogeology

Many studies have described the geology and hydrogeology within portions of the SCR watershed. Annotated bibliographies for some of these studies are provided in Appendix A, including RCS (1986, 1988, and 2002), DWR (1989), Densmore et. al. (1992), LA Water Board (1994), LACSD (1999), USGS (1998, 1999, and 2003a,b,c), and CH2M HILL (2001, 2002, 2004a,b, and 2005b). The hydrogeology data that were incorporated into the Upper Basin Water Purveyor's model (CH2M HILL 2004a,b and 2005b) and the UWCD's updated version of the USGS model (USGS, 2003a) will be used as a starting point for incorporating hydrogeologic features and properties into the GSWI model. These models have already undergone technical reviews and are well documented. Figure 3-9 shows the locations of the numerical model grids from both the Upper Basin Water Purveyor's model, including the modeling domain of the Surface Water Routing Model (SWRM) (see Table 3-1 and Appendix D of CH2M HILL, 2004a), and the UWCD's updated version of the USGS model. As illustrated on Figure 3-9, these modeling domains cover a large portion of the GSWI study area. Most of the GSWI study area that lies outside of the model grid areas shown on Figure 3-9 also lies outside of the Santa Clara River Valley East Groundwater Basin, Piru Groundwater Basin, and Fillmore Groundwater Basin (hereafter referred to as the East Subbasin, Piru Subbasin, and Fillmore Subbasin, respectively). Figure 3-10 shows the groundwater basin boundaries.

3.5.1 Santa Clara River Valley East Subbasin

3.5.1.1 Geologic/Hydrogeologic Units

Figure 3-11 is a geologic map that covers portions of the Santa Clara River Valley East, Piru, and Fillmore Subbasins. Descriptions of bedrock units, Saugus Formation, and Alluvial Aquifer are provided in RCS (1986, 1988, and 2002) and CH2M HILL (2004a,b and 2005b) and will be used to develop the conceptual model of the East Subbasin.

3.5.1.2 Geologic Structure

Descriptions of the geologic structure including locations and status of faults, provided in RCS (1986, 1988, and 2002) and CH2M HILL (2004a,b and 2005b) will also be used to develop the conceptual model of the East Subbasin.

3.5.1.3 Hydrogeologic Properties

Figure 3-12 shows well locations at which well construction information is available (well location maps are split into five different local views [Areas A, B, C, D, and E]) with equal map scales because of the large extent of the GSWI study area. Well locations with known well construction are distributed fairly well in the alluvial portions (see Figures 3-11 and 3-12) of Areas B and C in LA County. Area A contains fewer known well construction locations, especially near the eastern boundary of the GSWI study area in the Lang community. Area D also contains very few wells with known well construction near the county boundary, which is an especially important portion of the GSWI study area (perennial section of Upper SCR in Reaches 4 and 5 downstream of Saugus and Valencia WRPs). This area is considered a data gap area, as will be discussed in Section 4.0. The Ventura County portions of Areas D and E are discussed in Section 3.5.2.

Transmissivity. Locations within the GSWI study area at which transmissivity has been evaluated and at which data have been made available electronically are shown on Figure 3-13. Transmissivity, as estimated from specific capacity data resulting from Edison tests, for many of the Upper Basin Water Purveyor's alluvial supply wells are readily available in an electronic format. These data were presented in Appendix B of CH2M HILL, 2004a. Other transmissivity and groundwater storage data exist in historical reports, such as RCS (1986, 1988, and 2002), and CH2M HILL (2001 and 2002). These transmissivity data were incorporated into the existing Upper Basin Water Purveyor model, along with estimates of groundwater storage and saturated thickness that were required to calibrate the model.

The groundwater system was represented in the Upper Basin Water Purveyor's model with seven layers. The Alluvial Aquifer, where present, was modeled with a single layer, and the Saugus Formation was modeled with multiple layers to its total depth, which was defined as the base of the Sunshine Ranch Member of the Saugus Formation. RCS (2002) compiled and geographically grouped hydrogeologic data from Alluvial Aquifer wells to estimate the aquifer's saturated thickness during various historical periods. The saturated thickness was defined from the average base elevation of the aquifer and the water level elevations measured during fall 1985 and spring 2000, then typical saturated thicknesses for geographic subareas were defined. Along the Upper SCR, the typical saturated thickness ranges between 110 and 130 feet west of Interstate 5; is less than 100 feet near Round Mountain; ranges between 100 and 150 feet between Round Mountain and Soledad Canyon;

and ranges between 80 and 90 feet in Soledad Canyon. The typical saturated thickness ranges between 80 and 100 feet in the Castaic Creek Valley and in the lower reach of Bouquet Canyon. Other tributary canyons to the Upper SCR have typical saturated thicknesses of 60 feet or less, and the saturated thickness decreases significantly in the upstream direction within each canyon, particularly along the South Fork SCR, where all production wells are constructed in the Saugus Formation, rather than the alluvium (RCS, 2002).

The Saugus Formation was simulated using 500-foot-thick model layers through the freshwater-bearing deposits, which are present in the basin at depths up to 2,500 feet (RCS, 1988 and 2002). The model layers were specified at each node by importing digitized contours of the total thickness of the Saugus Formation's freshwater-bearing deposits (Plate 5 in RCS, 1988).

The coverage of well locations at which transmissivity estimates have been evaluated in the East Subbasin is fairly well distributed throughout the alluvium.

Storage. The top layer in the Upper Basin Water Purveyor's model was assigned a specific yield of 0.10 to simulate this layer as unconfined. In deeper model layers, the storage coefficients were allowed to range between 10^{-4} and 10^{-3}, using analyses of the aquifer storage and recovery (ASR) test results (RCS, 2001) and pumping tests at other Saugus wells (RCS, 2002).

Model layer definitions, hydraulic conductivity (horizontal and vertical), and storage values were calibrated for 1980 to 2005. This model was subjected to extensive peer review by the Upper Basin Water Purveyors, UWCD, Stetson Engineers, the California Department of Health Services, and other consultants. This prior modeling effort will serve as a good starting point for defining the hydrogeologic units and their hydrogeologic properties, which will be calibrated further in the larger GSWI model.

3.5.2 Piru Subbasin

3.5.2.1 Geologic/Hydrogeologic Units

As previously stated, Figure 3-11 is a geologic map that covers portions of the East Subbasin, Piru Subbasin, and Fillmore Subbasin. CH2M HILL also obtained hardcopy geologic maps from the Dibblee Foundation[12]. The Dibblee geologic maps provide additional information on the geology within the Ventura County portion of the GWSI study area. Descriptions of the bedrock units, San Pedro Formation, and the Alluvial Aquifer provided in USGS (1999 and 2003a) and the Dibblee geologic maps will be used to develop the conceptual model of the portions of the Piru and a small portion of the Fillmore Subbasins that lie within the GWSI study area.

3.5.2.2 Geologic Structure

Descriptions of the geologic structure, including locations and status of faults, provided in USGS (1999 and 2003a) and in the Dibblee geologic maps will also be used to develop the conceptual model of the Piru and Fillmore Subbasins.

[12] http://www.sbnature.org/dibblee/

3.5.2.3 Hydrogeologic Properties

Figure 3-12 (d and e) shows well locations at which well construction information is available for Map Areas D and E that encompass Ventura County portions of the GWSI study area. Well locations with known well construction are distributed fairly well in Area E. However, as previously stated, Area D contains very few wells with known well construction near the county boundary, which is an especially important portion of the GWSI study area (perennial section of Upper SCR in Reaches 4 and 5 downstream of Saugus and Valencia WRPs).

Transmissivity. Transmissivity data for wells located in Ventura County were not available in an electronic format in time for the development of this report. Therefore, the adequacy of the distribution of well locations at which transmissivity has been estimated will be evaluated throughout the execution of the GSWI project.

Storage.
Much of the available aquifer property data were incorporated into the existing UWCD's version of the USGS (2003a) numerical model. Model layer definitions, hydraulic conductivity (horizontal and vertical), and storage values were calibrated for 1970 through 2000 in UWCD's version of the USGS model. This prior modeling effort will serve as a good starting point for defining the hydrogeologic units and their hydrogeologic properties, which will be calibrated further in the larger GSWI model.

3.6 Groundwater Flow and Quality

3.6.1 Santa Clara River Valley East Subbasin Groundwater Trends

3.6.1.1 Groundwater Levels

Figure 3-14 (a, b, c, and d) shows the East Subbasin locations at which measurement of groundwater levels has resulted in water level data from 1980 to 2005 in the GSWI study area. Table 3-7 summarizes the number of water level measurements recorded by location, and Appendix I contains hydrographs.

The coverage of water level measurement locations shown on Figure 3-14, coupled with the availability of measurements between 1980 and 2005, as indicated in Table 3-7, suggest that sufficient water level data are available for developing conceptual and numerical models in the GSWI study area. However, Areas A (near Lang) and D (county line) would benefit from additional monitoring well locations.

3.6.1.2 Pumping

Figure 3-15 (a, b, c, and d) shows the East Subbasin locations at which pumping rate measurements have resulted in water pumping data from 1980 to 2005 in the GSWI study area. Table 3-8 summarizes the number of pumping rate measurements recorded by location, and Appendix J contains time-series graphs of annual pumping.

The coverage of pumping rate measurement locations shown on Figure 3-15 and the ample availability of measurements between 1980 and 2005, as indicated in Table 3-8 and Appendix J, suggest that sufficient pumping data are available for developing conceptual

5-1688

and numerical models in the GSWI study area. However, it might be necessary to estimate pumping rates at more frequent intervals depending on WRP flow data during development of the GSWI model.

3.6.1.3 Groundwater Quality

Chloride. Figure 3-16 shows the groundwater sampling locations at which collection of water quality samples has resulted in chloride concentration data from 1980 to 2005 in the GSWI study area. Table 3-9 summarizes the number of chloride samples collected by location, and Appendix K contains chloride chemographs.

The coverage of groundwater sampling locations shown on Figure 3-16 and the availability of measurements between 1980 and 2005, as indicated in Table 3-9, suggest that additional chloride data could be beneficial near the Saugus and Valencia WRPs and at the county line. Monthly sampling at selected locations could be beneficial for evaluating the seasonal variability in chloride concentrations in groundwater.

Total Dissolved Solids. Figure 3-17 shows the groundwater sampling locations at which collection of water quality samples has resulted in TDS concentration data from 1980 to 2005 in the GSWI study area. Table 3-10 summarizes the number of TDS samples collected by location, and Appendix L contains TDS chemographs.

The coverage of groundwater sampling locations shown on Figure 3-17, coupled with the availability of measurements between 1980 and 2005, as indicated in Table 3-10, suggest that additional TDS data would be beneficial near the Saugus and Valencia WRPs and at the county line. Monthly sampling at selected locations could be beneficial for evaluating the seasonal variability in TDS concentrations in groundwater.

3.6.2 Piru Subbasin Groundwater Trends

3.6.2.1 Groundwater Levels

Figure 3-14 (d and e) and Table 3-7 provide information on the location and number of water level measurements recorded in the Piru Subbasin, and Appendix I contains hydrographs.

The coverage of water level measurement locations shown on Figure 3-14 and the availability of measurements between 1980 and 2005, as indicated in Table 3-7, suggest that sufficient water level data are available for use in developing conceptual and numerical models in Area E, but additional monitoring points in Area D would be beneficial.

3.6.2.2 Pumping

Figure 3-15 (d and e) and Table 3-8 provide information on the location and number of pumping rate measurements recorded in the Piru Subbasin, and Appendix J contains time-series graphs of annual pumping. Reported pumpage was compiled from UWCD. These data were generally semiannual and/or annual totals of user-reported agriculture, nonagriculture, and total pumpage (USGS, 2003a).

The coverage of pumping rate measurement locations shown on Figure 3-15, coupled with the availability of measurements between 1980 and 2005, as indicated in Table 3-8, suggest that sufficient pumping data are available for use in developing conceptual and numerical

5-1089

models in the GWSI study area. However, it might be necessary to estimate pumping rates at more frequent intervals during development of the GSWI model.

3.6.2.3 Groundwater Quality

Chloride. Figure 3-16 (d and e) and Table 3-9 provide information on the location and number of chloride samples collected within the GSWI study area, and Appendix K contains chloride chemographs.

The coverage of groundwater sampling locations shown on Figure 3-16 in the Piru Subbasin and the sparse availability of relatively continuous measurements between 1980 and 2005, as indicated in Table 3-9, suggest that additional water quality sampling near the county boundary would be beneficial. Monthly sampling at selected locations could be beneficial for evaluating the seasonal variability in chloride concentrations in groundwater.

Total Dissolved Solids. Figure 3-17 (d and e) and Table 3-10 provide information on the location and number of TDS samples collected within the GSWI study area, and Appendix L contains TDS chemographs.

The coverage of groundwater sampling locations shown on Figure 3-17 in the Piru Subbasin and the sparse availability of relatively continuous measurements between 1980 and 2005, as indicated in Table 3-10, suggest that additional TDS data would be beneficial near the county line. Monthly sampling at selected locations could be beneficial for evaluating the seasonal variability in TDS concentrations in groundwater.

3.7 Salt Loading and Transport

3.7.1 Water and Salt Budget

Figure 3-18 is a schematic drawing showing the general routing processes for water and salts in the GSWI study area. Additional complexities can be incorporated into a conceptual and numerical model, as knowledge of the hydrologic system improves. For example, during the conceptual and GSWI model development, both a water budget and a salt budget will be developed. During the conceptual model development, these budgets will identify the dominant inflow and outflow components of water and chloride/TDS mass. To the extent possible, rates of inflow and outflow can be assigned during the conceptual model development; however, it will be necessary to use the GSWI model to aid in estimating rates for a final water/salt budget that honors available flow and water quality data.

Table 3-11 lists the primary components of the GSWI study area water budget. Refinements to this table, including the addition of sources and sinks for salts, will evolve throughout the execution of this GSWI study.

3.7.2 Transport Properties

Chloride and TDS are conservative components for transport (i.e., their adsorption to solid material and decay are negligible). The two main transport properties for chloride and TDS that are required for the GSWI study and that will be adjusted during calibration of the GSWI model include the effective (transport) porosity beneath the water table and the

dispersivity in both the groundwater and surface-water systems. Additional information on these transport properties is discussed below.

3.7.2.1 Effective Porosity

Porosity is a term that is restricted to the subsurface material. The total porosity is defined as the ratio of the volume of void spaces in a field volume of soil to the total field volume (voids and solids) of soil. The effective porosity is the fraction of the total field volume of soil through which the bulk of the groundwater and solutes (chloride and TDS) flow. In other words, dead-end pore space to subsurface flow is not included in the effective porosity. The result of lowering the assumed value of effective porosity on the transport of groundwater and solutes is to increase their average transport velocity (when all other aquifer variables are held constant). Selection of effective porosity values will be based on literature values for the subsurface material (lithology), professional judgment, and achieving calibration of the GSWI model.

3.7.2.2 Dispersivity

As water and solutes migrate, not all of the water and solute molecules are traveling at the same velocity. This is true in groundwater and surface-water systems. These velocity differences result in mixing between the water and the solute. This mixing is called mechanical dispersion, and it affects the spatial and temporal concentration of the solute in the groundwater and surface-water systems. The dispersivity is a variable (factor) that gets applied to the average water flow velocity, to quantify the mechanical dispersion. Selection of dispersivity values for groundwater systems will be based on equations from Xu and Eckstein (1995), professional judgment, and achieving calibration of the subsurface transport components of the GSWI model. Selection of dispersivity values for surface-water systems will be based on Chapra (1997), Martin and McCutcheon (1999), professional judgment, and achieving calibration of the surface transport components of the GSWI model.

5-1091

This page intentionally left blank.

TABLE 3-1
Summary of Existing Computer Models Developed within the SCR Watershed
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

Model	Model Developer	Year(s) Developed	Model Application
Santa Clara-Calleguas Basin Modflow Model	USGS (2003a)	1986 to 2003	Groundwater flow model used to aid in RASA study, which evaluated groundwater/surface-water interactions within southern Ventura County. Results used for long-range planning and to develop FCGMA Management Plan. The model calibration period focused on the 1920s to 1994; however, the model simulated groundwater conditions from 1891 to 1994 using quarterly stress periods. Model cells were spaced on 0.5-mile centers throughout its domain. The model consisted of two model layers; one each for the upper and lower aquifer systems. An updated version of this model is under development by UWCD.
Santa Clara River WARMF Model	Systech Engineering (2002b)	2002 to 2003	Surface-water model used to simulate future nutrient loading in the SCR watershed and water management scenarios. The model calibration period was water-year 1990 to 2000.
Newhall Ranch MicroFEM Model	CH2M HILL (2001 and 2002)	2000 to 2002	Groundwater flow model used to forecast impacts of future aquifer storage and recovery operations for Newhall Ranch development.
Santa Clarita Valley SWRM Model	CH2M HILL (2004a and 2005b)	2003 to 2004	Integrated GIS and Microsoft® Excel spreadsheet model designed to compute monthly rainfall, infiltration, and runoff rates within selected subwatersheds of the Santa Clarita Valley and linked with the Santa Clarita Valley Regional MicroFEM Model. The model calibration period was from 1980 through February 2005.
Santa Clarita Valley Regional MicroFEM Model	CH2M HILL (2004a and 2005b)	2003 to 2004	Groundwater flow model used to aid in water management planning for future water use in Santa Clarita Valley. The model calibration was from 1980 through February 2005, using monthly stress periods. Model node spacings ranged from 500 to 150 feet. The model consisted of seven model layers; one for the alluvium and the remaining for the Saugus Formation. SWRM model used to compute monthly headwater inflows into the groundwater flow modeling domain and associated input files for MicroFEM.
Santa Clarita Perchlorate Containment MicroFEM Model	CH2M HILL (2004b)	2004	Groundwater flow model used to support a Department of Health Services 97-005 permit application for restoring lost water supply because of perchlorate contamination. Modified the previous model (CH2M HILL, 2004a) by refining node spacing down to 75-foot centers near the Whittaker-Bermite facility in the Santa Clarita Valley to simulate groundwater flow patterns and hydraulic capture of perchlorate in groundwater near the facility over a 78-year period.
Whittaker-Bermite Modflow Model	CH2M HILL (2005c and 2005d)	2004 to 2005	USACE groundwater flow model used to aid in aquifer characterization at the Whittaker-Bermite property in LA County. The model was calibrated to aquifer test data collected in March 2004 for the Saugus Formation. Model cells were spaced on 500-foot centers and consisted of 11 model layers, one for the alluvium and the remaining for the Saugus Formation.

TABLE 3-1
Summary of Existing Computer Models Developed within the SCR Watershed
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

Model	Model Developer	Year(s) Developed	Model Application
UWCD Spreadsheet Model	UWCD (2005)	2005	Spreadsheet model used to calculate streamflow and infiltration at various points along the SCR, according to releases from Piru Lake. The calibration period was from 1955 to 2003, where empirical relationships were established between releases from Piru Lake and infiltration along Piru Creek and the SCR.

Notes:

RASA = Regional Aquifer System Analysis
FCGMA = Fox Canyon Groundwater Management Agency

TABLE 3-2
Summary of Precipitation Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]							Since 1980						
Location	County	Date Range			Value Range (inches)[b]			Number of Values	Date Range			Value Range (inches)[b]			Number of Values
200	LA	09/30/28	to	12/30/93	0.00	to	6.95	23,833	01/01/80	to	12/30/93	0.00	to	6.63	5,113
372	LA	09/30/33	to	08/30/05	0.00	to	6.50	26,258	01/01/80	to	08/30/05	0.00	to	6.50	9,364
1040	LA	10/23/51	to	03/30/92	0.00	to	5.71	14,770	01/01/80	to	03/30/92	0.00	to	5.12	4,473
1005b	LA	11/13/65	to	05/30/05	0.00	to	6.00	14,432	01/01/80	to	05/30/05	0.00	to	6.00	9,270
1009a	LA	09/30/46	to	12/30/84	0.00	to	4.35	13,958	01/01/80	to	12/30/84	0.00	to	3.80	1,812
1012b	LA	10/13/68	to	09/05/05	0.00	to	4.50	13,164	01/01/80	to	09/05/05	0.00	to	5.13	9,067
1022a	LA	10/11/48	to	02/27/86	0.00	to	5.98	11,545	12/31/80	to	02/27/86	0.00	to	4.05	757
1104c	LA	11/13/55	to	05/30/05	0.00	to	10.50	14,323	01/01/80	to	05/30/05	0.00	to	10.50	5,508
1184a	LA	08/06/68	to	01/29/81	0.00	to	5.02	4,560	01/01/80	to	01/29/81	0.00	to	2.64	395
125b	LA	11/20/61	to	08/30/05	0.00	to	5.81	15,990	01/01/80	to	08/30/05	0.00	to	5.81	9,374
127b	LA	09/30/60	to	01/30/90	0.00	to	6.22	10,696	01/01/80	to	01/30/90	0.00	to	6.22	3,666
252c	LA	10/02/72	to	05/30/05	0.00	to	5.40	11,929	01/01/80	to	05/30/05	0.00	to	5.40	9,282
32c	LA	10/02/46	to	09/04/05	0.00	to	7.56	21,521	01/01/80	to	09/04/05	0.00	to	7.56	9,377
493d	LA	11/05/69	to	09/28/97	0.00	to	7.00	10,082	01/01/80	to	09/28/97	0.00	to	7.00	6,373
al402	LA	10/02/99	to	09/05/05	0.00	to	3.86	2,046	10/02/99	to	09/05/05	0.00	to	3.86	2,046
25	V	10/28/27	to	04/18/04	0.00	to	8.52	2,599	01/09/80	to	04/18/04	0.00	to	5.37	832
171	V	12/06/56	to	04/18/04	0.00	to	6.92	1,629	01/07/80	to	04/18/04	0.00	to	6.40	898
199	V	10/01/59	to	04/18/04	0.00	to	6.41	1,723	01/07/80	to	04/18/04	0.00	to	6.41	999
101r	V	10/11/00	to	04/18/04	0.00	to	5.60	1,109	01/07/80	to	04/18/04	0.00	to	3.20	883
36a	V	10/06/66	to	04/18/04	0.00	to	5.50	1,406	01/07/80	to	04/18/04	0.00	to	5.20	943
94c	V	10/19/72	to	04/18/04	0.00	to	5.35	1,000	01/07/80	to	04/18/04	0.00	to	5.35	779
Piru #101	V	01/01/51	to	02/20/05	0.00	to	10.80	19,762	01/01/80	to	02/20/05	0.00	to	6.48	9,170
Piru Treatment Plant	V	10/01/96	to	01/31/97	0.00	to	3.50	123	10/01/96	to	01/31/97	0.00	to	3.50	123

[a]Period of record shown only for locations with data later than December 31,1979.
[b]Data include daily totals.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

This Page Intentionally
Left Blank

TABLE 3-3
Summary of Point Source Discharge Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]							Since 1980						
Location	County	Date Range			Value Range (mgd)			Number of Values	Date Range			Value Range (mgd)			Number of Values
Saugus WRP	LA	02/01/73	to	07/30/05	2.1	to	9.2	7,274	01/01/80	to	07/30/05	2.1	to	9.2	7,191
Valencia WRP	LA	01/01/71	to	07/30/05	0.4	to	21.8	6,892	01/01/80	to	07/30/05	0.4	to	21.8	6,784
Piru Treatment Plant	V	01/01/88	to	06/30/05	0.0	to	7,840.0	10,151	01/01/88	to	06/30/05	0.0	to	7,840.0	10,151

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
mgd = million gallons per day
UNK = coordinates were not provided for this location
V = Ventura County

This Page Intentionally
Left Blank

TABLE 3-4
Summary of Streamflow Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]							Since 1980						
Location	County	Date Range			Value Range (cfs)[b]			Number of Values	Date Range			Value Range (cfs)[b]			Number of Values
Z2129550	UNK	11/13/1996	to	11/24/1997	25.0	to	60	3	11/13/96	to	11/24/97	25.0	to	60.0	3.0
Z2136010	UNK	11/21/1994	to	05/15/2000	20.0	to	100	5	11/21/94	to	05/15/00	20.0	to	100.0	5
Z2170200	UNK	11/21/1994	to	05/15/2000	6.0	to	50	8	11/21/94	to	05/15/00	6.0	to	50.0	8
11107745 (Lang)	LA	10/01/1949	to	09/30/2004	0.0	to	1,280	10,839	02/09/02	to	09/30/04	0.0	to	185.0	965.0
F328-R	LA	10/01/1956	to	09/30/2004	0.0	to	392	16,003	01/01/80	to	09/30/04	0.0	to	392.0	8,243.0
F377-R	LA	10/01/1969	to	09/30/2004	0.0	to	326	11,694	01/01/80	to	09/30/04	0.0	to	301.0	8,610.0
F92C-R	LA	10/01/1931	to	09/30/2004	0.0	to	9,360	33,428	01/06/82	to	09/30/04	0.0	to	7,080.0	12,247.0
OF101[c]	LA	08/31/2005	to	08/31/2005	1.0	to	1	1	08/31/05	to	08/31/05	1.0	to	1.0	1.0
OS101[c]	LA	08/30/2005	to	08/30/2005	0.3	to	0	1	08/30/05	to	08/30/05	0.3	to	0.3	1.0
SCR-Old Hwy 99 Bridge	LA	05/02/1967	to	09/11/1996	2.0	to	50	78	01/30/80	to	09/11/96	3.0	to	50.0	47.0
SR101[c]	LA	08/30/2005	to	08/30/2005	1.1	to	1	1	08/30/05	to	08/30/05	1.1	to	1.1	1.0
SR102[c]	LA	08/30/2005	to	08/30/2005	0.7	to	1	1	08/30/05	to	08/30/05	0.7	to	0.7	1.0
SR103[c]	LA	08/30/2005	to	08/30/2005	0.1	to	0	1	08/30/05	to	08/30/05	0.1	to	0.1	1.0
SR104[c]	LA	08/31/2005	to	08/31/2005	8.8	to	9	1	08/31/05	to	08/31/05	8.8	to	8.8	1.0
SR105[c]	LA	08/31/2005	to	08/31/2005	45.0	to	45	1	08/31/05	to	08/31/05	45.0	to	45.0	1.0
04N17W29SW1[c]	V	01/30/1980	to	04/26/1999	10.0	to	1,200	39	01/30/80	to	04/26/99	10.0	to	1,200.0	39.0
04N18W30SW1[c]	V	08/31/1993	to	10/21/1999	10.0	to	215	6	08/31/93	to	10/21/99	10.0	to	215.0	6.0
04N19W33SW1[c]	V	04/07/1992	to	10/21/1999	10.0	to	600	23	04/07/92	to	10/21/99	10.0	to	600.0	23.0
11108500 (Blue Cut)	V	04/17/1951	to	10/21/1996	0.0	to	28,800	17,149	01/01/80	to	10/21/96	9.8	to	7,900.0	6,268.0
11109000	V	10/01/1927	to	09/30/2000	0.0	to	10,000	3,294	06/14/90	to	09/30/00	3.5	to	10,000.0	1,467.0
11110500	V	10/01/1930	to	09/30/1983	0.0	to	2,770	28,574	01/01/80	to	09/30/83	0.0	to	2,000.0	2,735.0
11114000	V	10/01/1927	to	09/30/1999	0.0	to	92,300	19,619	01/01/80	to	09/30/99	0.0	to	60,000.0	6,585.0
HC101[c]	V	08/31/2005	to	08/31/2005	1.2	to	1	1	08/31/05	to	08/31/05	1.2	to	1.2	1.0
PC101[c]	V	08/31/2005	to	08/31/2005	175.0	to	175	1	08/31/05	to	08/31/05	175.0	to	175.0	1.0
Piru Release	V	04/28/1992	to	09/02/1992	5.5	to	99	2	04/28/92	to	09/02/92	5.5	to	99.0	2.0
PLC101[c]	V	08/31/2005	to	08/31/2005	1.0	to	1	1	08/31/05	to	08/31/05	1.0	to	1.0	1.0

TABLE 3-4
Summary of Streamflow Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]							Since 1980						
Location	County	Date Range			Value Range (cfs)[b]			Number of Values	Date Range			Value Range (cfs)[b]			Number of Values
SR107[c]	V	08/31/2005	to	08/31/2005	159.0	to	159	1	08/31/05	to	08/31/05	159.0	to	159.0	1.0
SR109[c]	V	08/31/2005	to	08/31/2005	152.0	to	152	1	08/31/05	to	08/31/05	152.0	to	152.0	1.0

[a]Period of record shown only for locations with data later than December 31,1979.
[b]Data include mean daily, mean monthly, instantaneous, and unspecified streamflow values.
[c]These data are based on visual estimates of streamflow. Therefore, these locations do not appear on Figure 3-6, Stream Gage Locations.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

TABLE 3-5
Summary of Chloride Sample Counts in Surface Water
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
04N19W25L SW	UNK	07/09/92 to 07/09/92	43.0 to 43.0	1	07/09/92 to 07/09/92	43.0 to 43.0	1
RB01	UNK	05/04/99 to 07/20/05	39.9 to 152.0	74	05/04/99 to 07/20/05	39.9 to 152.0	74
S29	UNK	10/10/02 to 01/13/04	2.6 to 140.0	11	10/10/02 to 01/13/04	2.6 to 140.0	11
SCR-Castaic Crk	UNK	05/07/93 to 05/07/93	94.0 to 94.0	1	05/07/93 to 05/07/93	94.0 to 94.0	1
SCR-Fill Fish Hatch	UNK	02/24/92 to 01/28/05	34.0 to 76.0	55	02/24/92 to 01/28/05	34.0 to 76.0	55
SCR-Willard Rd	UNK	02/24/92 to 01/28/05	22.0 to 70.0	55	02/24/92 to 01/28/05	22.0 to 70.0	55
Station 1	UNK	02/20/01 to 02/20/01	34.0 to 34.0	1	02/20/01 to 02/20/01	34.0 to 34.0	1
Station 11	UNK	02/15/01 to 03/01/01	100.0 to 169.0	2	02/15/01 to 03/01/01	100.0 to 169.0	2
Station 16	UNK	03/18/97 to 03/18/97	59.0 to 59.0	1	03/18/97 to 03/18/97	59.0 to 59.0	1
Station 2	UNK	04/27/90 to 03/01/01	28.0 to 43.0	4	04/27/90 to 03/01/01	28.0 to 43.0	4
Station 20	UNK	09/29/97 to 01/16/02	17.0 to 84.0	18	09/29/97 to 01/16/02	17.0 to 84.0	18
Station 21	UNK	09/29/97 to 01/16/02	17.0 to 84.0	18	09/29/97 to 01/16/02	17.0 to 84.0	18
Station 22	UNK	01/30/90 to 01/16/02	27.0 to 118.0	105	01/30/90 to 01/16/02	27.0 to 118.0	105
Station 23	UNK	08/17/93 to 01/16/02	37.0 to 82.0	12	08/17/93 to 01/16/02	37.0 to 82.0	12
Station 24	UNK	08/31/93 to 09/20/94	45.0 to 50.0	3	08/31/93 to 09/20/94	45.0 to 50.0	3
Station 26	UNK	08/31/93 to 09/21/94	48.0 to 56.0	3	08/31/93 to 09/21/94	48.0 to 56.0	3
Station 27	UNK	08/17/93 to 10/13/95	24.0 to 78.0	8	08/17/93 to 10/13/95	24.0 to 78.0	8
Station 28	UNK	02/24/92 to 05/02/02	6.0 to 79.0	126	02/24/92 to 05/02/02	6.0 to 79.0	126
Station 30	UNK	04/30/92 to 01/16/02	6.0 to 123.0	23	04/30/92 to 01/16/02	6.0 to 123.0	23
Station 31	UNK	02/24/92 to 01/16/02	0.0 to 84.4	55	02/24/92 to 01/16/02	0.0 to 84.4	55
Station 4	UNK	02/20/01 to 02/20/01	57.0 to 57.0	1	02/20/01 to 02/20/01	57.0 to 57.0	1
Station 5	UNK	05/04/99 to 03/01/01	46.0 to 58.0	3	05/04/99 to 03/01/01	46.0 to 58.0	3
Station 6	UNK	08/23/90 to 08/23/90	24.0 to 24.0	1	08/23/90 to 08/23/90	24.0 to 24.0	1
04N16W17SW1	LA	01/30/80 to 11/27/00	60.0 to 118.0	11	01/30/80 to 11/27/00	60.0 to 118.0	11
04N17W14SW1	LA	03/18/97 to 03/18/97	59.0 to 59.0	1	03/18/97 to 03/18/97	59.0 to 59.0	1
403STC004	LA	10/30/01 to 02/25/03	73.3 to 112.0	2	10/30/01 to 02/25/03	73.3 to 112.0	2
403STC019	LA	10/31/01 to 02/25/03	81.2 to 117.0	2	10/31/01 to 02/25/03	81.2 to 117.0	2
403STC027	LA	11/13/01 to 02/24/03	23.3 to 30.6	2	11/13/01 to 02/24/03	23.3 to 30.6	2
403STC068	LA	02/25/03 to 02/25/03	64.3 to 64.3	1	02/25/03 to 02/25/03	64.3 to 64.3	1
403STCCTC	LA	11/13/01 to 11/13/01	187.0 to 187.0	1	11/13/01 to 11/13/01	187.0 to 187.0	1
403STCSFO	LA	10/31/01 to 10/31/01	26.5 to 26.5	1	10/31/01 to 10/31/01	26.5 to 26.5	1

TABLE 3-5
Summary of Chloride Sample Counts in Surface Water
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
Castaic Crk	LA	09/24/90 to 09/24/90	138.0 to 138.0	1	09/24/90 to 09/24/90	138.0 to 138.0	1
Potrerro Rd	LA	06/19/96 to 09/11/96	101.0 to 107.0	2	06/19/96 to 09/11/96	101.0 to 107.0	2
Saugus WRP	LA	01/13/70 to 07/17/05	78.0 to 285.0	577	01/17/80 to 07/17/05	84.0 to 200.0	322
SCR-Hwy 99	LA	09/21/92 to 09/11/96	87.0 to 108.0	4	09/21/92 to 09/11/96	87.0 to 108.0	4
SCR-Old Hwy 99	LA	05/11/88 to 07/07/94	9.8 to 137.0	69	05/11/88 to 07/07/94	9.8 to 137.0	69
SCR-Old Hwy99 Bridge	LA	09/12/51 to 08/28/00	5.0 to 560.0	571	01/08/80 to 08/28/00	9.8 to 540.0	235
SCR-RA	LA	05/21/98 to 04/13/05	21.6 to 133.0	6	05/21/98 to 04/13/05	21.6 to 133.0	6
SCR-RB	LA	11/06/95 to 07/22/05	88.3 to 336.0	77	11/06/95 to 07/22/05	88.3 to 336.0	77
SCR-RC	LA	11/06/95 to 06/15/05	31.3 to 170.0	50	11/06/95 to 06/15/05	31.3 to 170.0	50
SCR-RD	LA	11/06/95 to 07/22/05	30.5 to 190.0	94	11/06/95 to 07/22/05	30.5 to 190.0	94
SCR-RE	LA	09/24/90 to 07/20/05	47.1 to 140.0	57	09/24/90 to 07/20/05	47.1 to 140.0	57
Valencia WRP	LA	01/19/71 to 07/17/05	65.0 to 341.0	608	01/17/80 to 07/17/05	67.5 to 341.0	328
11109000	V	10/21/91 to 09/02/92	110.0 to 120.0	2	10/21/91 to 09/02/92	110.0 to 120.0	2
04N17W29SW1	V	01/30/80 to 01/27/05	21.0 to 151.0	179	01/30/80 to 01/27/05	21.0 to 151.0	179
04N18W03SW1	V	04/16/87 to 07/30/03	29.0 to 107.0	35	04/16/87 to 07/30/03	29.0 to 107.0	35
04N18W03SW2	V	01/30/80 to 01/30/04	27.0 to 118.0	129	01/30/80 to 01/30/04	27.0 to 118.0	129
04N18W03SW3	V	01/10/90 to 01/10/90	104.0 to 104.0	1	01/10/90 to 01/10/90	104.0 to 104.0	1
04N18W20SW1	V	08/17/93 to 01/30/04	37.0 to 82.0	19	08/17/93 to 01/30/04	37.0 to 82.0	19
04N18W25SW1	V	08/16/93 to 03/22/02	102.0 to 133.0	13	08/16/93 to 03/22/02	102.0 to 133.0	13
04N18W26SW1	V	08/16/93 to 09/19/94	107.0 to 117.0	5	08/16/93 to 09/19/94	107.0 to 117.0	5
04N18W29SW1	V	08/31/93 to 09/20/94	45.0 to 50.0	3	08/31/93 to 09/20/94	45.0 to 50.0	3
04N18W30SW1	V	08/31/93 to 10/13/95	33.0 to 57.0	5	08/31/93 to 10/13/95	33.0 to 57.0	5
04N18W31SW1	V	09/21/94 to 09/21/94	48.0 to 48.0	1	09/21/94 to 09/21/94	48.0 to 48.0	1
04N19W25SW1	V	03/18/97 to 01/30/04	10.0 to 52.0	23	03/18/97 to 01/30/04	10.0 to 52.0	23
04N19W30SW1	V	03/18/97 to 01/30/04	4.0 to 16.0	28	03/18/97 to 01/30/04	4.0 to 16.0	28
04N19W31SW1	V	08/17/93 to 10/11/95	45.0 to 62.0	7	08/17/93 to 10/11/95	45.0 to 62.0	7
04N19W33SW1	V	02/24/92 to 01/28/05	34.0 to 76.0	89	02/24/92 to 01/28/05	34.0 to 76.0	89
04N19W35SW1	V	08/17/93 to 10/13/95	24.0 to 78.0	8	08/17/93 to 10/13/95	24.0 to 78.0	8
04N19W36SW1	V	08/31/93 to 09/21/94	48.0 to 56.0	3	08/31/93 to 09/21/94	48.0 to 56.0	3
04N20W26SW1	V	08/18/93 to 10/27/93	36.0 to 42.0	3	08/18/93 to 10/27/93	36.0 to 42.0	3
04N20W35SW1	V	08/17/93 to 09/22/94	50.0 to 67.0	4	08/17/93 to 09/22/94	50.0 to 67.0	4

TABLE 3-5
Summary of Chloride Sample Counts in Surface Water
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
04N20W36SW1	V	07/27/99 to 08/13/99	73.0 to 85.2	2	07/27/99 to 08/13/99	73.0 to 85.2	2
04N20W36SW2	V	05/15/99 to 08/13/99	72.0 to 84.4	3	05/15/99 to 08/13/99	72.0 to 84.4	3
11108500 (Blue Cut)	V	03/17/30 to 01/27/05	8.9 to 848.0	617	01/16/80 to 01/27/05	21.0 to 182.0	195
403STC008	V	11/13/01 to 02/24/03	67.6 to 68.3	2	11/13/01 to 02/24/03	67.6 to 68.3	2
403STC076	V	02/25/03 to 02/25/03	71.6 to 71.6	1	02/25/03 to 02/25/03	71.6 to 71.6	1
403STCNRB	V	10/30/01 to 11/13/01	117.0 to 125.0	2	10/30/01 to 11/13/01	117.0 to 125.0	2
403STCPRU	V	11/01/01 to 11/01/01	52.0 to 52.0	1	11/01/01 to 11/01/01	52.0 to 52.0	1
403STCSSP	V	11/15/01 to 11/15/01	19.5 to 19.5	1	11/15/01 to 11/15/01	19.5 to 19.5	1
SCR-RF	V	10/21/91 to 07/20/05	59.6 to 163.0	78	10/21/91 to 07/20/05	59.6 to 163.0	78
SCR-VCOL	V	04/17/51 to 12/28/99	8.9 to 585.0	425	01/30/80 to 12/28/99	54.0 to 182.0	86

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
UNK = Coordinates were not provided for this location
V = Ventura County

This Page Intentionally
Left Blank

TABLE 3-6
Summary of TDS Sample Counts in Surface Water
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
04N19W25L SW	UNK	07/09/92 to 07/09/92	1,660.0 to 1,660.0	2	07/09/92 to 07/09/92	1,660.0 to 1,660.0	2
RB01	UNK	09/24/90 to 07/20/05	640.0 to 1,112.0	74	09/24/90 to 07/20/05	640.0 to 1,112.0	74
RE01	UNK	09/17/99 to 11/15/99	949.0 to 1,018.0	3	09/17/99 to 11/15/99	949.0 to 1,018.0	3
S29	UNK	10/10/02 to 01/13/04	28.0 to 942.0	11	10/10/02 to 01/13/04	28.0 to 942.0	11
SCR-Castaic Crk	UNK	05/07/93 to 05/07/93	680.0 to 680.0	1	05/07/93 to 05/07/93	680.0 to 680.0	1
SCR-Fill Fish Hatch	UNK	02/24/92 to 01/28/05	600.0 to 1,291.0	83	02/24/92 to 01/28/05	600.0 to 1,291.0	83
SCR-Misc	UNK	10/19/99 to 05/02/00	722.0 to 1,056.0	11	10/19/99 to 05/02/00	722.0 to 1,056.0	11
SCR-Willard Rd	UNK	02/24/92 to 01/28/05	664.0 to 1,544.0	81	02/24/92 to 01/28/05	664.0 to 1,544.0	81
Station 1	UNK	02/20/01 to 02/20/01	373.0 to 373.0	1	02/20/01 to 02/20/01	373.0 to 373.0	1
Station 11	UNK	02/15/01 to 03/01/01	638.0 to 1,190.0	2	02/15/01 to 03/01/01	638.0 to 1,190.0	2
Station 16	UNK	03/18/97 to 03/18/97	370.0 to 370.0	1	03/18/97 to 03/18/97	370.0 to 370.0	1
Station 2	UNK	04/27/90 to 03/01/01	347.0 to 404.0	4	04/27/90 to 03/01/01	347.0 to 404.0	4
Station 20	UNK	10/25/89 to 01/16/02	0.0 to 940.0	64	10/25/89 to 01/16/02	0.0 to 940.0	64
Station 21	UNK	10/25/89 to 01/16/02	324.0 to 940.0	61	10/25/89 to 01/16/02	324.0 to 940.0	61
Station 22	UNK	01/30/90 to 01/16/02	540.0 to 936.0	61	01/30/90 to 01/16/02	540.0 to 936.0	61
Station 23	UNK	10/21/99 to 01/16/02	520.0 to 1,000.0	9	10/21/99 to 01/16/02	520.0 to 1,000.0	9
Station 24	UNK	12/20/93 to 05/02/02	690.0 to 1,470.0	95	12/20/93 to 05/02/02	690.0 to 1,470.0	95
Station 30	UNK	09/01/92 to 01/16/02	494.0 to 827.0	19	09/01/92 to 01/16/02	494.0 to 827.0	19
Station 31	UNK	02/24/92 to 01/16/02	600.0 to 1,224.0	46	02/24/92 to 01/16/02	600.0 to 1,224.0	46
Station 4	UNK	02/20/01 to 02/20/01	515.0 to 515.0	1	02/20/01 to 02/20/01	515.0 to 515.0	1
Station 5	UNK	02/15/01 to 03/01/01	470.0 to 497.0	2	02/15/01 to 03/01/01	470.0 to 497.0	2
Station 6	UNK	08/23/90 to 08/23/90	229.0 to 229.0	1	08/23/90 to 08/23/90	229.0 to 229.0	1
Station 7	UNK	08/23/90 to 08/23/90	253.0 to 253.0	1	08/23/90 to 08/23/90	253.0 to 253.0	1
Station 9	UNK	08/23/90 to 08/23/90	621.0 to 621.0	1	08/23/90 to 08/23/90	621.0 to 621.0	1
04N16W17SW1	LA	01/30/80 to 11/27/00	699.0 to 1,090.0	11	01/30/80 to 11/27/00	699.0 to 1,090.0	11
04N17W14SW1	LA	03/18/97 to 03/18/97	370.0 to 370.0	1	03/18/97 to 03/18/97	370.0 to 370.0	1
Castaic Crk	LA	09/24/90 to 09/24/90	907.0 to 907.0	1	09/24/90 to 09/24/90	907.0 to 907.0	1
OF101	LA	08/31/05 to 08/31/05	770.0 to 770.0	1	08/31/05 to 08/31/05	770.0 to 770.0	1
OS101	LA	08/30/05 to 08/30/05	930.0 to 930.0	1	08/30/05 to 08/30/05	930.0 to 930.0	1

TABLE 3-6
Summary of TDS Sample Counts in Surface Water
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
Potrerro Rd	LA	06/19/96 to 09/11/96	888.0 to 905.0	2	06/19/96 to 09/11/96	888.0 to 905.0	2
Saugus WRP	LA	01/01/63 to 07/17/05	141.0 to 1,103.0	434	01/01/80 to 07/17/05	141.0 to 874.0	313
SCR-Hwy 99	LA	09/21/92 to 09/11/96	739.0 to 897.0	4	09/21/92 to 09/11/96	739.0 to 897.0	4
SCR-Old Hwy 99	LA	05/11/88 to 07/07/94	78.0 to 1,136.0	69	05/11/88 to 07/07/94	78.0 to 1,136.0	69
SCR-Old Hwy 99 Bridge	LA	05/02/67 to 07/27/94	1.0 to 1,949.0	194	01/30/80 to 07/27/94	608.0 to 1,090.0	49
SCR-RA	LA	03/12/93 to 04/13/05	364.0 to 655.0	6	03/12/93 to 04/13/05	364.0 to 655.0	6
SCR-RB	LA	03/12/90 to 07/20/05	452.0 to 1,530.0	73	03/12/90 to 07/20/05	452.0 to 1,530.0	73
SCR-RC	LA	03/12/90 to 07/20/05	604.0 to 1,850.0	71	03/12/90 to 07/20/05	604.0 to 1,850.0	71
SCR-RD	LA	03/12/90 to 07/20/05	0.0 to 1,980.0	73	03/12/90 to 07/20/05	0.0 to 1,980.0	73
SCR-RE	LA	03/12/90 to 07/20/05	0.0 to 1,496.0	73	03/12/90 to 07/20/05	0.0 to 1,496.0	73
SR101	LA	08/30/05 to 08/30/05	390.0 to 390.0	1	08/30/05 to 08/30/05	390.0 to 390.0	1
SR102	LA	08/30/05 to 08/30/05	430.0 to 490.0	2	08/30/05 to 08/30/05	430.0 to 490.0	2
SR103	LA	08/30/05 to 08/30/05	570.0 to 570.0	1	08/30/05 to 08/30/05	570.0 to 570.0	1
SR104	LA	08/31/05 to 08/31/05	760.0 to 760.0	1	08/31/05 to 08/31/05	760.0 to 760.0	1
SR105	LA	08/31/05 to 08/31/05	760.0 to 760.0	1	08/31/05 to 08/31/05	760.0 to 760.0	1
Valencia WRP	LA	02/01/71 to 07/17/05	371.0 to 1,030.0	1023	01/01/80 to 07/17/05	371.0 to 961.0	916
11109000	V	09/02/92 to 09/02/92	1,160.0 to 1,160.0	1	09/02/92 to 09/02/92	1,160.0 to 1,160.0	1
04N17W29SW1	V	01/30/80 to 01/27/05	400.0 to 1,530.0	209	01/30/80 to 01/27/05	400.0 to 1,530.0	209
04N18W03SW1	V	04/16/87 to 07/30/03	480.0 to 924.0	86	04/16/87 to 07/30/03	480.0 to 924.0	86
04N18W03SW2	V	01/30/80 to 07/19/01	540.0 to 936.0	198	01/30/80 to 07/19/01	540.0 to 936.0	198
04N18W03SW3	V	01/10/90 to 01/10/90	1,420.0 to 1,500.0	3	01/10/90 to 01/10/90	1,420.0 to 1,500.0	3
04N18W20SW1	V	10/21/99 to 10/21/03	600.0 to 1,000.0	9	10/21/99 to 10/21/03	600.0 to 1,000.0	9
04N18W25SW1	V	07/19/01 to 07/19/01	1,020.0 to 1,020.0	1	07/19/01 to 07/19/01	1,020.0 to 1,020.0	1
04N19W25SW1	V	03/18/97 to 01/16/02	1,220.0 to 1,820.0	42	03/18/97 to 01/16/02	1,220.0 to 1,820.0	42
04N19W30SW1	V	03/18/97 to 01/16/02	630.0 to 1,740.0	42	03/18/97 to 01/16/02	630.0 to 1,740.0	42
04N19W33SW1	V	02/24/92 to 01/28/05	600.0 to 1,291.0	144	02/24/92 to 01/28/05	600.0 to 1,291.0	144
11108500 (Blue Cut)	V	10/14/52 to 01/27/05	377.0 to 5,986.0	915	01/16/80 to 01/27/05	400.0 to 2,800.0	309
HC101	V	08/31/05 to 08/31/05	1,500.0 to 1,500.0	1	08/31/05 to 08/31/05	1,500.0 to 1,500.0	1
PC101	V	08/31/05 to 08/31/05	570.0 to 570.0	1	08/31/05 to 08/31/05	570.0 to 570.0	1

TABLE 3-6
Summary of TDS Sample Counts in Surface Water
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
Piru Treatment Plant	V	02/09/88 to 04/21/05	491.0 to 1,690.0	79	02/09/88 to 04/21/05	491.0 to 1,690.0	79
PLC101	V	08/31/05 to 08/31/05	1,300.0 to 1,300.0	1	08/31/05 to 08/31/05	1,300.0 to 1,300.0	1
SCR-RF	V	06/29/00 to 07/20/05	605.0 to 1,281.0	67	06/29/00 to 07/20/05	605.0 to 1,281.0	67
SCR-VCOL	V	09/02/53 to 12/28/99	387.0 to 5,986.0	297	01/30/80 to 12/28/99	603.0 to 2,800.0	104
SR106	V	08/31/05 to 08/31/05	980.0 to 980.0	1	08/31/05 to 08/31/05	980.0 to 980.0	1
SR107	V	08/31/05 to 08/31/05	600.0 to 600.0	1	08/31/05 to 08/31/05	600.0 to 600.0	1
SR108	V	08/31/05 to 08/31/05	840.0 to 840.0	1	08/31/05 to 08/31/05	840.0 to 840.0	1
SR109	V	08/31/05 to 08/31/05	670.0 to 670.0	1	08/31/05 to 08/31/05	670.0 to 670.0	1

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

This Page Intentionally
Left Blank

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
03N15W06A01S	LA	12/11/56 to 05/19/80	1,401.7 to 1,443.5	32	05/19/80 to 05/19/80	1,437.9 to 1,437.9	1
03N16W01M01S	LA	11/12/57 to 05/19/80	563.4 to 1,285.5	48	05/19/80 to 05/19/80	1,263.0 to 1,263.0	1
03N16W02G02S	LA	04/14/76 to 05/05/80	1,211.6 to 1,223.4	27	05/05/80 to 05/05/80	1,223.4 to 1,223.4	1
03N16W04A01S	LA	10/31/74 to 05/15/80	1,112.0 to 1,144.5	22	05/15/80 to 05/15/80	1,144.5 to 1,144.5	1
03N16W11A01S	LA	11/12/57 to 05/19/80	1,300.2 to 1,348.9	33	05/19/80 to 05/19/80	1,344.5 to 1,344.5	1
03N16W13A01S	LA	08/04/58 to 05/19/80	1,482.0 to 1,523.8	29	05/19/80 to 05/19/80	1,522.9 to 1,522.9	1
04N15W19D01S	LA	12/04/56 to 05/05/80	1,168.6 to 1,265.0	83	05/05/80 to 05/05/80	1,265.0 to 1,265.0	1
04N15W20F02S	LA	02/14/75 to 03/21/80	1,258.3 to 1,329.3	48	01/29/80 to 03/21/80	1,316.3 to 1,321.2	2
04N16W21H02S	LA	01/16/56 to 05/01/80	1,028.7 to 1,106.5	234	01/29/80 to 05/01/80	1,096.8 to 1,106.5	3
04N16W32Q01S	LA	07/18/56 to 06/13/80	1,231.9 to 1,339.1	126	06/13/80 to 06/13/80	1,296.3 to 1,296.3	1
04N16W33L01S	LA	11/10/71 to 05/12/80	1,066.3 to 1,165.4	18	05/12/80 to 05/12/80	1,165.4 to 1,165.4	1
04N16W34J02S	LA	11/07/57 to 05/15/80	1,051.7 to 1,183.5	27	05/15/80 to 05/15/80	1,137.8 to 1,137.8	1
04N16W34L01S	LA	08/02/72 to 05/05/80	1,086.8 to 1,131.8	77	05/05/80 to 05/05/80	1,131.8 to 1,131.8	1
04N16W34L02S	LA	01/05/72 to 05/05/80	1,088.3 to 1,137.2	75	05/05/80 to 05/05/80	1,137.2 to 1,137.2	1
04N16W35E02S	LA	04/11/76 to 05/05/80	1,151.6 to 1,161.0	26	05/05/80 to 05/05/80	1,151.6 to 1,151.6	1
04N16W35K01S	LA	11/08/71 to 05/15/80	1,071.6 to 1,169.8	17	05/15/80 to 05/15/80	1,156.6 to 1,156.6	1
04N16W36M04S	LA	12/11/56 to 05/19/80	1,064.1 to 1,180.9	28	05/19/80 to 05/19/80	1,180.9 to 1,180.9	1
04N16W36R01S	LA	12/11/56 to 05/19/80	1,242.7 to 1,297.0	33	05/19/80 to 05/19/80	1,276.2 to 1,276.2	1
04N17W01A01S	LA	07/01/60 to 06/26/85	1,012.6 to 1,053.6	104	02/05/81 to 06/26/85	1,035.4 to 1,049.9	13
04N17W01J01S	LA	07/01/60 to 05/08/85	1,006.9 to 1,045.8	95	02/05/81 to 05/08/85	1,028.2 to 1,040.8	13
04N17W12B02S	LA	07/01/60 to 06/26/85	995.2 to 1,031.3	118	02/05/81 to 06/26/85	1,013.8 to 1,026.7	14
04N17W12R03S	LA	07/05/72 to 06/11/80	996.0 to 1,006.8	80	01/29/80 to 06/11/80	1,003.3 to 1,006.4	3
04N17W13C02S	LA	11/04/42 to 06/26/85	881.0 to 977.9	258	03/20/80 to 06/26/85	968.7 to 973.1	14
05N17W25B02S	LA	07/01/60 to 06/26/85	1,061.9 to 1,119.3	129	02/05/81 to 06/26/85	1,099.8 to 1,112.4	12
05N17W25B04S	LA	07/01/60 to 06/26/85	1,070.5 to 1,120.7	193	02/05/81 to 06/26/85	1,101.4 to 1,114.9	14
05N17W25B05S	LA	07/01/60 to 08/07/84	1,070.8 to 1,121.8	141	02/05/81 to 08/07/84	1,107.4 to 1,115.0	10
05N17W25G04S	LA	12/10/56 to 06/17/82	1,068.2 to 1,205.6	135	02/05/81 to 06/17/82	1,101.9 to 1,111.0	6
05N17W25G06S	LA	05/22/72 to 06/26/85	1,075.3 to 1,110.8	24	02/05/81 to 06/26/85	1,088.4 to 1,108.4	11
05N17W36A03S	LA	11/06/57 to 06/26/85	1,055.1 to 1,100.2	121	02/05/81 to 06/26/85	1,078.4 to 1,094.8	13
05N17W36G04S	LA	07/01/60 to 06/26/85	1,046.1 to 1,084.5	105	02/05/81 to 06/26/85	1,064.2 to 1,080.9	14

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
05N17W36H03S	LA	07/01/60 to 06/26/85	1,053.9 to 1,095.2	89	02/05/81 to 06/26/85	1,070.0 to 1,085.0	12
05N17W36J02S	LA	10/09/67 to 06/26/85	1,046.6 to 1,086.6	60	02/05/81 to 06/26/85	1,067.3 to 1,080.8	13
LACFCD-5831	LA	01/20/64 to 11/17/99	1,057.0 to 1,236.0	77	05/12/80 to 11/17/99	1,150.2 to 1,236.0	31
LACFCD-5841	LA	06/07/73 to 11/21/00	1,079.0 to 1,185.3	59	05/12/80 to 11/21/00	1,079.0 to 1,133.5	31
LACFCD-5842F	LA	10/31/74 to 11/21/00	1,120.5 to 1,172.5	57	05/15/80 to 11/21/00	1,121.0 to 1,172.5	28
LACFCD-5851	LA	06/19/68 to 07/18/01	1,066.5 to 1,152.8	516	05/05/80 to 07/18/01	1,066.5 to 1,152.8	399
LACFCD-5851A	LA	06/19/68 to 12/24/00	1,083.5 to 1,153.2	309	05/05/80 to 12/24/00	1,085.2 to 1,153.2	194
LACFCD-5860C	LA	12/11/61 to 12/14/00	1,006.0 to 1,159.0	115	11/30/84 to 12/14/00	1,006.0 to 1,159.0	50
LACFCD-5860D	LA	07/15/74 to 12/14/00	996.0 to 1,115.0	96	11/30/84 to 12/14/00	996.0 to 1,115.0	54
LACFCD-5860E	LA	08/25/87 to 12/14/00	954.0 to 1,099.0	36	08/25/87 to 12/14/00	954.0 to 1,099.0	36
LACFCD-5871D	LA	10/22/48 to 11/21/00	1,031.2 to 1,161.8	53	05/15/80 to 11/21/00	1,031.2 to 1,150.0	31
LACFCD-5873E	LA	07/15/73 to 12/14/00	1,216.0 to 1,322.0	97	11/30/84 to 12/14/00	1,276.0 to 1,322.0	53
LACFCD-5882	LA	11/12/57 to 11/21/00	1,232.0 to 1,313.1	93	05/19/80 to 11/21/00	1,232.0 to 1,290.6	33
LACFCD-5912A	LA	12/11/56 to 11/21/00	1,398.7 to 1,440.3	71	05/19/80 to 11/21/00	1,401.0 to 1,438.1	36
LACFCD-5932	LA	11/25/64 to 11/21/00	1,486.6 to 1,526.2	67	05/19/80 to 11/21/00	1,486.6 to 1,526.1	38
LACFCD-6949	LA	11/19/68 to 11/21/00	877.0 to 888.0	49	06/05/80 to 11/21/00	877.0 to 887.3	29
LACFCD-6968	LA	12/20/63 to 04/26/93	902.2 to 974.3	6	04/26/93 to 04/26/93	902.2 to 902.2	1
LACFCD-6980E	LA	12/01/60 to 11/10/04	1,062.9 to 1,116.0	198	11/30/84 to 11/10/04	1,085.0 to 1,111.0	117
LACFCD-6980G	LA	01/11/62 to 11/19/87	1,071.5 to 1,126.9	58	06/11/80 to 11/19/87	1,093.0 to 1,117.1	14
LACFCD-6981D	LA	08/15/72 to 11/10/04	1,068.0 to 1,107.5	175	11/30/84 to 11/10/04	1,068.0 to 1,107.5	117
LACFCD-6981E	LA	10/30/89 to 12/14/00	1,067.0 to 1,097.0	29	10/30/89 to 12/14/00	1,067.0 to 1,097.0	29
LACFCD-6991A	LA	11/18/53 to 11/21/00	1,052.7 to 1,118.0	112	06/05/80 to 11/21/00	1,052.7 to 1,118.0	29
LACFCD-6993A	LA	11/20/58 to 11/10/99	993.0 to 1,048.3	96	06/05/80 to 11/10/99	993.0 to 1,048.3	66
LACFCD-6994A	LA	12/17/27 to 10/24/95	1,022.5 to 1,046.8	50	10/24/95 to 10/24/95	1,033.9 to 1,033.9	1
LACFCD-6995D	LA	02/03/70 to 11/21/00	995.5 to 1,006.9	145	01/29/80 to 11/21/00	995.5 to 1,006.5	38
LACFCD-7043C	LA	04/29/81 to 11/23/99	1,443.9 to 1,492.4	25	04/29/81 to 11/23/99	1,443.9 to 1,492.4	25
LACFCD-7048C	LA	05/27/81 to 09/18/91	1,076.8 to 1,114.2	206	05/27/81 to 09/18/91	1,076.8 to 1,114.2	206
LACFCD-7053C	LA	05/13/81 to 04/14/92	1,223.0 to 1,272.3	20	05/13/81 to 04/14/92	1,223.0 to 1,272.3	20
LACFCD-7053D	LA	10/30/85 to 11/23/99	1,309.0 to 1,380.0	19	10/30/85 to 11/23/99	1,309.0 to 1,380.0	19

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
LACFCD-7066D	LA	01/30/83 to 11/30/04	1,125.0 to 1,181.0	143	01/30/83 to 11/30/04	1,125.0 to 1,181.0	143
LACFCD-7067D	LA	01/10/64 to 08/21/95	1,062.0 to 1,152.5	219	04/01/86 to 08/21/95	1,101.5 to 1,152.5	166
LACFCD-7076C	LA	11/23/54 to 04/14/92	963.1 to 1,048.0	44	05/07/80 to 04/14/92	1,010.0 to 1,048.0	14
LACFCD-7086B	LA	01/30/83 to 10/31/00	1,196.0 to 1,229.0	54	01/30/83 to 10/31/00	1,196.0 to 1,229.0	54
LACFCD-7095	LA	02/14/30 to 11/27/00	1,187.0 to 1,308.5	206	05/12/80 to 11/27/00	1,235.0 to 1,293.9	29
LACFCD-7107K	LA	01/30/84 to 10/31/00	1,185.0 to 1,258.0	54	01/30/84 to 10/31/00	1,185.0 to 1,258.0	54
LACFCD-7113	LA	01/11/62 to 11/27/00	1,384.9 to 1,440.3	70	05/12/80 to 11/27/00	1,386.6 to 1,439.7	38
LACFCD-7123B	LA	01/13/62 to 11/27/00	1,392.6 to 1,473.6	66	05/12/80 to 11/27/00	1,441.9 to 1,468.6	36
LACFCD-7127D	LA	05/01/80 to 04/17/00	1,231.3 to 1,329.6	197	05/01/80 to 04/17/00	1,231.3 to 1,329.6	197
LACFCD-7132	LA	11/27/45 to 11/27/00	1,487.8 to 1,564.0	93	12/18/80 to 11/27/00	1,528.1 to 1,561.3	35
LACFCD-7140B	LA	08/22/63 to 11/27/00	1,483.4 to 1,552.5	62	05/12/80 to 11/27/00	1,489.9 to 1,546.4	31
LACFCD-7148K	LA	06/15/86 to 05/31/04	1,322.0 to 1,411.0	43	06/15/86 to 05/31/04	1,322.0 to 1,411.0	43
LACFCD-7168C	LA	01/30/83 to 11/30/04	1,389.0 to 1,468.0	74	01/30/83 to 11/30/04	1,389.0 to 1,468.0	74
LACFCD-7177B	LA	05/19/80 to 05/18/04	1,435.2 to 1,527.8	42	05/19/80 to 05/18/04	1,435.2 to 1,527.8	42
LACFCD-7188A	LA	05/27/80 to 05/18/04	1,499.0 to 1,581.2	38	05/27/80 to 05/18/04	1,499.0 to 1,581.2	38
LACFCD-7197	LA	05/05/80 to 07/02/03	1,476.0 to 1,561.3	39	05/05/80 to 07/02/03	1,476.0 to 1,561.3	39
LACFCD-7197D	LA	11/30/84 to 11/10/04	1,479.0 to 1,564.0	50	11/30/84 to 11/10/04	1,479.0 to 1,564.0	50
NCWD-10	LA	12/11/61 to 02/15/05	861.0 to 1,204.0	727	01/01/84 to 02/15/05	861.0 to 1,204.0	684
NCWD-11	LA	10/10/73 to 02/15/05	964.0 to 1,188.0	862	01/01/84 to 02/15/05	964.0 to 1,188.0	856
NCWD-12	LA	09/27/85 to 02/15/05	811.0 to 1,204.0	752	09/27/85 to 02/15/05	811.0 to 1,204.0	752
NCWD-13	LA	06/01/91 to 02/15/05	844.0 to 1,194.0	541	06/01/91 to 02/15/05	844.0 to 1,194.0	541
NCWD-7	LA	11/19/59 to 02/15/05	930.0 to 1,250.0	800	07/01/84 to 02/15/05	930.0 to 1,250.0	785
NCWD-9	LA	03/09/51 to 12/01/01	1,061.0 to 1,358.0	669	07/01/84 to 12/01/01	1,061.0 to 1,358.0	624
NCWD-Castaic 1	LA	07/01/84 to 12/01/04	1,032.0 to 1,106.0	619	07/01/84 to 12/01/04	1,032.0 to 1,106.0	619
NCWD-Castaic 2	LA	07/01/84 to 12/01/04	1,060.0 to 1,106.0	589	07/01/84 to 12/01/04	1,060.0 to 1,106.0	589
NCWD-Castaic 3	LA	07/01/84 to 07/01/04	1,060.0 to 1,106.0	611	07/01/84 to 07/01/04	1,060.0 to 1,106.0	611
NCWD-Castaic 4	LA	02/01/85 to 12/01/04	1,014.0 to 1,108.0	353	02/01/85 to 12/01/04	1,014.0 to 1,108.0	353
NCWD-Pinetree 1	LA	07/01/84 to 03/01/05	1,474.0 to 1,578.0	538	07/01/84 to 03/01/05	1,474.0 to 1,578.0	538
NCWD-Pinetree 2	LA	07/01/84 to 03/01/05	1,477.0 to 1,568.0	436	07/01/84 to 03/01/05	1,477.0 to 1,568.0	436

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
NCWD-Pinetree 3	LA	07/01/84 to 03/01/05	1,422.0 to 1,533.0	629	07/01/84 to 03/01/05	1,422.0 to 1,533.0	629
NCWD-Pinetree 4	LA	07/01/84 to 03/01/05	1,434.0 to 1,529.0	570	07/01/84 to 03/01/05	1,434.0 to 1,529.0	570
NLF-156	LA	10/11/61 to 09/11/00	907.5 to 986.0	28	09/11/00 to 09/11/00	976.1 to 976.1	1
NLF-161	LA	05/24/84 to 06/09/86	937.6 to 974.0	6	05/24/84 to 06/09/86	937.6 to 974.0	6
NLF-B10	LA	06/15/57 to 11/01/04	821.0 to 888.0	172	03/17/80 to 11/01/04	850.3 to 888.0	36
NLF-B11	LA	07/27/93 to 04/21/00	841.3 to 873.9	18	07/27/93 to 04/21/00	841.3 to 873.9	18
NLF-B5	LA	05/06/76 to 03/28/00	866.0 to 884.0	39	02/12/81 to 03/28/00	868.7 to 881.0	28
NLF-B6	LA	10/17/75 to 04/21/00	858.6 to 887.0	52	03/17/80 to 04/21/00	858.6 to 887.0	35
NLF-B7	LA	03/20/56 to 04/21/00	835.5 to 894.0	145	02/24/84 to 04/21/00	835.5 to 890.2	35
NLF-C	LA	10/17/75 to 09/01/02	871.0 to 941.0	70	03/17/80 to 09/01/02	879.6 to 934.8	48
NLF-C3	LA	03/29/56 to 04/21/00	842.0 to 925.9	172	04/17/84 to 04/21/00	842.0 to 919.3	30
NLF-C4	LA	10/17/75 to 11/01/04	887.0 to 935.0	73	03/17/80 to 11/01/04	887.0 to 935.0	52
NLF-C5	LA	07/15/56 to 04/21/00	845.2 to 944.0	216	03/17/80 to 04/21/00	845.2 to 938.1	60
NLF-C6	LA	03/29/56 to 04/21/00	876.0 to 949.0	217	03/17/80 to 04/21/00	887.2 to 947.4	63
NLF-C7	LA	08/15/56 to 04/21/00	882.6 to 940.0	172	04/10/84 to 04/21/00	882.6 to 937.9	34
NLF-C8	LA	10/19/50 to 04/21/00	811.2 to 937.7	88	05/21/84 to 04/21/00	872.7 to 931.7	28
NLF-C9	LA	08/15/00 to 08/15/00	952.7 to 973.6	2	08/15/00 to 08/15/00	952.7 to 973.6	2
NLF-E	LA	10/17/75 to 11/01/04	971.1 to 1,008.8	99	03/17/80 to 11/01/04	971.1 to 1,008.8	77
NLF-E2	LA	07/29/38 to 04/21/00	921.9 to 1,008.0	207	12/21/89 to 04/21/00	931.4 to 998.2	26
NLF-E4	LA	10/17/75 to 04/21/00	922.5 to 977.0	71	03/17/80 to 04/21/00	922.5 to 977.0	48
NLF-E5	LA	06/10/92 to 08/18/00	884.3 to 968.8	18	06/10/92 to 08/18/00	884.3 to 968.8	18
NLF-E7	LA	06/15/57 to 05/16/97	926.0 to 984.0	109	08/11/93 to 05/16/97	971.2 to 976.6	12
NLF-E9	LA	01/01/76 to 04/21/00	910.4 to 991.0	58	03/17/80 to 04/21/00	910.4 to 991.0	38
NLF-G45	LA	04/16/84 to 04/21/00	969.7 to 1,016.6	31	04/16/84 to 04/21/00	969.7 to 1,016.6	31
NLF-Q	LA	10/17/75 to 12/17/81	1,086.0 to 1,136.0	28	03/17/80 to 12/17/81	1,110.0 to 1,134.0	5
NLF-R	LA	10/17/75 to 12/17/81	1,094.0 to 1,136.0	26	03/17/80 to 12/17/81	1,108.0 to 1,136.0	5
NLF-R2	LA	07/23/41 to 12/17/81	1,067.0 to 1,173.5	257	03/04/80 to 12/17/81	1,137.0 to 1,170.0	13
NLF-S	LA	08/25/37 to 08/19/82	1,002.6 to 1,102.0	114	03/17/80 to 08/19/82	1,061.0 to 1,084.0	9
NLF-S2	LA	07/16/40 to 05/30/84	982.0 to 1,102.0	251	03/17/80 to 05/30/84	1,056.4 to 1,085.0	11

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
NLF-S3	LA	04/11/51 to 06/04/91	941.0 to 1,087.4	178	09/24/81 to 06/04/91	1,066.9 to 1,087.4	12
NLF-W4	LA	07/01/46 to 11/29/95	1,101.0 to 1,195.0	243	02/01/81 to 11/29/95	1,142.7 to 1,192.0	46
NLF-W5	LA	10/01/47 to 03/10/05	1,035.0 to 1,151.2	302	02/12/81 to 03/10/05	1,121.1 to 1,151.2	47
NLF-X3	LA	03/20/56 to 06/01/04	927.1 to 1,004.8	187	04/11/84 to 06/01/04	927.1 to 1,004.8	69
PR-Lennar (D. Poe)	LA	08/03/00 to 08/03/00	1,125.7 to 1,125.7	1	08/03/00 to 08/03/00	1,125.7 to 1,125.7	1
PR-Lombardi (Anden)	LA	05/10/90 to 09/12/00	1,169.0 to 1,227.5	2	05/10/90 to 09/12/00	1,169.0 to 1,227.5	2
SCWC-Clark	LA	06/06/72 to 12/01/04	1,164.0 to 1,237.0	399	01/01/80 to 12/01/04	1,180.0 to 1,237.0	312
SCWC-Guida	LA	03/01/73 to 12/01/04	1,265.0 to 1,324.0	400	01/01/80 to 12/01/04	1,265.0 to 1,324.0	316
SCWC-Honby	LA	07/23/65 to 12/01/04	1,161.0 to 1,270.0	405	01/01/80 to 12/01/04	1,189.0 to 1,270.0	307
SCWC-Lost Canyon 2	LA	07/23/65 to 01/15/05	1,416.6 to 1,522.0	405	01/01/80 to 01/15/05	1,419.0 to 1,522.0	317
SCWC-Lost Canyon 2A	LA	01/01/91 to 01/15/05	1,422.0 to 1,522.0	200	01/01/91 to 01/15/05	1,422.0 to 1,522.0	200
SCWC-Methodist	LA	05/28/75 to 07/24/01	1,135.9 to 1,154.9	5	07/24/01 to 07/24/01	1,154.9 to 1,154.9	1
SCWC-Mitchell	LA	07/19/65 to 12/01/04	1,380.0 to 1,476.0	385	01/01/80 to 12/01/04	1,385.0 to 1,476.0	343
SCWC-Mitchell #5B	LA	01/03/03 to 07/01/04	1,398.0 to 1,409.0	19	01/03/03 to 07/01/04	1,398.0 to 1,409.0	19
SCWC-N. Oaks Central	LA	03/01/73 to 01/15/05	1,287.0 to 1,379.0	403	01/01/80 to 01/15/05	1,287.0 to 1,379.0	320
SCWC-N. Oaks East	LA	11/27/63 to 01/15/05	1,253.2 to 1,383.0	399	01/01/80 to 01/15/05	1,289.0 to 1,383.0	310
SCWC-N. Oaks West	LA	06/05/72 to 01/15/05	1,291.0 to 1,381.0	367	01/01/80 to 01/15/05	1,291.0 to 1,380.0	279
SCWC-Sand Canyon	LA	03/01/74 to 07/01/04	1,419.0 to 1,516.0	368	01/01/80 to 07/01/04	1,419.0 to 1,516.0	297
SCWC-Saugus 1	LA	07/26/88 to 12/01/04	837.0 to 1,082.0	174	07/26/88 to 12/01/04	837.0 to 1,082.0	174
SCWC-Saugus 2	LA	09/18/88 to 12/01/04	699.0 to 1,073.0	222	09/18/88 to 12/01/04	699.0 to 1,073.0	222
SCWC-Sierra	LA	01/01/74 to 07/01/04	1,303.0 to 1,398.0	317	01/01/80 to 07/01/04	1,303.0 to 1,398.0	237
SCWC-Stadium	LA	07/20/65 to 11/01/04	1,102.2 to 1,191.0	930	01/01/80 to 11/01/04	1,139.0 to 1,191.0	804
SE-P-1	LA	09/01/99 to 01/10/01	934.0 to 939.0	8	09/01/99 to 01/10/01	934.0 to 939.0	8
SE-P-10	LA	10/16/99 to 01/10/01	835.0 to 843.0	8	10/16/99 to 01/10/01	835.0 to 843.0	8
SE-P-11	LA	04/07/00 to 01/10/01	895.0 to 896.5	4	04/07/00 to 01/10/01	895.0 to 896.5	4
SE-P-12P	LA	06/06/00 to 01/10/01	1,212.0 to 1,215.5	3	06/06/00 to 01/10/01	1,212.0 to 1,215.5	3
SE-P-13	LA	04/07/00 to 01/10/01	927.0 to 929.0	4	04/07/00 to 01/10/01	927.0 to 929.0	4
SE-P-18F	LA	07/25/94 to 01/10/01	1,138.8 to 1,142.6	17	07/25/94 to 01/10/01	1,138.8 to 1,142.6	17
SE-P-1P	LA	06/05/00 to 01/10/01	861.0 to 862.5	3	06/05/00 to 01/10/01	861.0 to 862.5	3

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
SE-P-22F	LA	07/25/94 to 01/10/01	1,065.7 to 1,077.6	18	07/25/94 to 01/10/01	1,065.7 to 1,077.6	18
SE-P-23F	LA	07/25/94 to 01/10/01	989.2 to 998.5	11	07/25/94 to 01/10/01	989.2 to 998.5	11
SE-P-27F	LA	07/25/94 to 01/10/01	1,073.7 to 1,085.0	18	07/25/94 to 01/10/01	1,073.7 to 1,085.0	18
SE-P-29F	LA	07/28/94 to 01/10/01	833.0 to 835.2	17	07/28/94 to 01/10/01	833.0 to 835.2	17
SE-P-2M	LA	10/10/99 to 01/10/01	950.0 to 953.0	8	10/10/99 to 01/10/01	950.0 to 953.0	8
SE-P-2P	LA	06/05/00 to 01/10/01	956.0 to 957.5	3	06/05/00 to 01/10/01	956.0 to 957.5	3
SE-P-3	LA	09/01/99 to 01/10/01	904.0 to 906.5	8	09/01/99 to 01/10/01	904.0 to 906.5	8
SE-P-32F	LA	08/03/94 to 01/10/01	916.9 to 923.5	11	08/03/94 to 01/10/01	916.9 to 923.5	11
SE-P-35F	LA	07/10/94 to 01/10/01	873.2 to 879.6	16	07/10/94 to 01/10/01	873.2 to 879.6	16
SE-P-37F	LA	08/03/94 to 01/10/01	1,086.2 to 1,093.5	11	08/03/94 to 01/10/01	1,086.2 to 1,093.5	11
SE-P-3M	LA	10/10/99 to 01/10/01	1,032.0 to 1,036.0	8	10/10/99 to 01/10/01	1,032.0 to 1,036.0	8
SE-P-4	LA	11/10/99 to 01/10/01	864.0 to 868.0	7	11/10/99 to 01/10/01	864.0 to 868.0	7
SE-P-5	LA	10/02/99 to 01/10/01	935.0 to 939.0	8	10/02/99 to 01/10/01	935.0 to 939.0	8
SE-P-6	LA	10/02/99 to 01/10/01	928.0 to 932.0	8	10/02/99 to 01/10/01	928.0 to 932.0	8
SE-P-7	LA	10/02/99 to 01/10/01	919.5 to 921.0	8	10/02/99 to 01/10/01	919.5 to 921.0	8
SE-P-8	LA	10/02/99 to 01/10/01	1,003.0 to 1,007.0	8	10/02/99 to 01/10/01	1,003.0 to 1,007.0	8
SE-P-8P	LA	06/06/00 to 01/10/01	1,091.5 to 1,092.0	3	06/06/00 to 01/10/01	1,091.5 to 1,092.0	3
SE-P-9	LA	10/02/99 to 01/10/01	823.5 to 827.0	8	10/02/99 to 01/10/01	823.5 to 827.0	8
VWC-157	LA	03/03/62 to 03/09/05	961.2 to 1,089.4	264	11/01/80 to 03/09/05	967.5 to 1,089.4	165
VWC-159	LA	02/04/92 to 03/10/05	920.0 to 1,240.4	78	02/04/92 to 03/10/05	920.0 to 1,240.4	78
VWC-160	LA	05/11/64 to 03/09/05	929.0 to 1,062.6	304	03/01/80 to 03/09/05	938.0 to 1,062.6	200
VWC-201	LA	03/21/89 to 03/09/05	921.0 to 1,075.2	175	03/21/89 to 03/09/05	921.0 to 1,075.2	175
VWC-205	LA	06/01/00 to 03/09/05	891.4 to 1,070.0	77	06/01/00 to 03/09/05	891.4 to 1,070.0	77
VWC-205M	LA	01/01/00 to 07/01/03	1,030.8 to 1,062.1	14	01/01/00 to 07/01/03	1,030.8 to 1,062.1	14
VWC-All. Mon. Well	LA	07/26/00 to 10/16/00	1,092.6 to 1,094.3	5	07/26/00 to 10/16/00	1,092.6 to 1,094.3	5
VWC-D	LA	01/20/56 to 12/01/04	966.0 to 1,025.0	549	03/17/80 to 12/01/04	982.6 to 1,018.8	374
VWC-I	LA	03/29/56 to 03/10/05	985.0 to 1,079.4	246	03/04/80 to 03/10/05	987.1 to 1,079.4	137
VWC-K2	LA	03/20/56 to 07/01/03	1,007.0 to 1,112.0	297	06/01/80 to 07/01/03	1,072.0 to 1,112.0	142
VWC-L2	LA	03/29/56 to 07/01/03	1,004.0 to 1,124.0	344	03/01/80 to 07/01/03	1,056.7 to 1,124.0	147

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
VWC-N	LA	05/05/28 to 03/09/05	995.0 to 1,113.0	461	03/01/80 to 03/09/05	1,060.0 to 1,113.0	226
VWC-N3	LA	10/17/75 to 11/01/03	1,074.0 to 1,111.0	151	11/01/91 to 11/01/03	1,074.0 to 1,111.0	147
VWC-N4	LA	03/29/56 to 07/01/03	981.0 to 1,123.0	309	03/01/80 to 07/01/03	1,077.0 to 1,123.0	155
VWC-Q2	LA	02/01/55 to 03/09/05	1,010.0 to 1,149.0	606	03/01/80 to 03/09/05	1,068.8 to 1,149.0	265
VWC-S6	LA	07/01/00 to 03/09/05	1,038.0 to 1,080.3	80	07/01/00 to 03/09/05	1,038.0 to 1,080.3	80
VWC-S7	LA	07/01/00 to 03/09/05	1,057.2 to 1,100.7	76	07/01/00 to 03/09/05	1,057.2 to 1,100.7	76
VWC-S8	LA	07/01/00 to 03/10/05	1,058.3 to 1,104.5	76	07/01/00 to 03/10/05	1,058.3 to 1,104.5	76
VWC-T2	LA	06/01/53 to 01/06/05	1,063.0 to 1,192.0	650	03/01/80 to 01/06/05	1,126.7 to 1,192.0	330
VWC-T4	LA	11/01/54 to 01/06/05	1,069.0 to 1,186.0	384	03/01/80 to 01/06/05	1,126.3 to 1,186.0	211
VWC-U3	LA	01/01/56 to 05/10/04	1,159.0 to 1,255.4	548	03/01/80 to 05/10/04	1,179.2 to 1,255.4	236
VWC-U4	LA	01/01/56 to 03/09/05	1,113.0 to 1,233.0	513	03/01/80 to 03/09/05	1,167.7 to 1,233.0	259
VWC-W10	LA	09/01/03 to 03/09/05	1,021.9 to 1,090.4	44	09/01/03 to 03/09/05	1,021.9 to 1,090.4	44
VWC-W6	LA	06/01/53 to 05/01/02	1,037.0 to 1,146.0	315	06/01/80 to 05/01/02	1,048.0 to 1,143.0	133
VWC-W9	LA	11/01/90 to 03/09/05	1,091.0 to 1,146.7	228	11/01/90 to 03/09/05	1,091.0 to 1,146.7	228
SCWC-Mitchell #5A	UNK	01/03/03 to 12/01/04	1,395.0 to 1,408.0	24	01/03/03 to 12/01/04	1,395.0 to 1,408.0	24
V-0290	V	04/25/25 to 03/15/93	316.1 to 414.8	373	03/15/93 to 03/15/93	350.9 to 350.9	1
V-0330	V	11/15/61 to 06/03/05	327.6 to 434.6	456	01/31/80 to 06/03/05	356.3 to 434.6	288
V-0421	V	01/30/50 to 07/29/05	293.6 to 404.6	400	01/31/80 to 07/29/05	346.4 to 404.6	195
V-0070	V	08/23/30 to 06/03/05	430.8 to 655.5	644	02/07/80 to 06/03/05	509.7 to 655.5	194
V-0040	V	11/03/27 to 06/22/81	489.2 to 624.5	576	06/02/81 to 06/22/81	585.7 to 587.9	7
V-0060	V	01/26/26 to 03/31/04	436.0 to 689.0	303	05/28/99 to 03/31/04	538.3 to 574.5	22
V-0061	V	05/28/04 to 01/27/05	526.0 to 583.5	5	05/28/04 to 01/27/05	526.0 to 583.5	5
V-0055	V	10/09/74 to 06/22/81	512.5 to 600.6	189	10/06/80 to 06/22/81	579.3 to 600.6	25
V-0052	V	12/01/75 to 06/22/81	512.0 to 624.2	48	10/06/80 to 06/22/81	576.1 to 600.0	12
V-0036	V	02/20/57 to 07/29/05	441.7 to 661.3	430	02/06/80 to 07/29/05	533.3 to 661.3	264
V-0013	V	07/21/28 to 01/27/05	554.0 to 693.3	774	04/30/80 to 01/27/05	626.9 to 693.3	180
V-0031	V	03/02/65 to 02/02/05	437.4 to 676.4	276	02/06/80 to 02/02/05	534.4 to 676.4	168
V-0058	V	05/09/32 to 01/27/05	491.2 to 621.3	1,753	01/06/80 to 01/27/05	509.5 to 621.0	1,223
V-0054	V	01/03/33 to 02/04/05	523.6 to 627.5	283	04/03/80 to 02/04/05	524.1 to 627.5	136

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
V-0043	V	05/12/30 to 02/07/86	508.5 to 630.8	246	07/21/80 to 02/07/86	567.0 to 623.8	43
V-0090	V	04/25/06 to 08/07/85	458.2 to 600.4	524	04/30/80 to 08/07/85	544.3 to 597.5	45
V-0108	V	01/30/94 to 01/27/05	54.0 to 581.2	146	01/30/94 to 01/27/05	54.0 to 581.2	146
V-0109	V	05/23/94 to 01/27/05	56.8 to 584.7	148	05/23/94 to 01/27/05	56.8 to 584.7	148
V-0106	V	05/23/94 to 01/27/05	57.4 to 584.7	147	05/23/94 to 01/27/05	57.4 to 584.7	147
V-0107	V	05/23/94 to 01/27/05	57.7 to 584.9	143	05/23/94 to 01/27/05	57.7 to 584.9	143
V-0105	V	05/23/94 to 01/27/05	57.9 to 584.5	147	05/23/94 to 01/27/05	57.9 to 584.5	147
V-0134	V	09/29/61 to 07/29/05	427.9 to 611.1	465	02/07/80 to 07/29/05	487.9 to 611.1	291
V-0123	V	07/28/28 to 12/04/97	428.4 to 595.4	767	06/20/80 to 12/04/97	492.6 to 595.4	176
V-0121	V	02/09/98 to 12/07/04	556.0 to 569.2	63	02/09/98 to 12/07/04	556.0 to 569.2	63
V-0138	V	10/30/74 to 01/27/05	478.4 to 566.0	189	04/30/80 to 01/27/05	491.5 to 566.0	160
V-0162	V	03/12/56 to 06/03/05	421.0 to 550.4	512	02/06/80 to 06/03/05	486.9 to 550.4	189
V-0183	V	08/01/29 to 10/13/95	421.5 to 514.4	321	08/10/95 to 10/13/95	511.4 to 511.4	2
V-0242	V	09/22/92 to 09/22/92	462.2 to 462.2	1	09/22/92 to 09/22/92	462.2 to 462.2	1
V-0340	V	02/16/45 to 07/28/05	337.8 to 434.4	431	02/06/80 to 07/28/05	337.8 to 434.4	273
V-0309	V	09/24/92 to 09/24/92	417.6 to 417.6	1	09/24/92 to 09/24/92	417.6 to 417.6	1
V-0302	V	02/17/49 to 07/28/05	356.4 to 442.4	610	01/31/80 to 07/28/05	389.5 to 442.4	264
V-0327	V	04/04/30 to 07/25/02	355.3 to 417.8	515	01/31/80 to 07/25/02	381.0 to 411.8	115
V-0296	V	02/04/48 to 02/04/05	336.6 to 448.8	385	01/31/80 to 02/04/05	368.5 to 448.8	172
V-0241	V	10/15/73 to 12/19/84	446.2 to 466.7	158	04/28/80 to 12/19/84	462.1 to 465.3	23
V-0281	V	09/28/92 to 09/28/92	436.0 to 436.0	1	09/28/92 to 09/28/92	436.0 to 436.0	1
V-0254	V	12/29/48 to 09/23/92	391.0 to 456.9	149	09/23/92 to 09/23/92	456.1 to 456.1	1
V-0284	V	10/07/64 to 07/29/05	351.5 to 482.3	382	02/06/80 to 07/29/05	409.2 to 449.5	244
V-0249	V	05/22/70 to 01/31/01	442.6 to 464.9	280	02/06/80 to 01/31/01	444.0 to 464.9	185
V-0237	V	04/11/49 to 07/29/05	339.0 to 478.4	455	02/06/80 to 07/29/05	457.7 to 478.4	196
V-0238	V	08/08/49 to 07/29/05	342.7 to 479.5	461	02/06/80 to 07/29/05	451.0 to 479.5	212
V-0217	V	10/01/92 to 10/01/92	481.3 to 481.3	1	10/01/92 to 10/01/92	481.3 to 481.3	1
V-0176	V	07/12/56 to 02/04/05	417.1 to 517.8	106	06/18/99 to 02/04/05	503.6 to 517.8	21
V-0181	V	11/28/49 to 07/29/05	422.5 to 519.5	524	02/06/80 to 07/29/05	473.9 to 519.5	270

TABLE 3-7
Summary of Groundwater Level Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (ft msl)	Number of Values	Date Range	Value Range (ft msl)	Number of Values
V-0196	V	04/30/52 to 02/07/86	408.7 to 498.0	376	05/19/80 to 02/07/86	491.6 to 497.3	46
V-0166	V	07/23/28 to 07/29/05	399.8 to 541.1	795	08/10/81 to 07/29/05	482.1 to 541.1	277
V-0474	V	11/04/27 to 02/07/00	350.9 to 397.0	520	02/07/80 to 02/07/00	362.5 to 397.0	144

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

5-1117

This Page Intentionally
Left Blank

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
03N19W06D04S	UNK	12/31/99 to 12/31/04	0.0 to 45.0	6	12/31/99 to 12/31/04	0.0 to 45.0	6
03N20W02G05S	UNK	12/31/90 to 12/31/98	8.0 to 20.0	9	12/31/90 to 12/31/98	8.0 to 20.0	9
V-0695a	UNK	12/31/79 to 12/31/98	0.0 to 35.0	20	12/31/80 to 12/31/98	0.0 to 35.0	19
V-0695b	UNK	12/31/83 to 12/31/98	21.3 to 42.5	16	12/31/83 to 12/31/98	21.3 to 42.5	16
V-0695c	UNK	12/31/79 to 12/31/98	15.0 to 73.6	20	12/31/80 to 12/31/98	15.0 to 73.6	19
V-0686a	UNK	12/31/81 to 12/31/98	0.0 to 115.6	18	12/31/81 to 12/31/98	0.0 to 115.6	18
V-0686b	UNK	12/31/79 to 12/31/98	0.0 to 178.5	20	12/31/80 to 12/31/98	0.0 to 178.5	19
04N18W12B01S	UNK	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
04N18W20K02S	UNK	12/31/97 to 12/31/04	0.0 to 20.5	8	12/31/97 to 12/31/04	0.0 to 20.5	8
04N18W23K01S	UNK	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0082a	UNK	12/31/95 to 12/31/98	38.7 to 77.5	4	12/31/95 to 12/31/98	38.7 to 77.5	4
V-0082b	UNK	12/31/95 to 12/31/98	13.8 to 29.2	4	12/31/95 to 12/31/98	13.8 to 29.2	4
V-0082c	UNK	12/31/95 to 12/31/98	0.0 to 22.5	4	12/31/95 to 12/31/98	0.0 to 22.5	4
V-0082d	UNK	12/31/95 to 12/31/98	5.0 to 10.0	4	12/31/95 to 12/31/98	5.0 to 10.0	4
V-0110a	UNK	12/31/79 to 12/31/98	56.0 to 182.4	20	12/31/80 to 12/31/98	91.0 to 182.4	19
V-0110b	UNK	12/31/80 to 12/31/98	4.4 to 58.1	19	12/31/80 to 12/31/98	4.4 to 58.1	19
04N18W31M00S	UNK	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
04N19W19K01S	UNK	12/31/97 to 12/31/04	0.0 to 0.0	8	12/31/97 to 12/31/04	0.0 to 0.0	8
04N19W22J01S	UNK	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
04N19W23R02S	UNK	12/31/91 to 12/31/04	0.0 to 24.1	14	12/31/91 to 12/31/04	0.0 to 24.1	14
04N19W24M01S	UNK	12/31/91 to 12/31/04	0.0 to 0.0	14	12/31/91 to 12/31/04	0.0 to 0.0	14
04N19W25Q02S	UNK	12/31/88 to 12/31/90	0.0 to 0.0	3	12/31/88 to 12/31/90	0.0 to 0.0	3
04N19W29R01S	UNK	12/31/79 to 12/31/04	5.1 to 80.0	26	12/31/80 to 12/31/04	10.2 to 80.0	25
V-0251b	UNK	12/31/79 to 12/31/98	0.4 to 1.8	20	12/31/80 to 12/31/98	0.4 to 1.8	19
04N19W31Q00S	UNK	12/31/92 to 12/31/93	71.2 to 127.2	2	12/31/92 to 12/31/93	71.2 to 127.2	2
04N19W31Q0aS	UNK	12/31/92 to 12/31/93	71.2 to 127.2	2	12/31/92 to 12/31/93	71.2 to 127.2	2
04N19W32L00S	UNK	12/31/92 to 12/31/93	34.4 to 123.2	2	12/31/92 to 12/31/93	34.4 to 123.2	2
04N19W32L02S	UNK	12/31/92 to 12/31/04	34.4 to 768.7	13	12/31/92 to 12/31/04	34.4 to 768.7	13
04N19W32L0aS	UNK	12/31/92 to 12/31/93	34.4 to 123.2	2	12/31/92 to 12/31/93	34.4 to 123.2	2

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
04N19W32N00S	UNK	12/31/93 to 12/31/93	64.8 to 64.8	1	12/31/93 to 12/31/93	64.8 to 64.8	1
04N19W32N0aS	UNK	12/31/93 to 12/31/93	64.8 to 64.8	1	12/31/93 to 12/31/93	64.8 to 64.8	1
V-0219a	UNK	12/31/97 to 12/31/98	50.0 to 50.0	2	12/31/97 to 12/31/98	50.0 to 50.0	2
04N19W33M08S	UNK	12/31/95 to 12/31/04	4.9 to 1,407.7	10	12/31/95 to 12/31/04	4.9 to 1,407.7	10
V-0457b	UNK	12/31/79 to 12/31/98	0.5 to 2.0	20	12/31/80 to 12/31/98	1.0 to 2.0	19
05N19W31Q01S	UNK	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
NCWD-10	LA	01/01/53 to 01/01/04	0.0 to 1,286.0	52	01/01/80 to 01/01/04	0.0 to 1,286.0	25
NCWD-11	LA	01/01/53 to 01/01/04	0.0 to 2,237.0	52	01/01/80 to 01/01/04	0.0 to 2,237.0	25
NCWD-12	LA	01/01/53 to 01/01/04	0.0 to 2,992.0	52	01/01/80 to 01/01/04	0.0 to 2,992.0	25
NCWD-13	LA	01/01/53 to 01/01/04	0.0 to 3,000.8	52	01/01/80 to 01/01/04	0.0 to 3,000.8	25
NCWD-7	LA	01/01/53 to 01/01/04	0.0 to 451.0	52	01/01/80 to 01/01/04	0.0 to 416.0	25
NCWD-8	LA	01/01/53 to 01/01/00	0.0 to 613.0	48	01/01/80 to 01/01/00	0.0 to 454.0	21
NCWD-9	LA	01/01/53 to 01/01/04	0.0 to 328.0	50	01/01/80 to 01/01/04	0.0 to 227.0	23
NCWD-Castaic 1	LA	01/01/68 to 01/01/04	117.7 to 561.4	37	01/01/80 to 01/01/04	117.7 to 561.4	25
NCWD-Castaic 2	LA	01/01/68 to 01/01/04	0.0 to 682.0	37	01/01/80 to 01/01/04	0.0 to 682.0	25
NCWD-Castaic 3	LA	01/01/68 to 01/01/03	0.0 to 651.0	36	01/01/80 to 01/01/03	0.0 to 651.0	24
NCWD-Castaic 4	LA	01/01/68 to 01/01/04	0.0 to 99.8	37	01/01/80 to 01/01/04	0.0 to 99.8	25
NCWD-Pinetree 1	LA	01/01/68 to 01/01/04	0.0 to 403.6	37	01/01/80 to 01/01/04	0.0 to 403.6	25
NCWD-Pinetree 2	LA	01/01/68 to 01/01/04	0.0 to 356.0	37	01/01/80 to 01/01/04	0.0 to 356.0	25
NCWD-Pinetree 3	LA	01/01/68 to 01/01/04	0.0 to 865.8	37	01/01/80 to 01/01/04	224.0 to 865.8	25
NCWD-Pinetree 4	LA	01/01/68 to 01/01/04	0.0 to 510.2	37	01/01/80 to 01/01/04	0.0 to 510.2	25
NLF-156	LA	01/01/84 to 01/01/04	20.0 to 479.0	21	01/01/84 to 01/01/04	20.0 to 479.0	21
NLF-161	LA	01/01/84 to 01/01/04	0.0 to 2,021.0	21	01/01/84 to 01/01/04	0.0 to 2,021.0	21
NLF-B10	LA	01/01/84 to 01/01/04	0.0 to 1,446.0	21	01/01/84 to 01/01/04	0.0 to 1,446.0	21
NLF-B11	LA	01/01/84 to 01/01/04	0.0 to 454.0	21	01/01/84 to 01/01/04	0.0 to 454.0	21
NLF-B5	LA	01/01/47 to 01/01/04	514.0 to 2,280.0	45	01/01/84 to 01/01/04	841.0 to 2,280.0	21
NLF-B6	LA	01/01/47 to 01/01/04	100.0 to 2,175.0	45	01/01/84 to 01/01/04	100.0 to 2,175.0	21
NLF-B7	LA	01/01/47 to 01/01/04	0.0 to 2,046.0	43	01/01/86 to 01/01/04	0.0 to 584.0	19
NLF-C	LA	01/01/84 to 01/01/04	258.0 to 1,720.0	21	01/01/84 to 01/01/04	258.0 to 1,720.0	21

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
NLF-C3	LA	01/01/84 to 01/01/04	55.0 to 619.0	21	01/01/84 to 01/01/04	55.0 to 619.0	21
NLF-C4	LA	01/01/84 to 01/01/04	7.0 to 1,078.0	21	01/01/84 to 01/01/04	7.0 to 1,078.0	21
NLF-C5	LA	01/01/84 to 01/01/04	150.0 to 896.0	21	01/01/84 to 01/01/04	150.0 to 896.0	21
NLF-C6	LA	01/01/84 to 01/01/04	0.0 to 360.0	21	01/01/84 to 01/01/04	0.0 to 360.0	21
NLF-C7	LA	01/01/84 to 01/01/04	188.0 to 1,167.0	21	01/01/84 to 01/01/04	188.0 to 1,167.0	21
NLF-C8	LA	01/01/84 to 01/01/04	0.0 to 593.0	21	01/01/84 to 01/01/04	0.0 to 593.0	21
NLF-C9	LA	01/01/00 to 01/01/04	0.0 to 7.0	5	01/01/00 to 01/01/04	0.0 to 7.0	5
NLF-E	LA	01/01/84 to 01/01/04	0.0 to 3,640.0	21	01/01/84 to 01/01/04	0.0 to 3,640.0	21
NLF-E2	LA	01/01/84 to 01/01/04	0.0 to 1,309.0	21	01/01/84 to 01/01/04	0.0 to 1,309.0	21
NLF-E3	LA	01/01/84 to 01/01/00	0.0 to 138.0	17	01/01/84 to 01/01/00	0.0 to 138.0	17
NLF-E4	LA	01/01/84 to 01/01/04	0.0 to 871.0	21	01/01/84 to 01/01/04	0.0 to 871.0	21
NLF-E5	LA	01/01/88 to 01/01/04	0.0 to 679.0	17	01/01/88 to 01/01/04	0.0 to 679.0	17
NLF-E7	LA	01/01/88 to 01/01/00	0.0 to 116.0	13	01/01/88 to 01/01/00	0.0 to 116.0	13
NLF-E9	LA	01/01/84 to 01/01/04	12.0 to 814.0	21	01/01/84 to 01/01/04	12.0 to 814.0	21
NLF-G45	LA	01/01/84 to 01/01/03	60.0 to 291.0	20	01/01/84 to 01/01/03	60.0 to 291.0	20
NLF-Q	LA	01/01/84 to 01/01/99	0.0 to 380.0	16	01/01/84 to 01/01/99	0.0 to 380.0	16
NLF-R	LA	01/01/84 to 01/01/99	0.0 to 200.0	16	01/01/84 to 01/01/99	0.0 to 200.0	16
NLF-R2	LA	01/01/84 to 01/01/99	0.0 to 137.0	15	01/01/84 to 01/01/99	0.0 to 137.0	15
NLF-S	LA	01/01/84 to 01/01/99	0.0 to 0.0	16	01/01/84 to 01/01/99	0.0 to 0.0	16
NLF-S2	LA	01/01/84 to 01/01/00	0.0 to 936.0	17	01/01/84 to 01/01/00	0.0 to 936.0	17
NLF-S3	LA	01/01/84 to 01/01/01	0.0 to 564.0	17	01/01/84 to 01/01/01	0.0 to 564.0	17
NLF-Topco 1	LA	01/01/92 to 01/01/92	75.0 to 75.0	1	01/01/92 to 01/01/92	75.0 to 75.0	1
NLF-W4	LA	01/01/54 to 01/01/04	0.0 to 312.0	21	01/01/84 to 01/01/04	0.0 to 312.0	20
NLF-W5	LA	01/01/84 to 01/01/04	0.0 to 476.0	21	01/01/84 to 01/01/04	0.0 to 476.0	21
NLF-X3	LA	01/01/84 to 01/01/04	0.0 to 553.0	21	01/01/84 to 01/01/04	0.0 to 553.0	21
PR-Lennar (D. Poe)	LA	01/01/96 to 01/01/99	0.0 to 0.0	4	01/01/96 to 01/01/99	0.0 to 0.0	4
PR-Lombardi (Anden)	LA	01/01/90 to 01/01/00	0.0 to 0.0	11	01/01/90 to 01/01/00	0.0 to 0.0	11
PR-Robinson Ranch	LA	01/01/00 to 01/01/04	390.3 to 571.0	5	01/01/00 to 01/01/04	390.3 to 571.0	5
SCWC-Clark	LA	01/01/84 to 01/01/04	0.0 to 1,027.0	21	01/01/84 to 01/01/04	0.0 to 1,027.0	21

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
SCWC-Guida	LA	01/01/84 to 01/01/04	0.0 to 1,556.0	21	01/01/84 to 01/01/04	0.0 to 1,556.0	21
SCWC-Honby	LA	01/01/84 to 01/01/04	0.0 to 1,393.0	21	01/01/84 to 01/01/04	0.0 to 1,393.0	21
SCWC-Lost Canyon 2	LA	01/01/84 to 01/01/04	0.0 to 946.0	21	01/01/84 to 01/01/04	0.0 to 946.0	21
SCWC-Lost Canyon 2A	LA	01/01/84 to 01/01/04	0.0 to 1,383.0	21	01/01/84 to 01/01/04	0.0 to 1,383.0	21
SCWC-Methodist	LA	01/01/84 to 01/01/00	0.0 to 0.0	17	01/01/84 to 01/01/00	0.0 to 0.0	17
SCWC-Mitchell	LA	01/01/84 to 01/01/00	0.0 to 913.0	17	01/01/84 to 01/01/00	0.0 to 913.0	17
SCWC-Mitchell #5B	LA	01/01/01 to 01/01/04	0.0 to 150.0	4	01/01/01 to 01/01/04	0.0 to 150.0	4
SCWC-N. Oaks Central	LA	01/01/84 to 01/01/04	0.0 to 1,682.0	21	01/01/84 to 01/01/04	0.0 to 1,682.0	21
SCWC-N. Oaks East	LA	01/01/84 to 01/01/04	0.0 to 1,483.0	21	01/01/84 to 01/01/04	0.0 to 1,483.0	21
SCWC-N. Oaks West	LA	01/01/84 to 01/01/04	0.0 to 1,894.0	21	01/01/84 to 01/01/04	0.0 to 1,894.0	21
SCWC-Sand Canyon	LA	01/01/84 to 01/01/04	0.0 to 1,629.0	21	01/01/84 to 01/01/04	0.0 to 1,629.0	21
SCWC-Saugus 1	LA	01/01/84 to 01/01/03	0.0 to 1,690.0	20	01/01/84 to 01/01/03	0.0 to 1,690.0	20
SCWC-Saugus 2	LA	01/01/84 to 01/01/03	0.0 to 3,091.0	20	01/01/84 to 01/01/03	0.0 to 3,091.0	20
SCWC-Sierra	LA	01/01/84 to 01/01/04	0.0 to 1,777.0	21	01/01/84 to 01/01/04	0.0 to 1,777.0	21
SCWC-Stadium	LA	01/01/84 to 01/01/04	0.0 to 825.0	21	01/01/84 to 01/01/04	0.0 to 825.0	21
VWC-157	LA	01/01/62 to 01/01/03	0.0 to 2,188.0	42	01/01/80 to 01/01/03	0.0 to 1,491.0	24
VWC-159	LA	01/01/63 to 01/01/04	0.0 to 1,041.0	42	01/01/80 to 01/01/04	0.0 to 174.0	25
VWC-160	LA	01/01/64 to 01/01/04	135.0 to 2,211.0	41	01/01/80 to 01/01/04	346.9 to 1,599.0	25
VWC-201	LA	01/01/84 to 01/01/04	0.0 to 2,482.0	21	01/01/84 to 01/01/04	0.0 to 2,482.0	21
VWC-205	LA	01/01/00 to 01/01/04	0.0 to 813.0	5	01/01/00 to 01/01/04	0.0 to 813.0	5
VWC-D	LA	01/01/54 to 01/01/04	0.0 to 1,209.0	24	01/01/84 to 01/01/04	0.0 to 1,209.0	21
VWC-I	LA	01/01/54 to 01/01/03	0.0 to 200.0	21	01/01/84 to 01/01/03	0.0 to 200.0	20
VWC-K2	LA	01/01/54 to 01/01/03	0.0 to 2,078.0	21	01/01/84 to 01/01/03	0.0 to 2,078.0	20
VWC-L2	LA	01/01/54 to 01/01/03	0.0 to 1,231.0	21	01/01/84 to 01/01/03	0.0 to 1,231.0	20
VWC-N	LA	01/01/54 to 01/01/04	0.0 to 1,551.0	22	01/01/84 to 01/01/04	0.0 to 1,551.0	21
VWC-N3	LA	01/01/54 to 01/01/03	0.0 to 1,536.0	23	01/01/82 to 01/01/03	0.0 to 1,536.0	22
VWC-N4	LA	01/01/54 to 01/01/03	0.0 to 1,328.0	23	01/01/82 to 01/01/03	0.0 to 1,328.0	22
VWC-Q2	LA	01/01/54 to 01/01/04	0.0 to 1,732.0	22	01/01/84 to 01/01/04	335.0 to 1,732.0	21
VWC-S6	LA	01/01/00 to 01/01/04	515.0 to 2,300.9	5	01/01/00 to 01/01/04	515.0 to 2,300.9	5

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
VWC-S7	LA	01/01/00 to 01/01/04	111.0 to 1,095.1	5	01/01/00 to 01/01/04	111.0 to 1,095.1	5
VWC-S8	LA	01/01/00 to 01/01/04	79.0 to 408.9	5	01/01/00 to 01/01/04	79.0 to 408.9	5
VWC-T2	LA	01/01/54 to 01/01/04	0.0 to 1,039.0	21	01/01/84 to 01/01/04	3.0 to 1,039.0	20
VWC-T4	LA	01/01/54 to 01/01/04	0.0 to 1,258.0	22	01/01/84 to 01/01/04	0.0 to 1,258.0	21
VWC-U3	LA	01/01/54 to 01/01/03	0.0 to 1,410.0	21	01/01/84 to 01/01/03	1.0 to 1,410.0	20
VWC-U4	LA	01/01/54 to 01/01/04	0.0 to 1,222.0	22	01/01/84 to 01/01/04	2.0 to 1,222.0	21
VWC-W10	LA	01/01/99 to 01/01/04	0.0 to 1,536.6	6	01/01/99 to 01/01/04	0.0 to 1,536.6	6
VWC-W11	LA	01/01/04 to 01/01/04	122.9 to 122.9	1	01/01/04 to 01/01/04	122.9 to 122.9	1
VWC-W6	LA	01/01/54 to 01/01/02	0.0 to 615.0	49	01/01/80 to 01/01/02	0.0 to 615.0	23
VWC-W9	LA	01/01/84 to 01/01/04	0.0 to 1,176.0	21	01/01/84 to 01/01/04	0.0 to 1,176.0	21
SCWC-Mitchell #5A	UNK	01/01/01 to 01/01/04	19.0 to 407.0	4	01/01/01 to 01/01/04	19.0 to 407.0	4
V-0330	V	12/31/79 to 12/31/04	89.1 to 520.0	26	12/31/80 to 12/31/04	89.1 to 520.0	25
V-0342	V	12/31/79 to 12/31/04	154.2 to 596.8	26	12/31/80 to 12/31/04	154.2 to 596.8	25
V-0348	V	12/31/89 to 12/31/98	0.0 to 4.0	10	12/31/89 to 12/31/98	0.0 to 4.0	10
V-0354	V	12/31/79 to 12/31/98	0.2 to 2.0	20	12/31/80 to 12/31/98	0.4 to 2.0	19
V-0362	V	12/31/79 to 12/31/98	91.2 to 705.1	20	12/31/80 to 12/31/98	91.2 to 705.1	19
V-0391	V	12/31/79 to 12/31/98	0.4 to 2.0	20	12/31/80 to 12/31/98	0.5 to 2.0	19
V-0421	V	12/31/79 to 12/31/98	0.0 to 604.0	20	12/31/80 to 12/31/98	0.0 to 604.0	19
V-0447	V	12/31/79 to 12/31/98	0.3 to 2.0	20	12/31/80 to 12/31/98	0.5 to 2.0	19
V-0423	V	12/31/79 to 12/31/98	0.4 to 2.0	20	12/31/80 to 12/31/98	0.4 to 2.0	19
V-0398	V	12/31/89 to 12/31/98	0.0 to 1.5	10	12/31/89 to 12/31/98	0.0 to 1.5	10
V-0373	V	12/31/79 to 12/31/98	0.0 to 2.0	20	12/31/80 to 12/31/98	0.0 to 2.0	19
V-0347	V	12/31/79 to 12/31/98	2.2 to 1,271.5	20	12/31/80 to 12/31/98	3.0 to 1,271.5	19
V-0009	V	12/31/79 to 12/31/04	1.0 to 2.0	26	12/31/80 to 12/31/04	1.0 to 2.0	25
V-0014	V	12/31/01 to 12/31/01	0.0 to 0.0	1	12/31/01 to 12/31/01	0.0 to 0.0	1
V-0015	V	12/31/79 to 12/31/04	0.3 to 358.2	26	12/31/80 to 12/31/04	0.3 to 358.2	25
V-0026	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0098	V	12/31/79 to 12/31/04	84.0 to 350.0	26	12/31/80 to 12/31/04	91.8 to 350.0	25
V-0095	V	12/31/79 to 12/31/04	0.0 to 749.1	26	12/31/80 to 12/31/04	0.0 to 749.1	25

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
V-0079	V	12/31/79 to 12/31/04	67.2 to 377.7	26	12/31/80 to 12/31/04	67.2 to 377.7	25
V-0070	V	12/31/79 to 12/31/97	0.0 to 116.8	13	12/31/80 to 12/31/97	0.0 to 116.8	12
V-0037	V	12/31/89 to 12/31/98	0.0 to 0.0	10	12/31/89 to 12/31/98	0.0 to 0.0	10
V-0045	V	12/31/79 to 12/31/99	0.0 to 243.4	21	12/31/80 to 12/31/99	0.0 to 243.4	20
V-0060	V	12/31/79 to 12/31/04	29.7 to 496.4	26	12/31/80 to 12/31/04	29.7 to 496.4	25
V-0061	V	12/31/79 to 12/31/04	0.0 to 388.3	26	12/31/80 to 12/31/04	0.0 to 388.3	25
V-0062	V	12/31/04 to 12/31/04	248.2 to 248.2	1	12/31/04 to 12/31/04	248.2 to 248.2	1
V-0055	V	12/31/79 to 12/31/04	5.2 to 23.7	26	12/31/80 to 12/31/04	7.1 to 23.7	25
V-0036	V	12/31/79 to 12/31/04	83.6 to 1,133.3	26	12/31/80 to 12/31/04	83.6 to 1,133.3	25
V-0008	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0012	V	12/31/79 to 12/31/04	14.9 to 212.2	26	12/31/80 to 12/31/04	14.9 to 212.2	25
V-0013	V	12/31/79 to 12/31/04	0.0 to 179.5	20	12/31/80 to 12/31/04	0.0 to 179.5	19
V-0031	V	12/31/79 to 12/31/04	0.8 to 1,305.2	26	12/31/80 to 12/31/04	0.8 to 1,305.2	25
V-0042	V	12/31/79 to 12/31/04	53.9 to 480.9	26	12/31/80 to 12/31/04	53.9 to 480.9	25
V-0063	V	12/31/79 to 12/31/04	59.9 to 226.5	26	12/31/80 to 12/31/04	59.9 to 226.5	25
V-0059	V	12/31/79 to 12/31/04	40.4 to 268.6	26	12/31/80 to 12/31/04	40.4 to 268.6	25
V-0053	V	12/31/80 to 12/31/04	1.0 to 283.4	25	12/31/80 to 12/31/04	1.0 to 283.4	25
V-0039	V	12/31/79 to 12/31/04	0.0 to 848.4	26	12/31/80 to 12/31/04	0.0 to 848.4	25
V-0064	V	12/31/79 to 12/31/04	112.0 to 415.8	26	12/31/80 to 12/31/04	112.0 to 415.8	25
V-0058	V	12/31/79 to 12/31/04	0.0 to 114.6	26	12/31/80 to 12/31/04	0.0 to 114.6	25
V-0054	V	12/31/79 to 12/31/04	1.0 to 4.8	26	12/31/80 to 12/31/04	1.0 to 4.8	25
V-0102	V	12/31/79 to 12/31/04	0.0 to 193.9	26	12/31/80 to 12/31/04	0.0 to 193.9	25
V-0093	V	12/31/79 to 12/31/04	37.6 to 132.3	26	12/31/80 to 12/31/04	37.6 to 132.3	25
V-0092	V	12/31/88 to 12/31/04	2.8 to 9.0	17	12/31/88 to 12/31/04	2.8 to 9.0	17
V-0082	V	12/31/79 to 12/31/04	37.5 to 177.8	26	12/31/80 to 12/31/04	37.5 to 177.8	25
V-0081	V	12/31/79 to 12/31/04	5.5 to 55.8	26	12/31/80 to 12/31/04	5.5 to 55.8	25
V-0078	V	12/31/79 to 12/31/04	13.6 to 119.0	26	12/31/80 to 12/31/04	13.6 to 119.0	25
V-0086	V	12/31/99 to 12/31/04	3.7 to 7.4	6	12/31/99 to 12/31/04	3.7 to 7.4	6
V-0068	V	12/31/89 to 12/31/04	0.0 to 3.2	16	12/31/89 to 12/31/04	0.0 to 3.2	16

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
V-0071	V	12/31/79 to 12/31/04	0.0 to 2.9	26	12/31/80 to 12/31/04	0.0 to 2.9	25
V-0080	V	12/31/79 to 12/31/04	0.0 to 10.2	26	12/31/80 to 12/31/04	0.0 to 10.2	25
V-0087	V	12/31/79 to 12/31/04	75.0 to 416.5	26	12/31/80 to 12/31/04	159.0 to 416.5	25
V-0103	V	12/31/79 to 12/31/04	2.6 to 183.0	26	12/31/80 to 12/31/04	2.6 to 183.0	25
V-0090	V	12/31/04 to 12/31/04	33.8 to 33.8	1	12/31/04 to 12/31/04	33.8 to 33.8	1
V-0104	V	12/31/79 to 12/31/04	131.2 to 462.0	26	12/31/80 to 12/31/04	131.2 to 462.0	25
V-0110	V	12/31/79 to 12/31/04	87.7 to 270.1	25	12/31/80 to 12/31/04	128.9 to 270.1	24
V-0100	V	12/31/88 to 12/31/90	0.0 to 0.0	3	12/31/88 to 12/31/90	0.0 to 0.0	3
V-0221	V	12/31/79 to 12/31/97	0.0 to 11.2	8	12/31/80 to 12/31/97	0.0 to 11.2	7
V-0148	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0117	V	12/31/79 to 12/31/04	91.3 to 195.8	26	12/31/80 to 12/31/04	91.3 to 195.8	25
V-0125	V	12/31/79 to 12/31/97	0.0 to 0.0	12	12/31/80 to 12/31/97	0.0 to 0.0	11
V-0134	V	12/31/79 to 12/31/04	28.0 to 92.5	26	12/31/80 to 12/31/04	46.3 to 92.5	25
V-0111	V	12/31/79 to 12/31/04	0.0 to 524.2	26	12/31/80 to 12/31/04	0.0 to 524.2	25
V-0122	V	12/31/79 to 12/31/04	56.0 to 254.0	26	12/31/80 to 12/31/04	56.0 to 254.0	25
V-0123	V	12/31/79 to 12/31/99	0.0 to 264.4	21	12/31/80 to 12/31/99	0.0 to 264.4	20
V-0126	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0121	V	12/31/98 to 12/31/04	14.4 to 42.5	7	12/31/98 to 12/31/04	14.4 to 42.5	7
V-0127	V	12/31/79 to 12/31/04	78.4 to 387.4	26	12/31/80 to 12/31/04	129.9 to 387.4	25
V-0138	V	12/31/79 to 12/31/04	0.0 to 2.2	26	12/31/80 to 12/31/04	0.0 to 2.2	25
V-0139	V	12/31/79 to 12/31/04	103.8 to 426.7	26	12/31/80 to 12/31/04	103.8 to 426.7	25
V-0152	V	12/31/79 to 12/31/04	17.4 to 599.8	26	12/31/80 to 12/31/04	17.4 to 599.8	25
V-0145	V	12/31/79 to 12/31/04	22.5 to 124.6	26	12/31/80 to 12/31/04	22.5 to 124.6	25
V-0143	V	12/31/79 to 12/31/04	131.0 to 1,104.0	26	12/31/80 to 12/31/04	131.0 to 1,104.0	25
V-0142	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0144	V	12/31/97 to 12/31/04	2.0 to 2.4	8	12/31/97 to 12/31/04	2.0 to 2.4	8
V-0162	V	12/31/79 to 12/31/04	28.9 to 775.8	26	12/31/80 to 12/31/04	28.9 to 775.8	25
V-0160	V	12/31/79 to 12/31/04	0.0 to 548.4	26	12/31/80 to 12/31/04	0.0 to 548.4	25
V-0154	V	12/31/79 to 12/31/04	40.0 to 120.0	26	12/31/80 to 12/31/04	64.0 to 120.0	25

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
V-0157	V	12/31/88 to 12/31/04	0.0 to 8.0	17	12/31/88 to 12/31/04	0.0 to 8.0	17
V-0175	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0192	V	12/31/79 to 12/31/04	26.8 to 154.0	26	12/31/80 to 12/31/04	26.8 to 154.0	25
V-0184	V	12/31/79 to 12/31/04	18.0 to 93.7	26	12/31/80 to 12/31/04	27.1 to 93.7	25
V-0168	V	12/31/79 to 12/31/04	68.9 to 220.8	26	12/31/80 to 12/31/04	68.9 to 220.8	25
V-0178	V	12/31/79 to 12/31/04	32.0 to 125.8	26	12/31/80 to 12/31/04	64.0 to 125.8	25
V-0214	V	12/31/79 to 12/31/04	0.0 to 170.6	26	12/31/80 to 12/31/04	0.0 to 170.6	25
V-0212	V	12/31/02 to 12/31/04	10.2 to 29.5	3	12/31/02 to 12/31/04	10.2 to 29.5	3
V-0293	V	12/31/89 to 12/31/04	0.0 to 5.8	16	12/31/89 to 12/31/04	0.0 to 5.8	16
V-0269	V	12/31/79 to 12/31/97	0.0 to 2.0	13	12/31/80 to 12/31/97	0.0 to 2.0	12
V-0277	V	12/31/79 to 12/31/04	0.0 to 51.3	26	12/31/80 to 12/31/04	0.0 to 51.3	25
V-0256	V	12/31/84 to 12/31/03	0.0 to 875.8	20	12/31/84 to 12/31/03	0.0 to 875.8	20
V-0251	V	12/31/79 to 12/31/04	0.0 to 1.1	26	12/31/80 to 12/31/04	0.0 to 1.1	25
V-0242	V	12/31/79 to 12/31/04	0.1 to 829.9	26	12/31/80 to 12/31/04	0.1 to 829.9	25
V-0243	V	12/31/79 to 12/31/04	28.8 to 2,284.0	26	12/31/80 to 12/31/04	57.6 to 2,284.0	25
V-0250	V	12/31/85 to 12/31/04	1.0 to 2.0	20	12/31/85 to 12/31/04	1.0 to 2.0	20
V-0340	V	12/31/79 to 12/31/04	68.6 to 250.4	26	12/31/80 to 12/31/04	68.6 to 250.4	25
V-0297	V	12/31/79 to 12/31/04	11.4 to 263.4	26	12/31/80 to 12/31/04	11.4 to 263.4	25
V-0309	V	12/31/79 to 12/31/04	0.0 to 0.8	26	12/31/80 to 12/31/04	0.0 to 0.3	25
V-0316	V	12/31/79 to 12/31/04	0.0 to 123.0	26	12/31/80 to 12/31/04	0.0 to 123.0	25
V-0314	V	12/31/79 to 12/31/97	0.0 to 94.5	11	12/31/80 to 12/31/97	0.0 to 94.5	10
V-0315	V	12/31/79 to 12/31/97	0.0 to 0.0	10	12/31/80 to 12/31/97	0.0 to 0.0	9
V-0317	V	12/31/89 to 12/31/90	0.0 to 0.0	2	12/31/89 to 12/31/90	0.0 to 0.0	2
V-0308	V	12/31/79 to 12/31/04	0.0 to 95.0	26	12/31/80 to 12/31/04	30.1 to 95.0	25
V-0302	V	12/31/79 to 12/31/04	0.0 to 58.7	26	12/31/80 to 12/31/04	0.0 to 58.7	25
V-0311	V	12/31/79 to 12/31/91	11.6 to 281.7	13	12/31/80 to 12/31/91	54.1 to 281.7	12
V-0331	V	12/31/79 to 12/31/97	0.0 to 0.0	13	12/31/80 to 12/31/97	0.0 to 0.0	12
V-0332	V	12/31/79 to 12/31/04	203.6 to 1,084.4	26	12/31/80 to 12/31/04	203.6 to 1,084.4	25
V-0327	V	12/31/79 to 12/31/04	11.6 to 248.7	26	12/31/80 to 12/31/04	54.1 to 248.7	25

TABLE 3-8

Summary of Annual Groundwater Pumping Measurement Counts

Task 1A – Evaluate Existing Models, Literature, and Data

Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
V-0322	V	12/31/89 to 12/31/04	0.0 to 2.0	16	12/31/89 to 12/31/04	0.0 to 2.0	16
V-0298	V	12/31/79 to 12/31/04	0.0 to 102.5	26	12/31/80 to 12/31/04	0.0 to 102.5	25
V-0312	V	12/31/79 to 12/31/04	42.4 to 473.7	26	12/31/80 to 12/31/04	84.8 to 473.7	25
V-0323	V	12/31/79 to 12/31/04	0.0 to 250.6	26	12/31/80 to 12/31/04	0.0 to 250.6	25
V-0320	V	12/31/79 to 12/31/04	0.4 to 2.0	26	12/31/80 to 12/31/04	0.8 to 2.0	25
V-0313	V	12/31/92 to 12/31/04	71.2 to 495.6	13	12/31/92 to 12/31/04	71.2 to 495.6	13
V-0296	V	12/31/79 to 12/31/04	108.0 to 486.2	26	12/31/80 to 12/31/04	117.9 to 486.2	25
V-0252	V	12/31/79 to 12/31/04	0.0 to 5,273.9	26	12/31/80 to 12/31/04	0.0 to 5,273.9	25
V-0282	V	12/31/79 to 12/31/04	0.0 to 68.0	26	12/31/80 to 12/31/04	0.0 to 68.0	25
V-0281	V	12/31/79 to 12/31/04	39.4 to 399.1	26	12/31/80 to 12/31/04	39.4 to 399.1	25
V-0263	V	12/31/79 to 12/31/04	0.0 to 1,231.3	26	12/31/80 to 12/31/04	0.0 to 1,231.3	25
V-0254	V	12/31/79 to 12/31/04	94.6 to 234.4	26	12/31/80 to 12/31/04	94.6 to 234.4	25
V-0253	V	12/31/88 to 12/31/90	0.0 to 0.0	3	12/31/88 to 12/31/90	0.0 to 0.0	3
V-0248	V	12/31/79 to 12/31/04	0.2 to 2.0	26	12/31/80 to 12/31/04	0.4 to 2.0	25
V-0244	V	12/31/79 to 12/31/04	0.0 to 1,089.0	26	12/31/80 to 12/31/04	0.0 to 1,089.0	25
V-0255	V	12/31/79 to 12/31/90	0.0 to 0.0	4	12/31/88 to 12/31/90	0.0 to 0.0	3
V-0265	V	12/31/79 to 12/31/97	0.0 to 0.0	9	12/31/80 to 12/31/97	0.0 to 0.0	8
V-0266	V	12/31/79 to 12/31/97	0.0 to 0.0	9	12/31/80 to 12/31/97	0.0 to 0.0	8
V-0264	V	12/31/79 to 12/31/90	0.0 to 0.0	4	12/31/88 to 12/31/90	0.0 to 0.0	3
V-0280	V	12/31/79 to 12/31/04	1.0 to 139.3	26	12/31/80 to 12/31/04	1.0 to 139.3	25
V-0292	V	12/31/89 to 12/31/04	0.0 to 1.5	16	12/31/89 to 12/31/04	0.0 to 1.5	16
V-0285	V	12/31/92 to 12/31/04	1.9 to 100.0	13	12/31/92 to 12/31/04	1.9 to 100.0	13
V-0202	V	12/31/79 to 12/31/04	21.9 to 66.8	26	12/31/80 to 12/31/04	21.9 to 66.8	25
V-0216	V	12/31/79 to 12/31/04	4.0 to 41.0	26	12/31/80 to 12/31/04	4.0 to 40.0	25
V-0224	V	12/31/03 to 12/31/04	537.2 to 559.4	2	12/31/03 to 12/31/04	537.2 to 559.4	2
V-0219	V	12/31/79 to 12/31/04	145.0 to 936.2	26	12/31/80 to 12/31/04	145.0 to 936.2	25
V-0220	V	12/31/82 to 12/31/97	0.0 to 0.0	7	12/31/82 to 12/31/97	0.0 to 0.0	7
V-0237	V	12/31/79 to 12/31/04	0.0 to 2,805.0	26	12/31/80 to 12/31/04	903.9 to 2,805.0	25
V-0238	V	12/31/79 to 12/31/04	0.0 to 2,532.3	26	12/31/80 to 12/31/04	0.0 to 2,532.3	25

TABLE 3-8

Summary of Annual Groundwater Pumping Measurement Counts

Task 1A – Evaluate Existing Models, Literature, and Data

Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
V-0235	V	12/31/79 to 12/31/04	0.0 to 9,288.5	26	12/31/80 to 12/31/04	0.0 to 9,288.5	25
V-0234	V	12/31/79 to 12/31/04	0.0 to 9,173.7	26	12/31/80 to 12/31/04	0.0 to 9,173.7	25
V-0217	V	12/31/79 to 12/31/04	0.0 to 1,208.1	26	12/31/80 to 12/31/04	0.0 to 1,208.1	25
V-0204	V	12/31/79 to 12/31/04	0.0 to 122.9	24	12/31/82 to 12/31/04	0.0 to 122.9	23
V-0213	V	12/31/79 to 12/31/04	93.9 to 508.8	26	12/31/80 to 12/31/04	93.9 to 508.8	25
V-0203	V	12/31/79 to 12/31/04	0.0 to 2.3	26	12/31/80 to 12/31/04	0.0 to 2.3	25
V-0205	V	12/31/79 to 12/31/97	0.0 to 0.0	13	12/31/80 to 12/31/97	0.0 to 0.0	12
V-0210	V	12/31/79 to 12/31/04	0.9 to 142.0	26	12/31/80 to 12/31/04	0.9 to 142.0	25
V-0229	V	12/31/79 to 12/31/04	0.0 to 653.0	26	12/31/80 to 12/31/04	0.0 to 653.0	25
V-0232	V	12/31/79 to 12/31/04	397.5 to 4,412.0	26	12/31/80 to 12/31/04	397.5 to 4,412.0	25
V-0231	V	12/31/79 to 12/31/04	0.0 to 218.0	26	12/31/80 to 12/31/04	0.0 to 218.0	25
V-0233	V	12/31/79 to 12/31/04	43.9 to 200.3	26	12/31/80 to 12/31/04	43.9 to 200.3	25
V-0185	V	12/31/89 to 12/31/04	0.0 to 118.8	16	12/31/89 to 12/31/04	0.0 to 118.8	16
V-0190	V	12/31/79 to 12/31/04	114.2 to 299.2	26	12/31/80 to 12/31/04	114.2 to 299.2	25
V-0200	V	12/31/79 to 12/31/04	45.2 to 91.2	26	12/31/80 to 12/31/04	45.2 to 91.2	25
V-0199	V	12/31/79 to 12/31/04	0.0 to 71.0	26	12/31/80 to 12/31/04	0.0 to 71.0	25
V-0193	V	12/31/89 to 12/31/04	0.0 to 77.5	16	12/31/89 to 12/31/04	0.0 to 77.5	16
V-0186	V	12/31/79 to 12/31/04	20.8 to 683.8	26	12/31/80 to 12/31/04	20.8 to 683.8	25
V-0176	V	12/31/79 to 12/31/04	61.2 to 223.0	26	12/31/80 to 12/31/04	64.1 to 223.0	25
V-0174	V	12/31/86 to 12/31/04	22.4 to 44.8	19	12/31/86 to 12/31/04	22.4 to 44.8	19
V-0187	V	12/31/02 to 12/31/04	83.9 to 510.3	3	12/31/02 to 12/31/04	83.9 to 510.3	3
V-0196	V	12/31/79 to 12/31/04	12.8 to 411.4	26	12/31/80 to 12/31/04	43.2 to 411.4	25
V-0172	V	12/31/79 to 12/31/04	0.0 to 2.9	26	12/31/80 to 12/31/04	0.4 to 2.9	25
V-0161	V	12/31/79 to 12/31/04	0.0 to 1,171.8	26	12/31/80 to 12/31/04	0.0 to 1,171.8	25
V-0159	V	12/31/79 to 12/31/04	0.0 to 4.0	26	12/31/80 to 12/31/04	0.0 to 4.0	25
V-0158	V	12/31/79 to 12/31/04	65.5 to 150.0	26	12/31/80 to 12/31/04	96.0 to 150.0	25
V-0164	V	12/31/79 to 12/31/04	0.0 to 137.6	26	12/31/80 to 12/31/04	0.0 to 137.6	25
V-0165	V	12/31/80 to 12/31/04	0.0 to 151.1	25	12/31/80 to 12/31/04	0.0 to 151.1	25
V-0350	V	12/31/79 to 12/31/98	266.0 to 829.4	20	12/31/80 to 12/31/98	320.0 to 829.4	19

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]							Since 1980						
Location	County	Date Range			Value Range (acre-feet)			Number of Values	Date Range			Value Range (acre-feet)			Number of Values
V-0352	V	12/31/89	to	12/31/90	0.0	to	0.0	2	12/31/89	to	12/31/90	0.0	to	0.0	2
V-0353	V	12/31/79	to	12/31/98	0.3	to	2.0	20	12/31/80	to	12/31/98	0.5	to	2.0	19
V-0360	V	12/31/79	to	12/31/98	2.6	to	895.9	20	12/31/80	to	12/31/98	2.6	to	895.9	19
V-0393	V	12/31/79	to	12/31/98	717.2	to	1,819.6	20	12/31/80	to	12/31/98	799.2	to	1,819.6	19
V-0392	V	12/31/93	to	12/31/98	0.0	to	332.9	6	12/31/93	to	12/31/98	0.0	to	332.9	6
V-0406	V	12/31/79	to	12/31/98	0.0	to	73.9	20	12/31/80	to	12/31/98	0.0	to	73.9	19
V-0388	V	12/31/79	to	12/31/97	0.0	to	28.8	13	12/31/80	to	12/31/97	0.0	to	28.8	12
V-0438	V	12/31/89	to	12/31/98	0.0	to	2.5	10	12/31/89	to	12/31/98	0.0	to	2.5	10
V-0453	V	12/31/79	to	12/31/98	18.6	to	313.3	20	12/31/80	to	12/31/98	18.6	to	313.3	19
V-0499	V	12/31/89	to	12/31/98	0.0	to	85.0	10	12/31/89	to	12/31/98	0.0	to	85.0	10
V-0500	V	12/31/91	to	12/31/98	7.5	to	80.0	8	12/31/91	to	12/31/98	7.5	to	80.0	8
V-0488	V	12/31/88	to	12/31/98	0.0	to	25.0	10	12/31/88	to	12/31/98	0.0	to	25.0	10
V-0389	V	12/31/89	to	12/31/98	0.0	to	21.0	10	12/31/89	to	12/31/98	0.0	to	21.0	10
V-0422	V	12/31/79	to	12/31/98	9.6	to	27.5	20	12/31/80	to	12/31/98	13.7	to	27.5	19
V-0424	V	12/31/80	to	12/31/98	0.3	to	1.6	19	12/31/80	to	12/31/98	0.3	to	1.6	19
V-0455	V	12/31/79	to	12/31/98	0.2	to	25.5	20	12/31/80	to	12/31/98	0.2	to	25.5	19
V-0457	V	12/31/79	to	12/31/98	0.0	to	296.0	20	12/31/80	to	12/31/98	0.0	to	296.0	19
V-0474	V	12/31/79	to	12/31/98	0.0	to	245.4	20	12/31/80	to	12/31/98	0.0	to	245.4	19
V-0473	V	12/31/79	to	12/31/98	0.0	to	0.0	20	12/31/80	to	12/31/98	0.0	to	0.0	19
V-0465	V	12/31/79	to	12/31/98	0.5	to	2.0	20	12/31/80	to	12/31/98	1.0	to	2.0	19
V-0346	V	12/31/79	to	12/31/98	3.4	to	142.4	20	12/31/80	to	12/31/98	3.4	to	142.4	19
V-0371	V	12/31/79	to	12/31/90	0.0	to	41.8	12	12/31/80	to	12/31/90	0.0	to	41.8	11
V-0383	V	12/31/79	to	12/31/98	46.8	to	195.4	20	12/31/80	to	12/31/98	46.8	to	195.4	19
V-0446	V	12/31/79	to	12/31/98	0.0	to	2.5	20	12/31/80	to	12/31/98	0.0	to	2.5	19
V-0450	V	12/31/96	to	12/31/98	13.7	to	27.5	3	12/31/96	to	12/31/98	13.7	to	27.5	3
V-0404	V	12/31/79	to	12/31/98	8.2	to	126.7	20	12/31/80	to	12/31/98	8.2	to	126.7	19
V-0381	V	12/31/79	to	12/31/98	0.0	to	809.6	20	12/31/80	to	12/31/98	0.0	to	809.6	19
V-0375	V	12/31/79	to	12/31/90	0.0	to	33.0	12	12/31/80	to	12/31/90	0.0	to	33.0	11
V-0351	V	12/31/79	to	12/31/98	10.0	to	37.5	20	12/31/80	to	12/31/98	10.0	to	37.5	19

TABLE 3-8
Summary of Annual Groundwater Pumping Measurement Counts
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (acre-feet)	Number of Values	Date Range	Value Range (acre-feet)	Number of Values
V-0345	V	12/31/89 to 12/31/98	0.0 to 1.0	10	12/31/89 to 12/31/98	0.0 to 1.0	10
V-0366	V	12/31/79 to 12/31/98	11.2 to 47.5	20	12/31/80 to 12/31/98	11.2 to 47.5	19
V-0372	V	12/31/89 to 12/31/98	0.0 to 2.0	10	12/31/89 to 12/31/98	0.0 to 2.0	10

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

TABLE 3-9

Summary of Chloride Sample Counts in Groundwater

Task 1A – Evaluate Existing Models, Literature, and Data

Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
03N16W02J03S	UNK	06/09/87 to 07/08/98	18.6 to 32.0	4	06/09/87 to 07/08/98	18.6 to 32.0	4
03N19W06D04S	UNK	10/18/95 to 10/18/95	48.0 to 48.0	1	10/18/95 to 10/18/95	48.0 to 48.0	1
04N15W18N03S	UNK	01/11/89 to 08/23/95	41.0 to 66.0	3	01/11/89 to 08/23/95	41.0 to 66.0	3
04N16W09Q03S	UNK	06/04/91 to 07/08/98	23.2 to 37.0	7	06/04/91 to 07/08/98	23.2 to 37.0	7
04N16W15R02S	UNK	07/26/90 to 10/19/94	29.7 to 68.0	3	07/26/90 to 10/19/94	29.7 to 68.0	3
04N16W21J01S	UNK	03/23/89 to 10/19/94	23.9 to 30.0	4	03/23/89 to 10/19/94	23.9 to 30.0	4
04N16W23F01S	UNK	04/05/89 to 08/23/95	44.0 to 78.0	3	04/05/89 to 08/23/95	44.0 to 78.0	3
04N16W24A06S	UNK	07/26/90 to 10/19/94	27.8 to 85.0	3	07/26/90 to 10/19/94	27.8 to 85.0	3
04N16W24B02S	UNK	07/26/90 to 10/19/94	27.7 to 87.0	4	07/26/90 to 10/19/94	27.7 to 87.0	4
04N16W35A01S	UNK	04/28/92 to 07/08/98	34.0 to 38.0	3	04/28/92 to 07/08/98	34.0 to 38.0	3
04N18W20R12S	UNK	08/23/99 to 08/23/99	89.0 to 89.0	1	08/23/99 to 08/23/99	89.0 to 89.0	1
04N19W23R02S	UNK	07/19/94 to 07/19/94	66.0 to 66.0	1	07/19/94 to 07/19/94	66.0 to 66.0	1
05N17W25G07S	UNK	04/05/89 to 07/08/98	42.9 to 69.5	3	04/05/89 to 07/08/98	42.9 to 69.5	3
03N16W02R01S	LA	06/09/87 to 07/08/98	54.0 to 69.0	4	06/09/87 to 07/08/98	54.0 to 69.0	4
04N15W06P01S	LA	04/05/89 to 08/23/95	42.0 to 52.0	3	04/05/89 to 08/23/95	42.0 to 52.0	3
04N16W04H01S	LA	10/16/91 to 09/26/95	23.5 to 45.0	5	10/16/91 to 09/26/95	23.5 to 45.0	5
04N16W09H02S	LA	10/09/91 to 07/08/98	22.6 to 39.0	6	10/09/91 to 07/08/98	22.6 to 39.0	6
04N16W12N02S	LA	01/11/89 to 08/23/95	55.0 to 61.0	3	01/11/89 to 08/23/95	55.0 to 61.0	3
04N16W17A05S	LA	07/26/90 to 10/19/94	38.1 to 44.0	3	07/26/90 to 10/19/94	38.1 to 44.0	3
04N16W21D01S	LA	07/26/90 to 10/19/94	19.6 to 24.0	3	07/26/90 to 10/19/94	19.6 to 24.0	3
04N16W22C01S	LA	01/27/89 to 07/08/98	49.0 to 111.0	8	01/27/89 to 07/08/98	49.0 to 111.0	8
04N16W22C03S	LA	10/23/91 to 07/08/98	46.5 to 97.0	6	10/23/91 to 07/08/98	46.5 to 97.0	6
04N16W22C04S	LA	05/07/91 to 07/08/98	60.8 to 93.0	7	05/07/91 to 07/08/98	60.8 to 93.0	7
04N16W22C07S	LA	02/01/89 to 07/08/98	47.0 to 112.0	8	02/01/89 to 07/08/98	47.0 to 112.0	8
04N16W22D02S	LA	07/26/90 to 10/19/94	40.8 to 74.0	3	07/26/90 to 10/19/94	40.8 to 74.0	3
04N16W22M01S	LA	07/26/90 to 07/08/98	24.0 to 31.2	4	07/26/90 to 07/08/98	24.0 to 31.2	4
04N16W23A01S	LA	07/26/90 to 10/19/94	35.7 to 93.0	3	07/26/90 to 10/19/94	35.7 to 93.0	3
04N16W23A02S	LA	09/05/91 to 07/08/98	48.0 to 83.0	8	09/05/91 to 07/08/98	48.0 to 83.0	8
04N16W27J03S	LA	06/09/87 to 07/08/98	28.0 to 38.0	4	06/09/87 to 07/08/98	28.0 to 38.0	4
04N16W33L01S	LA	10/15/91 to 07/08/98	16.2 to 18.0	5	10/15/91 to 07/08/98	16.2 to 18.0	5

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
04N16W34A03S	LA	06/09/87 to 07/08/98	53.0 to 112.0	4	06/09/87 to 07/08/98	53.0 to 112.0	4
04N17W12C01S	LA	07/26/90 to 10/19/94	84.5 to 180.0	4	07/26/90 to 10/19/94	84.5 to 180.0	4
05N17W25B02S	LA	06/09/87 to 07/08/98	63.0 to 115.4	5	06/09/87 to 07/08/98	63.0 to 115.4	5
05N17W25B04S	LA	06/09/87 to 07/08/98	60.0 to 115.0	5	06/09/87 to 07/08/98	60.0 to 115.0	5
05N17W25G06S	LA	06/09/87 to 09/09/98	61.0 to 115.0	5	06/09/87 to 09/09/98	61.0 to 115.0	5
NCWD-10	LA	06/05/60 to 07/08/98	30.0 to 112.0	14	06/09/87 to 07/08/98	53.0 to 112.0	4
NCWD-11	LA	05/09/75 to 08/15/00	25.0 to 38.0	12	03/10/80 to 08/15/00	25.0 to 38.0	10
NCWD-12	LA	04/28/92 to 08/15/00	34.0 to 38.0	4	04/28/92 to 08/15/00	34.0 to 38.0	4
NCWD-13	LA	07/11/90 to 08/15/00	34.2 to 50.0	5	07/11/90 to 08/15/00	34.2 to 50.0	5
NCWD-7	LA	09/08/55 to 07/08/98	19.0 to 420.0	32	03/10/80 to 07/08/98	19.0 to 70.0	12
NCWD-9	LA	06/09/87 to 08/15/00	18.6 to 32.0	5	06/09/87 to 08/15/00	18.6 to 32.0	5
NCWD-Castaic 1	LA	06/09/87 to 08/15/00	53.0 to 115.0	6	06/09/87 to 08/15/00	53.0 to 115.0	6
NCWD-Castaic 2	LA	06/09/87 to 08/15/00	55.0 to 115.4	6	06/09/87 to 08/15/00	55.0 to 115.4	6
NCWD-Castaic 3	LA	06/09/87 to 08/15/00	56.0 to 115.0	6	06/09/87 to 08/15/00	56.0 to 115.0	6
NCWD-Castaic 4	LA	04/05/89 to 08/15/00	42.9 to 69.5	4	04/05/89 to 08/15/00	42.9 to 69.5	4
NCWD-Pinetree 1	LA	06/09/87 to 08/15/00	55.0 to 92.0	5	06/09/87 to 08/15/00	55.0 to 92.0	5
NCWD-Pinetree 2	LA	06/09/87 to 06/29/95	66.0 to 100.0	3	06/09/87 to 06/29/95	66.0 to 100.0	3
NCWD-Pinetree 3	LA	06/09/87 to 08/15/00	37.0 to 53.0	5	06/09/87 to 08/15/00	37.0 to 53.0	5
NCWD-Pinetree 4	LA	06/09/87 to 08/15/00	53.1 to 102.0	5	06/09/87 to 08/15/00	53.1 to 102.0	5
NLF-B6	LA	07/30/47 to 03/01/01	44.0 to 85.0	16	03/27/86 to 03/01/01	64.0 to 83.0	5
NLF-C	LA	01/10/39 to 03/01/01	56.0 to 59.0	3	05/17/00 to 03/01/01	56.0 to 57.0	2
NLF-C6	LA	12/10/56 to 06/30/88	48.0 to 99.0	14	03/06/80 to 06/30/88	55.0 to 80.0	6
SCWC-Clark	LA	03/19/75 to 08/23/95	45.0 to 69.0	14	03/18/80 to 08/23/95	45.0 to 61.0	10
SCWC-Guida	LA	04/05/89 to 05/04/99	42.0 to 53.8	4	04/05/89 to 05/04/99	42.0 to 53.8	4
SCWC-Honby	LA	01/11/89 to 08/23/95	41.0 to 66.0	3	01/11/89 to 08/23/95	41.0 to 66.0	3
SCWC-Lost Canyon 2	LA	04/05/89 to 05/04/99	43.6 to 58.0	4	04/05/89 to 05/04/99	43.6 to 58.0	4
SCWC-Lost Canyon 2A	LA	08/05/92 to 06/21/00	45.0 to 55.0	3	08/05/92 to 06/21/00	45.0 to 55.0	3
SCWC-Mitchell	LA	01/11/89 to 05/04/99	51.2 to 68.0	4	01/11/89 to 05/04/99	51.2 to 68.0	4
SCWC-N. Oaks Central	LA	04/05/89 to 06/21/00	67.0 to 86.0	4	04/05/89 to 06/21/00	67.0 to 86.0	4
SCWC-N. Oaks East	LA	04/05/89 to 05/04/99	51.0 to 73.0	4	04/05/89 to 05/04/99	51.0 to 73.0	4

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
SCWC-N. Oaks West	LA	04/05/89 to 06/21/00	62.0 to 86.0	4	04/05/89 to 06/21/00	62.0 to 86.0	4
SCWC-Sand Canyon	LA	04/05/89 to 08/23/95	54.0 to 64.0	3	04/05/89 to 08/23/95	54.0 to 64.0	3
SCWC-Saugus 1	LA	07/02/91 to 06/07/96	23.0 to 29.0	3	07/02/91 to 06/07/96	23.0 to 29.0	3
SCWC-Saugus 2	LA	11/27/90 to 09/27/95	16.9 to 26.2	3	11/27/90 to 09/27/95	16.9 to 26.2	3
SCWC-Sierra	LA	04/05/89 to 08/23/95	41.0 to 67.0	3	04/05/89 to 08/23/95	41.0 to 67.0	3
SCWC-Stadium	LA	04/05/89 to 06/21/00	44.0 to 78.0	4	04/05/89 to 06/21/00	44.0 to 78.0	4
VWC-157	LA	09/19/66 to 07/08/98	11.0 to 98.0	22	03/06/80 to 07/08/98	21.0 to 98.0	11
VWC-159	LA	08/13/63 to 07/08/98	16.2 to 26.0	12	10/15/91 to 07/08/98	16.2 to 18.0	5
VWC-160	LA	06/29/65 to 06/27/00	19.6 to 26.0	8	07/26/90 to 06/27/00	19.6 to 25.0	4
VWC-201	LA	03/23/89 to 06/27/00	23.9 to 34.0	5	03/23/89 to 06/27/00	23.9 to 34.0	5
VWC-D	LA	05/17/56 to 05/04/99	61.0 to 180.0	13	07/26/90 to 05/04/99	64.8 to 180.0	5
VWC-I	LA	05/29/75 to 06/27/00	38.1 to 49.0	6	07/26/90 to 06/27/00	38.1 to 44.0	4
VWC-K2	LA	02/27/48 to 06/27/00	36.0 to 111.0	10	01/27/89 to 06/27/00	49.0 to 111.0	9
VWC-L2	LA	02/01/89 to 06/27/00	47.0 to 112.0	9	02/01/89 to 06/27/00	47.0 to 112.0	9
VWC-N	LA	03/30/53 to 05/04/99	17.0 to 74.0	16	03/06/80 to 05/04/99	40.8 to 74.0	11
VWC-N3	LA	09/13/48 to 06/27/00	22.0 to 97.0	15	10/23/91 to 06/27/00	46.5 to 97.0	7
VWC-N4	LA	01/28/51 to 07/08/98	54.0 to 93.0	18	05/07/91 to 07/08/98	60.8 to 93.0	7
VWC-Q2	LA	04/28/71 to 05/04/99	29.7 to 135.0	17	03/06/80 to 05/04/99	29.7 to 135.0	11
VWC-T2	LA	08/04/61 to 05/04/99	35.7 to 93.0	5	07/26/90 to 05/04/99	35.7 to 93.0	4
VWC-T4	LA	08/04/61 to 06/27/00	48.0 to 83.0	10	09/05/91 to 06/27/00	48.0 to 83.0	9
VWC-U3	LA	07/26/90 to 05/04/99	27.8 to 85.0	4	07/26/90 to 05/04/99	27.8 to 85.0	4
VWC-U4	LA	07/26/90 to 05/04/99	27.7 to 87.0	5	07/26/90 to 05/04/99	27.7 to 87.0	5
VWC-W6	LA	10/09/91 to 07/08/98	22.6 to 39.0	6	10/09/91 to 07/08/98	22.6 to 39.0	6
VWC-W9	LA	06/04/91 to 07/08/98	23.2 to 37.0	7	06/04/91 to 07/08/98	23.2 to 37.0	7
WHR-18 - Old	LA	04/12/67 to 03/14/89	50.0 to 89.0	8	03/20/80 to 03/14/89	50.0 to 89.0	7
V-0342	V	06/16/62 to 05/20/05	34.0 to 51.0	20	06/25/81 to 05/20/05	34.0 to 51.0	16
V-0362	V	05/01/67 to 05/08/01	36.0 to 43.0	7	09/28/87 to 05/08/01	36.0 to 43.0	6
V-0421	V	04/26/50 to 10/25/94	37.0 to 57.0	6	10/26/93 to 10/25/94	50.0 to 57.0	4
V-0447	V	08/25/52 to 06/02/05	47.0 to 72.0	2	06/02/05 to 06/02/05	72.0 to 72.0	1
V-0398	V	05/08/01 to 05/08/01	61.0 to 61.0	1	05/08/01 to 05/08/01	61.0 to 61.0	1

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0373	V	08/05/93 to 08/05/93	54.0 to 54.0	1	08/05/93 to 08/05/93	54.0 to 54.0	1
V-0009	V	02/09/61 to 02/02/82	22.0 to 68.0	9	02/02/82 to 02/02/82	39.0 to 39.0	1
V-0015	V	02/19/34 to 07/17/86	39.0 to 82.0	14	07/16/86 to 07/17/86	39.0 to 39.0	2
V-0022	V	04/24/01 to 04/24/01	36.0 to 36.0	1	04/24/01 to 04/24/01	36.0 to 36.0	1
V-0026	V	08/12/86 to 07/19/94	54.0 to 79.5	3	08/12/86 to 07/19/94	54.0 to 79.5	3
V-0096	V	07/10/43 to 08/12/86	43.0 to 70.0	4	11/07/85 to 08/12/86	66.0 to 70.0	3
V-0095	V	05/16/50 to 10/12/94	36.0 to 98.0	23	10/19/87 to 10/12/94	65.0 to 98.0	5
V-0097	V	05/05/50 to 10/25/93	37.0 to 633.0	10	08/04/93 to 10/25/93	93.0 to 100.0	2
V-0079	V	02/03/64 to 03/20/90	45.0 to 94.0	6	03/20/90 to 03/20/90	94.0 to 94.0	1
V-0070	V	05/14/30 to 05/11/01	21.0 to 100.0	41	08/11/86 to 05/11/01	87.0 to 100.0	5
V-0037	V	05/20/74 to 06/09/83	108.0 to 177.0	4	06/12/81 to 06/09/83	108.0 to 130.0	2
V-0060	V	10/11/51 to 05/03/04	24.0 to 100.0	33	02/19/81 to 05/03/04	39.0 to 100.0	23
V-0061	V	01/05/51 to 05/25/05	22.0 to 87.0	20	05/19/80 to 05/25/05	39.0 to 87.0	12
V-0055	V	06/16/71 to 08/04/93	41.0 to 110.0	8	08/26/91 to 08/04/93	72.0 to 110.0	2
V-0051	V	11/16/65 to 01/21/93	43.0 to 91.0	12	04/09/87 to 01/21/93	48.0 to 91.0	7
V-0036	V	06/04/98 to 05/23/05	89.0 to 157.0	6	06/04/98 to 05/23/05	89.0 to 157.0	6
V-0012	V	10/23/51 to 05/18/05	82.0 to 193.0	53	03/07/80 to 05/18/05	82.0 to 148.0	21
V-0013	V	04/25/60 to 06/25/04	83.0 to 159.0	9	01/08/04 to 06/25/04	140.0 to 151.0	2
V-0031	V	08/26/65 to 08/23/99	78.0 to 137.0	12	09/28/87 to 08/23/99	85.0 to 137.0	8
V-0042	V	05/07/71 to 05/18/05	67.0 to 139.0	6	03/19/90 to 05/18/05	100.0 to 139.0	4
V-0059	V	10/11/51 to 05/21/90	20.0 to 110.0	13	11/07/85 to 05/21/90	80.0 to 110.0	7
V-0053	V	10/06/81 to 08/29/05	55.0 to 122.0	13	10/06/81 to 08/29/05	55.0 to 122.0	13
V-0039	V	02/03/65 to 10/25/94	76.0 to 94.0	12	08/12/87 to 10/25/94	76.0 to 94.0	9
V-0064	V	06/26/69 to 11/02/93	33.0 to 58.0	4	11/02/93 to 11/02/93	58.0 to 58.0	1
V-0102	V	05/26/52 to 05/18/05	35.0 to 90.0	6	03/26/90 to 05/18/05	60.0 to 90.0	4
V-0093	V	07/01/59 to 07/20/88	35.0 to 76.0	3	07/20/88 to 07/20/88	76.0 to 76.0	1
V-0082	V	10/25/51 to 10/17/94	63.0 to 94.0	8	03/26/90 to 10/17/94	66.0 to 94.0	5
V-0067	V	05/26/52 to 06/16/88	32.0 to 90.0	4	06/16/88 to 06/16/88	90.0 to 90.0	1
V-0071	V	06/28/62 to 10/26/89	28.0 to 82.0	8	03/07/80 to 10/26/89	55.0 to 82.0	5
V-0077	V	05/02/05 to 05/06/05	76.5 to 76.5	2	05/02/05 to 05/06/05	76.5 to 76.5	2

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0094	V	05/02/05 to 05/06/05	85.2 to 85.2	2	05/02/05 to 05/06/05	85.2 to 85.2	2
V-0103	V	06/28/62 to 10/03/94	27.0 to 107.0	12	06/18/81 to 10/03/94	53.0 to 107.0	8
V-0090	V	04/25/33 to 06/10/88	27.0 to 91.0	10	06/10/88 to 06/10/88	91.0 to 91.0	1
V-0104	V	05/26/52 to 06/16/88	25.0 to 48.0	7	06/16/88 to 06/16/88	43.0 to 43.0	1
V-0110	V	08/26/65 to 10/19/94	26.0 to 72.0	10	03/07/80 to 10/19/94	46.0 to 72.0	7
V-0108	V	06/25/94 to 04/20/05	30.0 to 39.0	33	06/25/94 to 04/20/05	30.0 to 39.0	33
V-0109	V	06/25/94 to 04/19/05	52.0 to 81.0	33	06/25/94 to 04/19/05	52.0 to 81.0	33
V-0106	V	06/25/94 to 04/20/05	41.0 to 65.0	33	06/25/94 to 04/20/05	41.0 to 65.0	33
V-0107	V	06/25/94 to 04/21/05	36.0 to 71.0	33	06/25/94 to 04/21/05	36.0 to 71.0	33
V-0105	V	06/25/94 to 04/21/05	31.0 to 77.0	31	06/25/94 to 04/21/05	31.0 to 77.0	31
V-0100	V	09/26/89 to 09/26/89	56.0 to 56.0	1	09/26/89 to 09/26/89	56.0 to 56.0	1
V-0141	V	08/17/79 to 06/25/87	34.0 to 40.0	3	10/16/81 to 06/25/87	39.0 to 40.0	2
V-0148	V	01/03/89 to 01/03/89	43.0 to 43.0	1	01/03/89 to 01/03/89	43.0 to 43.0	1
V-0117	V	06/28/62 to 05/18/05	35.0 to 74.0	3	09/18/87 to 05/18/05	35.0 to 74.0	2
V-0134	V	09/07/61 to 05/11/01	40.0 to 69.0	12	11/10/93 to 05/11/01	60.0 to 69.0	5
V-0111	V	11/14/67 to 11/03/93	55.0 to 86.0	5	04/13/90 to 11/03/93	84.0 to 86.0	4
V-0112	V	01/28/05 to 01/28/05	96.0 to 96.0	1	01/28/05 to 01/28/05	96.0 to 96.0	1
V-0123	V	10/11/51 to 10/17/94	42.0 to 110.0	15	06/27/80 to 10/17/94	44.0 to 110.0	9
V-0126	V	02/17/95 to 10/26/01	61.0 to 80.0	3	02/17/95 to 10/26/01	61.0 to 80.0	3
V-0121	V	05/18/05 to 05/18/05	97.0 to 97.0	1	05/18/05 to 05/18/05	97.0 to 97.0	1
V-0127	V	12/07/46 to 06/14/94	26.0 to 100.0	13	07/13/83 to 06/14/94	53.0 to 100.0	6
V-0139	V	04/25/40 to 09/21/89	28.0 to 69.0	38	09/28/84 to 09/21/89	61.0 to 69.0	4
V-0140	V	05/18/05 to 05/18/05	59.0 to 59.0	1	05/18/05 to 05/18/05	59.0 to 59.0	1
V-0152	V	06/08/63 to 10/17/94	39.0 to 67.0	8	09/18/87 to 10/17/94	45.0 to 67.0	5
V-0143	V	04/25/40 to 05/18/05	32.0 to 96.0	13	05/13/82 to 05/18/05	51.0 to 96.0	3
V-0142	V	09/04/91 to 09/04/91	52.0 to 52.0	1	09/04/91 to 09/04/91	52.0 to 52.0	1
V-0162	V	04/26/55 to 09/15/99	40.0 to 74.0	10	06/02/87 to 09/15/99	48.0 to 74.0	5
V-0160	V	04/17/59 to 09/28/88	49.0 to 67.0	4	09/28/88 to 09/28/88	49.0 to 49.0	1
V-0154	V	10/11/51 to 08/27/91	43.0 to 48.0	3	08/27/91 to 08/27/91	44.0 to 44.0	1
V-0175	V	06/03/87 to 07/21/94	54.0 to 54.0	2	06/03/87 to 07/21/94	54.0 to 54.0	2

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0184	V	05/03/76 to 05/22/01	45.0 to 54.0	6	06/18/81 to 05/22/01	45.0 to 54.0	5
V-0168	V	08/04/64 to 06/28/05	45.0 to 56.0	7	06/27/80 to 06/28/05	45.0 to 56.0	6
V-0178	V	07/22/76 to 10/12/94	46.0 to 66.0	7	06/11/87 to 10/12/94	46.0 to 66.0	6
V-0214	V	10/11/51 to 08/01/94	35.0 to 39.0	3	08/01/94 to 08/01/94	39.0 to 39.0	1
V-0212	V	12/26/01 to 12/26/01	56.0 to 56.0	1	12/26/01 to 12/26/01	56.0 to 56.0	1
V-0242	V	01/22/74 to 06/09/92	36.0 to 40.0	2	06/09/92 to 06/09/92	36.0 to 36.0	1
V-0243	V	10/28/76 to 10/03/94	41.0 to 62.0	7	06/14/82 to 10/03/94	41.0 to 62.0	6
V-0250	V	11/09/93 to 11/09/93	40.0 to 40.0	1	11/09/93 to 11/09/93	40.0 to 40.0	1
V-0340	V	08/18/53 to 05/23/05	54.0 to 82.0	20	07/09/81 to 05/23/05	54.0 to 66.0	17
V-0309	V	11/30/48 to 12/18/03	34.0 to 59.0	35	07/14/80 to 12/18/03	41.0 to 59.0	20
V-0310	V	08/08/84 to 08/07/92	44.0 to 48.0	4	08/08/84 to 08/07/92	44.0 to 48.0	4
V-0314	V	07/31/26 to 07/14/80	39.0 to 143.0	21	07/14/80 to 07/14/80	54.0 to 54.0	1
V-0317	V	05/05/65 to 11/09/93	48.0 to 52.0	2	11/09/93 to 11/09/93	52.0 to 52.0	1
V-0308	V	07/16/63 to 07/21/94	33.0 to 51.0	4	10/19/87 to 07/21/94	42.0 to 51.0	3
V-0302	V	11/11/76 to 08/26/92	44.0 to 54.0	5	07/20/81 to 08/26/92	44.0 to 54.0	4
V-0333	V	03/11/63 to 08/12/86	31.0 to 48.0	7	08/12/86 to 08/12/86	46.0 to 46.0	1
V-0332	V	06/30/76 to 05/10/01	8.0 to 71.0	4	07/24/84 to 05/10/01	30.0 to 71.0	3
V-0327	V	02/08/52 to 08/07/86	41.0 to 56.0	3	10/24/85 to 08/07/86	45.0 to 56.0	2
V-0322	V	05/15/74 to 10/05/94	23.0 to 62.0	10	08/09/85 to 10/05/94	23.0 to 62.0	8
V-0329	V	10/19/93 to 10/19/93	46.3 to 46.3	2	10/19/93 to 10/19/93	46.3 to 46.3	2
V-0296	V	02/20/34 to 08/23/99	33.0 to 102.0	10	10/28/93 to 08/23/99	48.0 to 63.0	6
V-0295	V	10/28/93 to 10/28/93	59.0 to 59.0	1	10/28/93 to 10/28/93	59.0 to 59.0	1
V-0281	V	07/01/59 to 10/03/94	25.0 to 45.0	6	10/26/93 to 10/03/94	38.0 to 45.0	4
V-0248	V	05/26/76 to 10/03/94	31.0 to 70.0	7	05/13/82 to 10/03/94	36.0 to 70.0	6
V-0244	V	10/16/81 to 05/10/01	30.0 to 59.0	4	10/16/81 to 05/10/01	30.0 to 59.0	4
V-0284	V	06/04/98 to 09/15/99	43.0 to 69.0	2	06/04/98 to 09/15/99	43.0 to 69.0	2
V-0216	V	03/15/72 to 05/20/05	47.0 to 73.0	19	10/24/85 to 05/20/05	50.0 to 73.0	16
V-0219	V	07/23/56 to 10/03/94	29.0 to 77.0	12	09/22/83 to 10/03/94	44.0 to 56.0	9
V-0237	V	05/16/49 to 09/15/99	1.0 to 72.0	11	07/23/86 to 09/15/99	46.0 to 72.0	7
V-0238	V	10/25/51 to 10/24/85	25.0 to 49.0	25	06/27/80 to 10/24/85	40.0 to 47.0	2

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0234	V	11/09/93 to 11/09/93	46.0 to 46.0	1	11/09/93 to 11/09/93	46.0 to 46.0	1
V-0205	V	11/03/93 to 11/03/93	82.0 to 82.0	1	11/03/93 to 11/03/93	82.0 to 82.0	1
V-0206	V	10/23/51 to 10/12/94	68.0 to 90.0	4	06/29/94 to 10/12/94	84.0 to 90.0	3
V-0229	V	03/15/48 to 08/05/93	21.0 to 144.0	22	08/13/84 to 08/05/93	39.0 to 71.0	3
V-0231	V	05/29/73 to 10/03/94	26.0 to 75.0	6	10/28/93 to 10/03/94	31.0 to 75.0	5
V-0233	V	09/26/89 to 05/23/05	40.0 to 62.0	13	09/26/89 to 05/23/05	40.0 to 62.0	13
V-0185	V	05/26/52 to 06/17/92	41.0 to 57.0	7	09/19/86 to 06/17/92	54.0 to 54.0	3
V-0200	V	07/23/56 to 10/19/94	38.0 to 66.0	4	06/29/94 to 10/19/94	55.0 to 66.0	3
V-0199	V	09/12/58 to 06/28/05	39.0 to 65.0	4	09/18/87 to 06/28/05	55.0 to 65.0	3
V-0193	V	06/20/62 to 06/05/05	35.0 to 61.0	3	06/05/05 to 06/05/05	61.0 to 61.0	1
V-0186	V	12/26/58 to 10/12/94	34.0 to 48.0	4	06/14/94 to 10/12/94	41.0 to 48.0	3
V-0176	V	11/03/54 to 05/02/05	31.0 to 90.0	10	03/20/90 to 05/02/05	40.0 to 90.0	9
V-0181	V	10/12/31 to 09/17/99	40.0 to 67.0	4	09/17/99 to 09/17/99	67.0 to 67.0	1
V-0182	V	06/28/62 to 09/09/85	23.0 to 37.0	2	09/09/85 to 09/09/85	37.0 to 37.0	1
V-0161	V	04/17/59 to 08/19/87	43.0 to 76.0	9	11/07/85 to 08/19/87	52.0 to 60.0	3
V-0159	V	09/08/54 to 08/04/93	40.0 to 74.0	9	09/23/86 to 08/04/93	43.0 to 56.0	3
V-0158	V	12/27/34 to 04/13/90	22.0 to 90.0	7	04/13/90 to 04/13/90	90.0 to 90.0	1
V-0164	V	01/08/52 to 10/25/94	40.0 to 62.0	4	06/21/94 to 10/25/94	59.0 to 62.0	3
V-0165	V	07/17/81 to 07/23/92	39.0 to 80.0	5	07/17/81 to 07/23/92	39.0 to 80.0	5
V-0350	V	11/08/61 to 09/18/87	43.0 to 57.0	10	04/06/87 to 09/18/87	43.0 to 45.0	2
V-0352	V	09/24/74 to 07/15/92	43.0 to 59.0	3	08/27/91 to 07/15/92	43.0 to 59.0	2
V-0349	V	10/19/93 to 10/19/93	41.0 to 41.0	1	10/19/93 to 10/19/93	41.0 to 41.0	1
V-0360	V	07/25/63 to 05/11/98	40.0 to 54.0	23	07/14/80 to 05/11/98	40.0 to 52.0	8
V-0393	V	07/14/80 to 05/11/98	22.0 to 60.0	13	07/14/80 to 05/11/98	22.0 to 60.0	13
V-0392	V	12/12/90 to 02/04/97	40.0 to 48.0	4	12/12/90 to 02/04/97	40.0 to 48.0	4
V-0406	V	08/19/53 to 10/06/86	39.0 to 64.0	33	09/19/86 to 10/06/86	39.0 to 39.0	2
V-0438	V	11/15/95 to 08/20/99	24.0 to 35.0	2	11/15/95 to 08/20/99	24.0 to 35.0	2
V-0499	V	06/10/88 to 08/02/90	52.0 to 78.0	2	06/10/88 to 08/02/90	52.0 to 78.0	2
V-0500	V	08/09/94 to 08/09/94	44.4 to 44.4	1	08/09/94 to 08/09/94	44.4 to 44.4	1
V-0488	V	03/28/95 to 03/28/95	46.0 to 46.0	1	03/28/95 to 03/28/95	46.0 to 46.0	1

TABLE 3-9
Summary of Chloride Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0389	V	09/18/87 to 09/18/87	45.0 to 45.0	1	09/18/87 to 09/18/87	45.0 to 45.0	1
V-0474	V	09/15/99 to 09/15/99	46.0 to 46.0	1	09/15/99 to 09/15/99	46.0 to 46.0	1
V-0473	V	09/19/61 to 10/17/94	30.0 to 73.0	9	10/28/93 to 10/17/94	30.0 to 46.0	4
V-0468	V	11/03/93 to 11/03/93	42.0 to 42.0	1	11/03/93 to 11/03/93	42.0 to 42.0	1
V-0446	V	05/14/74 to 08/27/91	37.0 to 58.0	5	06/15/82 to 08/27/91	44.0 to 58.0	3
V-0372	V	10/19/93 to 11/04/99	40.0 to 49.0	3	10/19/93 to 11/04/99	40.0 to 49.0	3

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
03N16W02J03S	UNK	06/09/87 to 07/08/98	600 to 880	4	06/09/87 to 07/08/98	600 to 880	4
03N19W06D04S	UNK	10/18/95 to 10/18/95	1,140 to 1,140	1	10/18/95 to 10/18/95	1,140 to 1,140	1
04N15W18N03S	UNK	01/11/89 to 08/23/95	510 to 570	3	01/11/89 to 08/23/95	510 to 570	3
04N16W09Q03S	UNK	06/04/91 to 07/08/98	528 to 620	7	06/04/91 to 07/08/98	528 to 620	7
04N16W15R02S	UNK	07/26/90 to 10/19/94	290 to 630	3	07/26/90 to 10/19/94	290 to 630	3
04N16W21J01S	UNK	03/23/89 to 10/19/94	590 to 660	4	03/23/89 to 10/19/94	590 to 660	4
04N16W23F01S	UNK	04/05/89 to 08/23/95	590 to 840	3	04/05/89 to 08/23/95	590 to 840	3
04N16W24A06S	UNK	07/26/90 to 10/19/94	441 to 850	3	07/26/90 to 10/19/94	441 to 850	3
04N16W24B02S	UNK	07/26/90 to 10/19/94	453 to 1,150	4	07/26/90 to 10/19/94	453 to 1,150	4
04N16W35A01S	UNK	04/28/92 to 07/08/98	440 to 520	3	04/28/92 to 07/08/98	440 to 520	3
04N19W23R02S	UNK	07/19/94 to 07/19/94	2,250 to 2,250	1	07/19/94 to 07/19/94	2,250 to 2,250	1
04N19W25L	UNK	07/09/92 to 07/09/92	1,660 to 1,660	1	07/09/92 to 07/09/92	1,660 to 1,660	1
05N17W25G07S	UNK	04/05/89 to 07/08/98	450 to 728	3	04/05/89 to 07/08/98	450 to 728	3
03N16W02R01S	LA	06/09/87 to 07/08/98	510 to 600	4	06/09/87 to 07/08/98	510 to 600	4
04N15W06P01S	LA	04/05/89 to 08/23/95	460 to 590	3	04/05/89 to 08/23/95	460 to 590	3
04N16W04H01S	LA	10/16/91 to 09/26/95	538 to 630	5	10/16/91 to 09/26/95	538 to 630	5
04N16W09H02S	LA	10/09/91 to 07/08/98	524 to 640	6	10/09/91 to 07/08/98	524 to 640	6
04N16W12N02S	LA	01/11/89 to 08/23/95	570 to 580	3	01/11/89 to 08/23/95	570 to 580	3
04N16W17A05S	LA	07/26/90 to 10/19/94	656 to 700	3	07/26/90 to 10/19/94	656 to 700	3
04N16W21D01S	LA	07/26/90 to 10/19/94	670 to 770	3	07/26/90 to 10/19/94	670 to 770	3
04N16W22C01S	LA	01/27/89 to 07/08/98	500 to 732	8	01/27/89 to 07/08/98	500 to 732	8
04N16W22C03S	LA	10/23/91 to 07/08/98	512 to 720	6	10/23/91 to 07/08/98	512 to 720	6
04N16W22C04S	LA	05/07/91 to 07/08/98	599 to 690	7	05/07/91 to 07/08/98	599 to 690	7
04N16W22C07S	LA	02/01/89 to 07/08/98	480 to 702	7	02/01/89 to 07/08/98	480 to 702	7
04N16W22D02S	LA	07/26/90 to 10/19/94	512 to 650	3	07/26/90 to 10/19/94	512 to 650	3
04N16W22M01S	LA	07/26/90 to 07/08/98	490 to 566	4	07/26/90 to 07/08/98	490 to 566	4
04N16W23A01S	LA	07/26/90 to 10/19/94	434 to 620	3	07/26/90 to 10/19/94	434 to 620	3
04N16W23A02S	LA	09/05/91 to 07/08/98	460 to 640	8	09/05/91 to 07/08/98	460 to 640	8
04N16W27J03S	LA	06/09/87 to 07/08/98	530 to 870	4	06/09/87 to 07/08/98	530 to 870	4
04N16W33L01S	LA	10/15/91 to 07/08/98	890 to 1,088	5	10/15/91 to 07/08/98	890 to 1,088	5

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
04N16W34A03S	LA	06/09/87 to 07/08/98	420 to 530	4	06/09/87 to 07/08/98	420 to 530	4
04N17W12C01S	LA	07/26/90 to 10/19/94	649 to 1,150	4	07/26/90 to 10/19/94	649 to 1,150	4
05N17W25B02S	LA	06/09/87 to 07/08/98	480 to 590	5	06/09/87 to 07/08/98	480 to 590	5
05N17W25B04S	LA	06/09/87 to 07/08/98	470 to 650	5	06/09/87 to 07/08/98	470 to 650	5
05N17W25G06S	LA	06/09/87 to 09/09/98	460 to 610	5	06/09/87 to 09/09/98	460 to 610	5
NCWD-10	LA	06/05/60 to 07/08/98	381 to 631	24	06/09/87 to 07/08/98	397 to 530	5
NCWD-11	LA	05/09/75 to 08/15/00	461 to 987	20	03/10/80 to 08/15/00	461 to 870	16
NCWD-12	LA	04/28/92 to 08/15/00	440 to 520	4	04/28/92 to 08/15/00	440 to 520	4
NCWD-13	LA	07/11/90 to 08/15/00	500 to 680	5	07/11/90 to 08/15/00	500 to 680	5
NCWD-7	LA	09/08/55 to 07/08/98	288 to 840	56	03/10/80 to 07/08/98	317 to 840	20
NCWD-9	LA	06/09/87 to 08/15/00	600 to 880	5	06/09/87 to 08/15/00	600 to 880	5
NCWD-Castaic 1	LA	06/09/87 to 08/15/00	460 to 610	6	06/09/87 to 08/15/00	460 to 610	6
NCWD-Castaic 2	LA	06/09/87 to 08/15/00	480 to 590	6	06/09/87 to 08/15/00	480 to 590	6
NCWD-Castaic 3	LA	06/09/87 to 08/15/00	470 to 650	6	06/09/87 to 08/15/00	470 to 650	6
NCWD-Castaic 4	LA	04/05/89 to 08/15/00	450 to 728	4	04/05/89 to 08/15/00	450 to 728	4
NCWD-Pinetree 1	LA	06/09/87 to 08/15/00	470 to 682	5	06/09/87 to 08/15/00	470 to 682	5
NCWD-Pinetree 2	LA	06/09/87 to 06/29/95	530 to 730	3	06/09/87 to 06/29/95	530 to 730	3
NCWD-Pinetree 3	LA	06/09/87 to 08/15/00	450 to 511	5	06/09/87 to 08/15/00	450 to 511	5
NCWD-Pinetree 4	LA	06/09/87 to 08/15/00	444 to 823	5	06/09/87 to 08/15/00	444 to 823	5
NLF-B6	LA	07/30/47 to 03/01/01	108 to 1,477	13	03/27/86 to 03/01/01	840 to 960	5
NLF-C	LA	01/10/39 to 03/01/01	750 to 980	3	05/17/00 to 03/01/01	750 to 770	2
NLF-C6	LA	12/10/56 to 06/30/88	412 to 1,059	12	03/06/80 to 06/30/88	412 to 1,004	7
SCWC-Clark	LA	03/19/75 to 08/23/95	121 to 5,214	27	03/18/80 to 08/23/95	121 to 5,214	19
SCWC-Guida	LA	04/05/89 to 05/04/99	460 to 590	4	04/05/89 to 05/04/99	460 to 590	4
SCWC-Honby	LA	01/11/89 to 08/23/95	510 to 570	3	01/11/89 to 08/23/95	510 to 570	3
SCWC-Lost Canyon 2	LA	04/05/89 to 05/04/99	438 to 500	4	04/05/89 to 05/04/99	438 to 500	4
SCWC-Lost Canyon 2A	LA	08/05/92 to 06/21/00	480 to 552	3	08/05/92 to 06/21/00	480 to 552	3
SCWC-Mitchell	LA	01/11/89 to 05/04/99	493 to 610	4	01/11/89 to 05/04/99	493 to 610	4
SCWC-N. Oaks Central	LA	04/05/89 to 06/21/00	610 to 730	4	04/05/89 to 06/21/00	610 to 730	4
SCWC-N. Oaks East	LA	04/05/89 to 05/04/99	520 to 640	4	04/05/89 to 05/04/99	520 to 640	4

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
SCWC-N. Oaks West	LA	04/05/89 to 06/21/00	600 to 720	4	04/05/89 to 06/21/00	600 to 720	4
SCWC-Sand Canyon	LA	04/05/89 to 08/23/95	550 to 670	3	04/05/89 to 08/23/95	550 to 670	3
SCWC-Saugus 1	LA	07/02/91 to 06/07/96	480 to 525	3	07/02/91 to 06/07/96	480 to 525	3
SCWC-Saugus 2	LA	11/27/90 to 09/27/95	360 to 450	3	11/27/90 to 09/27/95	360 to 450	3
SCWC-Sierra	LA	04/05/89 to 08/23/95	450 to 600	3	04/05/89 to 08/23/95	450 to 600	3
SCWC-Stadium	LA	04/05/89 to 06/21/00	590 to 840	4	04/05/89 to 06/21/00	590 to 840	4
VWC-157	LA	09/19/66 to 07/08/98	338 to 566	37	03/06/80 to 07/08/98	338 to 566	17
VWC-159	LA	08/13/63 to 07/08/98	880 to 1,277	17	10/15/91 to 07/08/98	890 to 1,088	5
VWC-160	LA	06/29/65 to 06/27/00	442 to 770	12	07/26/90 to 06/27/00	670 to 770	4
VWC-201	LA	03/23/89 to 06/27/00	590 to 796	5	03/23/89 to 06/27/00	590 to 796	5
VWC-D	LA	05/17/56 to 05/04/99	63 to 1,150	21	07/26/90 to 05/04/99	649 to 1,150	5
VWC-I	LA	05/29/75 to 06/27/00	228 to 5,170	7	07/26/90 to 06/27/00	656 to 712	4
VWC-K2	LA	02/27/48 to 06/27/00	407 to 747	11	01/27/89 to 06/27/00	500 to 747	9
VWC-L2	LA	02/01/89 to 06/27/00	480 to 702	8	02/01/89 to 06/27/00	480 to 702	8
VWC-N	LA	03/30/53 to 05/04/99	199 to 739	26	03/06/80 to 05/04/99	339 to 650	18
VWC-N3	LA	09/13/48 to 06/27/00	28 to 950	18	10/23/91 to 06/27/00	512 to 720	7
VWC-N4	LA	01/28/51 to 07/08/98	30 to 1,260	30	05/07/91 to 07/08/98	599 to 690	7
VWC-Q2	LA	04/28/71 to 05/04/99	290 to 4,856	28	03/06/80 to 05/04/99	290 to 4,856	16
VWC-T2	LA	08/04/61 to 05/04/99	384 to 620	6	07/26/90 to 05/04/99	434 to 620	4
VWC-T4	LA	08/04/61 to 06/27/00	436 to 640	11	09/05/91 to 06/27/00	460 to 640	9
VWC-U3	LA	07/26/90 to 05/04/99	441 to 850	4	07/26/90 to 05/04/99	441 to 850	4
VWC-U4	LA	07/26/90 to 05/04/99	453 to 1,150	5	07/26/90 to 05/04/99	453 to 1,150	5
VWC-W6	LA	10/09/91 to 07/08/98	524 to 640	6	10/09/91 to 07/08/98	524 to 640	6
VWC-W9	LA	06/04/91 to 07/08/98	528 to 620	7	06/04/91 to 07/08/98	528 to 620	7
WHR-18 - Old	LA	04/12/67 to 03/14/89	501 to 940	16	03/20/80 to 03/14/89	501 to 940	14
V-0342	V	07/16/63 to 12/04/02	901 to 1,145	24	06/25/81 to 12/04/02	901 to 1,145	19
V-0362	V	05/01/67 to 05/08/01	703 to 1,040	17	09/28/87 to 05/08/01	880 to 1,040	16
V-0421	V	04/26/50 to 10/25/94	1,000 to 1,150	7	10/26/93 to 10/25/94	1,000 to 1,150	5
V-0447	V	06/02/05 to 06/02/05	1,230 to 1,230	1	06/02/05 to 06/02/05	1,230 to 1,230	1
V-0398	V	05/08/01 to 05/08/01	1,400 to 1,400	1	05/08/01 to 05/08/01	1,400 to 1,400	1

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0373	V	08/05/93 to 08/05/93	1,680 to 1,680	2	08/05/93 to 08/05/93	1,680 to 1,680	2
V-0009	V	02/09/61 to 02/02/82	847 to 1,645	9	02/02/82 to 02/02/82	847 to 847	1
V-0015	V	02/19/34 to 07/17/86	815 to 1,972	15	07/16/86 to 07/17/86	815 to 887	3
V-0019	V	01/30/01 to 01/30/01	1,360 to 1,360	1	01/30/01 to 01/30/01	1,360 to 1,360	1
V-0022	V	04/24/01 to 04/24/01	1,450 to 1,450	1	04/24/01 to 04/24/01	1,450 to 1,450	1
V-0026	V	08/15/86 to 07/19/94	3,633 to 3,730	4	08/15/86 to 07/19/94	3,633 to 3,730	4
V-0096	V	07/10/43 to 08/12/86	1,253 to 1,309	6	11/07/85 to 08/12/86	1,253 to 1,273	5
V-0095	V	05/16/50 to 10/12/94	1,140 to 1,612	17	10/19/87 to 10/12/94	1,249 to 1,400	7
V-0097	V	05/11/50 to 10/25/93	1,068 to 1,612	14	08/04/93 to 10/25/93	1,160 to 1,290	4
V-0079	V	02/03/64 to 03/20/90	1,173 to 1,707	6	03/20/90 to 03/20/90	1,350 to 1,430	2
V-0070	V	04/19/33 to 05/11/01	858 to 1,341	44	08/11/86 to 05/11/01	1,090 to 1,324	9
V-0037	V	05/20/74 to 08/03/84	2,744 to 4,120	16	09/02/80 to 08/03/84	3,043 to 3,400	8
V-0060	V	06/11/52 to 03/05/96	700 to 1,810	29	02/19/81 to 03/05/96	700 to 1,390	19
V-0061	V	01/05/51 to 11/17/04	865 to 1,715	22	05/19/80 to 11/17/04	865 to 1,140	9
V-0055	V	06/16/71 to 08/04/93	750 to 1,438	6	08/26/91 to 08/04/93	750 to 1,430	4
V-0051	V	11/16/65 to 01/21/93	694 to 1,730	13	04/09/87 to 01/21/93	694 to 1,730	7
V-0036	V	06/04/98 to 06/03/04	1,100 to 1,310	4	06/04/98 to 06/03/04	1,100 to 1,310	4
V-0012	V	10/23/51 to 11/19/04	1,098 to 3,860	50	03/07/80 to 11/19/04	1,098 to 1,370	19
V-0031	V	08/26/65 to 08/23/99	1,010 to 2,730	16	09/28/87 to 08/23/99	1,010 to 1,200	11
V-0042	V	05/07/71 to 04/30/90	948 to 2,020	9	03/19/90 to 04/30/90	948 to 1,050	3
V-0059	V	06/28/62 to 05/21/90	760 to 1,638	24	11/07/85 to 05/21/90	1,160 to 1,480	13
V-0053	V	10/06/81 to 08/13/92	708 to 1,356	30	10/06/81 to 08/13/92	708 to 1,356	30
V-0039	V	02/03/65 to 10/25/94	850 to 1,418	23	08/12/87 to 10/25/94	960 to 1,180	15
V-0064	V	06/26/69 to 11/02/93	917 to 1,192	8	11/02/93 to 11/02/93	917 to 917	2
V-0102	V	05/26/52 to 08/09/94	900 to 1,800	6	03/26/90 to 08/09/94	900 to 1,500	4
V-0093	V	07/01/59 to 08/13/92	660 to 1,273	13	08/03/84 to 08/13/92	660 to 1,080	12
V-0082	V	10/25/51 to 10/17/94	860 to 1,258	8	03/26/90 to 10/17/94	860 to 1,040	6
V-0067	V	05/26/52 to 06/16/88	974 to 1,144	5	06/16/88 to 06/16/88	989 to 989	2
V-0071	V	06/28/62 to 10/26/89	803 to 1,226	16	03/07/80 to 10/26/89	803 to 1,044	8
V-0077	V	05/06/05 to 05/06/05	724 to 724	1	05/06/05 to 05/06/05	724 to 724	1

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0094	V	05/06/05 to 05/06/05	840 to 840	1	05/06/05 to 05/06/05	840 to 840	1
V-0103	V	06/28/62 to 10/03/94	770 to 1,384	39	06/26/80 to 10/03/94	770 to 1,120	29
V-0090	V	04/25/33 to 06/10/88	804 to 1,660	11	06/10/88 to 06/10/88	1,501 to 1,501	2
V-0104	V	05/26/52 to 06/16/88	757 to 1,417	7	06/16/88 to 06/16/88	972 to 972	2
V-0110	V	08/26/65 to 10/19/94	803 to 1,335	16	03/07/80 to 10/19/94	850 to 996	10
V-0108	V	06/25/94 to 10/06/04	838 to 1,190	24	06/25/94 to 10/06/04	838 to 1,190	24
V-0109	V	06/25/94 to 10/06/04	800 to 1,040	24	06/25/94 to 10/06/04	800 to 1,040	24
V-0106	V	06/25/94 to 10/06/04	642 to 930	24	06/25/94 to 10/06/04	642 to 930	24
V-0107	V	06/25/94 to 10/06/04	600 to 850	24	06/25/94 to 10/06/04	600 to 850	24
V-0105	V	06/25/94 to 04/26/04	608 to 990	23	06/25/94 to 04/26/04	608 to 990	23
V-0100	V	09/26/89 to 08/08/90	728 to 876	4	09/26/89 to 08/08/90	728 to 876	4
V-0141	V	08/17/79 to 09/11/90	2,868 to 4,825	14	10/16/81 to 09/11/90	2,868 to 4,825	12
V-0148	V	01/03/89 to 01/03/89	776 to 776	1	01/03/89 to 01/03/89	776 to 776	1
V-0117	V	06/28/62 to 09/18/87	761 to 1,130	3	09/18/87 to 09/18/87	761 to 761	2
V-0134	V	09/07/61 to 05/11/01	1,000 to 1,866	12	11/10/93 to 05/11/01	1,000 to 1,200	5
V-0111	V	11/14/67 to 11/03/93	970 to 1,324	9	04/13/90 to 11/03/93	970 to 1,190	8
V-0112	V	01/28/05 to 01/28/05	900 to 900	1	01/28/05 to 01/28/05	900 to 900	1
V-0123	V	09/05/67 to 10/17/94	908 to 2,048	39	06/27/80 to 10/17/94	908 to 1,950	34
V-0121	V	05/18/05 to 05/18/05	990 to 990	1	05/18/05 to 05/18/05	990 to 990	1
V-0127	V	04/28/48 to 06/14/94	788 to 1,100	27	07/13/83 to 06/14/94	788 to 1,100	23
V-0129	V	07/23/56 to 09/11/90	2,036 to 2,360	4	09/11/90 to 09/11/90	2,224 to 2,224	2
V-0139	V	04/25/40 to 09/21/89	813 to 1,432	41	09/16/81 to 09/21/89	935 to 1,080	6
V-0140	V	05/18/05 to 05/18/05	2,040 to 2,040	1	05/18/05 to 05/18/05	2,040 to 2,040	1
V-0152	V	06/08/63 to 10/17/94	960 to 1,102	9	09/18/87 to 10/17/94	960 to 1,100	6
V-0143	V	05/26/52 to 05/18/05	772 to 1,590	23	06/18/81 to 05/18/05	772 to 1,043	17
V-0142	V	09/04/91 to 08/13/92	970 to 990	4	09/04/91 to 08/13/92	970 to 990	4
V-0162	V	04/26/55 to 09/15/99	950 to 2,240	18	10/07/80 to 09/15/99	950 to 1,993	13
V-0160	V	04/17/59 to 08/13/92	1,720 to 2,216	9	09/27/89 to 08/13/92	1,788 to 2,020	6
V-0154	V	06/08/63 to 08/27/91	1,740 to 1,932	3	08/27/91 to 08/27/91	1,740 to 1,770	2
V-0175	V	07/21/94 to 07/21/94	1,410 to 1,410	2	07/21/94 to 07/21/94	1,410 to 1,410	2

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0184	V	05/03/76 to 05/22/01	1,780 to 2,260	29	10/14/80 to 05/22/01	1,780 to 2,260	25
V-0168	V	08/04/64 to 06/28/05	1,250 to 1,879	20	06/27/80 to 06/28/05	1,250 to 1,860	17
V-0178	V	07/22/76 to 10/12/94	1,180 to 2,200	18	06/11/87 to 10/12/94	1,180 to 1,488	14
V-0214	V	06/20/62 to 08/01/94	1,523 to 1,840	3	08/01/94 to 08/01/94	1,840 to 1,840	2
V-0212	V	12/26/01 to 12/26/01	1,280 to 1,300	2	12/26/01 to 12/26/01	1,280 to 1,300	2
V-0242	V	06/09/92 to 06/09/92	809 to 838	2	06/09/92 to 06/09/92	809 to 838	2
V-0243	V	10/28/76 to 10/03/94	895 to 1,200	27	06/18/81 to 10/03/94	895 to 1,200	25
V-0250	V	11/09/93 to 11/09/93	930 to 930	2	11/09/93 to 11/09/93	930 to 930	2
V-0340	V	08/18/53 to 12/02/02	1,313 to 1,790	28	07/09/81 to 12/02/02	1,471 to 1,790	25
V-0309	V	11/30/48 to 07/20/97	1,106 to 2,214	37	07/14/80 to 07/20/97	1,170 to 1,600	17
V-0310	V	08/17/89 to 08/07/92	1,300 to 1,400	2	08/17/89 to 08/07/92	1,300 to 1,400	2
V-0314	V	07/31/26 to 07/14/80	152 to 2,493	24	07/14/80 to 07/14/80	1,960 to 1,960	2
V-0317	V	05/05/65 to 11/09/93	1,420 to 1,530	2	11/09/93 to 11/09/93	1,420 to 1,420	1
V-0308	V	07/16/63 to 07/21/94	1,040 to 1,452	6	10/19/87 to 07/21/94	1,040 to 1,200	5
V-0302	V	11/11/76 to 08/26/92	730 to 1,668	27	07/20/81 to 08/26/92	730 to 1,640	25
V-0333	V	03/11/63 to 08/12/86	1,115 to 1,501	8	08/12/86 to 08/12/86	1,115 to 1,115	1
V-0332	V	06/30/76 to 05/10/01	561 to 1,443	16	07/14/81 to 05/10/01	1,190 to 1,443	10
V-0327	V	02/08/52 to 08/07/86	1,022 to 1,115	5	10/24/85 to 08/07/86	1,080 to 1,115	4
V-0322	V	05/15/74 to 10/05/94	875 to 1,263	36	10/06/80 to 10/05/94	1,000 to 1,230	28
V-0329	V	10/19/93 to 10/19/93	1,040 to 1,040	2	10/19/93 to 10/19/93	1,040 to 1,040	2
V-0296	V	02/20/34 to 10/25/94	950 to 1,761	8	10/28/93 to 10/25/94	950 to 1,140	4
V-0295	V	10/28/93 to 10/28/93	1,080 to 1,080	2	10/28/93 to 10/28/93	1,080 to 1,080	2
V-0281	V	07/01/59 to 10/03/94	870 to 1,161	7	10/26/93 to 10/03/94	870 to 950	5
V-0248	V	05/26/76 to 10/03/94	812 to 1,488	32	10/06/80 to 10/03/94	812 to 1,100	24
V-0244	V	10/16/81 to 05/10/01	910 to 1,090	7	10/16/81 to 05/10/01	910 to 1,090	7
V-0284	V	06/04/98 to 09/15/99	920 to 1,480	2	06/04/98 to 09/15/99	920 to 1,480	2
V-0216	V	03/15/72 to 11/19/04	1,220 to 2,122	23	09/02/80 to 11/19/04	1,220 to 1,890	15
V-0219	V	07/23/56 to 10/03/94	1,070 to 1,789	25	07/14/81 to 10/03/94	1,070 to 1,638	19
V-0237	V	05/16/49 to 09/15/99	904 to 1,260	19	06/10/81 to 09/15/99	972 to 1,244	14
V-0238	V	10/25/51 to 10/24/85	820 to 2,613	25	06/27/80 to 10/24/85	1,033 to 1,180	4

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0234	V	11/09/93 to 11/09/93	1,040 to 1,040	2	11/09/93 to 11/09/93	1,040 to 1,040	2
V-0205	V	11/03/93 to 11/03/93	1,450 to 1,450	2	11/03/93 to 11/03/93	1,450 to 1,450	2
V-0206	V	10/23/51 to 10/12/94	1,400 to 1,747	4	06/29/94 to 10/12/94	1,400 to 1,500	3
V-0229	V	03/15/48 to 08/05/93	793 to 1,640	31	06/22/83 to 08/05/93	876 to 950	8
V-0231	V	10/28/93 to 10/03/94	830 to 970	5	10/28/93 to 10/03/94	830 to 970	5
V-0233	V	09/26/89 to 11/17/04	808 to 1,130	12	09/26/89 to 11/17/04	808 to 1,130	12
V-0185	V	05/26/52 to 06/17/92	1,343 to 1,819	12	09/19/86 to 06/17/92	1,343 to 1,510	5
V-0200	V	07/23/56 to 10/19/94	1,000 to 1,625	4	06/29/94 to 10/19/94	1,000 to 1,100	3
V-0199	V	09/12/58 to 09/18/87	1,000 to 1,408	3	09/18/87 to 09/18/87	1,000 to 1,000	2
V-0193	V	06/20/62 to 06/05/05	1,120 to 1,339	3	06/05/05 to 06/05/05	1,120 to 1,120	1
V-0186	V	12/26/58 to 10/12/94	950 to 1,100	4	06/14/94 to 10/12/94	950 to 1,100	3
V-0176	V	11/03/54 to 10/19/94	912 to 1,200	13	03/20/90 to 10/19/94	912 to 1,200	12
V-0181	V	10/12/31 to 09/17/99	1,174 to 1,520	3	09/17/99 to 09/17/99	1,520 to 1,520	1
V-0182	V	06/28/62 to 08/12/92	813 to 1,183	17	06/29/83 to 08/12/92	813 to 1,183	16
V-0161	V	04/17/59 to 08/19/87	1,040 to 2,421	15	11/07/85 to 08/19/87	1,040 to 1,423	6
V-0159	V	09/08/54 to 08/04/93	700 to 3,498	15	09/23/86 to 08/04/93	700 to 905	5
V-0158	V	12/27/34 to 04/13/90	834 to 1,332	6	04/13/90 to 04/13/90	1,130 to 1,210	2
V-0164	V	06/21/94 to 10/25/94	1,200 to 1,300	3	06/21/94 to 10/25/94	1,200 to 1,300	3
V-0165	V	07/17/81 to 07/23/92	380 to 1,240	18	07/17/81 to 07/23/92	380 to 1,240	18
V-0350	V	11/08/61 to 12/19/89	864 to 1,333	16	04/06/87 to 12/19/89	864 to 1,040	8
V-0352	V	09/24/74 to 07/15/92	732 to 1,150	7	10/17/90 to 07/15/92	732 to 1,130	6
V-0349	V	10/19/93 to 10/19/93	840 to 840	2	10/19/93 to 10/19/93	840 to 840	2
V-0360	V	07/25/63 to 05/11/98	895 to 1,150	28	07/14/80 to 05/11/98	895 to 1,000	11
V-0393	V	09/28/78 to 05/11/98	600 to 1,067	19	07/14/80 to 05/11/98	600 to 1,067	18
V-0392	V	12/12/90 to 02/04/97	1,100 to 1,200	5	12/12/90 to 02/04/97	1,100 to 1,200	5
V-0406	V	08/19/53 to 10/06/86	388 to 1,115	34	09/19/86 to 10/06/86	745 to 745	3
V-0438	V	11/15/95 to 08/20/99	1,060 to 1,080	2	11/15/95 to 08/20/99	1,060 to 1,080	2
V-0499	V	06/03/76 to 08/02/90	1,445 to 1,570	8	06/10/88 to 08/02/90	1,450 to 1,570	4
V-0500	V	08/09/94 to 08/09/94	1,340 to 1,340	1	08/09/94 to 08/09/94	1,340 to 1,340	1
V-0488	V	03/28/95 to 03/28/95	980 to 980	1	03/28/95 to 03/28/95	980 to 980	1

TABLE 3-10
Summary of TDS Sample Counts in Groundwater
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

		Period of Record[a]			Since 1980		
Location	County	Date Range	Value Range (mg/L)	Number of Values	Date Range	Value Range (mg/L)	Number of Values
V-0389	V	09/18/87 to 09/18/87	1,430 to 1,430	2	09/18/87 to 09/18/87	1,430 to 1,430	2
V-0474	V	09/15/99 to 09/15/99	1,520 to 1,520	1	09/15/99 to 09/15/99	1,520 to 1,520	1
V-0473	V	09/19/61 to 10/17/94	1,111 to 1,508	9	10/28/93 to 10/17/94	1,200 to 1,400	4
V-0468	V	11/03/93 to 11/03/93	1,330 to 1,330	2	11/03/93 to 11/03/93	1,330 to 1,330	2
V-0446	V	05/14/74 to 08/18/92	935 to 1,322	30	10/06/80 to 08/18/92	935 to 1,290	22
V-0372	V	10/19/93 to 11/04/99	860 to 1,080	4	10/19/93 to 11/04/99	860 to 1,080	4

[a]Period of record shown only for locations with data later than December 31,1979.

Notes:
LA = Los Angeles County
UNK = coordinates were not provided for this location
V = Ventura County

TABLE 3-11
Water Budget Components for the GSWI Study Area
Task 1A – Evaluate Existing Models, Literature, and Data
Upper Santa Clara River Chloride TMDL Collaborative Process

Inflows	Outflows
Surface Water	
Direct Runoff of Precipitation	ET of Precipitation
SCR Inflow from Upstream Basin (Acton)	Deep Percolation of Precipitation
Water Releases from Reservoirs (LADWP, SWP, and UWCD)	SCR Outflow from Piru into Fillmore Subbasin
Point Source Discharges to the SCR (WRPs and others)	Stream Leakage to Groundwater
Applied Water (agriculture and urban)	ET of Applied Water (agriculture and urban)
Irrigation Return Flows (agriculture and urban)	Deep Percolation of Applied Water (agriculture and urban)
Groundwater Discharge to Streams	Deep Percolation of Subsurface Discharges to Septic Systems
Groundwater	
Deep Percolation of Precipitation	Groundwater Pumping
Deep Percolation of Applied Water (agriculture and urban)	ET from Water Table
Stream Leakage to Groundwater	Groundwater Discharge to Streams
Subsurface Inflow from Upstream Basin (Acton)	Subsurface Outflow at the Downstream End of the GSWI Study Area
Deep Percolation of Subsurface Discharges to Septic Systems	
Dam Underflow	

Diversion item

This Page Intentionally
Left Blank

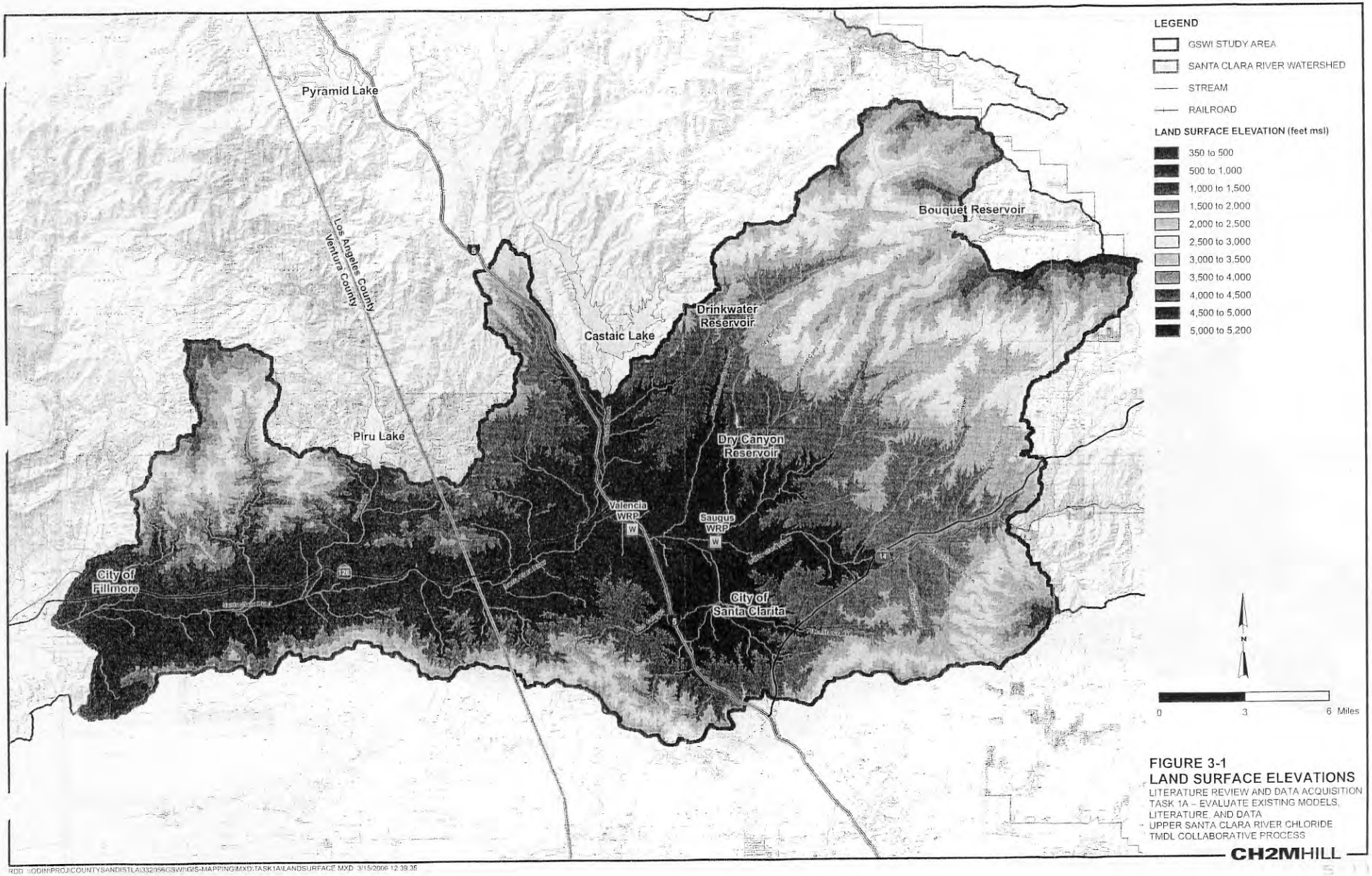
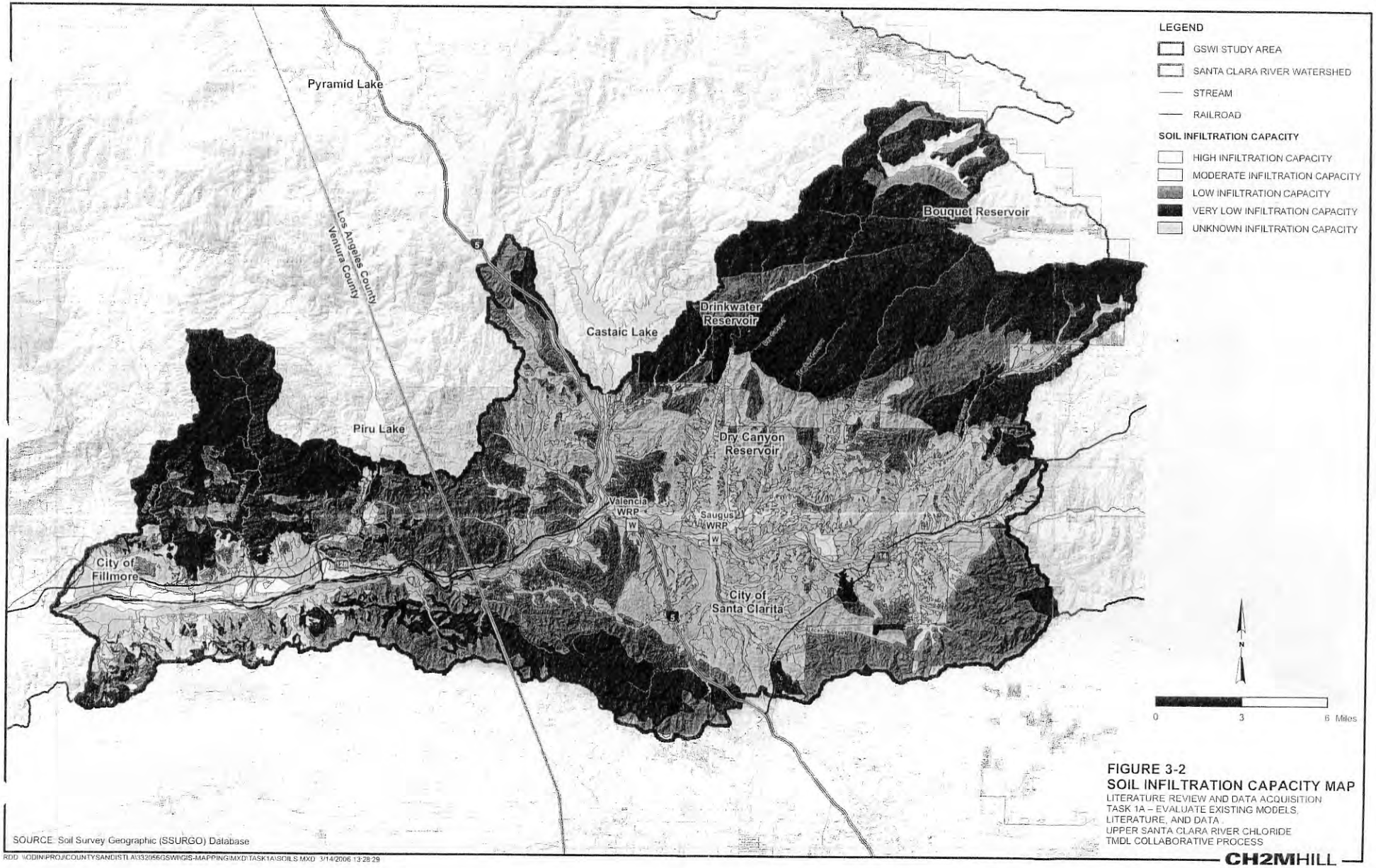


FIGURE 3-1
LAND SURFACE ELEVATIONS
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056\GSWI\GIS-MAPPING\MXD\TASK1A\LANDSURFACE.MXD 3/15/2006 12:39:35



SOURCE: Soil Survey Geographic (SSURGO) Database

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\SOILS.MXD 3/14/2006 13:28:29

FIGURE 3-2
SOIL INFILTRATION CAPACITY MAP
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

5-1158

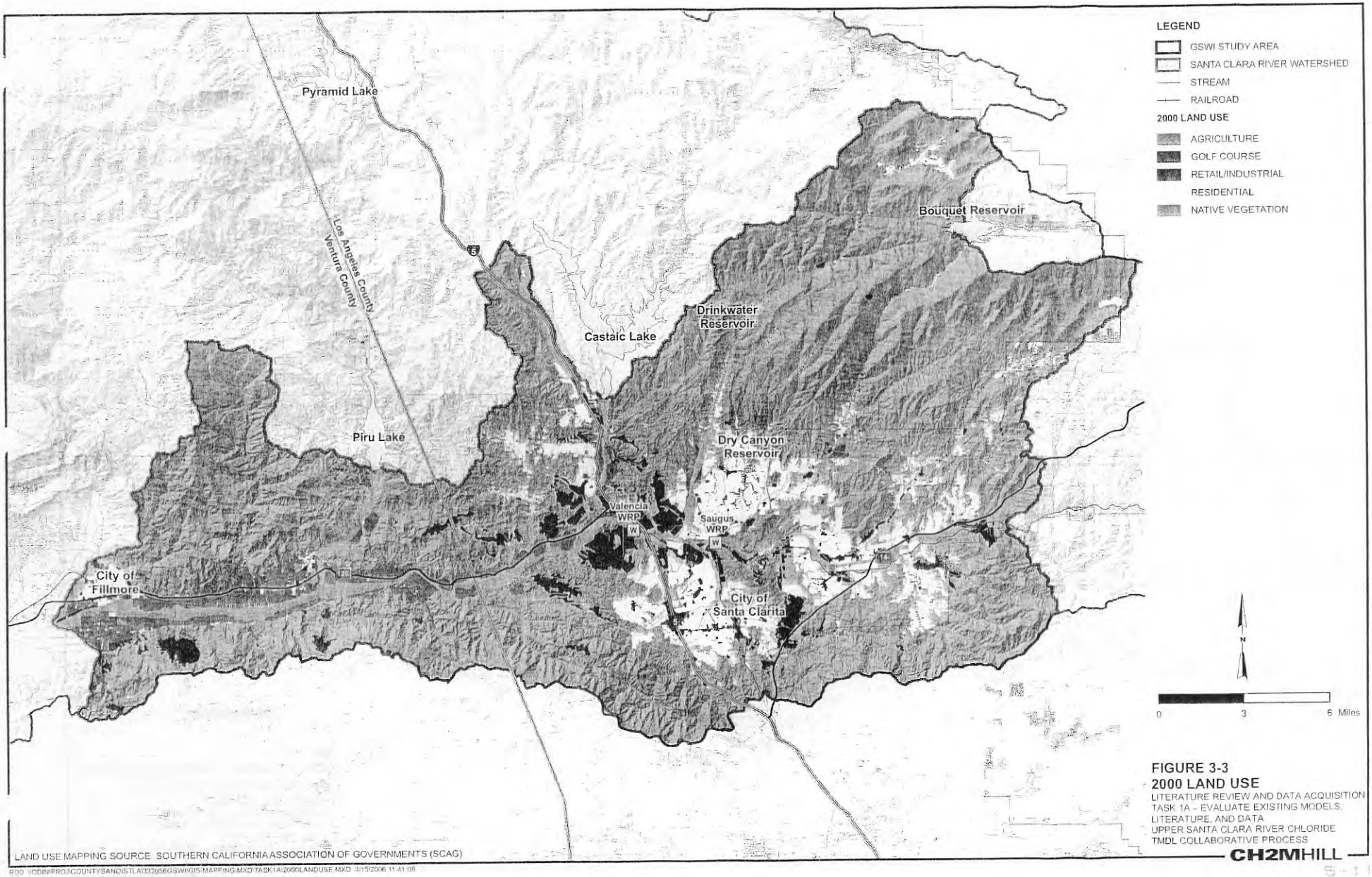
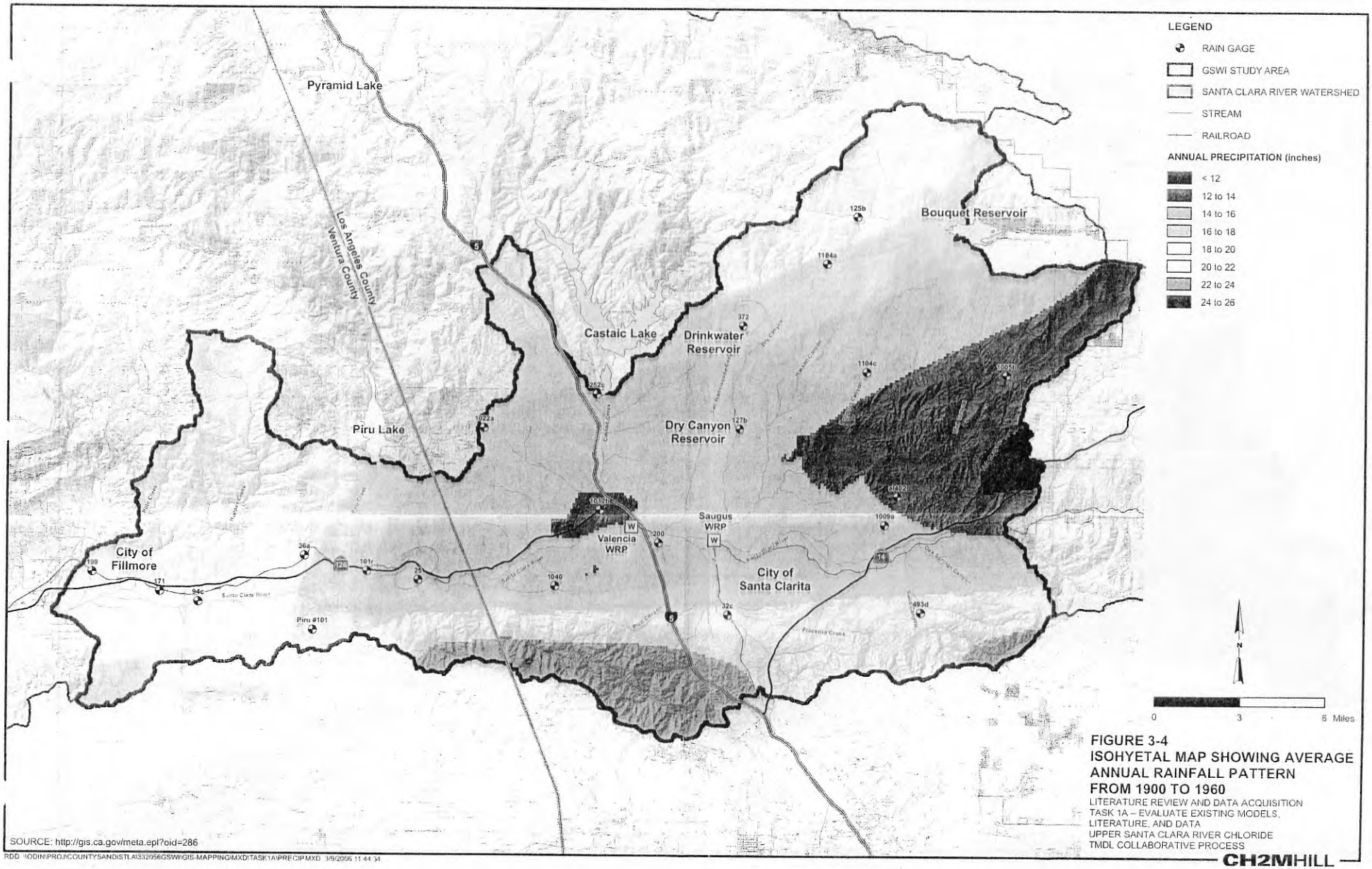


FIGURE 3-3
2000 LAND USE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A - EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

LAND USE MAPPING SOURCE: SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG)

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS\MAPPING\MXD\TASK1A\2000LANDUSE.MXD 3/15/2006 11:41:08



SOURCE: http://gis.ca.gov/meta.epl?oid=286

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\PRECIP.MXD 3/9/2006 11:44:34

FIGURE 3-4
ISOHYETAL MAP SHOWING AVERAGE ANNUAL RAINFALL PATTERN FROM 1900 TO 1960
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

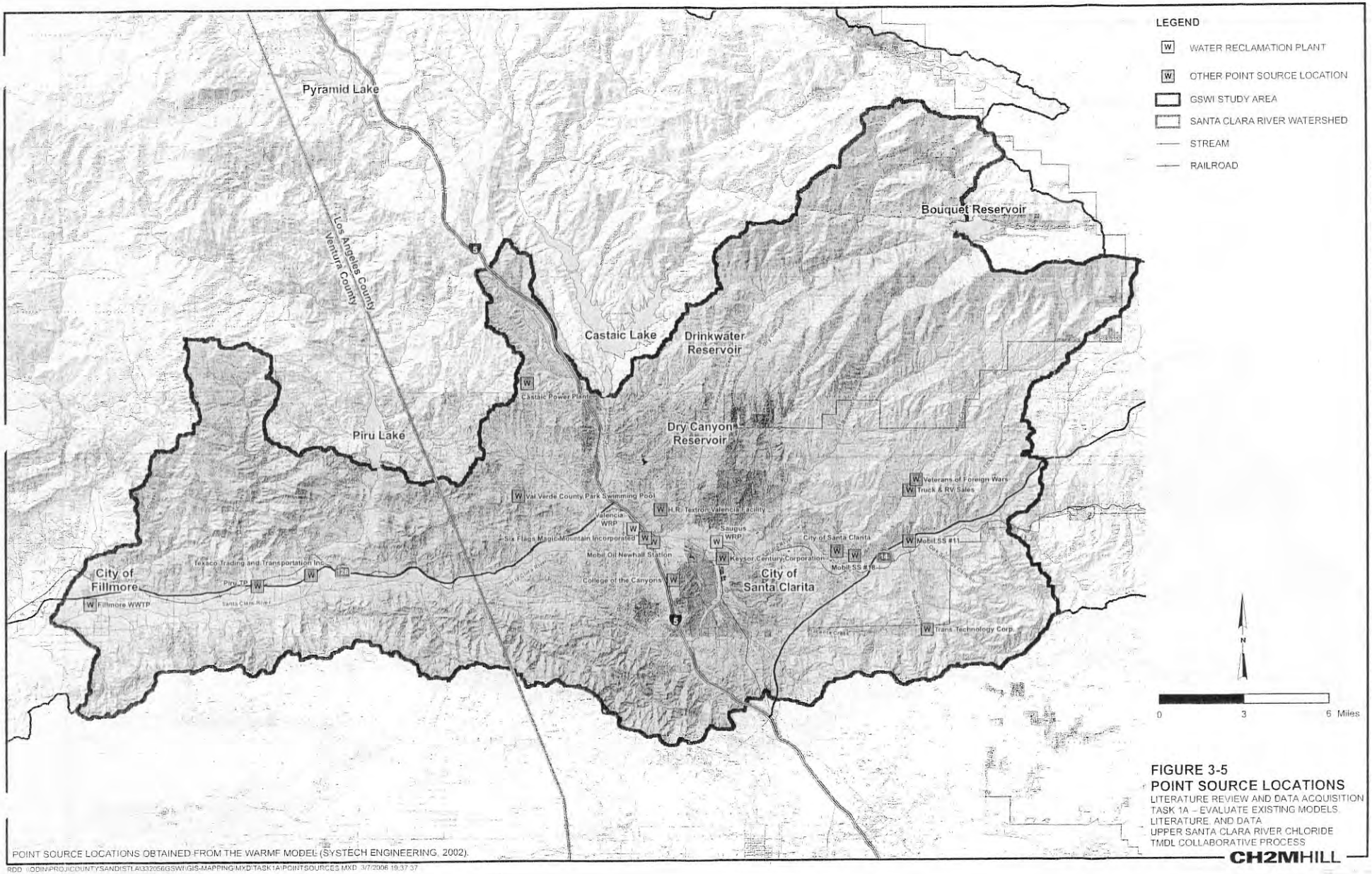


FIGURE 3-5
POINT SOURCE LOCATIONS
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

POINT SOURCE LOCATIONS OBTAINED FROM THE WARMF MODEL (SYSTECH ENGINEERING, 2002).

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA332056GSWI\GIS-MAPPING\MXD\TASK1A\POINTSOURCES.MXD 3/7/2006 19:37:37

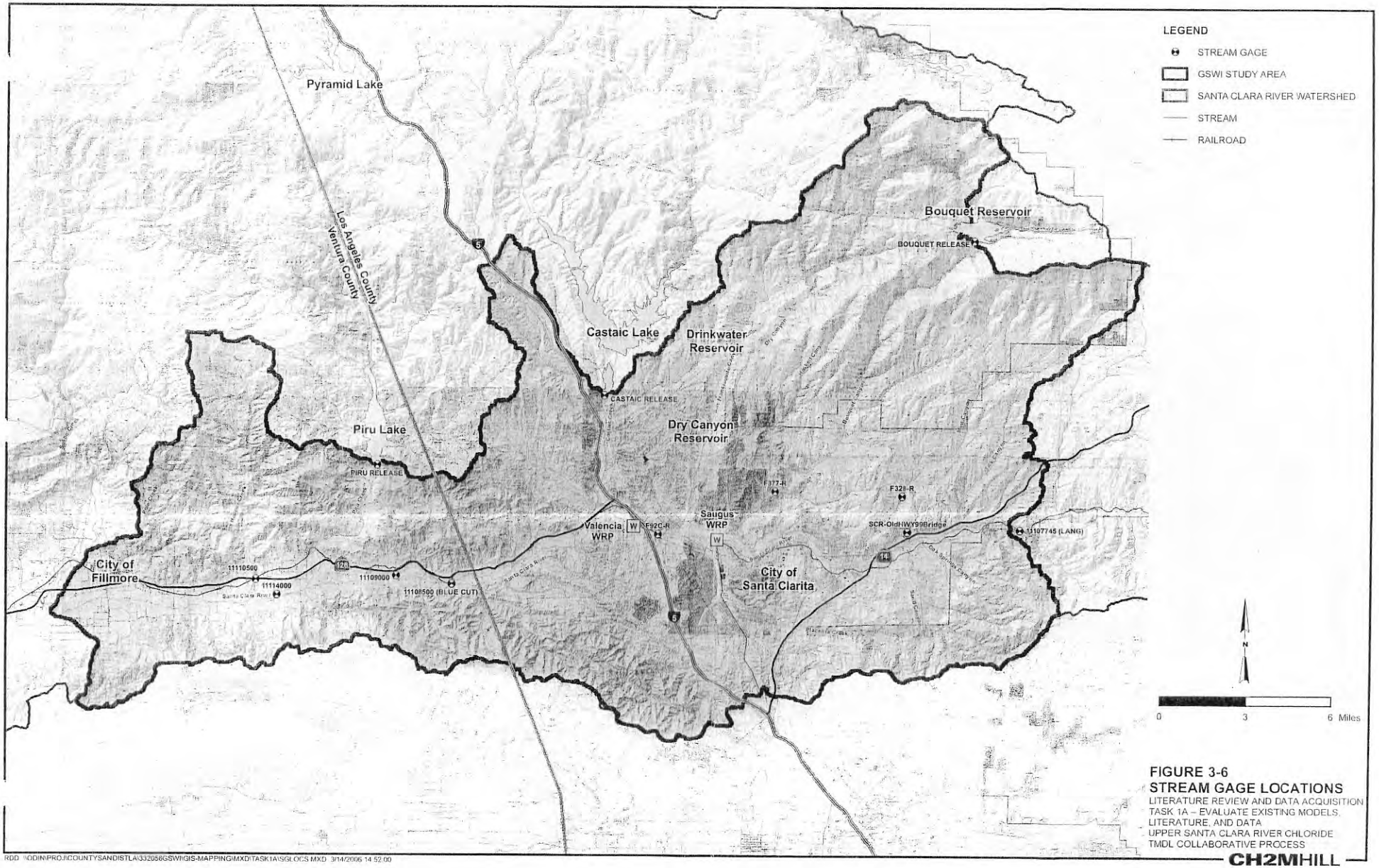


FIGURE 3-6
STREAM GAGE LOCATIONS
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\SGLOCS.MXD 3/14/2006 14:52:00

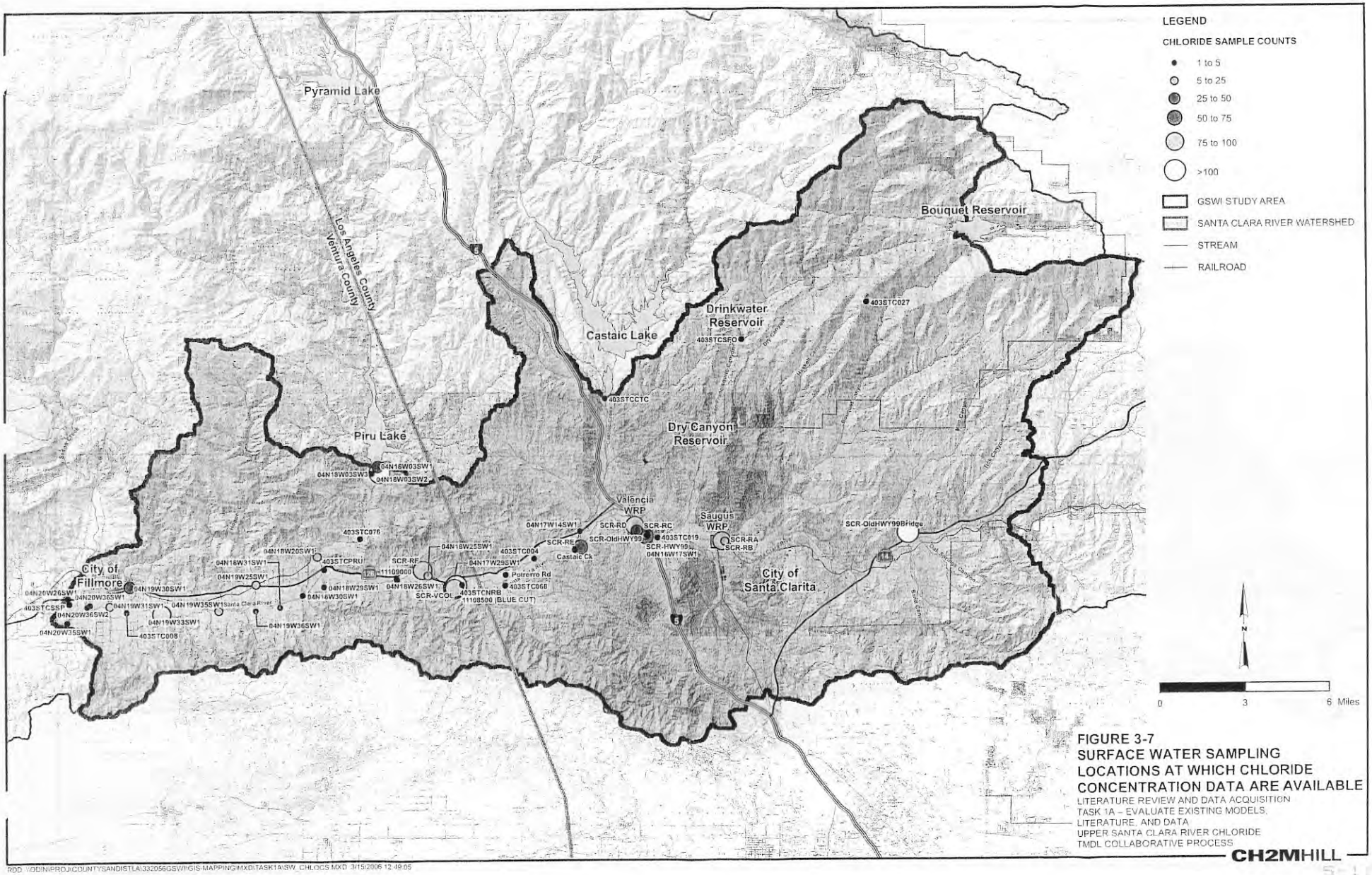


FIGURE 3-7
SURFACE WATER SAMPLING LOCATIONS AT WHICH CHLORIDE CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\SW_CHLOCS.MXD 3/15/2006 12:49:05

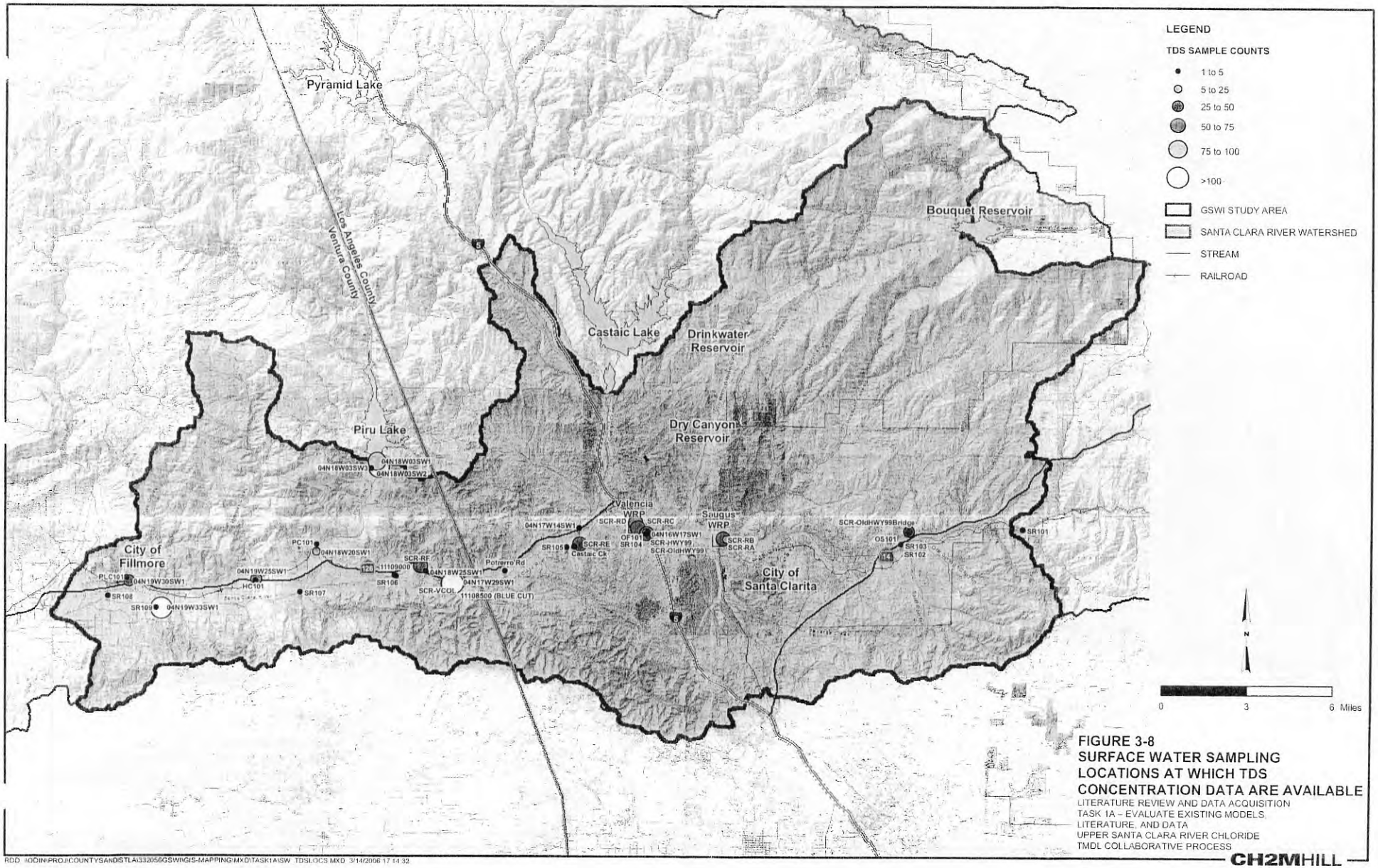


FIGURE 3-8
SURFACE WATER SAMPLING LOCATIONS AT WHICH TDS CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD I:\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\SW_TDSLOCS.MXD 3/14/2006 17:14:32

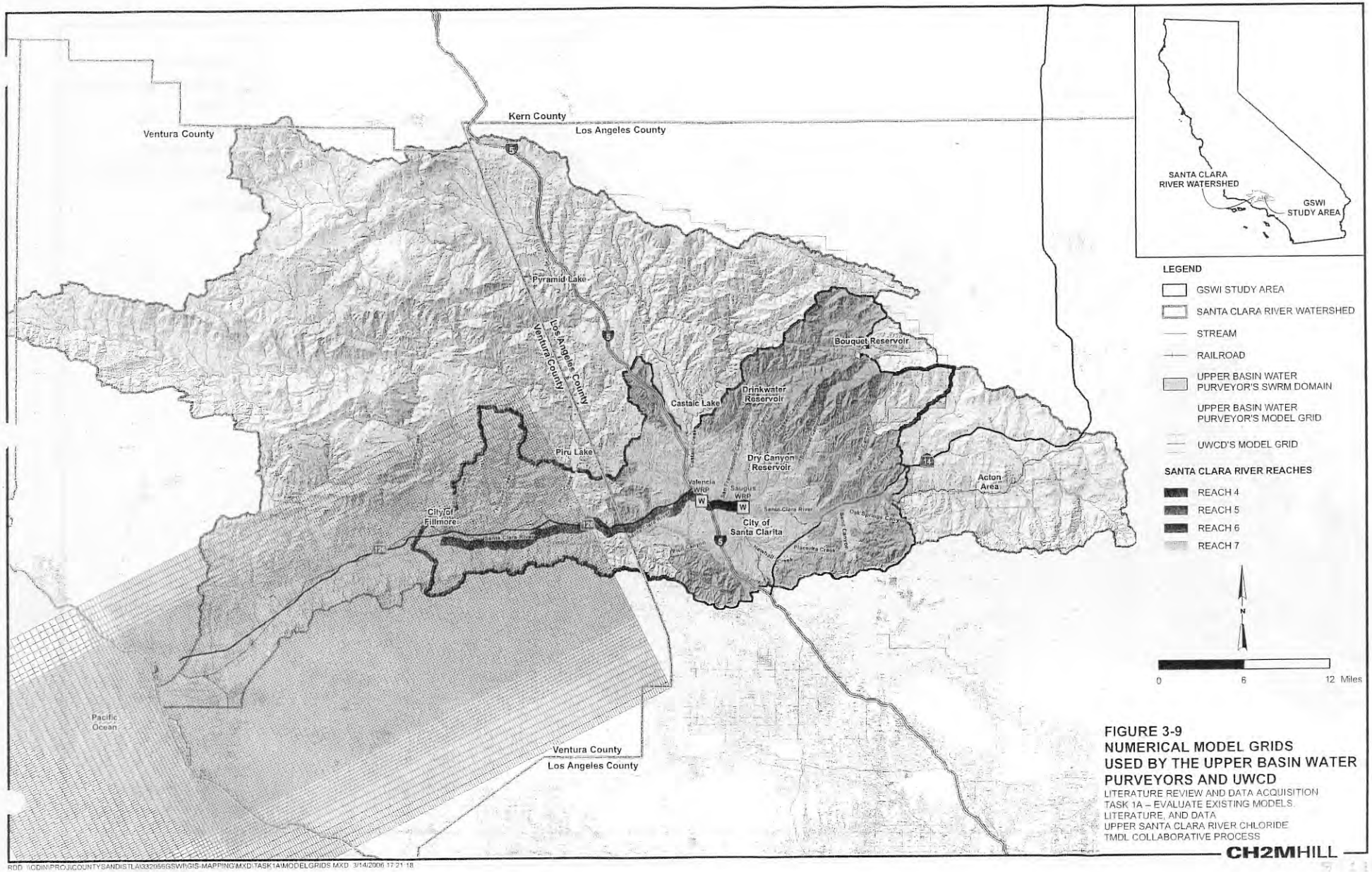


FIGURE 3-9
NUMERICAL MODEL GRIDS USED BY THE UPPER BASIN WATER PURVEYORS AND UWCD
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\CDIN\PROJ\COUNTYSANDISTLA\332056\GSWI\GIS-MAPPING\MXD\TASK1A\MODELGRIDS.MXD 3/14/2006 17:21:18

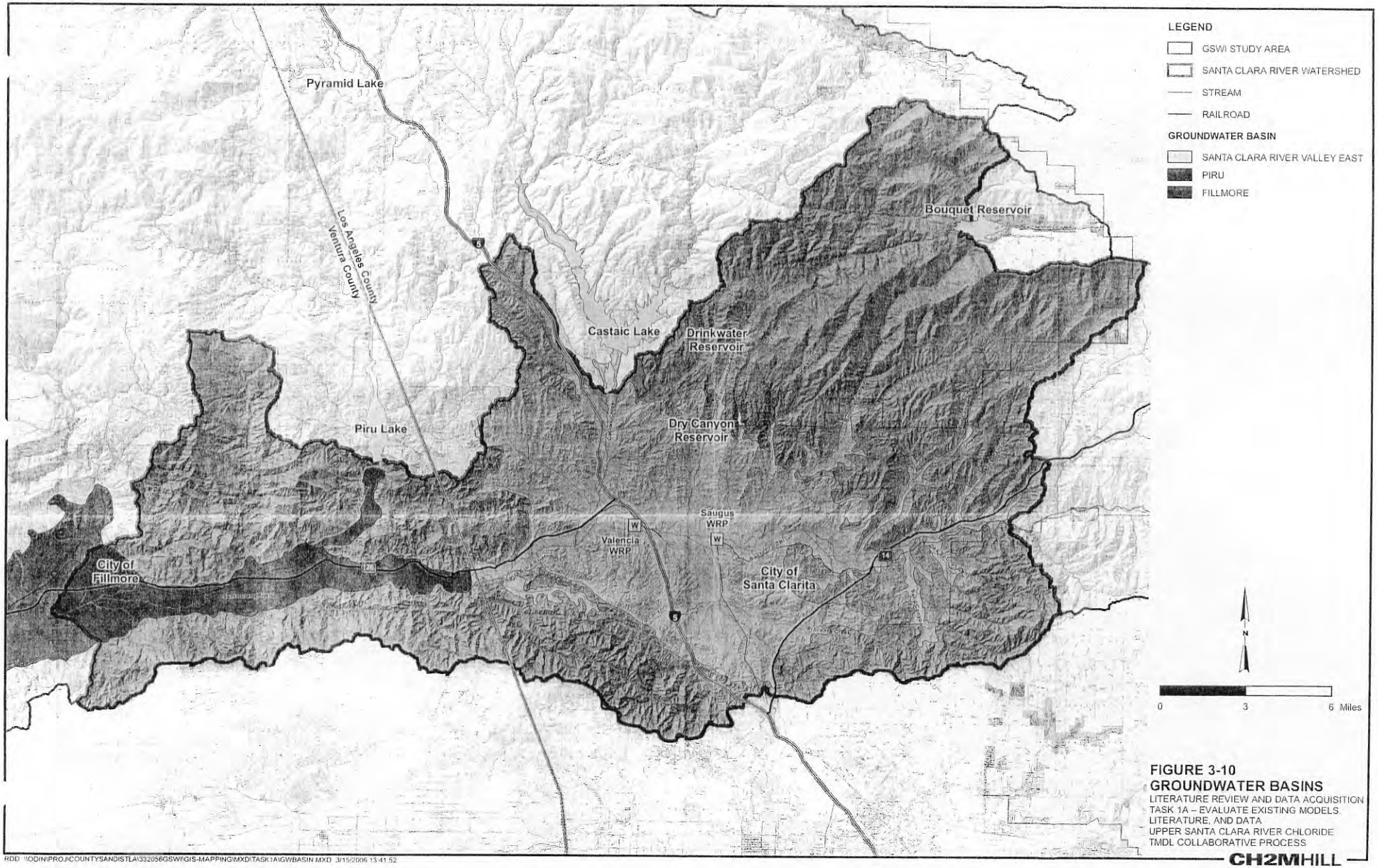


FIGURE 3-10
GROUNDWATER BASINS
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\GWBASIN.MXD 3/15/2006 13:41:52

CH2MHILL

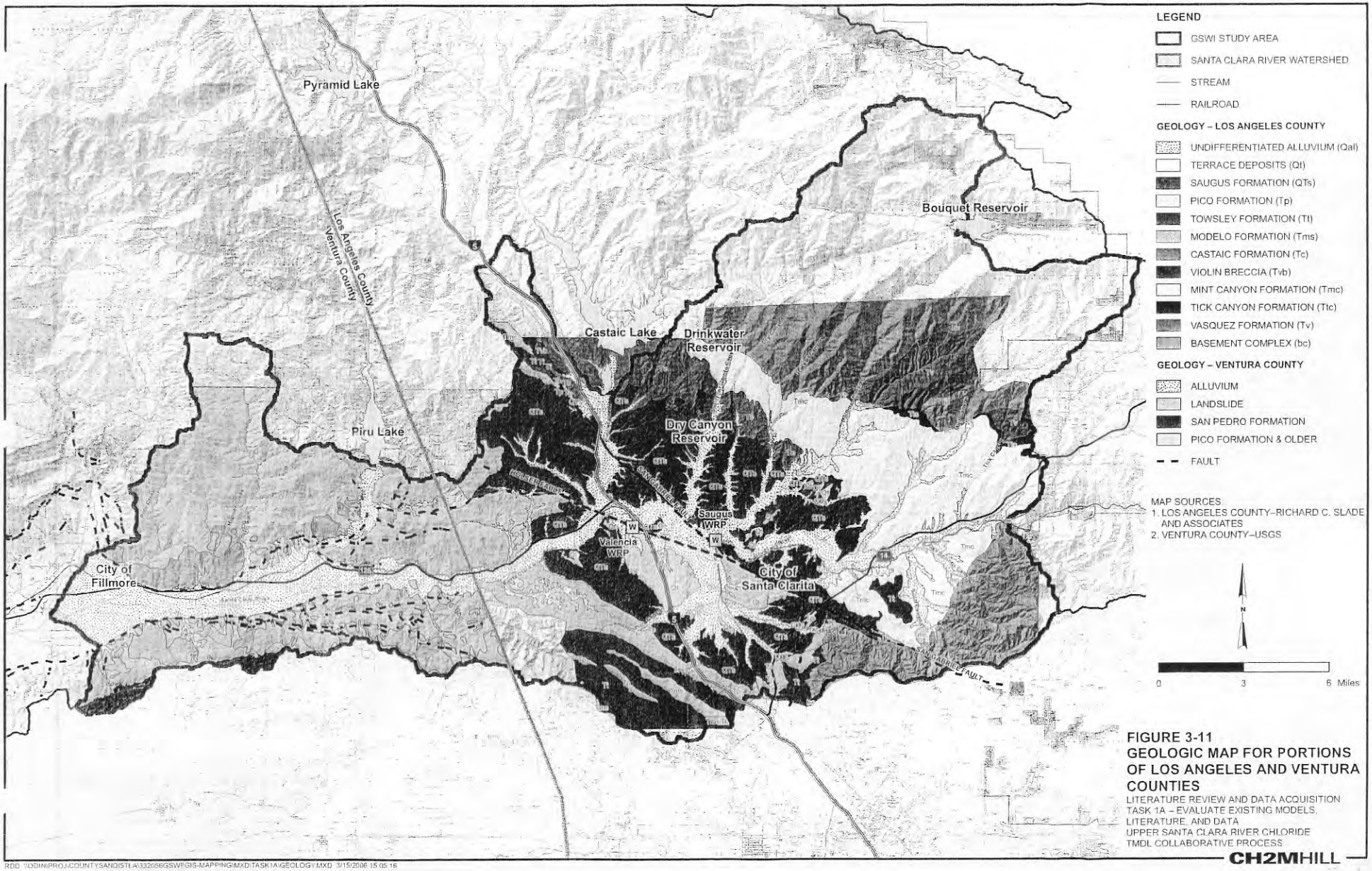


FIGURE 3-11
GEOLOGIC MAP FOR PORTIONS OF LOS ANGELES AND VENTURA COUNTIES
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLEA\332056GSWRGIS-MAPPING\MXD\TASK1A\GEOLOGY.MXD 3/15/2006 15:05:16

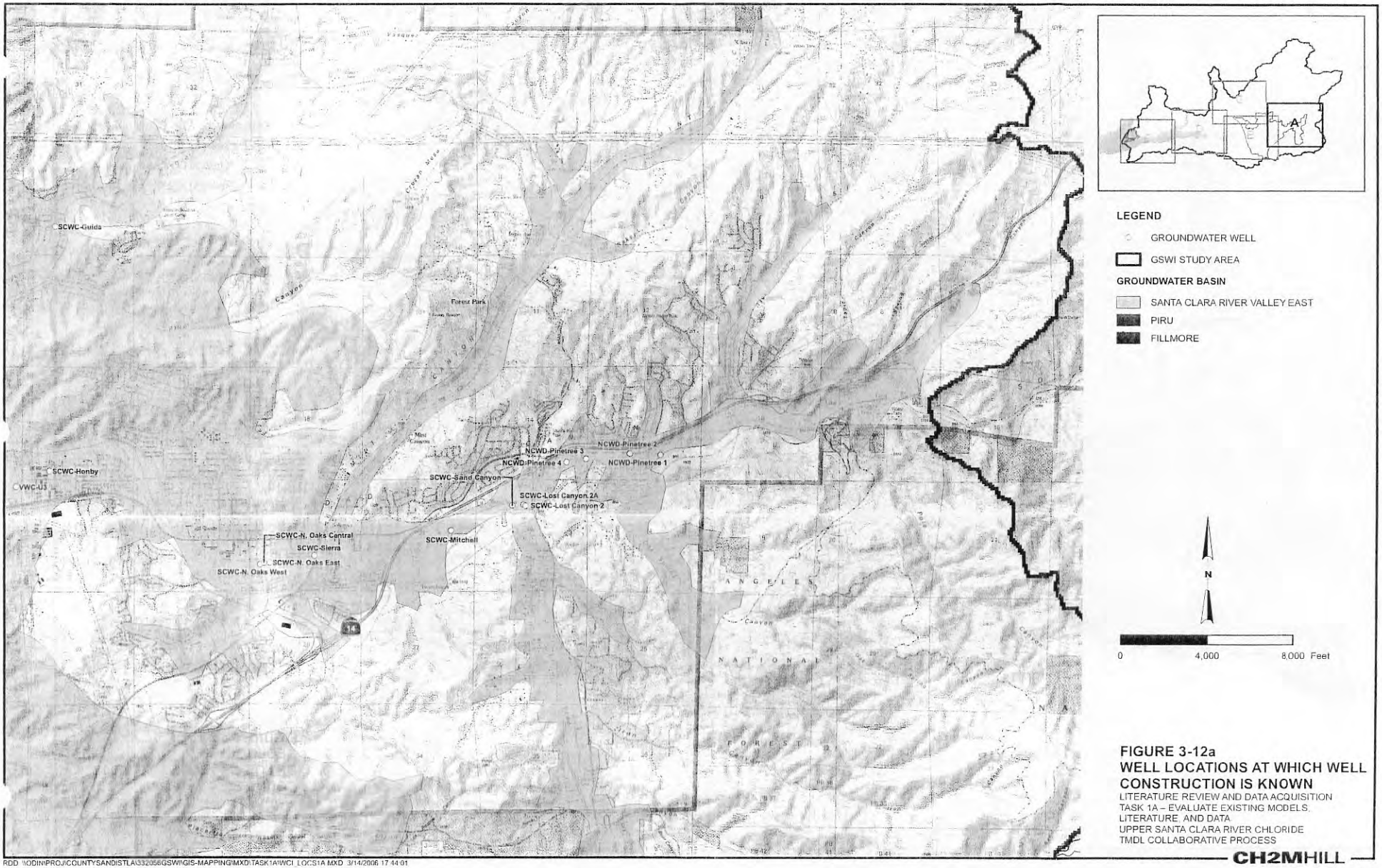


FIGURE 3-12a
WELL LOCATIONS AT WHICH WELL CONSTRUCTION IS KNOWN
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\WCI_LOCS1A.MXD 3/14/2006 17:44:01

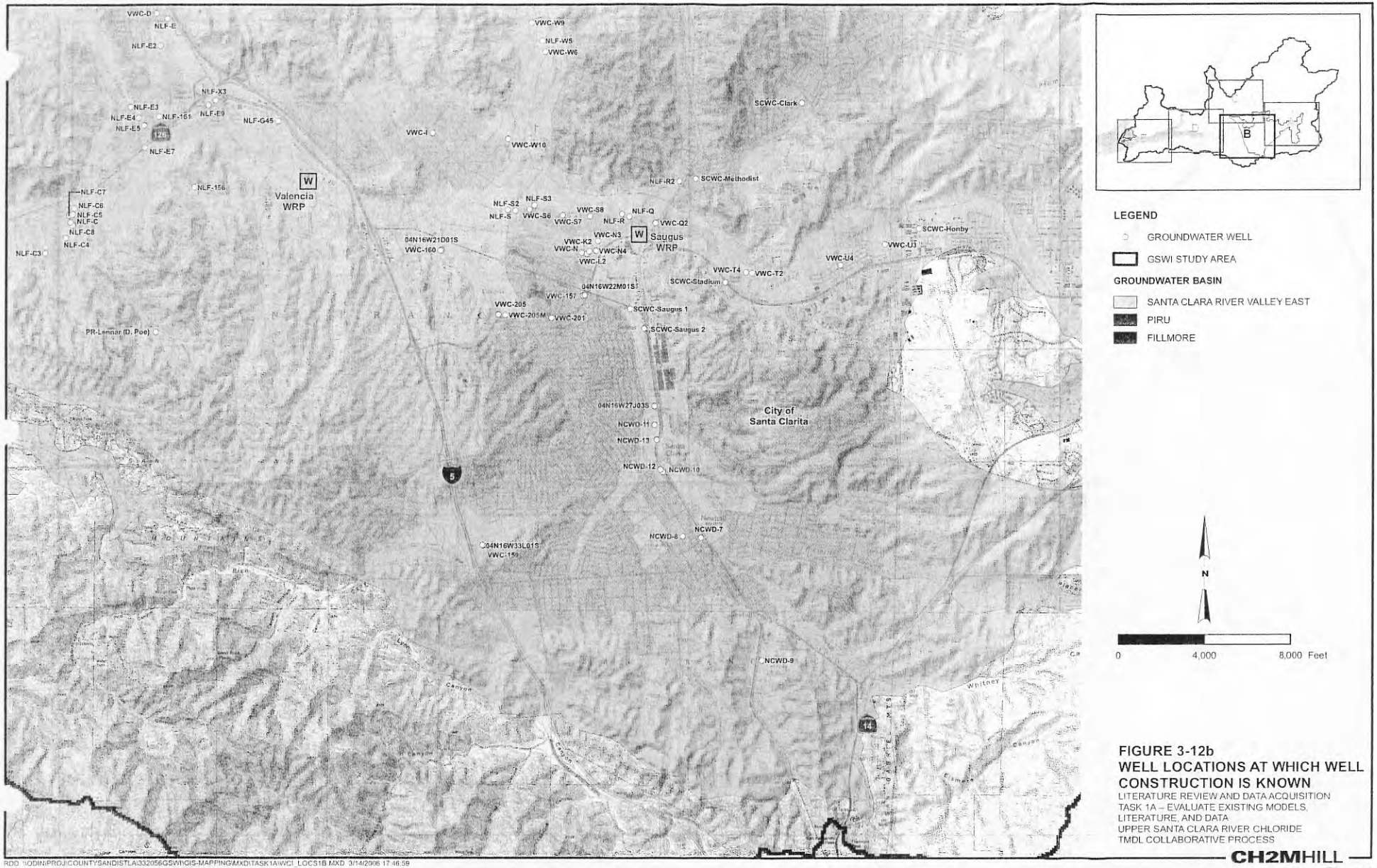


FIGURE 3-12b
WELL LOCATIONS AT WHICH WELL CONSTRUCTION IS KNOWN
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA332056GSWI\GIS-MAPPING\MXD\TASK1A\WCI_LOC51B.MXD 3/14/2006 17:46:59

5-1161

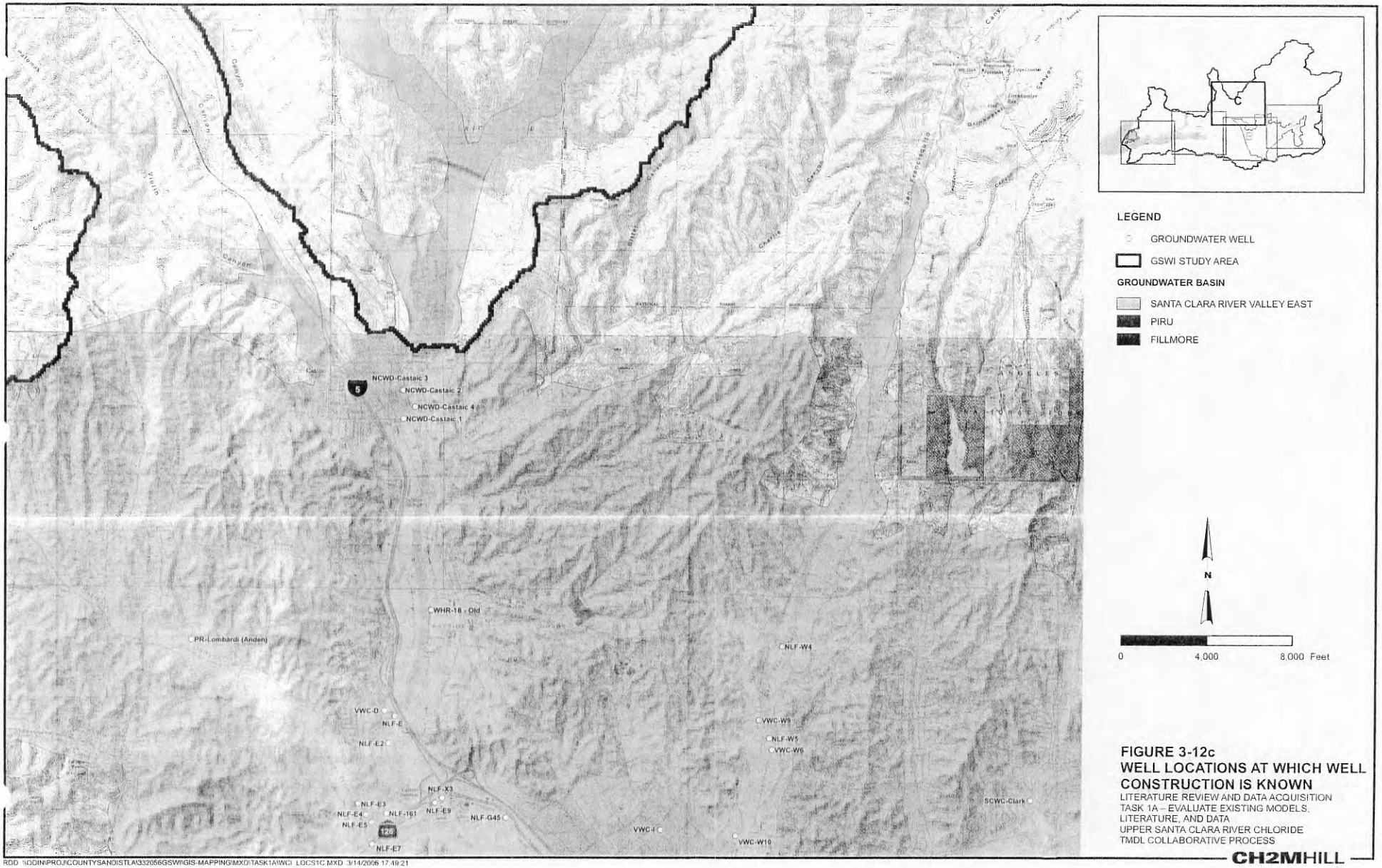


FIGURE 3-12c
WELL LOCATIONS AT WHICH WELL CONSTRUCTION IS KNOWN
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\WCI_LOCS1C.MXD 3/14/2006 17:49:21

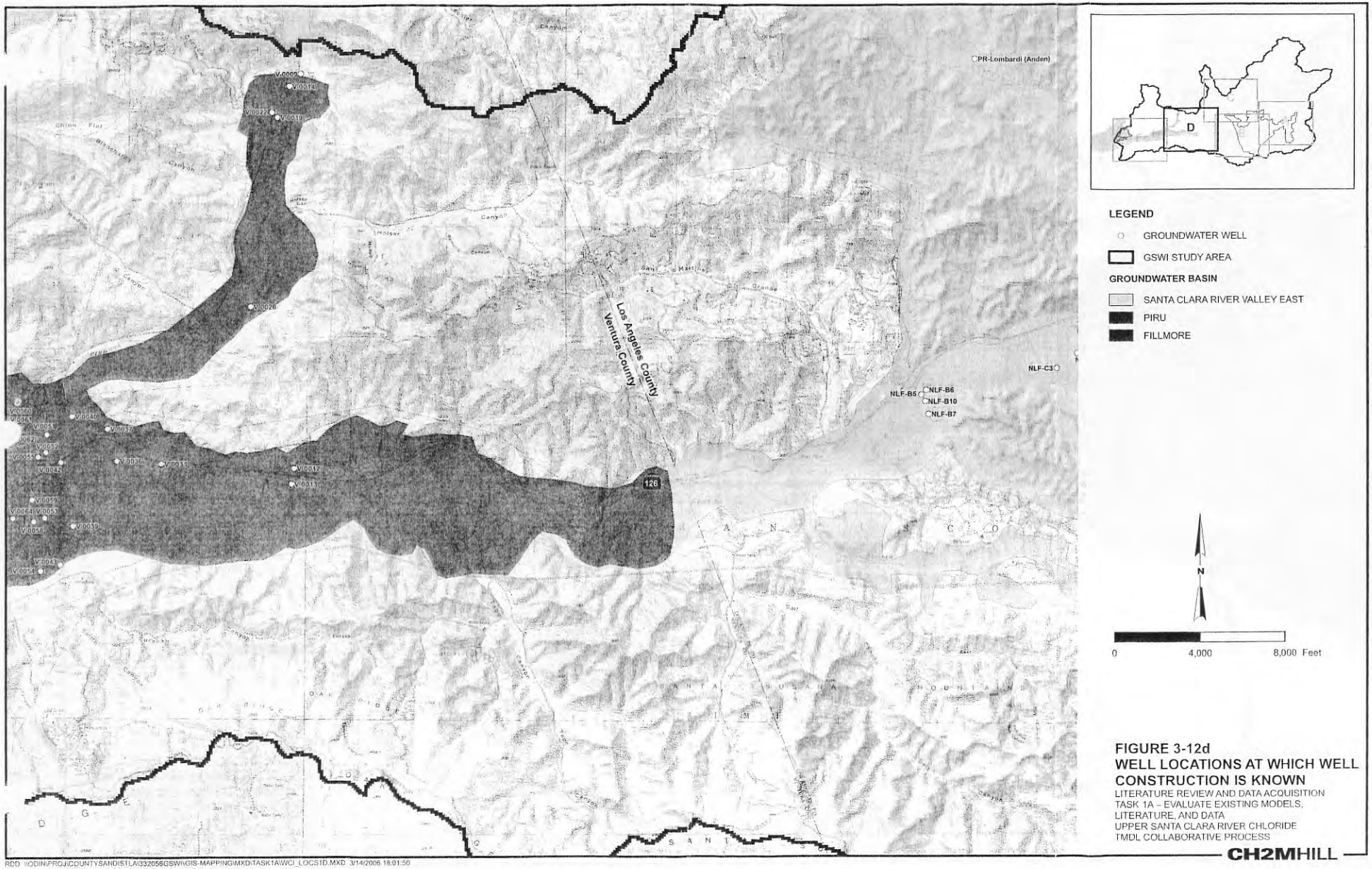


FIGURE 3-12d
WELL LOCATIONS AT WHICH WELL CONSTRUCTION IS KNOWN
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST.LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\WCI_LOCS1D.MXD 3/14/2006 18:01:50

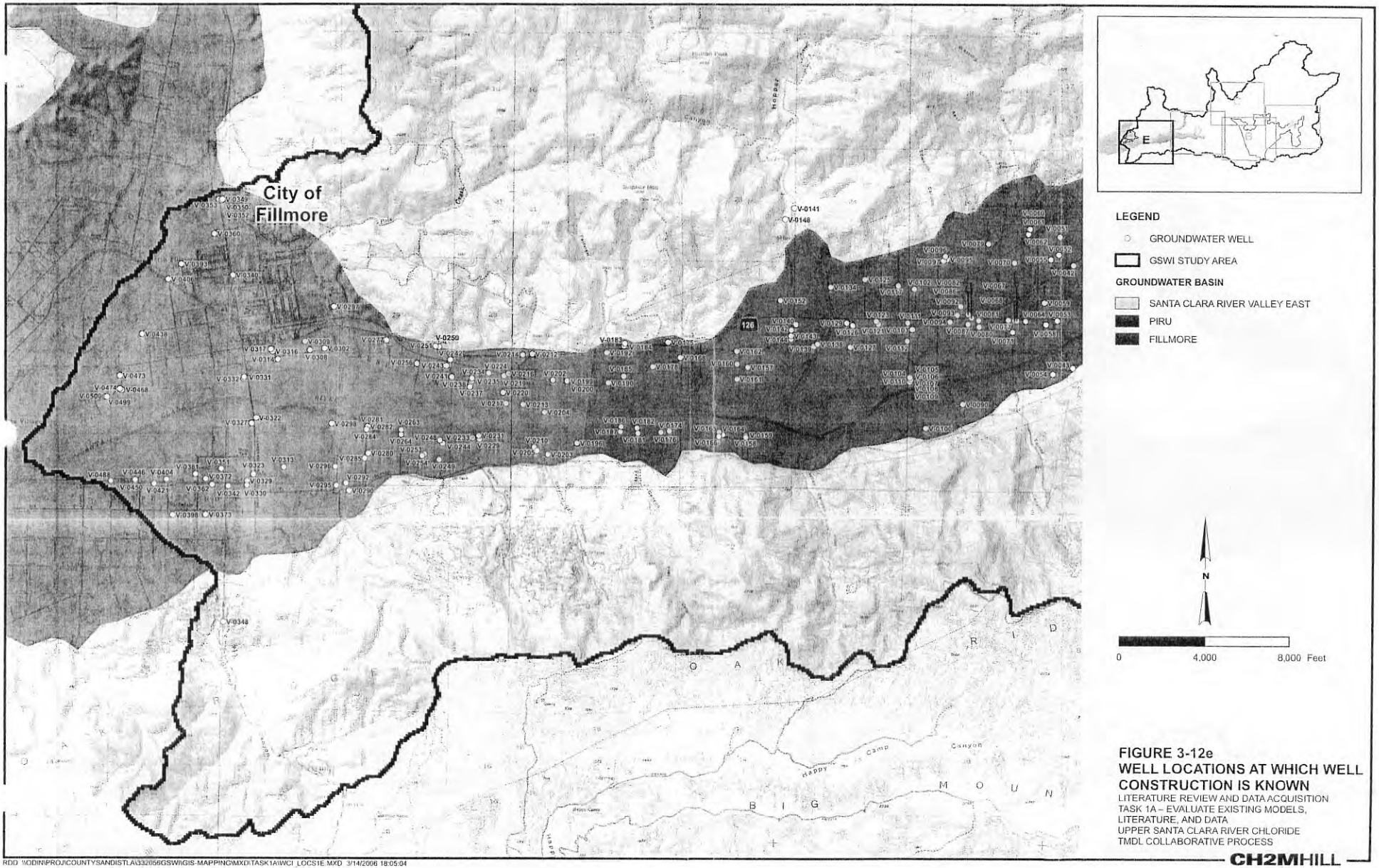


FIGURE 3-12e
WELL LOCATIONS AT WHICH WELL CONSTRUCTION IS KNOWN
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\WCI_LOCS1E.MXD 3/14/2006 18:05:04

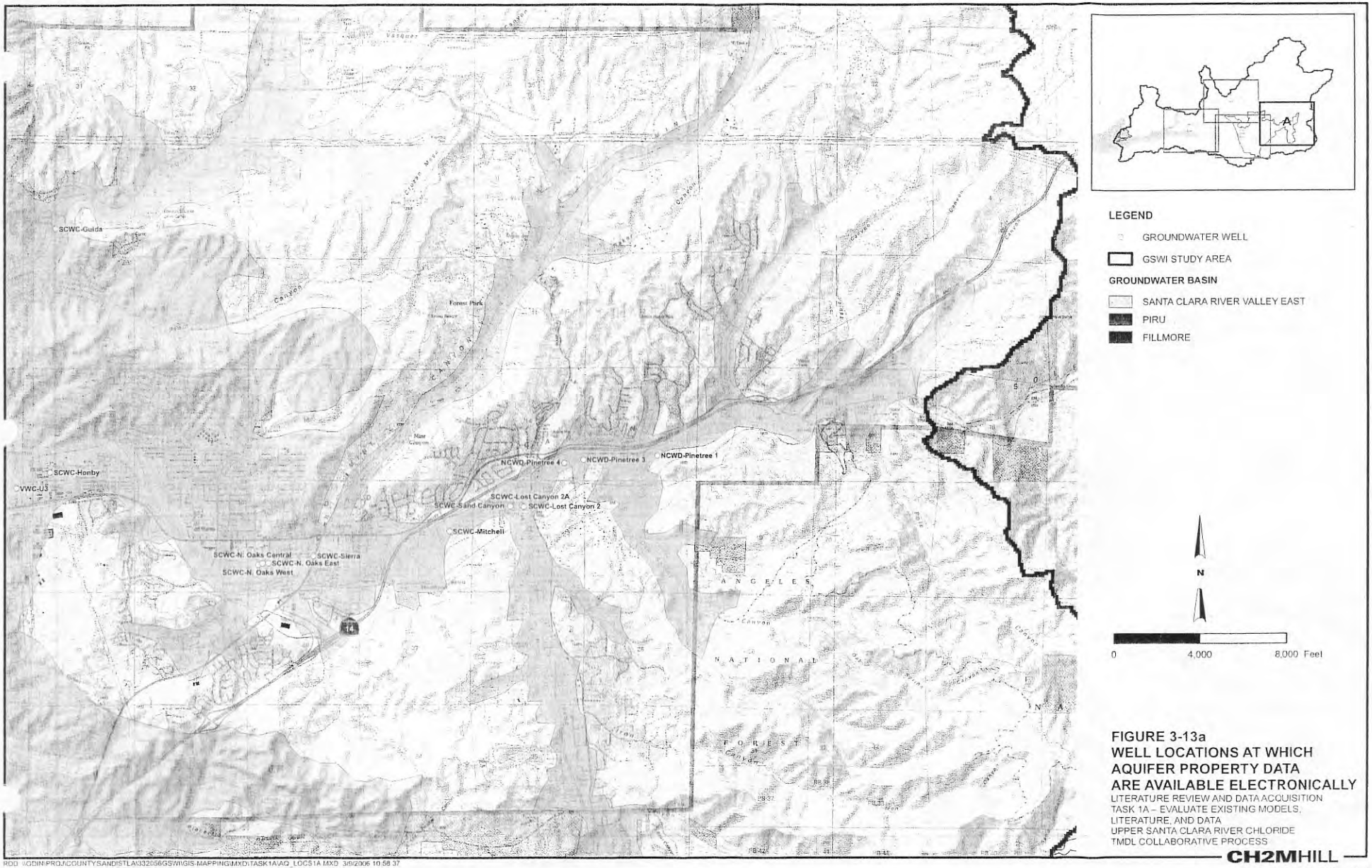


FIGURE 3-13a
WELL LOCATIONS AT WHICH AQUIFER PROPERTY DATA ARE AVAILABLE ELECTRONICALLY
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\AQ_LOCS1A.MXD 3/9/2006 10:58:37

CH2MHILL

S-1155

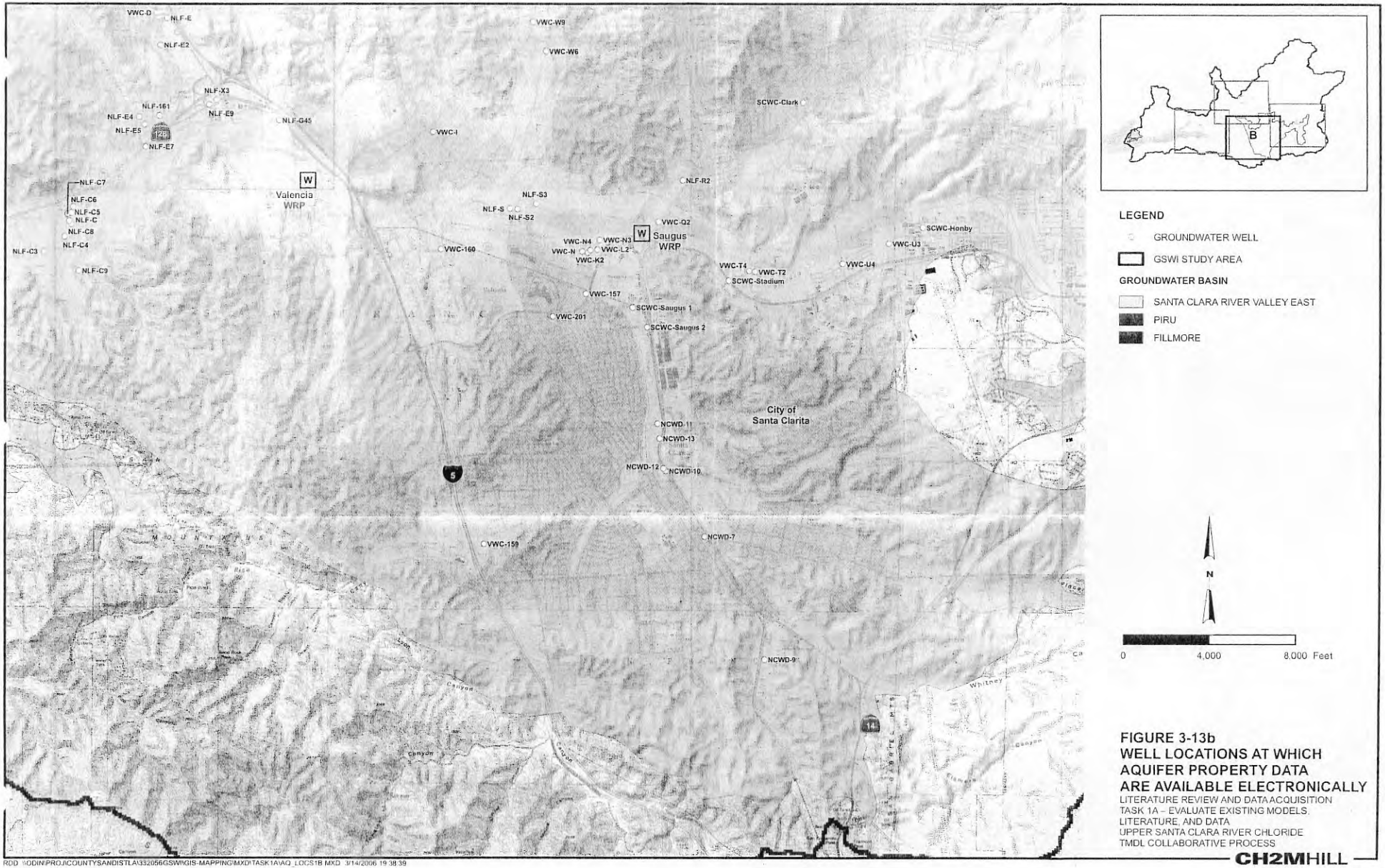
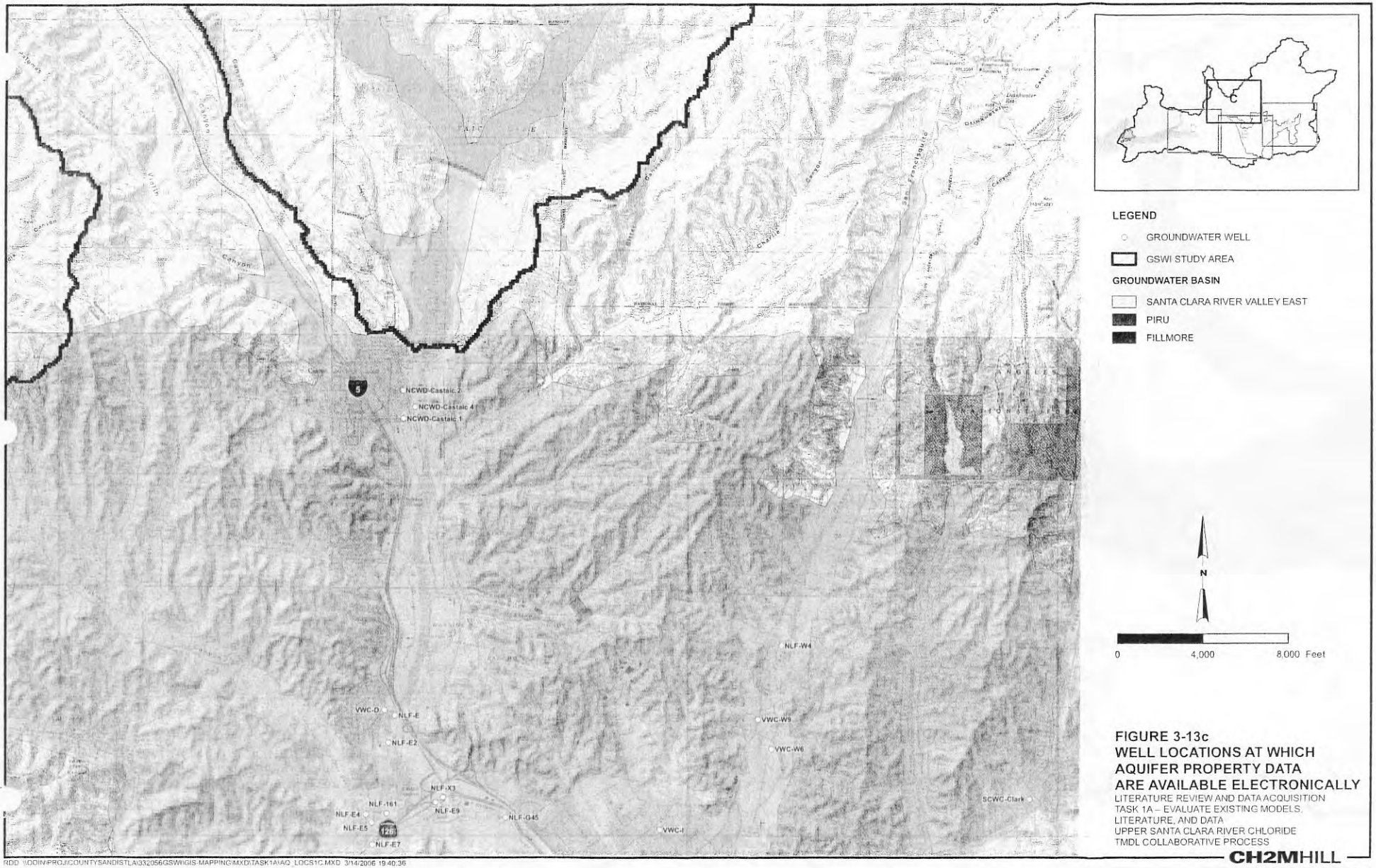


FIGURE 3-13b
WELL LOCATIONS AT WHICH AQUIFER PROPERTY DATA ARE AVAILABLE ELECTRONICALLY
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\GDIN\PROJ\COUNTYSANDISTLA\332056GSW\GIS-MAPPING\MXD\TASK1A\AQ_LOCS1B.MXD 3/14/2006 19:38:39



RDD \\OOIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\AQ_LOCS1C.MXD 3/14/2006 19:40:36

FIGURE 3-13c
WELL LOCATIONS AT WHICH AQUIFER PROPERTY DATA ARE AVAILABLE ELECTRONICALLY
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

5-11E7

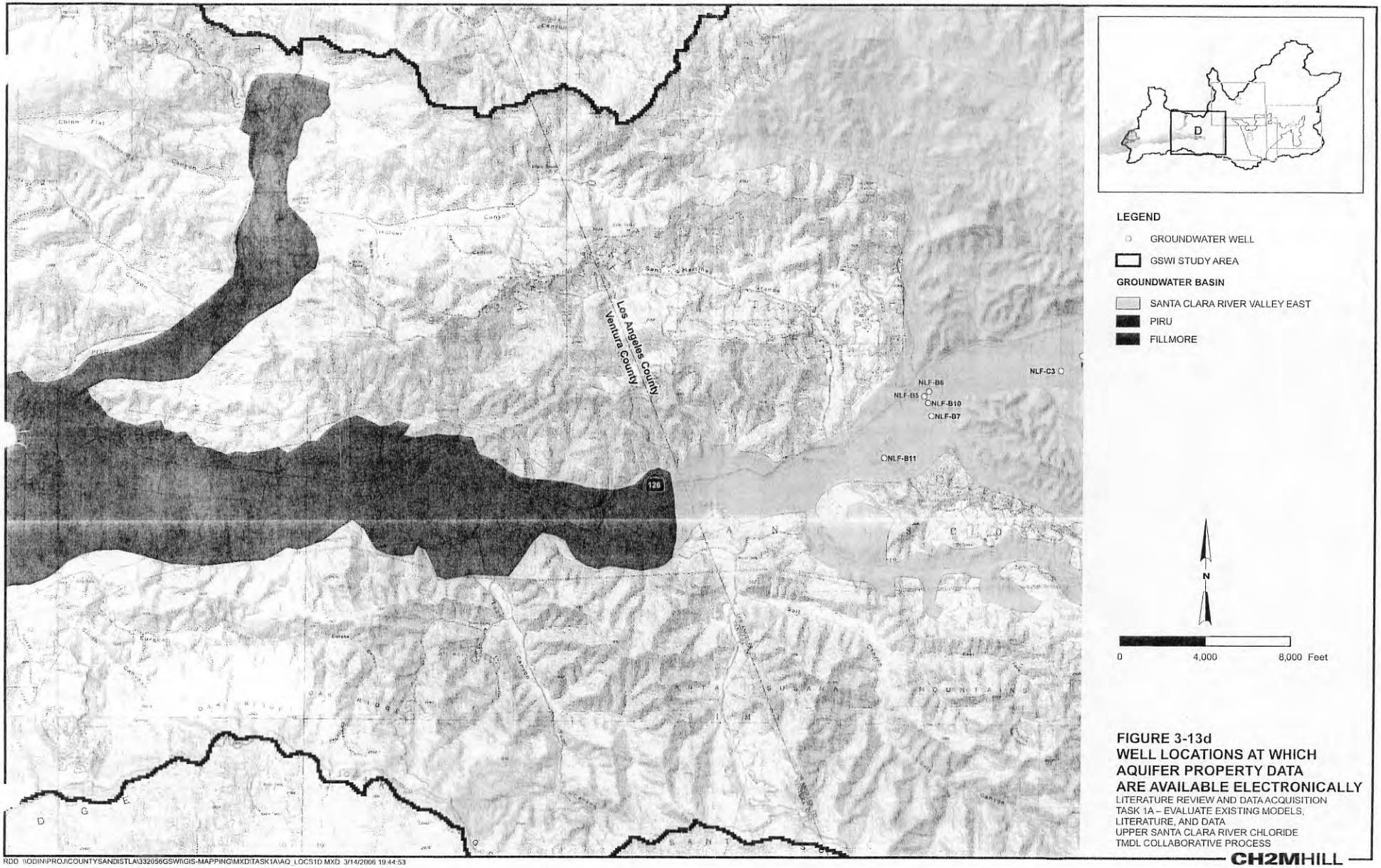


FIGURE 3-13d
WELL LOCATIONS AT WHICH AQUIFER PROPERTY DATA ARE AVAILABLE ELECTRONICALLY
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSW\GIS-MAPPING\MXD\TASK1A\AQ_LOCS1D.MXD 3/14/2006 19:44:53

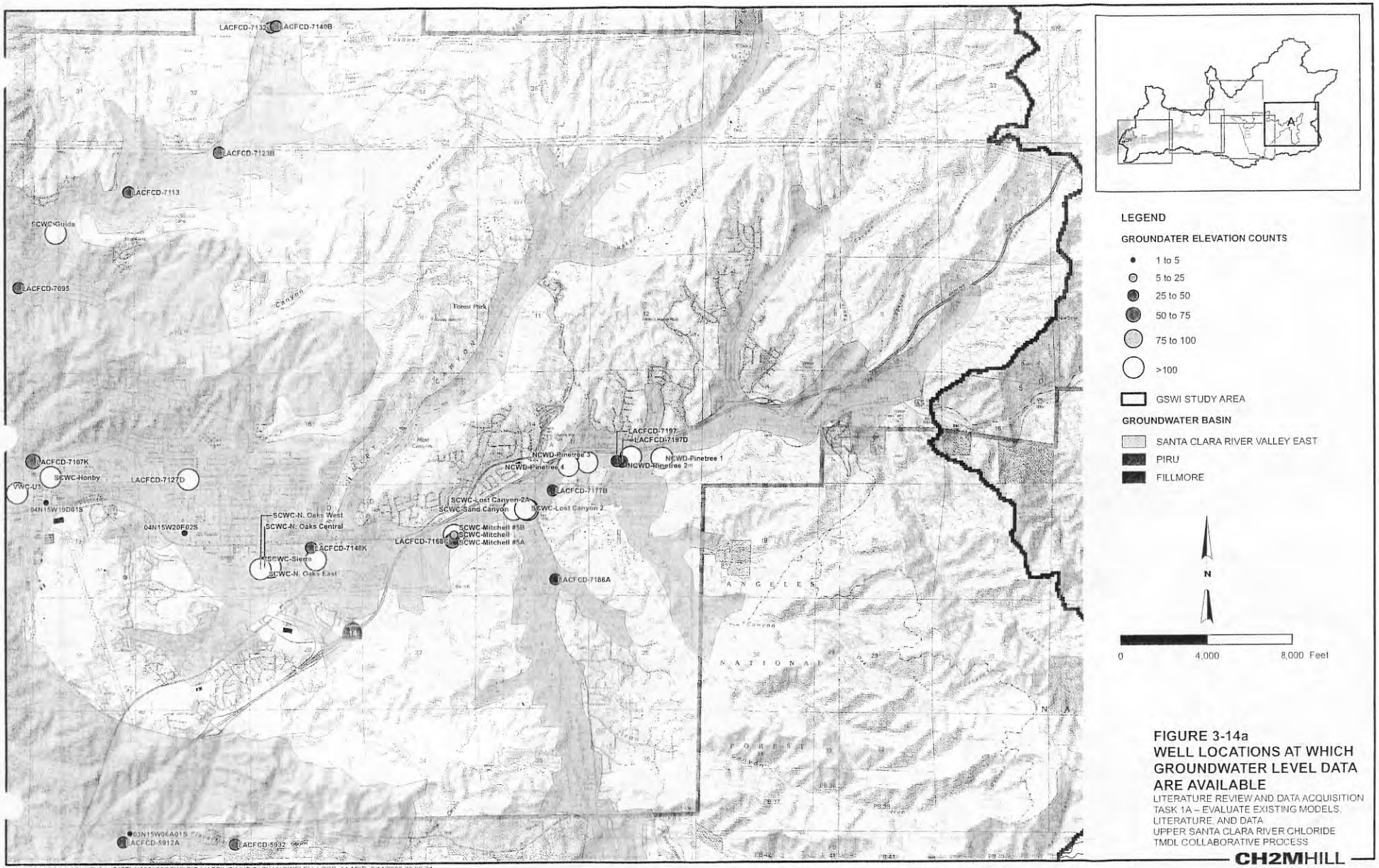
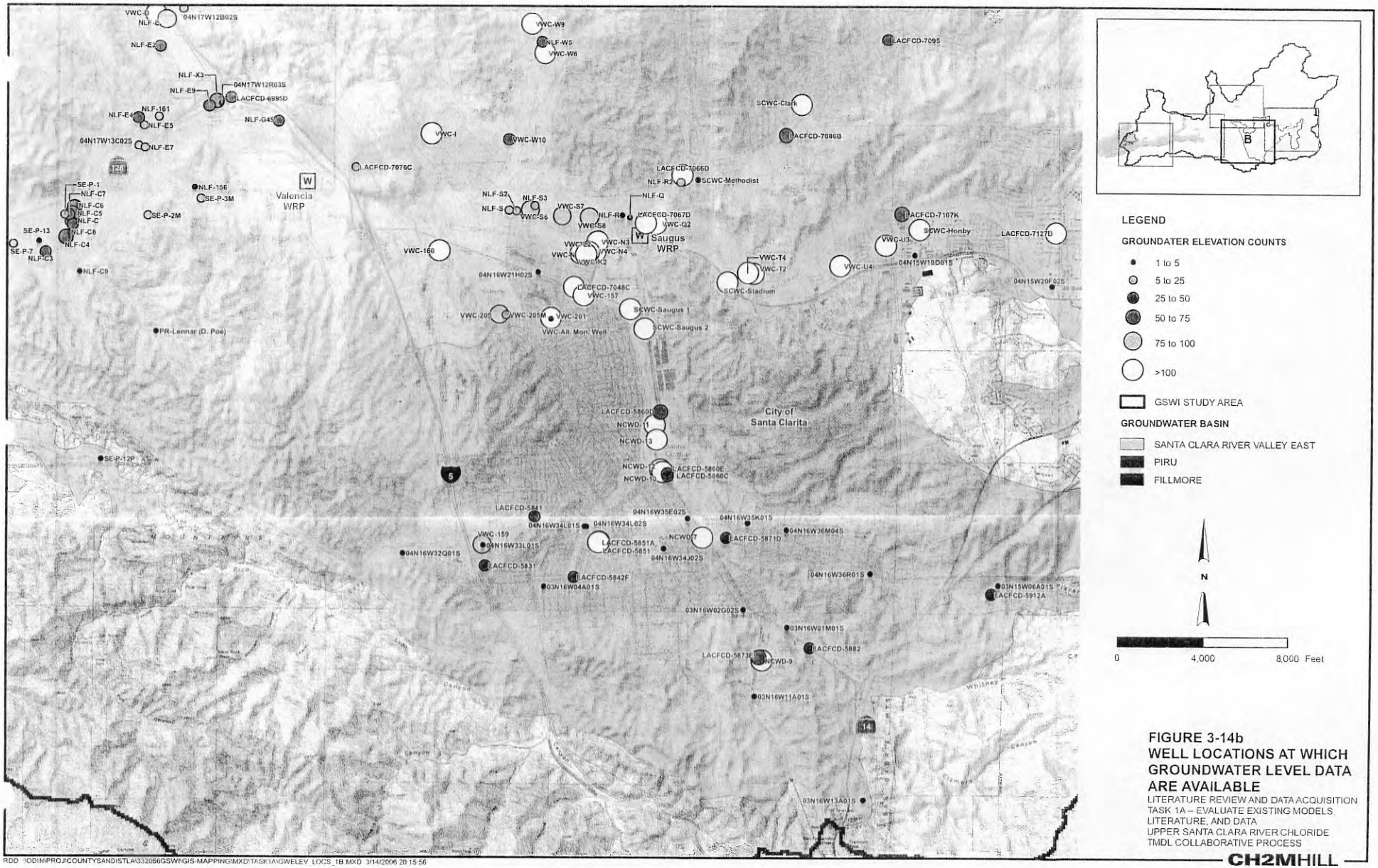


FIGURE 3-14a
WELL LOCATIONS AT WHICH GROUNDWATER LEVEL DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\GWELEV_LOCS_1A.MXD 3/14/2006 20:08:34

5-1163



RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWRGIS-MAPPING\MXD\TASK1A\GWELEV_LOCS_1B.MXD 3/14/2006 20:15:56

FIGURE 3-14b
WELL LOCATIONS AT WHICH GROUNDWATER LEVEL DATA ARE AVAILABLE

LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

5-1170

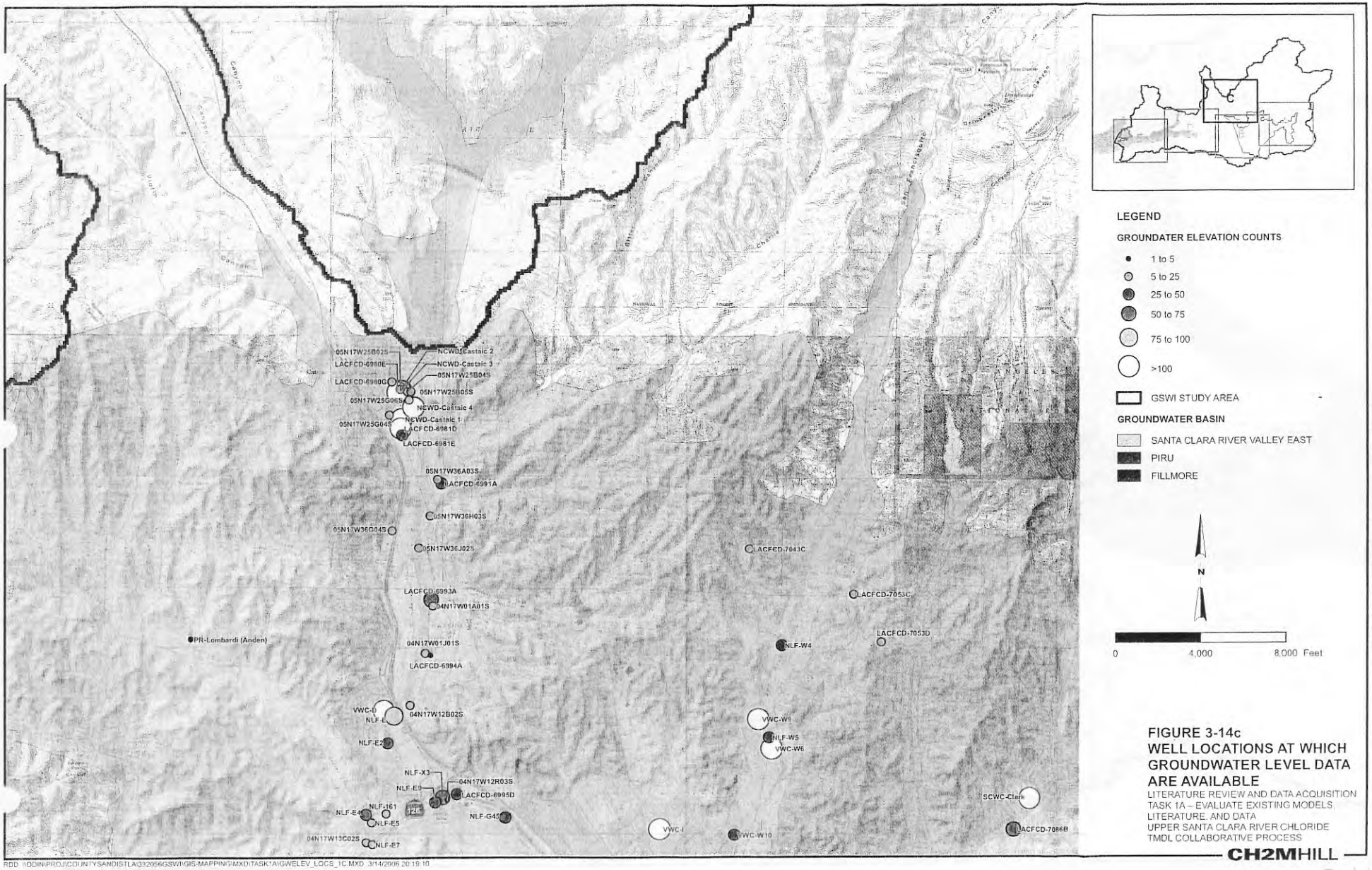


FIGURE 3-14c
WELL LOCATIONS AT WHICH GROUNDWATER LEVEL DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\GWELEV_LOCS_1C.MXD 3/14/2006 20:19:16

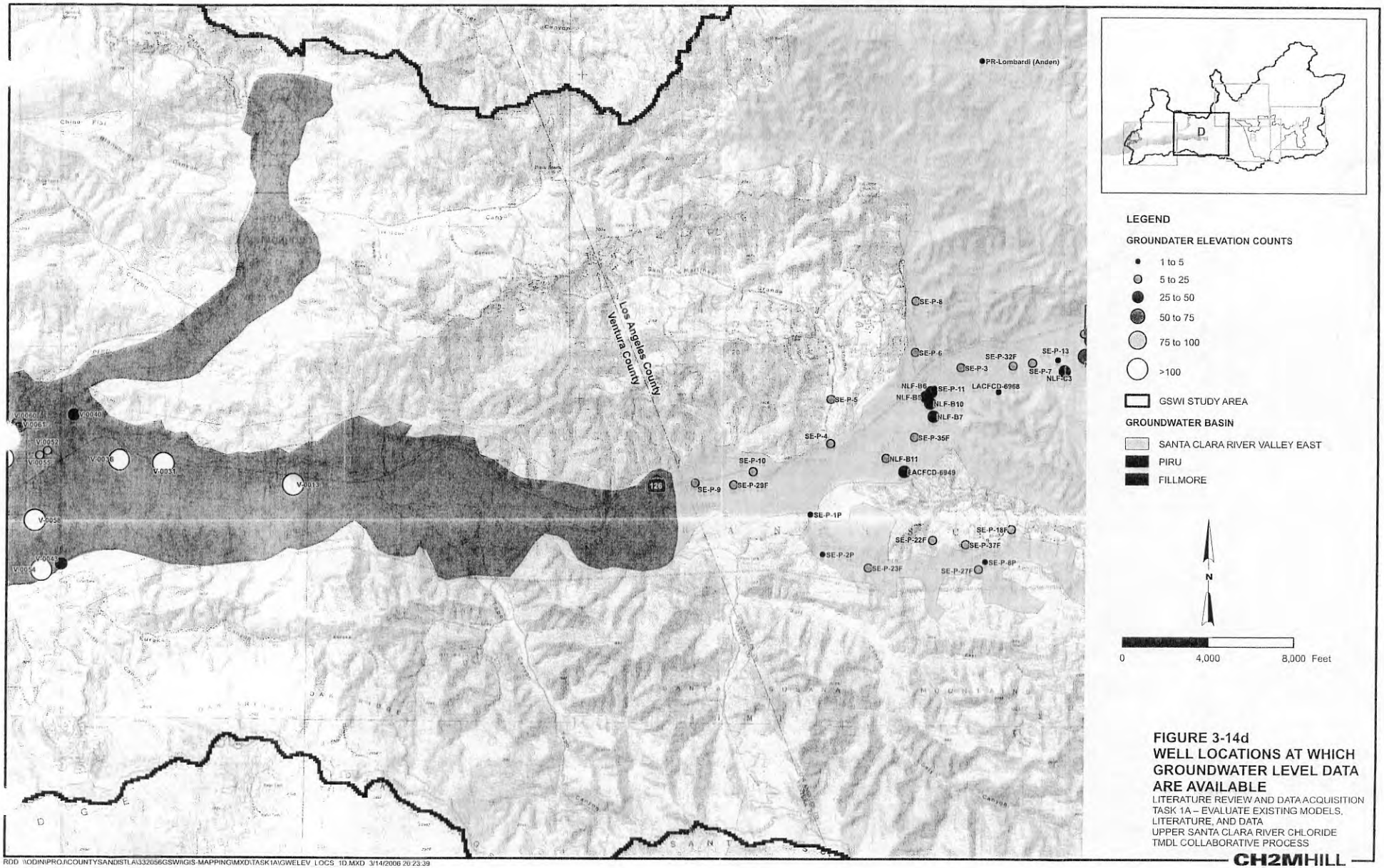


FIGURE 3-14d
WELL LOCATIONS AT WHICH GROUNDWATER LEVEL DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\GWELEV_LOCS_1D.MXD 3/14/2006 20:23:39

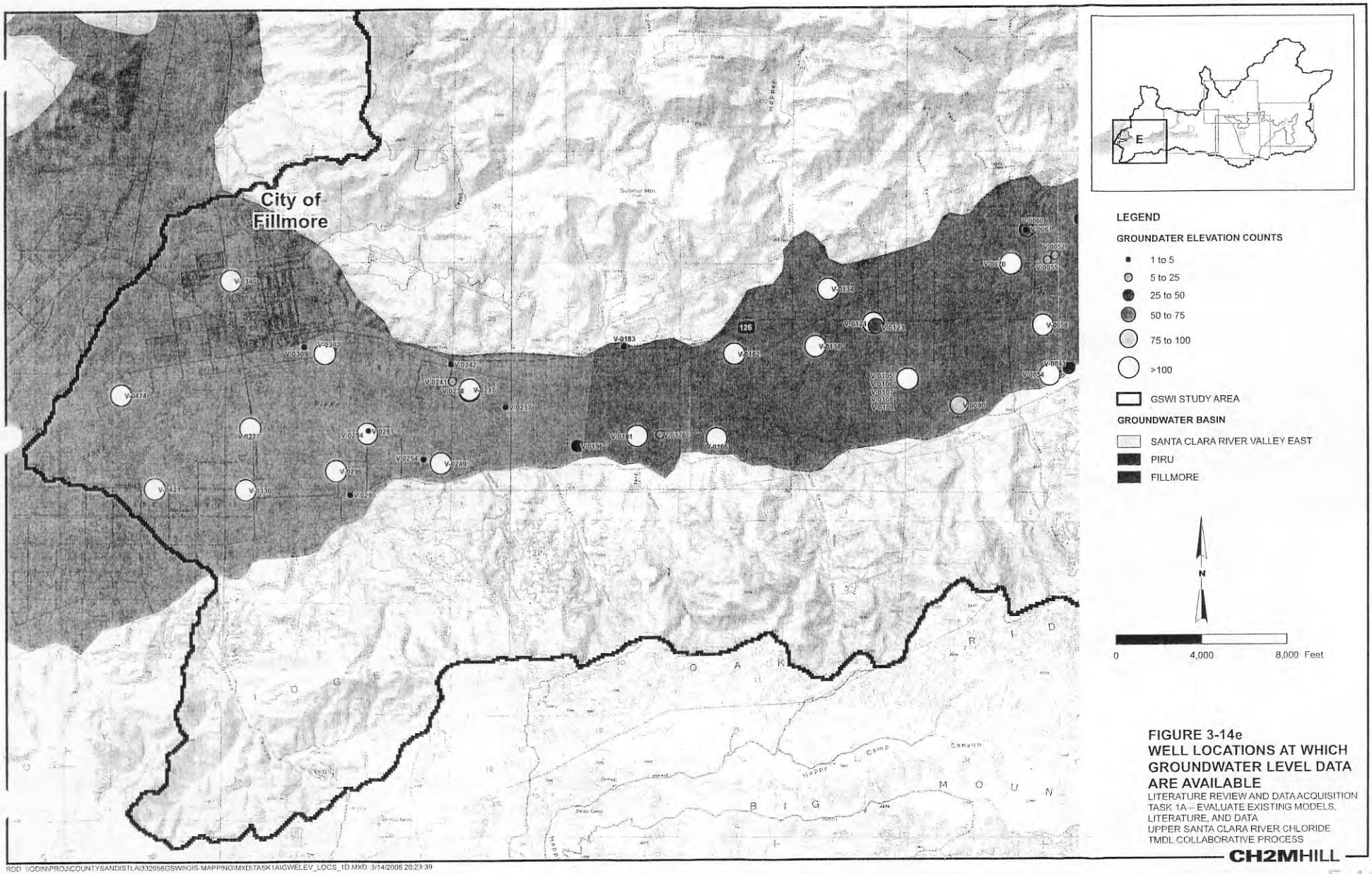


FIGURE 3-14e
WELL LOCATIONS AT WHICH GROUNDWATER LEVEL DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODINPROJ\COUNTYSANDISTLA\332056GSWIGIS-MAPPING\MXD\TASK1A\GWELEV_LOCS_1D.MXD 3/14/2006 20:23:39

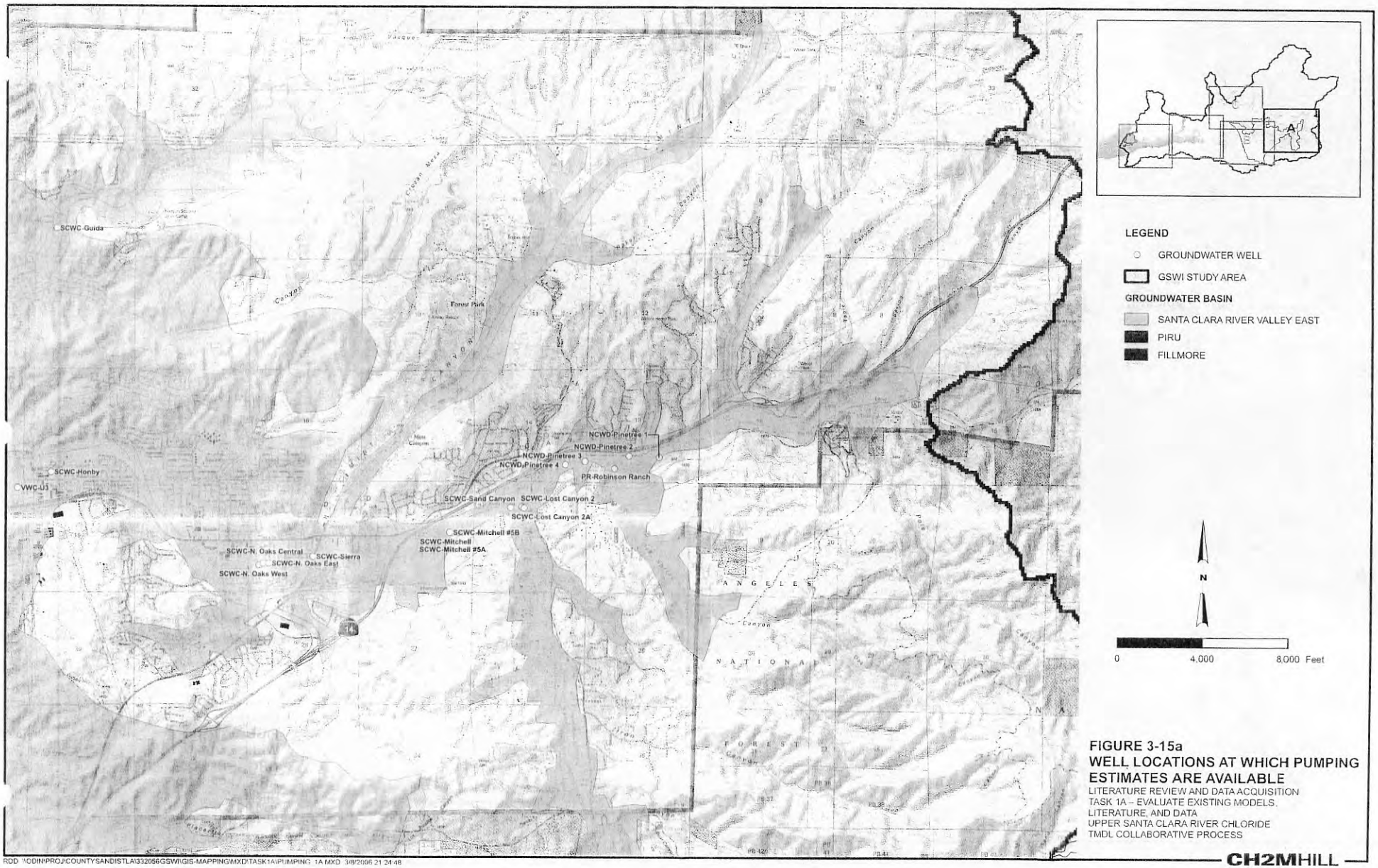


FIGURE 3-15a
WELL LOCATIONS AT WHICH PUMPING ESTIMATES ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\PUMPING_1A.MXD 3/8/2006 21:24:48

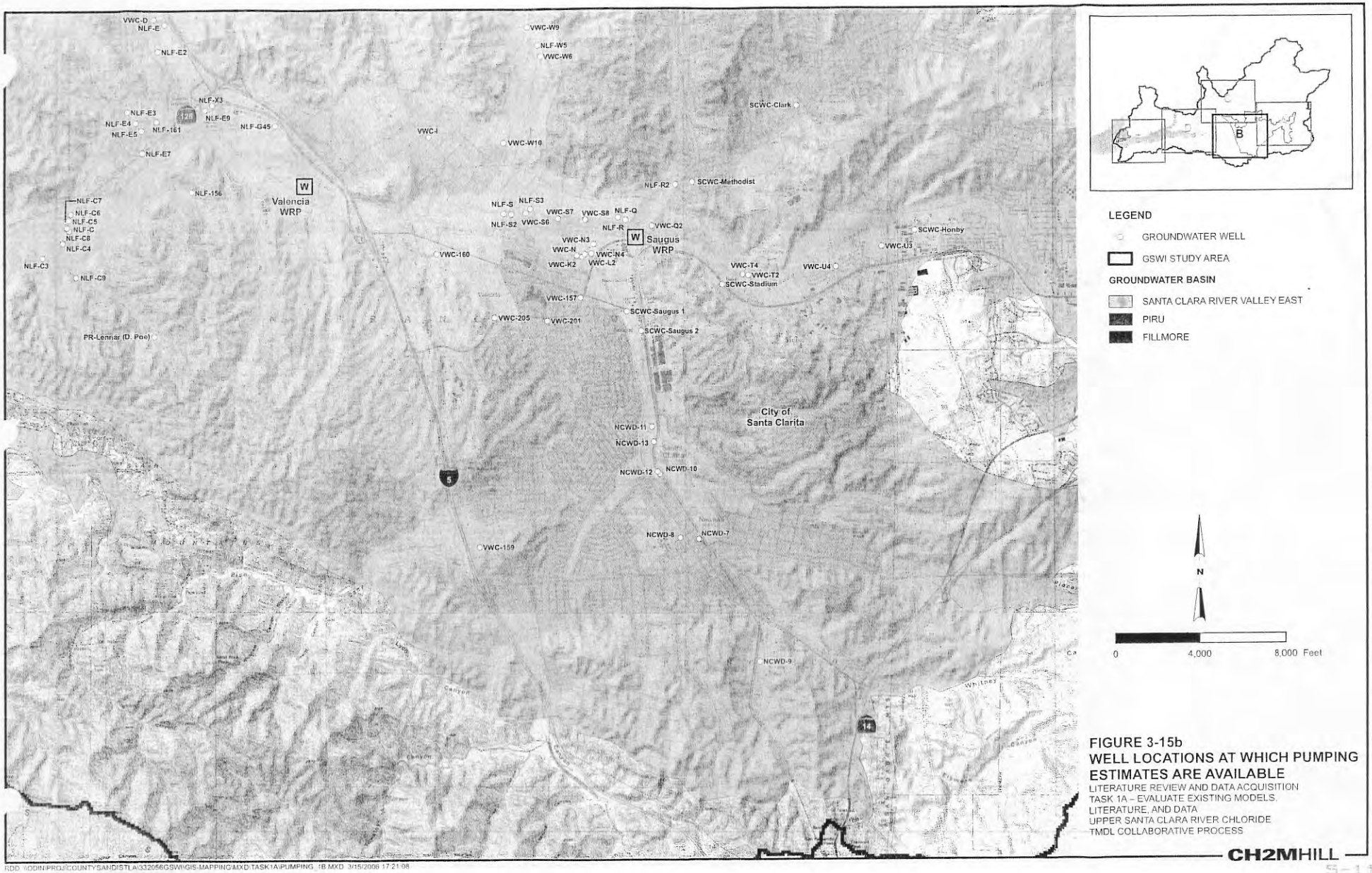


FIGURE 3-15b
WELL LOCATIONS AT WHICH PUMPING ESTIMATES ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\PUMPING_1B.MXD 3/15/2006 17:21:08

5-1175

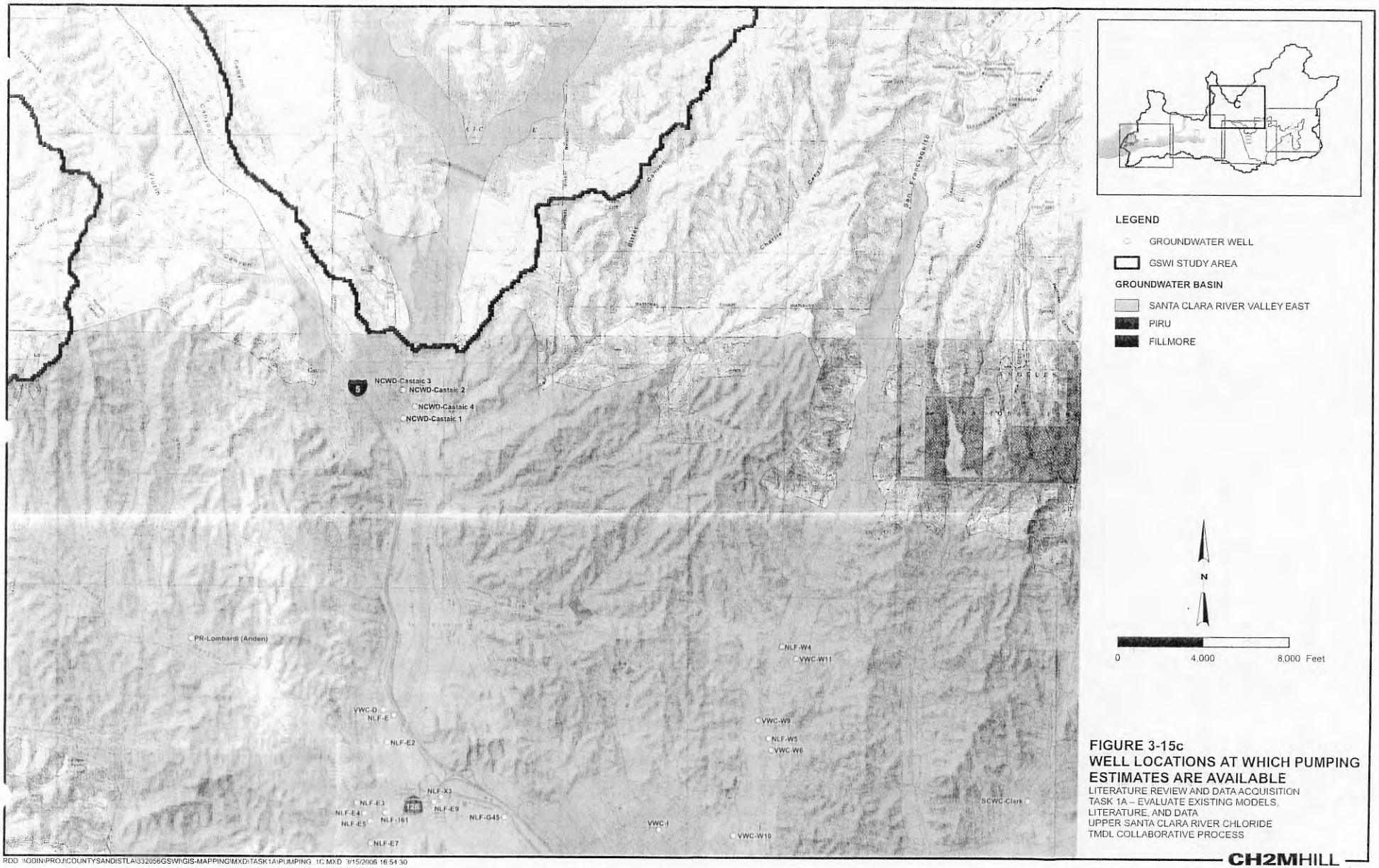


FIGURE 3-15c
WELL LOCATIONS AT WHICH PUMPING ESTIMATES ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\PUMPING_1C.MXD 3/15/2006 16:54:30

5-1176

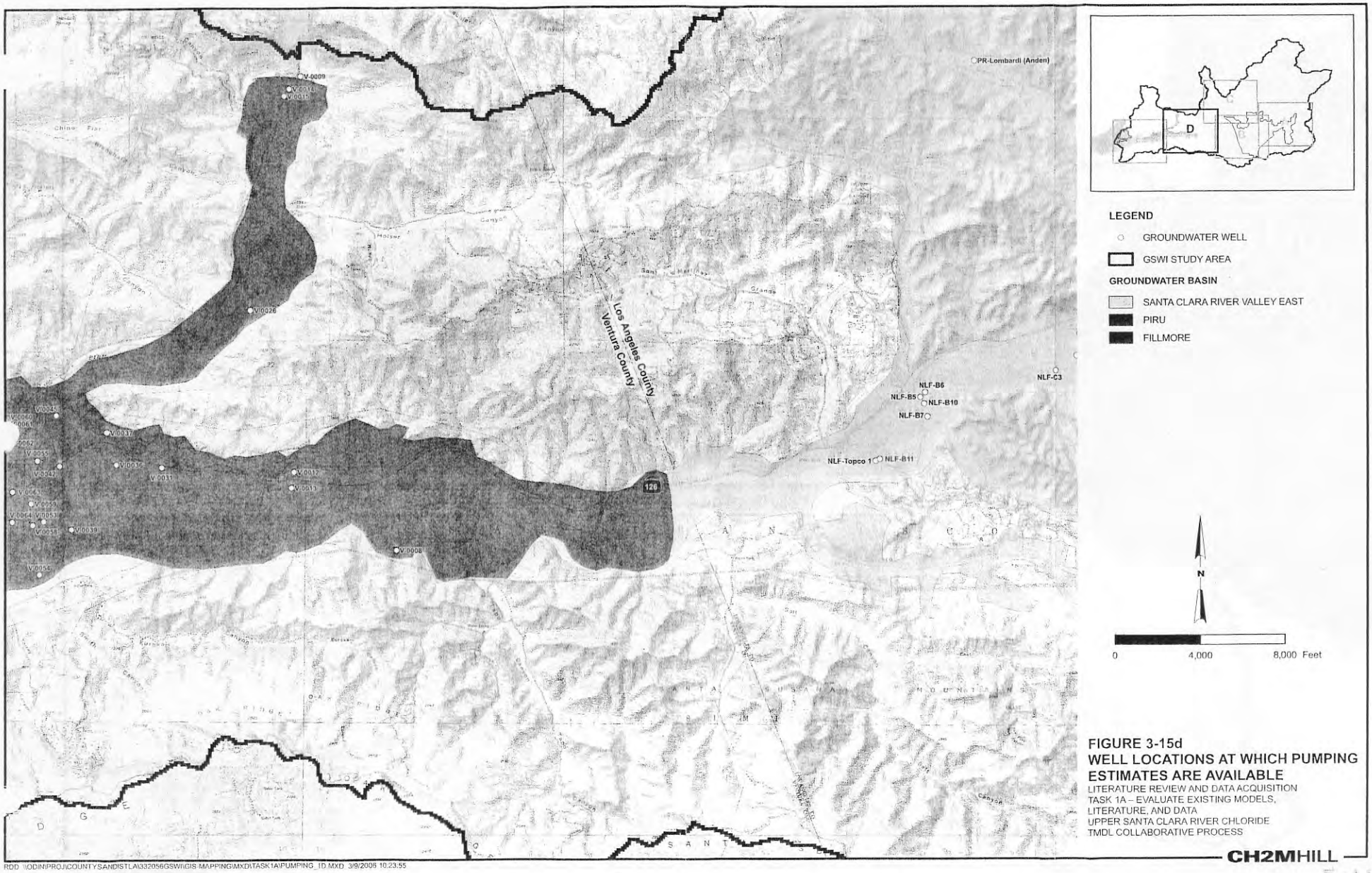


FIGURE 3-15d
WELL LOCATIONS AT WHICH PUMPING ESTIMATES ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODINPROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\PUMPING_1D.MXD 3/9/2006 10:23:55

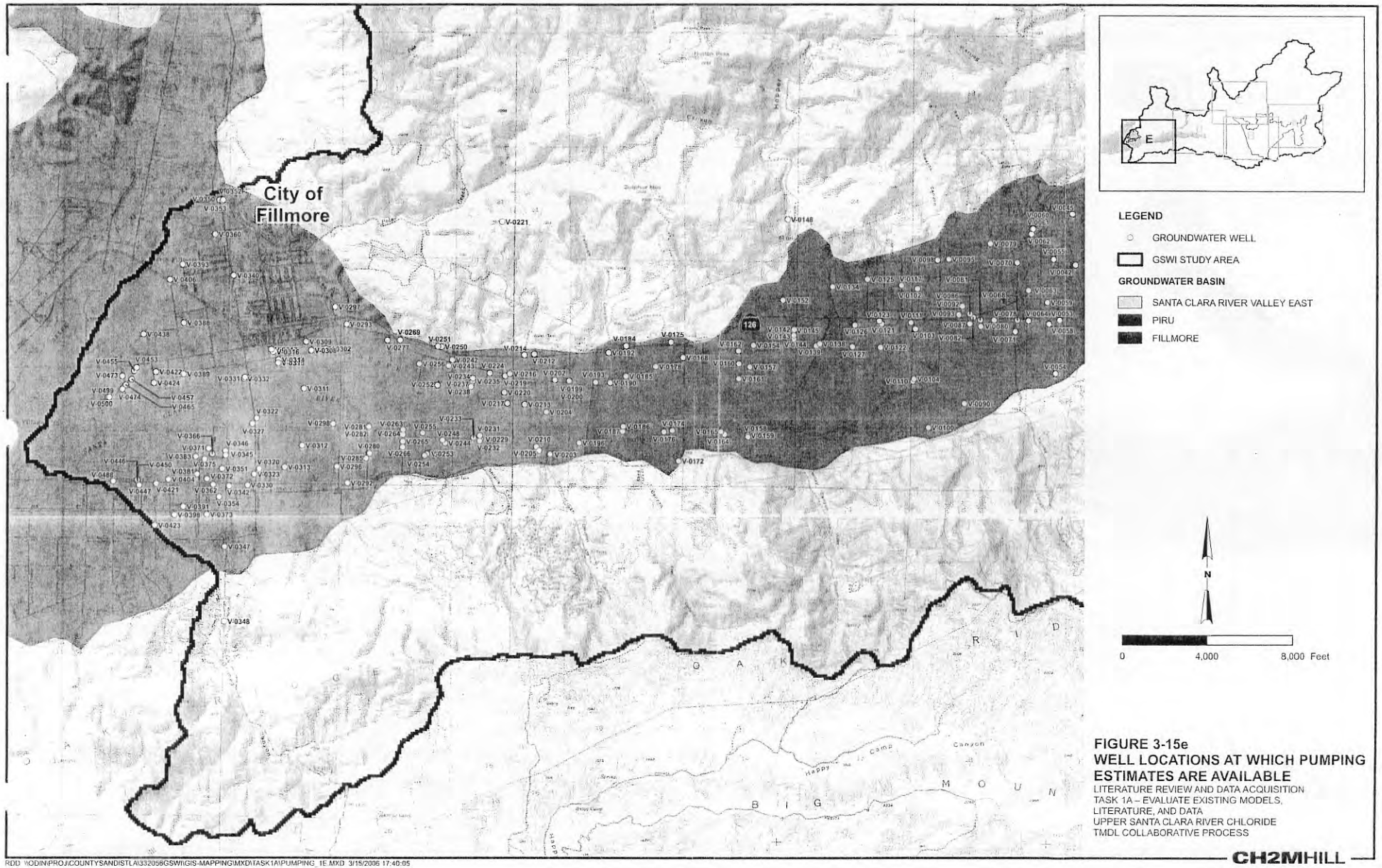


FIGURE 3-15e
WELL LOCATIONS AT WHICH PUMPING ESTIMATES ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\PUMPING_1E.MXD 3/15/2006 17:40:05

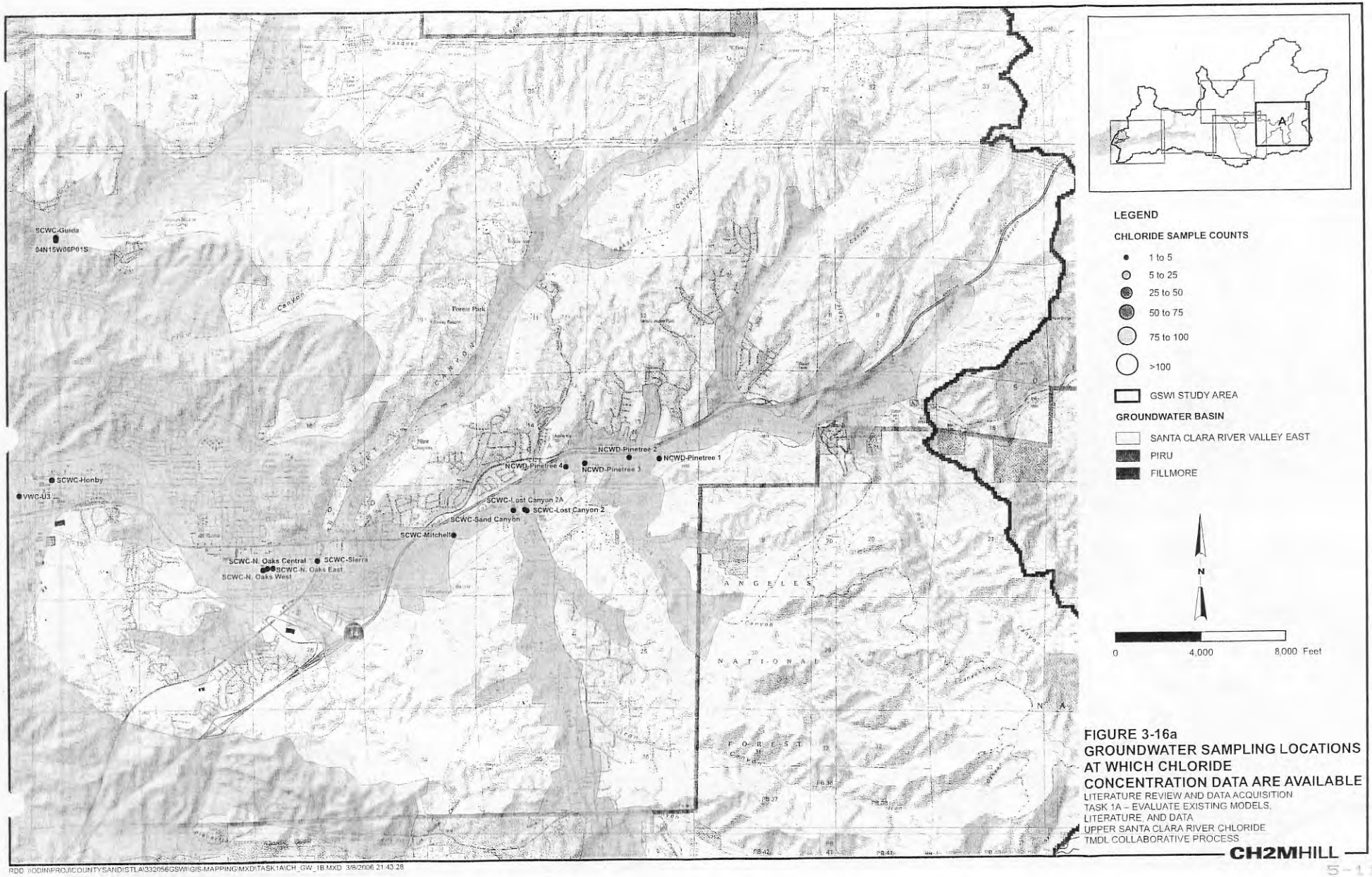
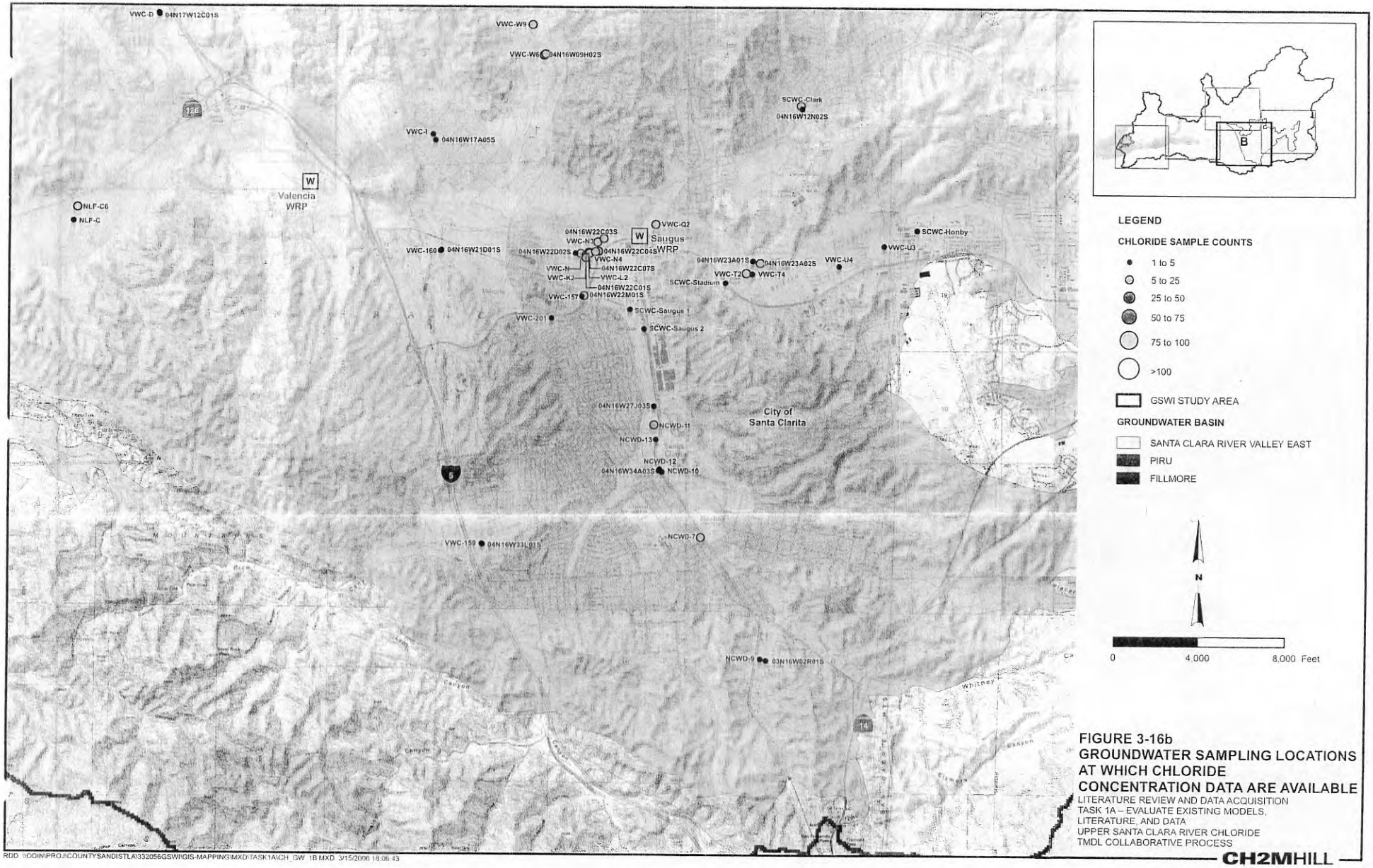


FIGURE 3-16a
GROUNDWATER SAMPLING LOCATIONS AT WHICH CHLORIDE CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\CH_GW_1B.MXD 3/8/2006 21:43:28



RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\CH_GW_1B.MXD 3/15/2006 18:06:43

FIGURE 3-16b
GROUNDWATER SAMPLING LOCATIONS AT WHICH CHLORIDE CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

5-1180

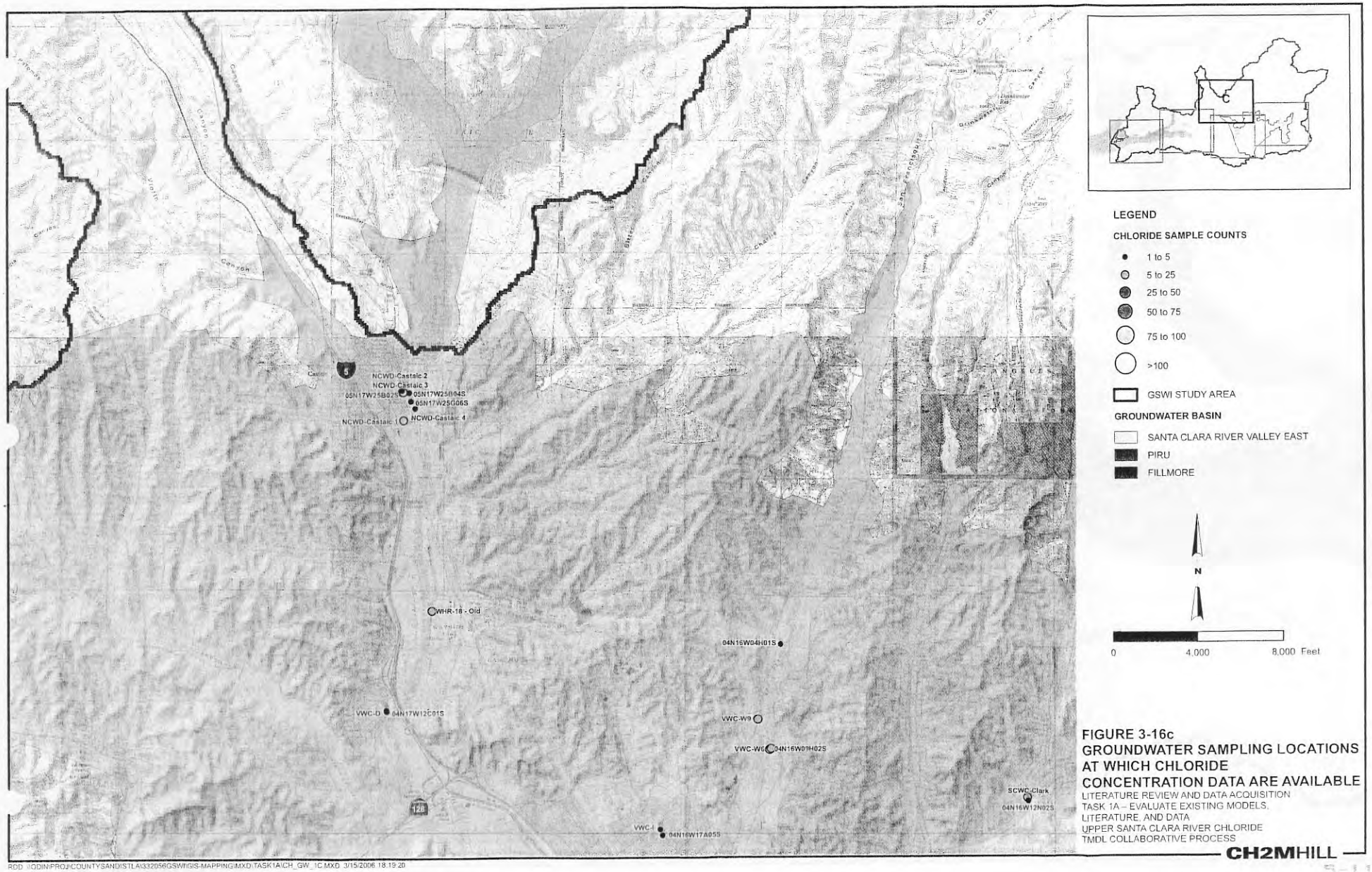


FIGURE 3-16c
GROUNDWATER SAMPLING LOCATIONS AT WHICH CHLORIDE CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSAND\STLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\CH_GW_1C.MXD 3/15/2006 18:19:20

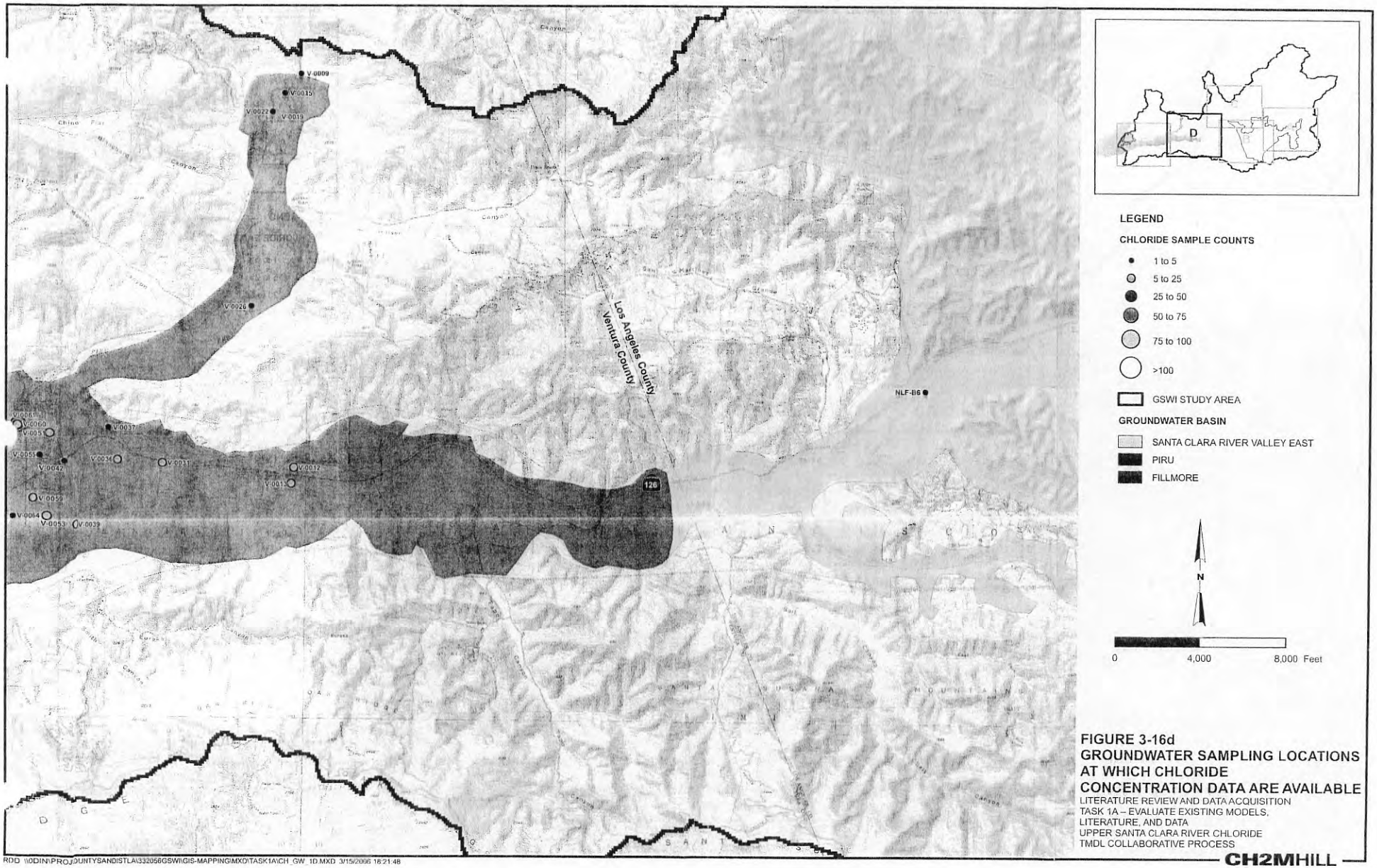


FIGURE 3-16d
GROUNDWATER SAMPLING LOCATIONS AT WHICH CHLORIDE CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\CH_GW_1D.MXD 3/15/2006 16:21:48

5-1182

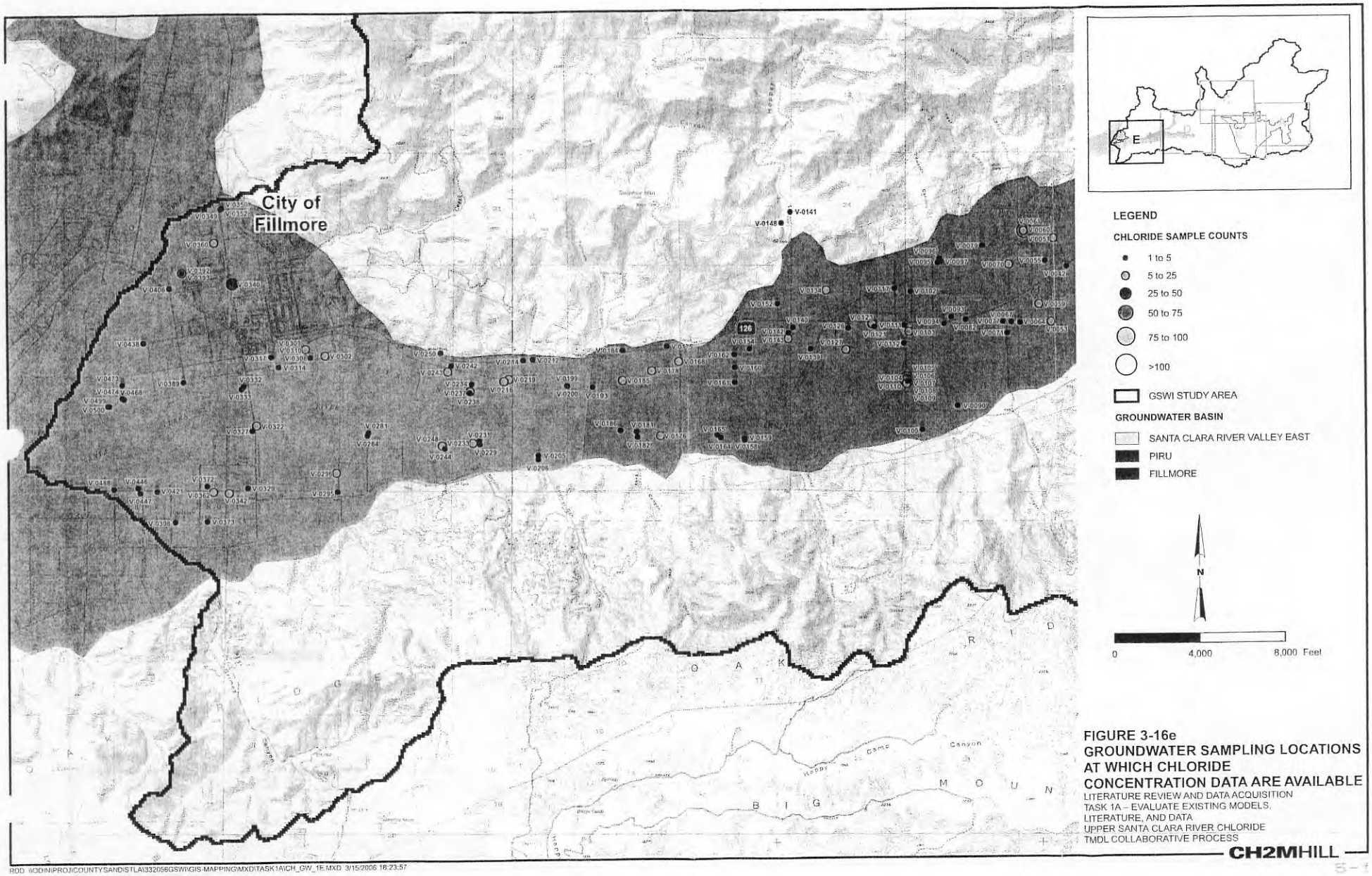


FIGURE 3-16e
GROUNDWATER SAMPLING LOCATIONS AT WHICH CHLORIDE CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODINPROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\CH_GW_1E.MXD 3/15/2006 18:23:57

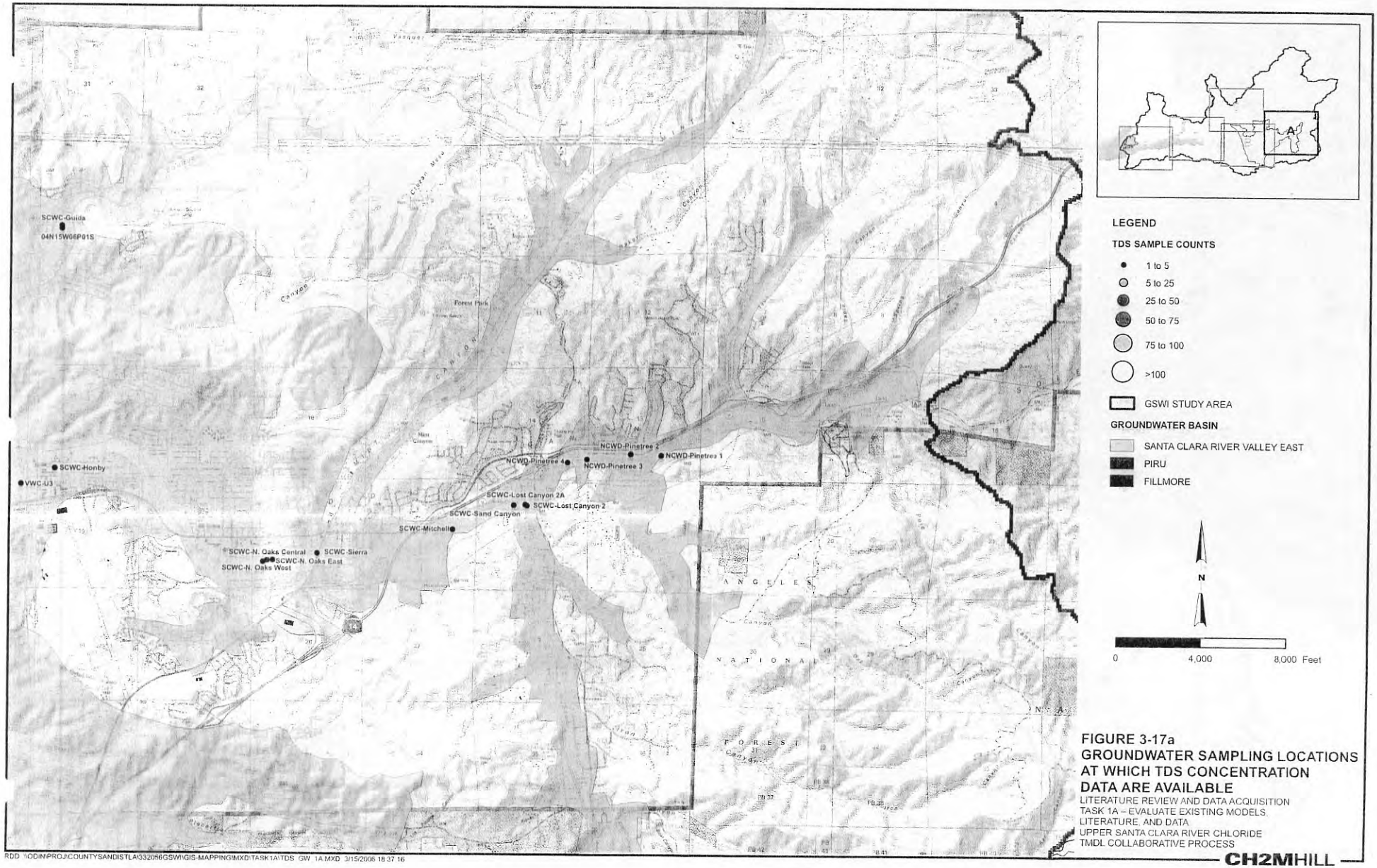


FIGURE 3-17a
GROUNDWATER SAMPLING LOCATIONS AT WHICH TDS CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWHGIS-MAPPING\MXD\TASK1A\TDS_GW_1A.MXD 3/15/2006 18:37:16

CH2MHILL

5-1184

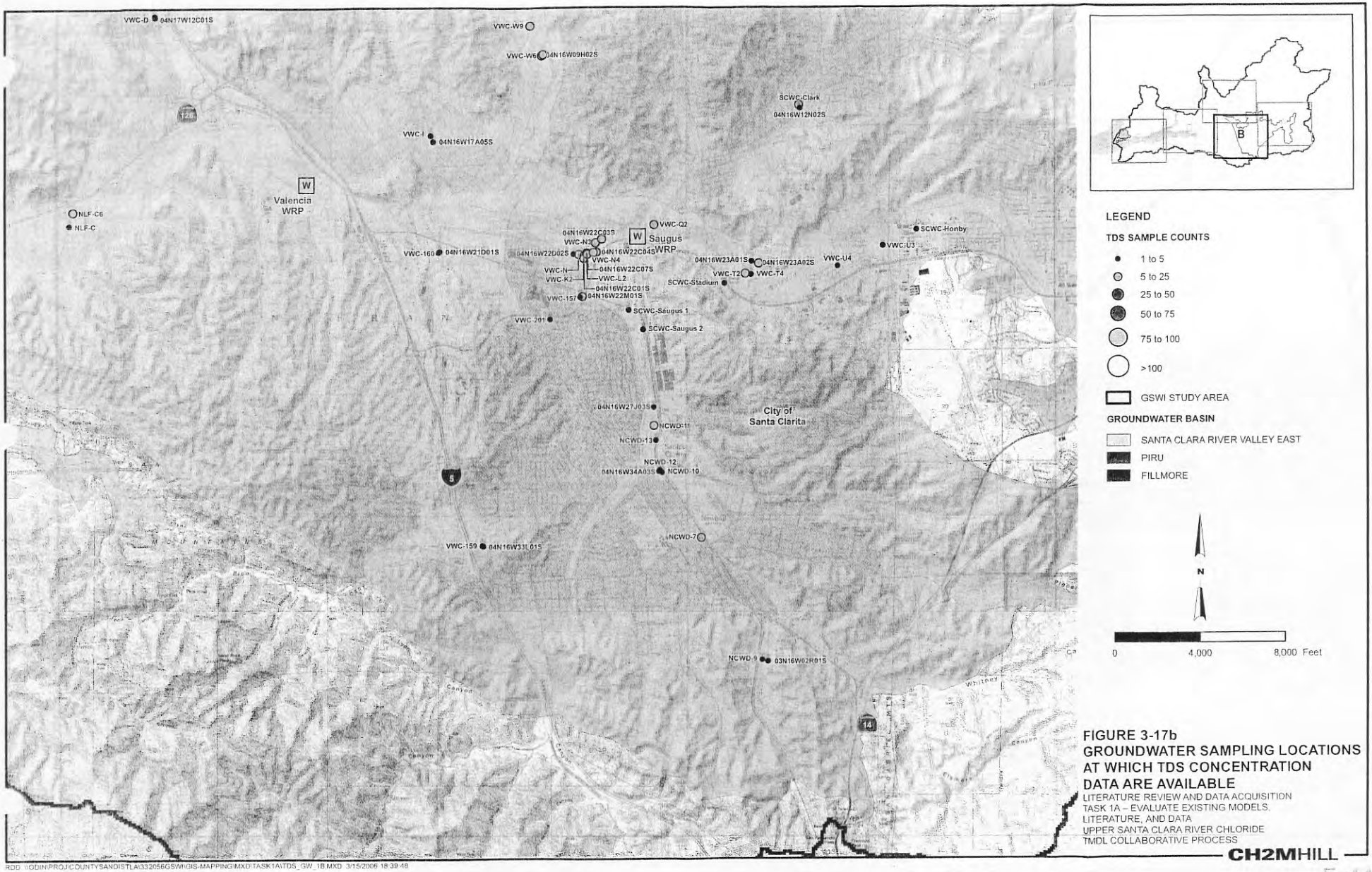


FIGURE 3-17b
GROUNDWATER SAMPLING LOCATIONS AT WHICH TDS CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\TDS_GW_1B.MXD 3/15/2006 18:39:48

5-1185

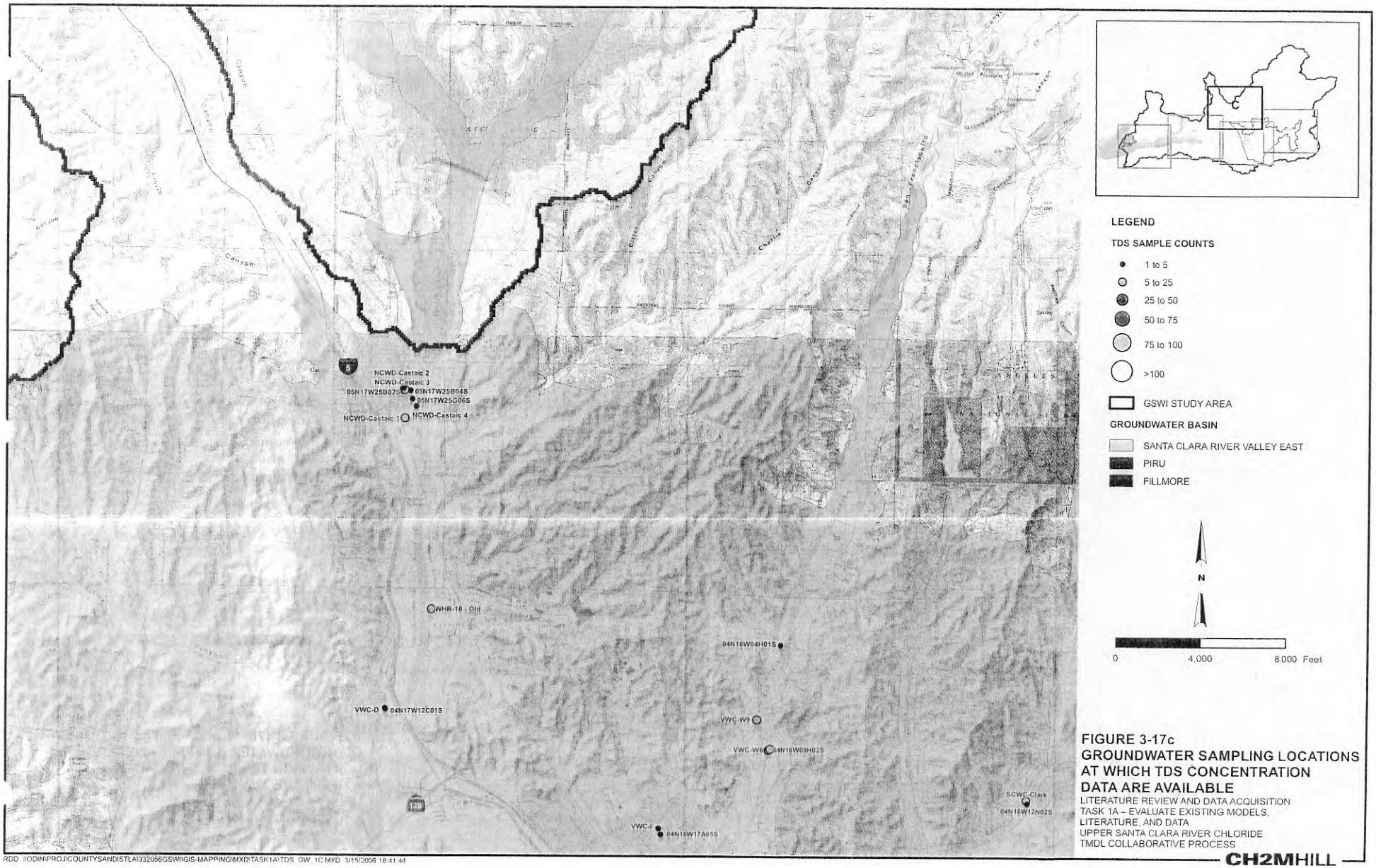


FIGURE 3-17c
GROUNDWATER SAMPLING LOCATIONS AT WHICH TDS CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\TDS_GW_1C.MXD 3/15/2006 18:41:44

5-1186

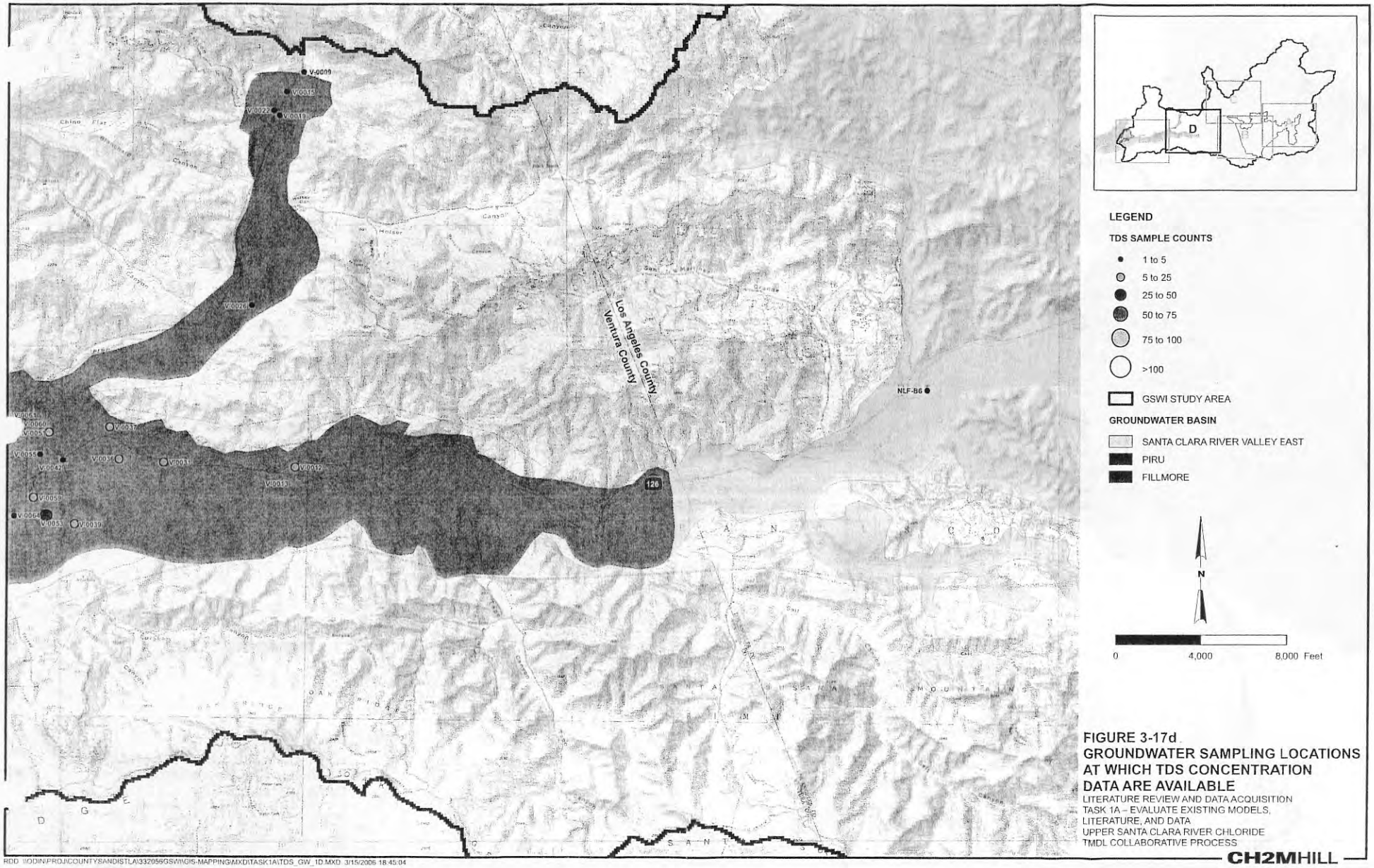


FIGURE 3-17d
GROUNDWATER SAMPLING LOCATIONS AT WHICH TDS CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDIST\LA\332056GSWI\GIS-MAPPING\MXD\TASK1A\TDS_GW_1D.MXD 3/15/2006 18:45:04

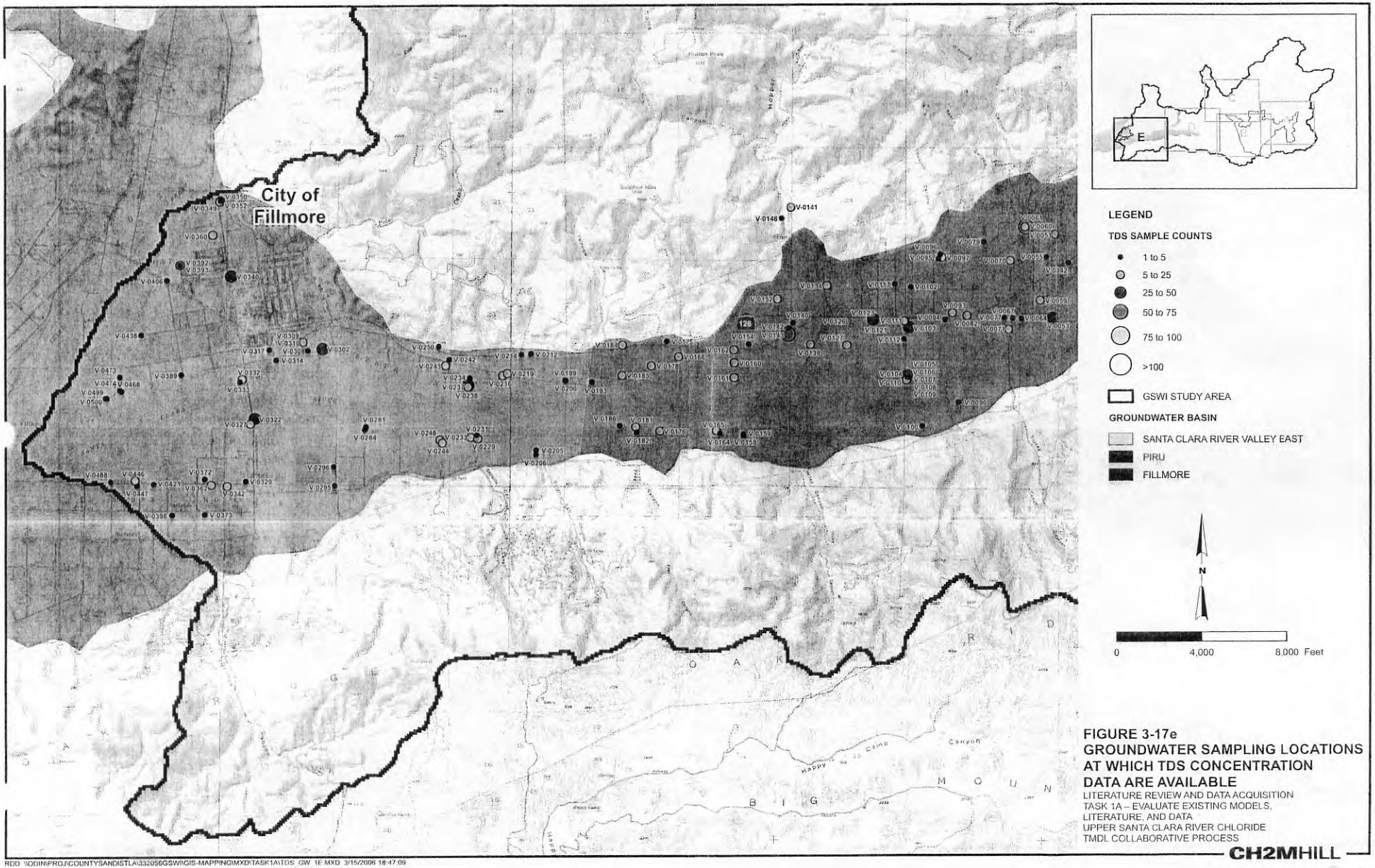
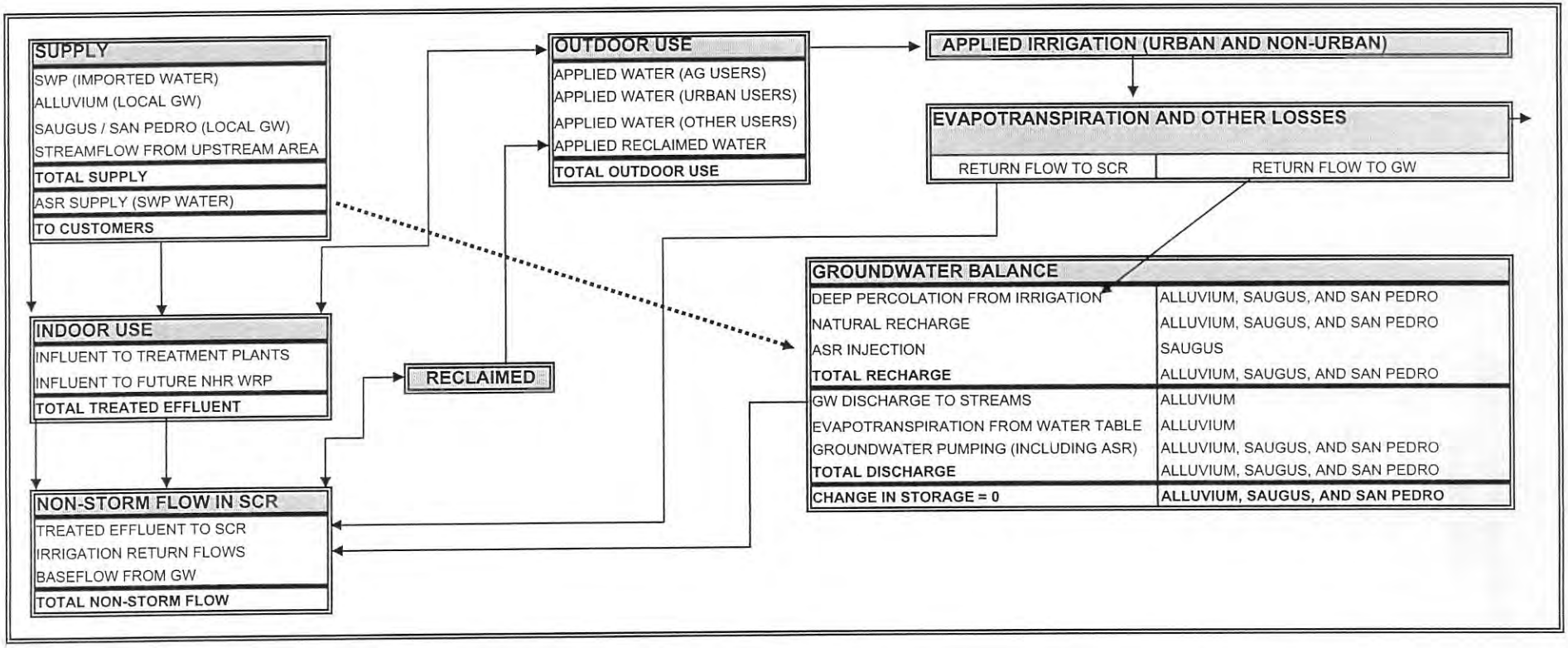


FIGURE 3-17e
GROUNDWATER SAMPLING LOCATIONS AT WHICH TDS CONCENTRATION DATA ARE AVAILABLE
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A – EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

CH2MHILL

RDD \\ODIN\PROJ\COUNTYSANDISTLA\332056GSWI\GIS-MAPPING\MXD\TASK1A\TDS_GW_1E.MXD 3/15/2006 18:47:09



ABBREVIATIONS:

GW = GROUNDWATER
NHR = NEWHALL RANCH
ASR = AQUIFER STORAGE AND RECOVERY
SCR = SANTA CLARA RIVER
SWP - STATE WATER PROJECT
WRP = WATER RECLAMATION PLANT
AG = AGRICULTURE

Notes:

1) The process of evapotranspiration by deep-rooted plants causes water, but not salt, to discharge from the watershed.
2) Stormwater that recharges groundwater within the Upper SCR Watershed is listed in the Groundwater Balance table under "Natural Recharge."
3) ASR is a potential future groundwater management activity, but is not currently ongoing within the Upper SCR Watershed at this time.

Diversion & Runoff

FIGURE 3-18
SCHEMATIC OF ROUTING PROCESSES FOR WATER AND SALTS
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A - EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

Fig3-18.xls

CH2MHILL

5-1180

This Page Intentionally
Left Blank

SECTION 4.0

Task 1A Data Gaps

Data gaps for the GSWI study fall into the following three general categories:

- Data gaps associated with surface and subsurface characterization (e.g., aquifer properties and alluvium geometry at subbasin boundaries) within the GSWI study domain
- Data gaps associated with water quantity (e.g., streamflow, diversions, groundwater levels, stage of surface-water bodies, and groundwater use)
- Data gaps associated with water quality (e.g., chloride and TDS concentrations in surface-water, groundwater, and point source discharges, and the associated mass loading of chloride and TDS)

4.1 GSWI Database

The following issues remain to be resolved with the GSWI database:

- Location identifiers (IDs) must be normalized. In some cases, data might have been collected by different organizations at or near the same geographic location, but different location IDs have been used.
- Location coordinates for some of the received data were not included by the data provider.
- Treated SWP water flow and quality data from CLWA have not yet been received. These data are important in establishing the SWP water quality and flows that are being distributed and blended with local groundwater that is pumped from local supply wells in LA County.
- Locations and diversion rates have not been pulled out of the WARMF model.

Feedback from data providers will be required to reconcile these particular data gaps.

4.2 Key Data Gap Area for Phase 1B

We anticipate that discovery of data gaps, and implementation of associated field activities to fill data gaps, will be ongoing throughout the GSWI study. However, it is apparent from the Phase 1A evaluations already conducted that relatively little data are available for the western portion of the East Subbasin and the eastern portion of the Piru Subbasin (in the vicinity of the county line). General observations and existing descriptions indicate that rising water, perennial surface-water flows, and then percolation into the Piru Subbasin all occur in this area. The conceptual and numerical models for the GSWI can be developed with greater certainty if actual conditions in this area are better understood and quantified. Specifically, this particular area lacks definition of alluvium geometry, groundwater levels,

5-1191

groundwater quality (specifically chloride and TDS), and aquifer properties. Because of the importance of this area to the study, it might be appropriate to design the initial Task 1B activities to begin characterizing this data-poor area. Specific recommendations for collection of additional data from this area will be developed and presented in the Task 1B work plan.

4.3 Potential Additional Data Gap Areas

As priority data gaps, identified in the previous section, are addressed during initial Task 1B activities, other geographic areas of uncertainty will need to be assessed throughout the execution of the GSWI study. These data gaps are considered to have lower short-term priority than those associated with the county line area described above, but might be important for the ultimate development of conceptual and GSWI models. Potential data gap areas for additional consideration include the following:

- Portions of Reach 7 near the Saugus WRP or potentially farther upstream
- Reach 6 downstream of the Saugus WRP
- Reaches 5 and 4 downstream of the Valencia WRP
- Water quantity and quality data associated with major diversions along the Upper SCR
- Water quantity and quality associated with less-studied tributaries to the Upper SCR (e.g., Salt Canyon near the county boundary)

It is anticipated that as the higher priority data gaps are filled, the potential importance and value of obtaining additional data from these other areas will be assessed according to the performance and results achieved with early versions of the GSWI model. In this way, knowledge gained from early stages of the GSWI study can be used to assess the relative importance of filling other identified data gaps in later stages of the GSWI study. The need for this type of phased approach to data collection was discussed in GSWI TWG meetings in early stages of the study. It is also acknowledged that data collection efforts by UWCD and LACSD are ongoing and that data gap areas identified during Task 1B need to account for this to avoid duplication of efforts.

SECTION 5.0

Works Cited

AMEC Earth & Environmental (AMEC). 2005. *Data Gap Analysis: Santa Clara River Comprehensive Monitoring Plan.* Prepared by Megan Schwartz/ AMEC for Mark Bandurraga/Ventura County. August.

California Department of Water Resources (DWR). 1993. *Investigation of Water Quality and Beneficial Uses. Upper Santa Clara River Hydrologic Area.* June. Final Project Report.

California Department of Water Resources (DWR). 1989. *Update of Basin Plan For Piru, Sespe, and Santa Paula Hydrologic Areas.* June. Final Project Report.

California Department of Water Resources (DWR). 1933. *Bulletin No. 46. Ventura County Investigation.* State of California Department of Public Works. Division of Water Resources.

Chapra, S. C. 1997. *Surface-water Quality Modeling.* McGraw-Hill.

CH2M HILL. 2005a. Final Report. *Phase 1 Literature Review Evaluation, Upper Santa Clara River Chloride TMDL Collaborative Process.* Prepared for Upper Santa Clara River Agricultural Technical Working Group. September.

CH2M HILL. 2005b. *Calibration Update of the Regional Groundwater Flow Model for the Santa Clarita Valley, Santa Clarita, California.* Prepared for the Santa Clarita Valley Water Purveyors. August.

CH2M HILL. 2005c. *Eastern Santa Clara Subbasin Groundwater Study. Santa Clarita, California. Conceptual Hydrogeology Technical Memorandum.* Prepared for U.S. Army Corps of Engineers. January.

CH2M HILL. 2005d. *Eastern Santa Clara Subbasin Groundwater Study. Santa Clarita, California. Progress Report: Groundwater Flow Model Construction and Calibration.* Prepared for U.S. Army Corps of Engineers. October.

CH2M HILL. 2004a. *Regional Groundwater Flow Model for the Santa Clarita Valley. Model Development and Calibration.* Prepared for the Upper Basin Water Purveyors including Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Division of Castaic Lake Water Agency, and Valencia Water Company. April.

CH2M HILL. 2004b. *Analysis of Perchlorate Containment in Groundwater near the Whittaker-Bermite Property.* Prepared in support of the 97-005 Permit Application. Prepared for the Upper Basin Water Purveyors including Upper Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Division of CLWA, and Valencia Water Company. December.

CH2M HILL. 2002. *Newhall Ranch Updated Water Resources Impact Evaluation.* Prepared for Newhall Ranch Company. November.

5-1193

CH2M HILL. 2001. *Newhall Ranch ASR Impact Evaluation.* Prepared for Newhall Ranch Company. February.

Densmore, J. N., G. K. Middleton, and J. A. Izbicki. 1992. *Surface-Water Releases for Ground-Water Recharge, Santa Clara River, Ventura County California.* In Herrman, Raymond, ed., Managing Water Resources During Global Change: American Water Resources Association, p. 407-416.

HydroGeoLogic (HGL). 2001. *MODHMS - A MODFLOW-based Hydrologic Modeling System, Documentation and User's Guide.* HydroGeoLogic, Inc., Herndon, Virginia.

Los Angeles County Sanitation District (LACSD). 1999. *Santa Clara River Watershed Chloride Study.* Final Draft. April 26.

Los Angeles County Sanitation District (LACSD). 1998. *Final 2015 Santa Clarita Valley Joint Sewerage System Facilities Plan and EIR.* January.

Los Angeles Regional Water Quality Control Board (LA Water Board). 1994. *Water Quality Control Plan - Los Angeles Region.* California Regional Water Quality Control Board, Los Angeles Region, 101 Centre Plaza Drive, Monterey Park, CA 91754.

Luhdorff and Scalmanini Consulting Engineers (LSCE). 2005. *2004 Santa Clarita Valley Water Report.* May.

Mann, J. F., Jr. 1959. *A Plan for Ground Water Management. United Water Conservation District.* Prepared for United Water Conservation District. 120p.

Martin, J. L. and S. C. McCutcheon. 1999. *Hydrodynamics and Transport for Water Quality Modeling.* Lewis Publishers.

McDonald, M. G. and A. W. Harbaugh. 1988. *A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model.* U.S. Geological Survey Techniques of Water-Resources Investigations Book 6, Chapter A1, 586 p.

Richard C. Slade and Associates, LLC (RCS). 2002. *2001 Update Report: Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems.*

Richard C. Slade Consulting Groundwater Geologist (RCS). 1988. *Hydrogeologic Assessment of the Saugus Formation in the Santa Clara Valley of Los Angeles County, California.* Prepared for Castaic Lake Water Agency, Los Angeles County Waterworks District No. 36 - Val Verde, Newhall County Water District, Santa Clarita Water Company, and Valencia Water Company. February.

Richard C. Slade Consulting Groundwater Geologist (RCS). 1986. *Hydrogeologic Investigation: Perennial Yield and Artificial Recharge Potential of the Alluvial Sediments in the Santa Clarita River Valley of Los Angeles County, California.* Prepared for Upper Santa Clara Water Committee: Los Angeles County Waterworks District No. 36 - Val Verde, Newhall County Water District, Santa Clarita Water Company, Valencia Water Company, and Castaic Lake Water Agency. December.

Systech Engineering, Inc. 2002a. *Final Task 1 Report for Santa Clara River Nutrient TMDL Analysis: Source Identification and Characterization.* Prepared for Santa Clara Nutrient TMDL Steering Committee. July 15.

Systech Engineering, Inc. 2002b. *Linkage Analysis For Santa Clara River Nutrient TMDL Analysis Parts I and II: Hydrology and Water Quality.* Prepared for Santa Clara Nutrient TMDL Steering Committee. September 1.

United States Geological Survey (USGS). 2003a. *Simulation of Ground-Water/Surface-Water Flow in the Santa Clara-Calleguas Ground-Water Basin, Ventura County, California.* Water-Resources Investigations Report 02-4136. A contribution of the Southern California Regional Aquifer-System Analysis Program.

United States Geological Survey (USGS). 2003b. *Heat as a Tool for Studying the Movement of Ground Water near Streams.* Circular 1260. U.S. Department of the Interior.

United States Geological Survey (USGS). 2003c. *Evaluation of Tracer Tests Completed in 1999 and 2000 on the Upper Santa Clara River, Los Angeles and Ventura Counties, California.* Water-Resources Investigations Report 03-4277. Prepared in cooperation with the Los Angeles County Sanitation Districts.

United States Geological Survey (USGS). 1999. *Evaluation of Surface-Water/Ground-Water Interactions in the Santa Clara River Valley, Ventura County, California.* Water-Resources Investigations Report 98-4208. Prepared in cooperation with the United Water Conservation District.

United States Geological Survey (USGS). 1998. *Statistical Analysis and Mathematical Modeling of a Tracer Test on the Santa Clara River, Ventura County, California.* Water-Resources Investigations Report 97-4275. Prepared in cooperation with United Water Conservation District.

United Water Conservation District (UWCD). 2005. *Description and Surface Water Modeling Capabilities of the Piru Basin.* Prepared by Murray McEachron of the United Water Conservation District. December.

Xu, M. and Y. Eckstein, 1995. "Use of Weighted Least-squares Method in Evaluation of the Relationship between Dispersivity and Field Scale." *Ground Water*, 33(6): 905-908.

This Page Intentionally
Left Blank

APPENDIX A

Annotated Bibliography

Several past studies of the surface-water and groundwater system of the Santa Clara River (SCR) in Los Angeles and Ventura Counties will be used to develop the conceptual and numerical groundwater/surface-water interaction (GSWI) model of the SCR hydrologic system. These models will be used to evaluate the groundwater/surface-water interactions for Reaches 4, 5, and 6 (as designated by the Los Angeles Regional Water Quality Control Board) of the Upper SCR and to assess the assimilative capacity of the surface-water and groundwater systems in those reaches with respect to chloride and total dissolved solids (TDS) concentrations in relation to the Water Quality Control Plan (Basin Plan) water quality objectives for groundwater and surface water. These studies include reports on the regional geology and hydrology, and on previous modeling analyses. Following are annotated bibliographies (in alphabetical order) for those studies that are considered to be significant in terms of providing key data or other information that will be especially useful for the current study. However, the references currently included in this appendix should not be considered an all-inclusive list. It is likely that the list of important references and data sources will grow as the GSWI study progresses.

AMEC Earth & Environmental. 2005. ***Data Gap Analysis: Santa Clara River Comprehensive Monitoring Plan.*** **Prepared by Megan Schwartz/AMEC for Mark Bandurraga/Ventura County. August.** This 2005 report presents the results of the Data Gap Analysis conducted for the Santa Clara River Monitoring Plan. The report focuses on water quality data to include metals, nutrients, organic compounds, and aquatic toxicity tests within the subwatershed of the SCR. The report summarizes the results of the analysis to current or future total maximum daily load (TMDL) regulations. The main conclusions that affect the current study include the following:

- The uppermost portion of the SCR watershed in Los Angeles County had little to no data for TDS and streamflow. The frequency of measurements for chloride was adequate, but the sampling locations have a poor spatial distribution.
- The Piru area in Ventura County has little to no data for TDS and streamflow. However, a moderate frequency of chloride measurements were reported, but most sampling locations are located on Piru and Hopper Canyon Creek. Little to no data were provided on the SCR.
- Water reclamation plants (WRP) are the best-documented source of chloride in the area. Chloride and TDS concentrations in treated effluent are impacted by water softeners in the residential homes in Piru's water and in water from the State Water Project (SWP) used by the WRPs for their water supply.

California Department of Water Resources. 1993. ***Investigation of Water Quality and Beneficial Uses. Upper Santa Clara River Hydrologic Area.*** **June. Final Project Report.** This report presented current mineral water quality conditions including degradation, compiled data, developed new objectives for several streams that had not previously been addressed,

5-1197

and recommended revisions to beneficial uses and mineral objectives for the Upper SCR. The report compiled available data on surface-water and groundwater quality, but it also collected new data including 142 on-time groundwater samples collected between April 1989 and August 1990, and 13 surface-water samples collected in August and September 1990. The study reported that TDS concentration in groundwater ranged from 140 to 7,400 milligrams per liter (mg/L), with 50 percent of samples below 500 mg/L and 90 percent of samples below 1,000 mg/L. Overall, chloride concentrations in well waters showed no significant change over time, except in Above Castaic Creek to Bouquet Canyon Subdivision of Eastern Subarea, which showed a decrease in chloride, and a localized increase in Placerita Canyon Area Subdivision of Eastern Subarea, possibly because of oil field activities and irrigation return flow. A statistically significant decrease in TDS and sulfate concentrations in surface water was identified along with an increasing trend for nitrogen compounds and no discernable trend for chloride. The study found the surface waters of the SCR and its tributaries to be hydraulically interconnected with the underlying alluvial groundwater. The study made several recommendations for additional beneficial use designations for multiple subunits of the Upper SCR HA. The report also recommended changes to the numeric water quality objectives for TDS, sulfate, and chloride in groundwater in the Eastern Subarea and for TDS and sulfate in surface water in the SCR.

California Department of Water Resources. 1989. ***Update of Basin Plan For Piru, Sespe, and Santa Paula Hydrologic Areas.*** **June. Final Project Report.** This report documented an update of the Los Angeles Regional Water Quality Control Board's Basin Plan for three subareas of the SCR Basin. The report provided information on the beneficial uses, water quality objectives, and implementation plans to achieve water quality objectives for surface water and groundwater within the three subareas (Piru, Sespe, and Santa Paula). The project involved a literature search and consultation with agencies to collect and interpret all available information on surface water and groundwater. Historical concentrations of several minerals, including chloride, in both surface water and groundwater are presented. The report also provided recommendations and rationale for changes to beneficial uses and water quality objectives.

CH2M HILL. 2005a. Final Report. ***Phase 1 Literature Review Evaluation, Upper Santa Clara River Chloride TMDL Collaborative Process.*** **Prepared for Upper Santa Clara River Agricultural Technical Working Group. September.** On May 6, 2004, the Los Angeles Regional Water Quality Control Board adopted an amendment to the Basin Plan for the Los Angeles Region to revise the interim waste-load allocations and the Implementation Plan of the Upper SCR TMDL. The Implementation Plan incorporated four major studies, including an evaluation of the appropriate chloride threshold for the reasonable protection of salt-sensitive agriculture. The Los Angeles County Sanitation Districts and the Los Angeles Regional Water Quality Control Board are working jointly on these studies. This compilation document contains all reports and information sources from the first (reasonable protection of salt-sensitive agriculture) of the four studies. Within the reaches of the Upper SCR, avocado, strawberry, and some nursery crops have been identified as the most chloride- and salt-sensitive crops that are currently grown or that are likely to be grown in the future.

This document brought together four individual reports and one compact disc of all literature sources. The following reports and compact disc were contained in this compilation document:

- **Final Literature Evaluation and Recommendations Report** – This report was developed in September 2005, following feedback from the Agricultural Technical Advisory Panel, the Agricultural Technical Working Group, and other interested stakeholders.
- **Critical Review Report** – This report was developed in September 2005, solely by the Agricultural Technical Advisory Panel as a comprehensive and critical review of the Literature Evaluation and Recommendations Report.
- **Comments and Responses to the Literature Evaluation and Recommendations Report** – This report was developed in June 2005, as a summary document to compile all comments and associated responses to the Draft Literature Evaluation and Recommendations Report.
- **Literature Review and Evaluation Methodology Report** – This report was developed in March 2005, as an initial summary of the pertinent literature and to provide a methodology for numerically evaluating literature and other information sources based on scope, applicability, and quality.
- **Literature Sources on Compact Disc** – This compact disk contained all referenced literature and other information sources used for the development of the Final Literature Evaluation and Recommendations Report, as well as other general literature and information.

CH2M HILL. 2005b. ***Calibration Update of the Regional Groundwater Flow Model for the Santa Clarita Valley, Santa Clarita, California.*** **Prepared for the Santa Clarita Valley Water Purveyors. August.** The Regional Model calibration was extended in this study an additional 62 months (from January 2000 through February 2005) to update and test the model's calibration against an independent data set consisting of recently observed hydrologic and pumping conditions in the basin. Additionally, the simulation was repeated for the initial calibration period (January 1980 through December 1999) because of a change in the boundary condition at the east end of the basin in the Alluvial Aquifer.

Examination of groundwater elevation hydrographs for the Alluvial Aquifer and the Saugus Formation indicated that the Regional Model had a similar overall ability to simulate conditions during the calibration update period as for the preceding 20-year period to which it was originally calibrated. Specifically, the transient model simulates trends in groundwater elevations and SCR flows that were generally well matched with observed trends. In Soledad Canyon, where local droughts have sometimes affected the Upper Basin Water Purveyors' ability to pump groundwater from the Alluvial Aquifer, the Regional Model simulated trends in groundwater elevations particularly well. In the Saugus Formation, the groundwater elevations and elevation trends were closely matched at most wells where data were available. Consequently, the process of updating the Regional Model's calibration for the additional 5-year period confirmed that the model is suitable for its intended applications, which were to evaluate groundwater management strategies, groundwater sustainability, artificial recharge options, and restoration of contaminated water supplies.

5-1199

CH2M HILL. 2004a. *Regional Groundwater Flow Model for the Santa Clarita Valley. Model Development and Calibration.* **Prepared for the Upper Basin Water Purveyors including Castaic Lake Water Agency, Newhall County Water District, Santa Clarita Division of Castaic Lake Water Agency, and Valencia Water Company. April.** This report presents the construction and calibration of a regional-scale numerical groundwater flow model for the Santa Clara Valley. The model was built to evaluate basin yield under varying resource management scenarios, the impact of artificial recharge on long-term sustainability of the aquifer system, and the impact of future water management plans within the Santa Clara Valley on downstream users, and to facilitate general management of water quantity and quality issues. The seven-layer model incorporated the aquifers of the alluvial deposits and the Saugus Formation. The base of the model was defined as the Sunshine Ranch Member of the Saugus Formation. Aquifer transmissivities were assigned using available aquifer test data and specific capacity measurements. The boundary conditions in the model consisted of specified flux boundaries for precipitation, irrigation, recharge from ephemeral streams, pumping, and underflow from beneath Castaic Dam. Head-dependent flux boundaries were used in the perennial reach of the SCR, and to model any residual drainage of groundwater that might occur in the ephemeral reach under high water table conditions. A head-dependent flux boundary was also used to simulate evapotranspiration from the water table. A constant-head boundary was used in the Alluvial Aquifer at the down-gradient (western) end of the valley, at the County Line gage. Groundwater recharge rates were estimated using precipitation records, streamflow records, watershed maps, topographic maps, and aerial photography. These recharge rates were calculated using a detailed Surface Water Routing Model that was written specifically for the construction and calibration of the Regional Model. Pumping rates and the vertical distribution of pumping were assigned using data provided by purveyors and other users in the valley, estimates of water demand for urban and agricultural water use, and well construction records.

Calibration of the Regional Model involved matching both steady-state and transient conditions in the Alluvial Aquifer and the Saugus Formation. The steady-state calibration was performed for calendar years 1980 through 1985, and the transient calibration was performed for calendar years 1980 through 1999. The goals of the calibration process were generally to match groundwater flow directions, groundwater gradients, and groundwater elevations that were measured throughout the 20-year simulation period at wells across the valley. An additional calibration goal was to match the patterns of total flow in the SCR and estimated groundwater discharge rates to the river. Model variables were adjusted in a manner that sought to honor independent estimates of parameter values while resulting in the best possible calibration.

Sensitivity analyses were performed to evaluate whether further changes in the values of key model parameters would improve the calibration quality of the Regional Model. The sensitivity analysis indicated that the model was calibrated well and that it was sensitive to the choices of horizontal hydraulic conductivity in both aquifers and vertical hydraulic conductivity in the Saugus Formation. The Regional Model was also sensitive to the river-bed leakage in terms of both groundwater recharge and groundwater discharge areas. However, the model was insensitive to the choice of evapotranspiration parameters.

It was concluded that the calibration process resulted in a Regional Model that closely simulates, on a monthly basis, total flows in the river and estimated volumes of ground-

water discharging to the river. The calibration process also resulted in a Regional Model that closely simulates the short-term and long-term temporal trends in groundwater elevations throughout the valley, which is necessary for evaluating groundwater management strategies.

CH2M HILL. 2004b. ***Analysis of Perchlorate Containment in Groundwater near the Whittaker-Bermite Property.*** **Prepared in Support of the 97-005 Permit Application. Prepared for Upper basin Water Purveyors: Upper Castaic Lake Water Agency; Newhall County Water District; Santa Clarita Division of CLWA; and Valencia Water Company. December.** In 2004, CH2M HILL conducted a study to analyze a plan for containment of perchlorate that is present in the Saugus Formation aquifer, which lies beneath a portion of the Santa Clarita Valley. The study consisted of designing a containment plan consisting of pumping from two deep production wells (SCWC-Saugus1 and SCWC-Saugus2) that had not operated in several years because of elevated concentrations of perchlorate in groundwater. The selected pumping plan was designed to cause perchlorate, which is migrating in groundwater from the nearby Whittaker-Bermite property, to be captured by these wells, thereby controlling its movement to other portions of the aquifer, where additional water supplies could otherwise be impacted. The containment evaluation for the impacted Saugus Formation production wells was performed using the Regional Model, which was developed by the local water purveyors for use in managing the local groundwater resource. The pumping rates were selected by considering the water supply needs of the valley and analyses of groundwater flow patterns that are expected under the pumping plan for these wells.

The major conclusions from the modeling analysis were as follows:

1. Operating production wells SCWC-Saugus1 and SCWC-Saugus2 at rates of 1,200 gallons per minute each on a nearly continual basis would effectively contain perchlorate migrating westward in the Saugus Formation from the Whittaker-Bermite property, and would also contain perchlorate that is present at Saugus wells MP-5 and VWC-157.

2. Operating production wells SCWC-Saugus1 and SCWC-Saugus2 at rates as low as 700 to 800 gpm each would not fully contain groundwater that is migrating westward from the Whittaker-Bermite property. Additionally, if these wells were operated at 1,000 gpm each, perchlorate that is present in the Saugus Formation at wells MP-5 and VWC-157 would not be captured, and would instead migrate to existing non-impacted wells VWC-160 and VWC-205.

3. No new production wells would be needed in the Saugus Formation to meet the perchlorate containment objectives.

4. Use of other water supplies in lieu of pumping at SCWC-Saugus1 and SCWC-Saugus2 would likely be detrimental to the long-term quality of groundwater in the Saugus Formation. Pumping at these two wells would be necessary to prevent migration of perchlorate to other portions of the Saugus Formation.

5. Implementation of the pumping plan for SCWC-Saugus1 and SCWC-Saugus2 might contain perchlorate that is migrating in the Alluvial Aquifer from the northern portion of the Whittaker-Bermite property, including perchlorate that has been detected in the Alluvial Aquifer at and south of Bouquet Junction.

5-1201

6. Implementation of the operational plan for the impacted production wells would not cause detrimental short-term or long-term effects to the groundwater and surface-water resources of the Santa Clarita Valley. In particular, the modeling analysis indicates that short- and long-term variability in local rainfall and streamflow is the predominant cause of fluctuating groundwater elevations, river flows, and groundwater storage volumes. Year-to-year changes in groundwater recharge volumes and groundwater storage volumes are much greater than year-to-year fluctuations in pumping. Implementation of the operational pumping plan for the valley, including the planned use of wells SCWC-Saugus1 and SCWC-Saugus2, would have much less influence on the water resources of the valley, as compared to local hydrology and climatic factors.

CH2M HILL. 2002. *Newhall Ranch Updated Water Resources Impact Evaluation* Prepared for Newhall Ranch Company. November. This document presented an update to the aquifer storage and recovery (ASR) impact evaluation, including analyzing the effects of all aspects of the Newhall Ranch community (not just ASR) on the valley's water resources. The new evaluation was conducted in response to comments from Ventura County during public review and included changes to the methodology and the groundwater flow model. The analysis methodology was enhanced to evaluate the effects of all project-induced changes in water use on the quantity of river flow crossing the County Line. The new analysis evaluated the impacts from implementing ASR, discontinuing current agricultural irrigation practices (which consist of irrigating with an average of 7,038 acre-feet (AF) per year (AF/yr) obtained from Alluvial Aquifer wells), irrigating urban lands within the future Newhall Ranch development (12,050 AF/yr, using potable and nonpotable water supplies), and increasing future direct discharges to the river from the Newhall Ranch WRP and two Los Angeles County Sanitation District WRPs.

The impacts were defined as changes in river flows and were based on the combined changes in the hydrologic system. Changes to the groundwater flow model consisted of recalibrating the model to higher estimates of groundwater discharges to the river and redefining the rates and locations of future water use and deep percolation.

The study reached several conclusions. Changes in groundwater discharges to the river arising from ASR operations would range from a 200-AF/month (3.4 cubic feet per second [cfs]) increase during injection cycles to a 43-AF/month (0.7 cfs) decrease during pumping cycles. However, after drought years, ASR operations could increase river flows within 4 months of resuming injection. The model also predicted that ASR pumping cycles would cause small (less than 1 foot) declines during drought years, and that ASR operations would not cause long-term groundwater elevation declines in the Alluvial Aquifer, where riparian habitat is present along the river. Furthermore, the updated impact analysis indicated that the project would increase river flows by as much as 2,000 AF/yr (2.8 cfs) during non-drought years and would decrease river flows by as much as 1,050 AF/yr (1.5 cfs) toward the end of a 3-year drought. For a 19-year historical hydrologic cycle, such as that which occurred from 1982 through 2000, implementation of the project would result in an overall increase in river flows over the long term. The combination of growth outside Newhall Ranch and development of the Newhall Ranch project with associated increases in imported water would further enhance the long-term flows to the river, compared with present conditions. On an annual basis, increases in river flows would range from 500 AF/yr (0.7 cfs) at the end of a 3-year drought to more than 6,000 AF/yr (8.3 cfs) in some non-

drought years, depending on antecedent conditions. The occurrence of increased annual flows during drought and non-drought years alike (compared with present-day conditions) is consistent with historical records showing that continued urbanization and associated importation of water from areas outside the valley increase river flows gradually over time.

CH2M HILL. 2001. ***Newhall Ranch ASR Impact Evaluation.*** **Prepared for Newhall Ranch Company. February.** This document presented the longer term basinwide influences that would occur for an ASR program that was proposed as part of the water supply for the planned Newhall Ranch community. This report presents the results of a groundwater modeling analysis of the Santa Clarita Valley. Principal aquifers in the project area consist of the Alluvial Aquifer and the Saugus Formation. Historical hydrologic information was incorporated into a numerical groundwater flow model of the Santa Clarita Valley. The model was constructed to estimate groundwater exchanges between the Saugus Formation, the Alluvial Aquifer, and the SCR under a representative ASR operational scenario and a sequence of climatic cycles observed during the 1980s and 1990s.

The ASR scenario used in the project simulation included a total of six ASR wells capable of storing up to 4,500 AF of SWP water over an 8-month injection period. Conclusions of the ASR simulations include the following:

1. The maximum predicted water level increase in the Saugus Formation at the end of a given 8-month injection period was approximately 45 feet at each well. In the riparian zone along the SCR downstream of Interstate 5, the water levels were calculated to rise in the Alluvial Aquifer by 0.5 to 3 feet because of ASR injection. Pumping the ASR wells in the Saugus Formation for 3 consecutive drought years was calculated to cause water level declines of less than 1 foot in the Alluvial Aquifer in this same area.

2. Operation of the ASR system would result in an overall increase in groundwater discharges to Ventura County.

3. Groundwater discharges to Ventura County would be reduced by ASR operations only during the end of the simulated 3-year drought period and the last few months of the last 1-year drought. However, the amount of the reductions during these months would be small (less than 10 AF/month). On an annual basis, the reduction in groundwater discharge to Ventura County would be about 60 AF/yr during the driest year, and the increase in groundwater discharge would be as much as 370 AF/yr during injection years.

Potential negative impacts associated with a Newhall Ranch ASR program (reductions in flows to downstream water users, impacts on riparian vegetation and habitat, and impacts on water quality) were predicted to be insignificant. The results of the technical analyses described in this report indicate that over the long term, there would be an overall positive benefit from the ASR program, which would increase the amount of water discharging to the SCR, maintain stable groundwater levels in the Saugus Formation, and potentially improve the assimilative capacity of the river with respect to chloride as a result of increased groundwater discharge.

5-1203

Densmore, J. N., G. K. Middleton, and J. A. Izbicki. 1992. ***Surface-Water Releases for Ground-Water Recharge, Santa Clara River, Ventura County California.*** **In Herrman, Raymond, ed., Managing Water Resources During Global Change: American Water Resources Association, p. 407-416.** In 1991, a study was conducted to evaluate the impacts of varying release rates from Lake Piru on groundwater recharge in the Piru, Fillmore, and Santa Paula Subbasins. A total volume of 34,000 AF was released over 2- to 3-week periods at rates of 100, 272, and 391 cfs. Stream discharge measurements and surface-water quality samples were collected at 23 points prior to, during, and following the releases. A decrease in streamflow between two consecutive points was assumed to be the result of either discharge to the groundwater system or stream diversion for irrigation. The volume of surface water diverted for irrigation was not measured; therefore, it was not possible to separate the two components. Results indicate that for all release rates, the majority of released water (70 to 100 percent) either infiltrates or is diverted within the Piru Subbasin. At release rates of 272 cfs and 391 cfs, approximately 13 percent and 10 percent (respectively) of the released water either infiltrated or was diverted in the Fillmore Subbasin, and 5 percent to 20 percent (respectively) of the released water was diverted at the Freeman Diversion. In all cases, little to no infiltration or diversion was observed in the Santa Paula Subbasin, because of the presence of low-permeability deposits underlying the alluvium. A correlation was observed between releases from Lake Piru and rising groundwater levels in the Piru Subbasin; however, the relationship between released surface-water and groundwater levels in the Fillmore and Santa Paula Subbasins was less clear. Concentrations of sulfate and specific conductance were measured to aid in the identification of areas where groundwater discharged to the stream system.

Los Angeles County Sanitation District. 1999. ***Santa Clara River Watershed Chloride Study.*** **Final Draft. April 26.** This report presents descriptions of historical analyses conducted on groundwater and surface water within the Santa Clara region. In reference to groundwater, the report discusses groundwater quality; geochemical analysis of ground and surface waters; reviews groundwater data, trend analysis, and geochemical analyses; and discusses historical trends and groundwater quality. For surface water, the report evaluates existing water quality objectives, discusses the Regional Water Quality Control Board's 1998 surface-water impairment assessment, evaluates surface-water quality, and discusses historical surface water quality. There is a section on review of crop sensitivity to chloride, and options for regulating chlorides impairment in U.S. Environmental Protection Agency Reaches 7 and 8.

Results from the groundwater trend analysis show no statistically significant basinwide increase in trends of chloride within the three basins studied. Results also support findings that beneficial uses (agricultural use) remain protected within the study area.

Los Angeles Regional Water Quality Control Board. 1994. ***Water Quality Control Plan – Los Angeles Region.*** **California Regional Water Quality Control Board, Los Angeles Region, 101 Centre Plaza Drive, Monterey Park, CA 91754.** This report documents the Basin Plan for the Los Angeles Region that encompasses the SCR watershed. The Basin Plan designates beneficial uses for surface water and groundwater, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and describes implementation programs to protect all waters in the region.

This document, including any amendments, serves as the official guideline document for the water quality objectives, against which GSWI modeling output of chloride and TDS concentrations will be compared.

Richard C. Slade and Associates, LLC (RCS). 2002. ***2001 Update Report: Hydrogeologic Conditions in the Alluvial and Saugus Formation Aquifer Systems.*** In 2002, RCS updated the 1986 and 1988 studies with more recent data and prepared a report for both the Alluvial and Saugus Formation aquifers. As part of this work, a geographic information system and digital database were constructed. Field activities conducted during the study included surveying water well locations and elevations using a global positioning system survey and water level data collected at Alluvial Aquifer and Saugus Formation wells. The report concluded that groundwater levels in the Alluvial Aquifer and Saugus Formation have fluctuated over time, but have shown no long-term progressive declines in the amount of groundwater storage that could be considered indicative of overdraft conditions. From the long-term pumping and water level data, the report concluded that the Alluvial Aquifer can be pumped at rates of 30,000 to and 40,000 AF/yr over the long term, and rates of 30,000 to 35,000 AF/yr during dry years. For the Saugus Formation, the study concluded that pumping can occur at rates of 7,500 to 15,000 AF/yr on a long-term basis, with short-term increases to as much as 35,000 AF/yr during the end of a multi-year drought period. These pumping rates for the Alluvial and Saugus aquifer systems were referred to in the 2002 study as the operational yields of both aquifers.

Richard C. Slade Consulting Groundwater Geologist (RCS). 1988. ***Hydrogeologic Assessment of the Saugus Formation in the Santa Clara Valley of Los Angeles County, California.*** **Prepared for Castaic Lake Water Agency, Los Angeles County Waterworks District No. 36 – Val Verde, Newhall County Water District, Santa Clarita Water Company, and Valencia Water Company. February.** In 1988, RCS conducted a study of the Saugus Formation that was similar in scope to the 1986 study of the Alluvial Aquifer. The scope of work included conducting 24-hour, constant-discharge aquifer tests in five different Saugus Formation wells, and included monitoring water level recovery rates. Six regional geologic cross sections were also constructed from geologic and geophysical logs that had been compiled prior to this study at water wells and numerous oil wells within and around the Santa Clarita Valley. The study concluded that the Saugus Formation is discretely layered, with groundwater production occurring from discrete sand and gravel zones that exist throughout much of the total thickness of the formation. The study also concluded that it is hydrogeologically feasible to develop additional groundwater supplies from the Saugus Formation as long as wells are properly sited and constructed, and that the groundwater-yielding capability of the Saugus Formation is likely greater south of the San Gabriel fault than north of the fault.

Richard C. Slade Consulting Groundwater Geologist (RCS). 1986. ***Hydrogeologic Investigation: Perennial Yield and Artificial Recharge Potential of the Alluvial Sediments in the Santa Clarita River Valley of Los Angeles County, California.*** **Prepared for Upper Santa Clara Water Committee: Los Angeles County Waterworks District No. 36 – Val Verde, Newhall County Water District, Santa Clarita Water Company, Valencia Water Company, and Castaic Lake Water Agency. December.** In 1986, RCS studied the alluvial sediments in the Santa Clarita Valley to evaluate the amount of groundwater in storage, the amount of recharge that occurs over the long term, and the feasibility of artificially

5-1205

recharging these sediments. This was the first published report detailing the hydrogeologic characteristics of the Alluvial Aquifer system, water well construction and testing information, and magnitudes and changes in groundwater elevation and groundwater quality. Prior studies in the Santa Clarita Valley focused on oil development, and therefore evaluated the regional geology with an emphasis on the subsurface geologic conditions in the hills and mountains surrounding the valley. The 1986 study identified 650 water wells that had been drilled in the valley up to that time, all but 22 of which were drilled in the alluvium to depths less than 250 feet. The study examined geologic logs, well testing (specific capacity) records, long-term water level data, and water quality records. The study concluded that the coarse-grained, permeable sediments comprising this aquifer system are subjected to seasonal and year-to-year variations in water levels and groundwater in storage because of highly variable rainfall and streamflow patterns. In addition to describing the hydrogeology of the Alluvial Aquifer, the study mapped and identified the watersheds contributing to streamflows in the SCR and its tributaries, and estimated the amount of runoff from these watersheds that is potentially available as recharge to the Alluvial Aquifer. The study also concluded that it would be feasible to artificially recharge portions of the Alluvial Aquifer using spreading basins, primarily along the SCR in the area east of the mouth of Bouquet Canyon.

Systech Engineering, Inc. 2002a. ***Final Task 1 Report for Santa Clara River Nutrient TMDL Analysis: Source Identification and Characterization.*** **Prepared for Santa Clara Nutrient TMDL Steering Committee. July 15.** This report summarizes the sources of pollution loads for ammonia, nitrite, nitrate, organic enrichment, and low dissolved oxygen within the SCR watershed. This report compiled and summarized existing information. The report focuses on data available from water years 1990 to 2000. The report identifies multiple reaches within the watershed and provides information on area and land use percentage for each reach. Other surface-water information summarized includes average surface-water flows from permitted surface-water discharges, pollution loads from reservoirs, and average pollutant discharge rates by permit holder. Name and average groundwater flow is presented for each discharger organized by reach along with monthly pollutant loading rates. Calculations for groundwater flow and loading from septic systems is included. The report contains information on diversions for groundwater recharge and irrigation including diversion flow rates for several reaches and pollutant loading rates. Average monthly groundwater well pumping rates are included and listed by reach. A monthly leaf area index, organized by land use, is presented along with atmospheric pollutant deposition rates. The report concludes that data was available and sufficient to conduct loading analysis and to calibrate a water quality model for linking pollutant sources and in-stream water quality.

Systech Engineering, Inc. 2002b. ***Linkage Analysis for Santa Clara River Nutrient TMDL Analysis Parts I and II: Hydrology and Water Quality.*** **Prepared for Santa Clara Nutrient TMDL Steering Committee. September 1.** This report presents a linkage analysis for pollution loads of ammonia, nitrite, nitrate, organic enrichment, and low dissolved oxygen within the SCR watershed to numerical surface-water quality targets. The report lists all sources of point and nonpoint source pollutant load within the watershed. The purpose of the linkage analysis is to determine the relationships between the pollutant loads and the water quality of river segments in the watershed and included determining the portion of pollutants on the soil surface or in the soil that were transported to river segments. The

linkage analysis also showed how pollutants might be assimilated within river segments. The linkage analysis used a watershed model capable of simulating the physical and chemical processes that affect river hydrology and water quality, namely, the Watershed Analysis Risk Management Framework (WARMF). The report used data available from water years 1990 to 2000. The report provides a summary of watershed information including area, topography, river details, soils, vegetation, land use, meteorology, hydrology, and water quality. The model was calibrated using existing data, and the report lists key assumptions and simulation results by reach and by result type (hydrology and water quality). A sensitivity analysis was conducted, and a linkage analysis was performed. The report concluded that the model was functioning and that there was insufficient data on some of the smaller reaches.

United States Geological Survey (USGS). 2003a. ***Simulation of Ground-Water/Surface-Water Flow in the Santa Clara-Calleguas Ground-Water Basin, Ventura County, California.*** **Water-Resources Investigations Report 02-4136. A contribution of the Southern California Regional Aquifer-System Analysis Program.** This report presents a numerical model of the Santa Clara – Calleguas Basin that was developed and calibrated to historical groundwater – surface-water flow over the years 1891-1993. The calibrated model was used to assess future groundwater conditions based on proposed water supply projects in the existing management plan for the Santa Clara – Calleguas groundwater basin and seven alternative water supply projects.

Two different approaches were used to estimate future conditions: first, a 24-year projection (1994-2017) using historical estimates of recharge and measured streamflow; second, a 44-year projection (1994-2037) using spectral estimates of future precipitation. The individual water supply projects were also simulated by the model, and adverse effects were noted. The authors recommend, however, that, in the future, management projects might require simulating multiple projects and employ supply-side optimization.

United States Geological Survey (USGS). 2003b. ***Heat as a Tool for Studying the Movement of Ground Water near Streams.*** **Circular 1260. U.S. Department of the Interior.** The hydraulic transport of heat enables its use as a tracer; differences between temperatures in the stream and surrounding sediments were analyzed to trace the movement of groundwater to and from the streams.

During fall 1999 and spring 2000, heat was used as a tracer along the county-line reach of the SCR to determine stream/groundwater interaction. The use of heat as a tracer is not intended to determine quality of water chemistry, but rather where and when the stream water transports chemicals into the ground (or where and when groundwater transports chemicals into the river). A series of six small piezometers perpendicular to the stream and one large piezometer in the river were installed at five cross section sites along the SCR. Temperature loggers were installed in all piezometers, with three dataloggers and varying depths in the large piezometer.

The USGS heat and water transport model, VS2DH, was used to simulate the expected sediment temperature gradients resulting from a series of shallow groundwater flow scenarios. The scenario that best described the observed temperature landscape was selected as the best representation of actual flow conditions.

5-1207

The results of temperature pattern modeling illuminate when and where stream water mixes with groundwater and for what duration the mixing takes place. This information allows for the determination of the amount of chemical exchange occurring, which has a direct consequence on downstream water quality.

United States Geological Survey (USGS). 2003c. ***Evaluation of Tracer Tests Completed in 1999 and 2000 on the Upper Santa Clara River, Los Angeles and Ventura Counties, California.*** **Water-Resources Investigations Report 03-4277. Prepared in cooperation with the Los Angeles County Sanitation Districts.** This study presents the interaction of surface water and groundwater along the SCR. This was evaluated by conducting tracer tests and analyzing water quality data over a range of flow conditions. Sodium bromide was injected into the river at a constant rate at the Los Angeles County Sanitation District's Saugus and Valencia WRPs. Flow curve results indicate net gains in flow throughout most, but not all, of the upper parts of the Valencia reach, and net losses in flow at the lower part of the reach. The water chemistry data indicates that there was an increase in sulfate and a decrease in chloride in both the Saugus and Valencia reaches of the river. The increasing sulfate concentrations are a result of higher sulfate groundwater discharging into the river. Additionally, there was a trend of decreasing ammonia and increasing nitrate concentrations in both reaches, indicating nitrification.

United States Geological Survey (USGS). 1999. ***Evaluation of Surface-Water/Ground-Water Interactions in the Santa Clara River Valley, Ventura County, California.*** **Water-Resources Investigations Report 98-4208. Prepared in cooperation with the United Water Conservation District.** The USGS conducted at study, collecting data between 1993 and 1995, to evaluate the nature of groundwater/surface-water interaction along the SCR within the Piru, Fillmore, and Santa Paula Subbasins. Multiple data sources were used in this study including stream discharge measurements (from points along the SCR and Piru Creek under both baseflow conditions and varying release schedules from Lake Piru), surface-water quality measurements (sulfate), stream stage measurements, groundwater level measurements (from existing wells and multiple-completion monitoring wells), groundwater quality measurements, and stable isotope analysis.

Because native groundwater has higher sulfate concentrations than precipitation or runoff in this area, it was possible to use a combination of stream discharge and surface-water quality to identify locations of groundwater discharge to the surface-water system. Between the lower end of the Piru Subbasin and the upper end of the Fillmore Subbasin both streamflow and sulfate concentration increase, indicating that this is a groundwater discharge area. The same trend was identified in the lower portions of the Fillmore Subbasin. It was concluded that increased streamflow near the end of the Santa Paula Subbasin was the result of discharge from the shallow aquifer near the river. Statistical regression analysis was used in an attempt to draw a correlation between net streamflow changes, releases from Lake Piru, and groundwater levels. Although this analysis was based on limited data, it was concluded that there is a statistical relationship between changes in net streamflow and the quantity of water released from Lake Piru/groundwater levels in the Piru Subbasin. A similar correlation was not found in the Fillmore or Santa Paula Subbasins.

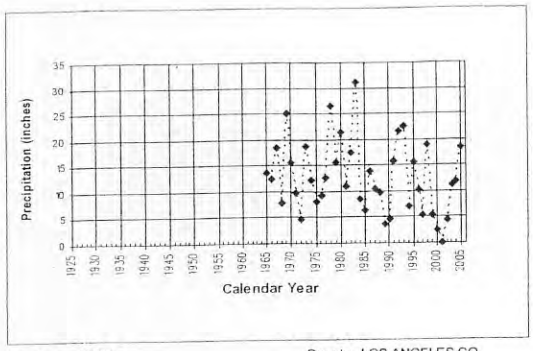
Multiple-completion monitoring wells and in-stream drive points were instrumented with transducers to provide a continuous record of stream stage and groundwater levels at varying depths within the aquifer system. Additionally, slug tests were performed at the

three new multiple-completion monitoring locations. These data were evaluated using an analytical model to estimate values for horizontal and vertical hydraulic conductivity, specific storage, and specific yield. Stable isotope data were used to estimate the age and source of groundwater within the basin. Results based on deuterium and oxygen 18 data indicate that groundwater in most wells in the Santa Clarita Valley is recharged from the surface-water system. Wells north of the river are generally recharged from mountain-front runoff. Tritium data, for the Santa Paula Subbasin, suggest that recent (post-1950) recharge water is limited to depths less than 350 feet below ground surface, indicating little hydraulic interaction between the shallow and lower aquifer systems.

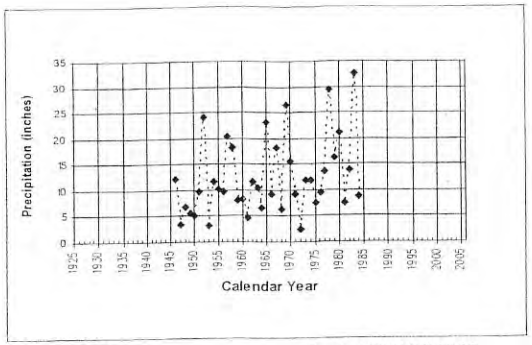
United States Geological Survey (USGS). 1998. ***Statistical Analysis and Mathematical Modeling of a Tracer Test on the Santa Clara River, Ventura County, California.*** **Water-Resources Investigations Report 97-4275. Prepared in cooperation with United Water Conservation District.** A 24-hour tracer test using fluorescent dye was completed on a 28-mile stretch of the SCR under steady-state conditions. The study reach included lower sections of Piru Creek and the middle SCR. The injection point for the dye was on Piru Creek, and the fluorescence of the river water was measured continuously at four sites and intermittently at two sites. The data from the study were used to calibrate a one-dimensional flow model (DAFLOW) and a solute transport model (BLTM). Statistical analyses of the data indicate that the transport characteristics of the SCR obey Fickian theory.

United Water Conservation District (UWCD). 2005. ***Description and Surface Water Modeling Capabilities of the Piru Basin.*** **Prepared by Murray McEachron of the United Water Conservation District. December.** This report documents historical and current groundwater and surface-water conditions in the Piru Subbasin. The paper describes locations of groundwater/surface-water interaction based on both historical and current observations. The report documents the construction and a spreadsheet model that calculates streamflow and infiltration at various points along the SCR.

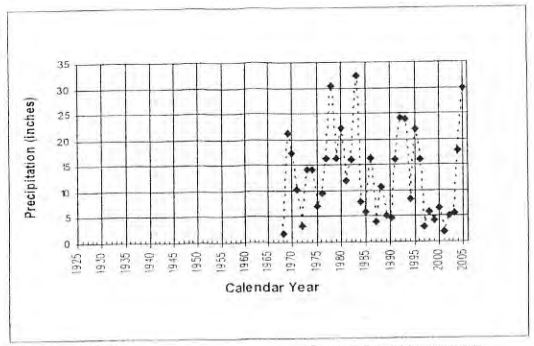
This Page Intentionally
Left Blank



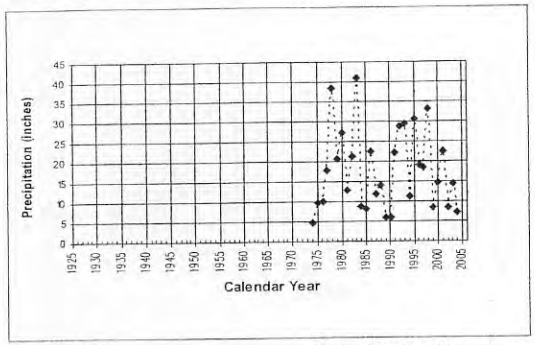
Location: 1005b County: LOS ANGELES CO



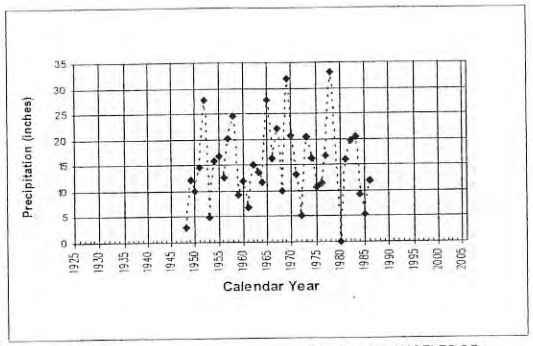
Location: 1009a County: LOS ANGELES CO



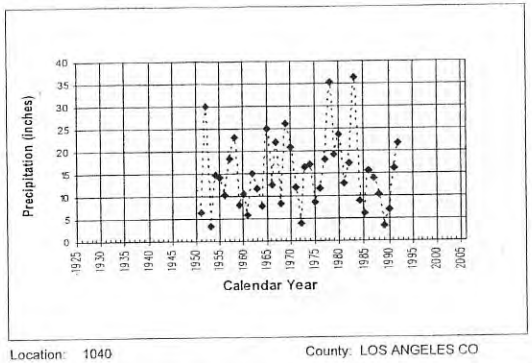
Location: 1012b County: LOS ANGELES CO



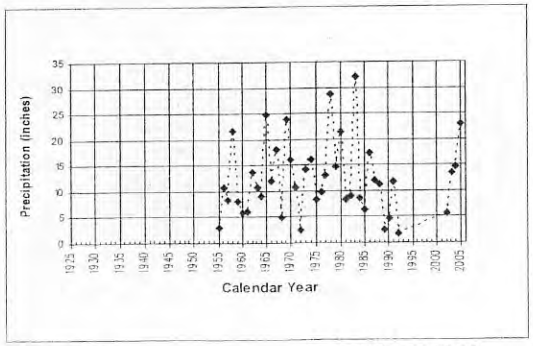
Location: 101r County: VENTURA CO



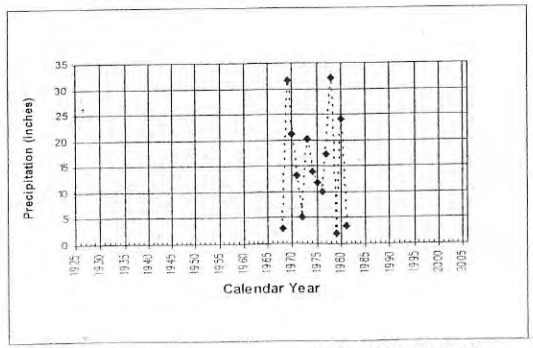
Location: 1022a County: LOS ANGELES CO



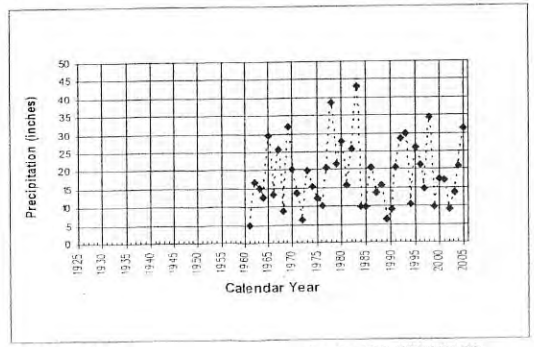
Location: 1040 County: LOS ANGELES CO



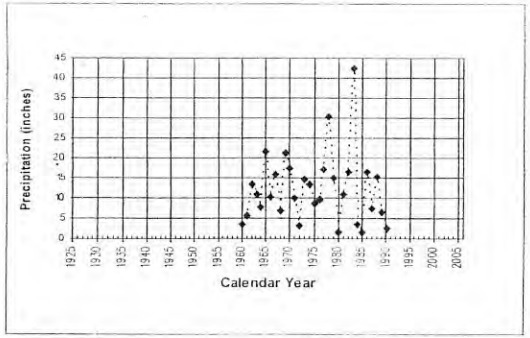
Location: 1104c County: LOS ANGELES CO



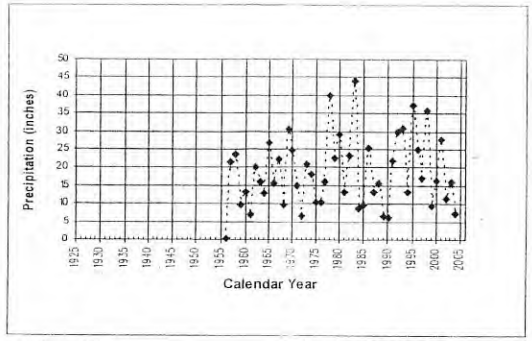
Location: 1184a County: LOS ANGELES CO



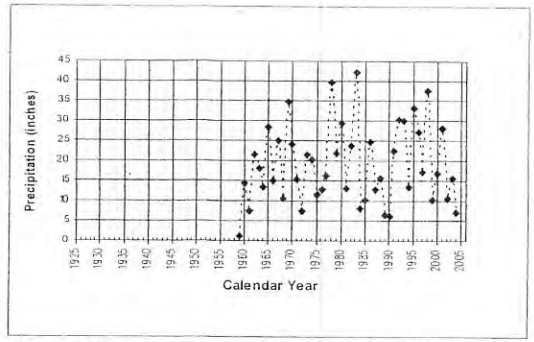
Location: 125b County: LOS ANGELES CO



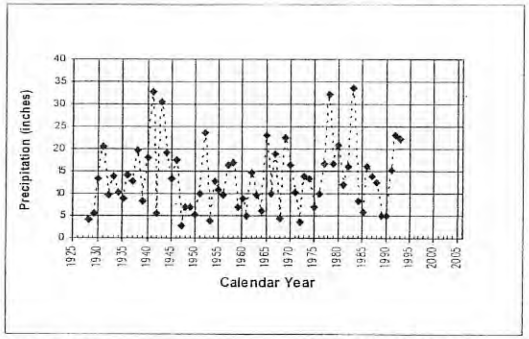
Location: 127b County: LOS ANGELES CO



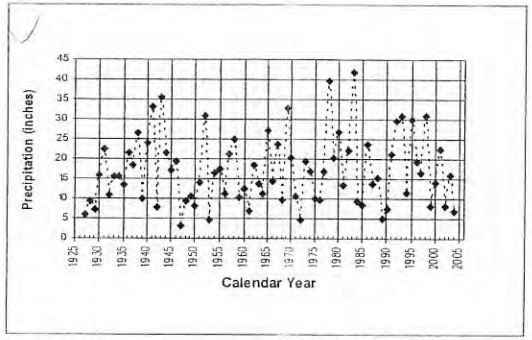
Location: 171 County: VENTURA CO



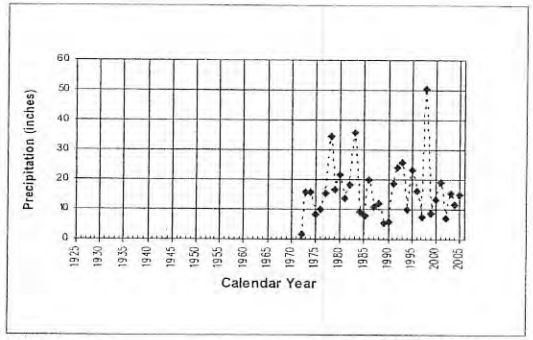
Location: 199 County: VENTURA CO



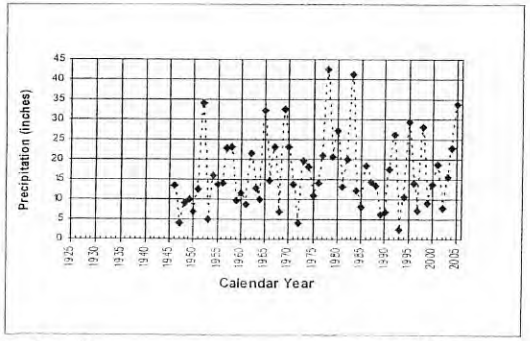
Location: 200 County: LOS ANGELES CO



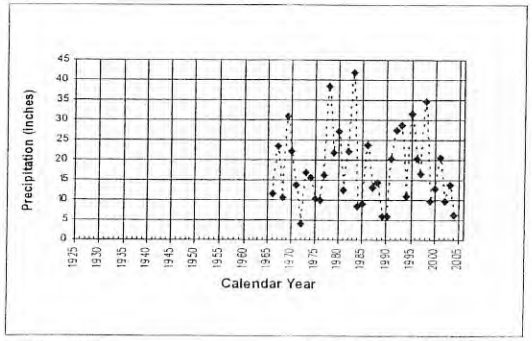
Location: 25 County: VENTURA CO



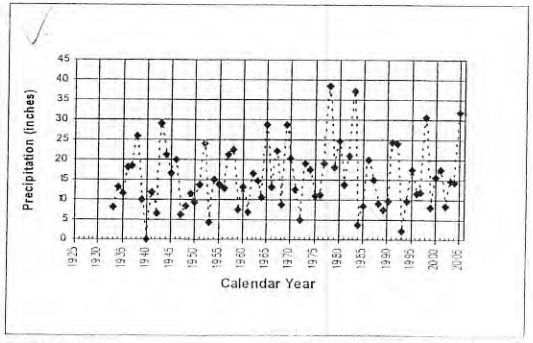
Location: 252c County: LOS ANGELES CO



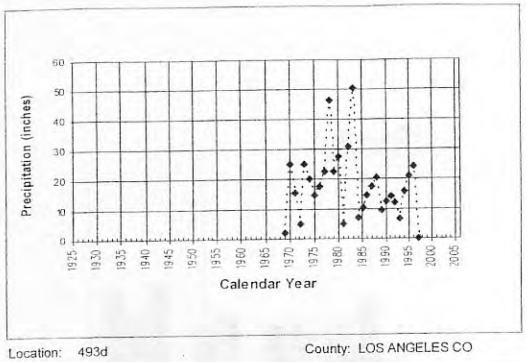
Location: 32c County: LOS ANGELES CO



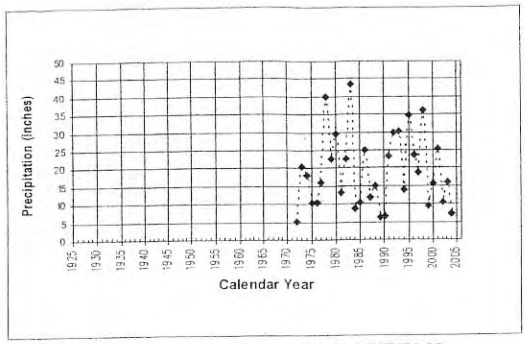
Location: 36a County: VENTURA CO



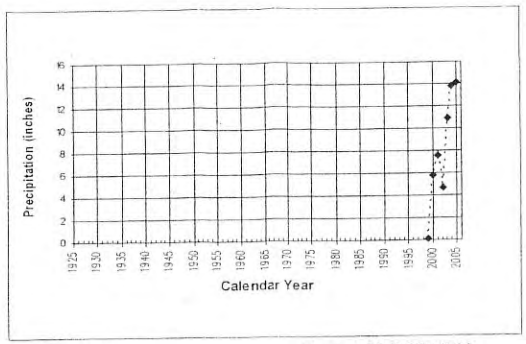
Location: 372 County: LOS ANGELES CO



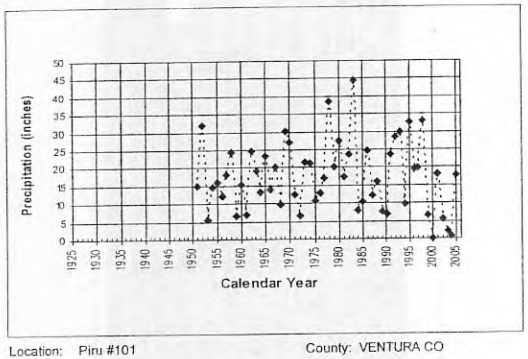
Location: 493d County: LOS ANGELES CO



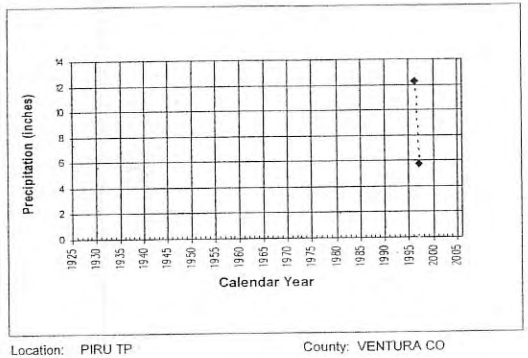
Location: 94c County: VENTURA CO



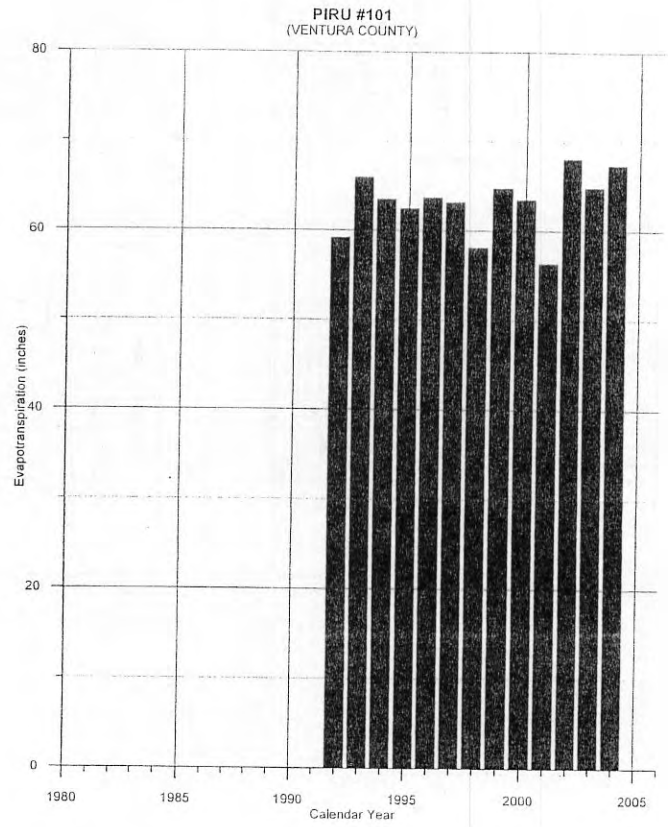
Location: al402 County: LOS ANGELES CO



Location: Piru #101 County: VENTURA CO



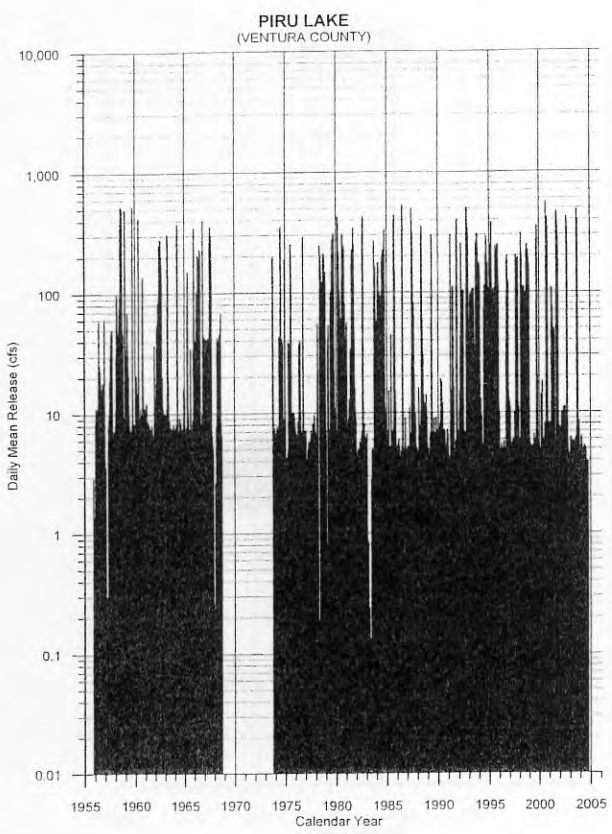
Location: PIRU TP County: VENTURA CO

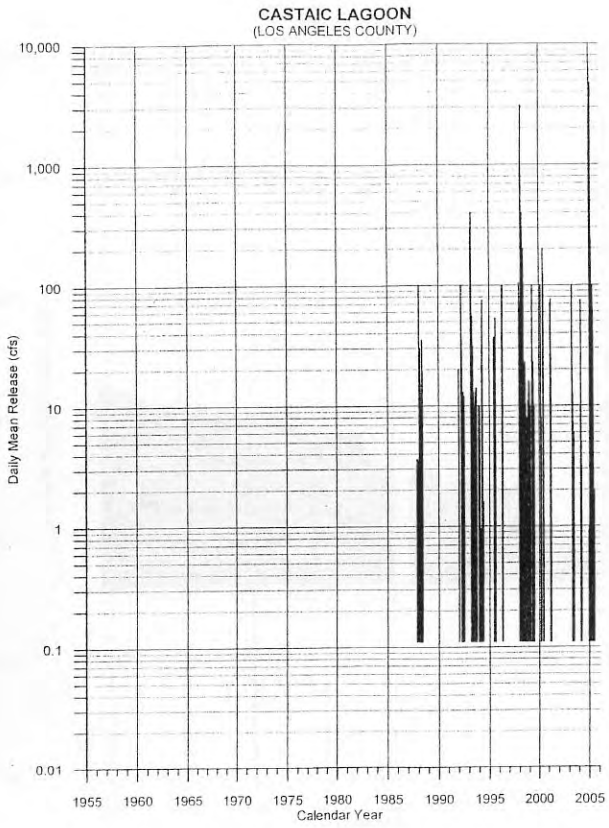


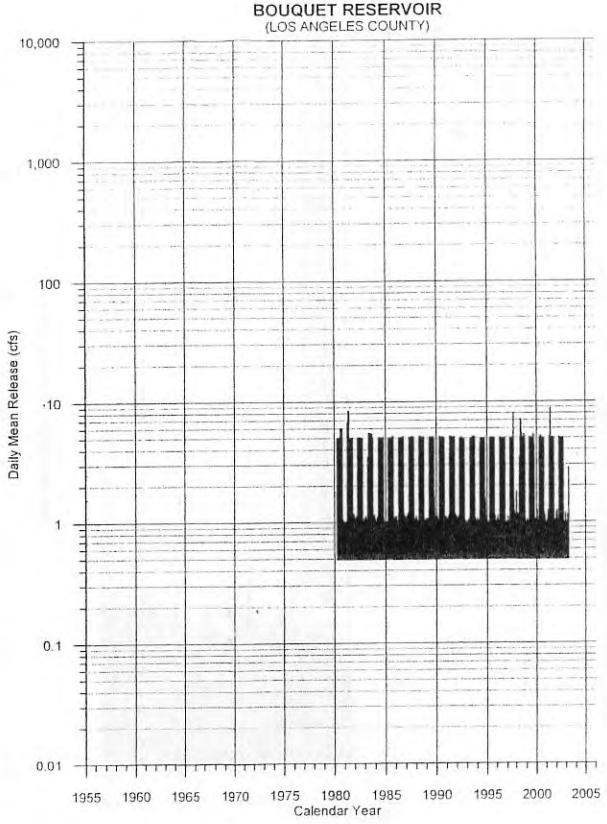
APPENDIX C (Page C-1 of C-1)
ANNUAL EVAPOTRANSPIRATION
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A - EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

RDD \\DDIN\PROJ\COUNTYSANDISTLA\332056GSW\DOC\TASK1A-LITREVIEW\FIGURES\GRAPHER\APPENDIXC.GRF

WEST ← → EAST







cfs = CUBIC FEET PER SECOND

RDD:\ODIN\PROJ\COUNTYSANDIST\LA032056GSW\IDOC\TASK1A-LITREVIEW\FIGURES\GRAPHER\APPENDIXD.GRF

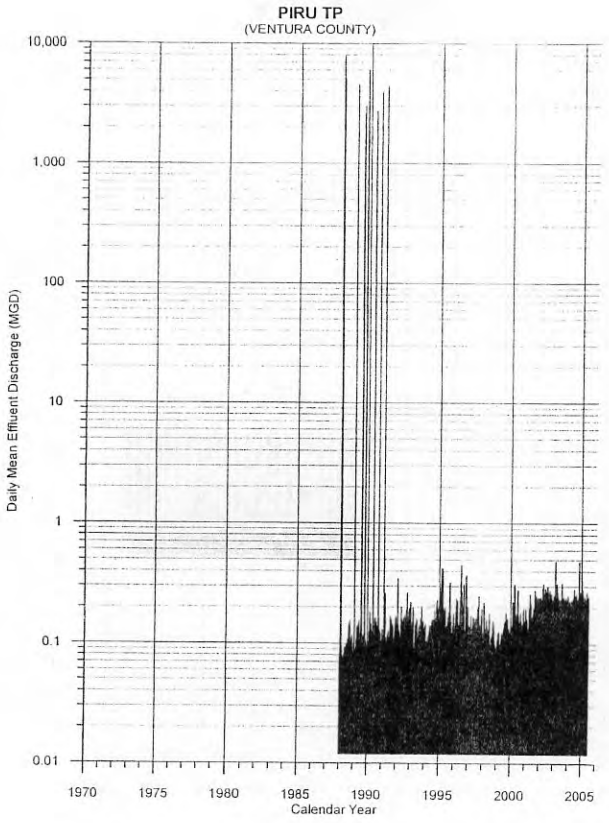
APPENDIX D (Page D-1 of D-1)

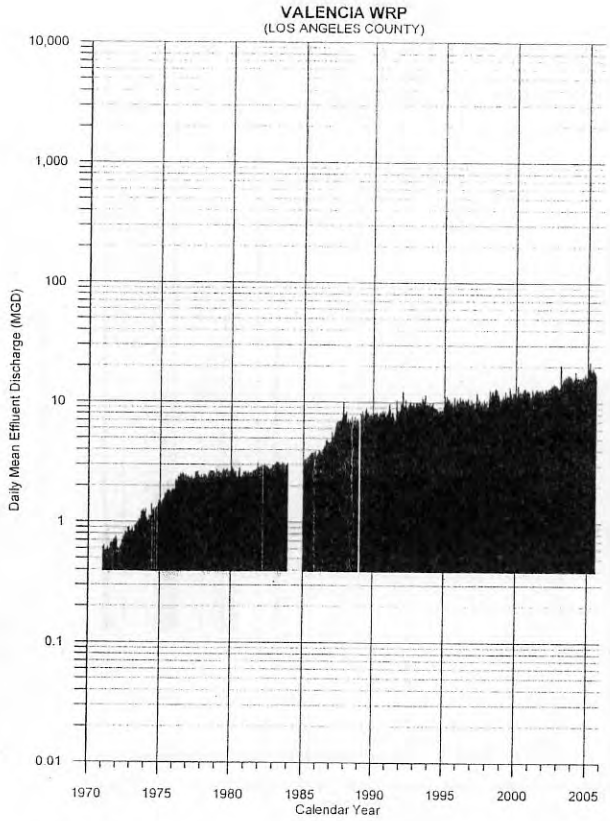
DAILY MEAN RESERVOIR RELEASES

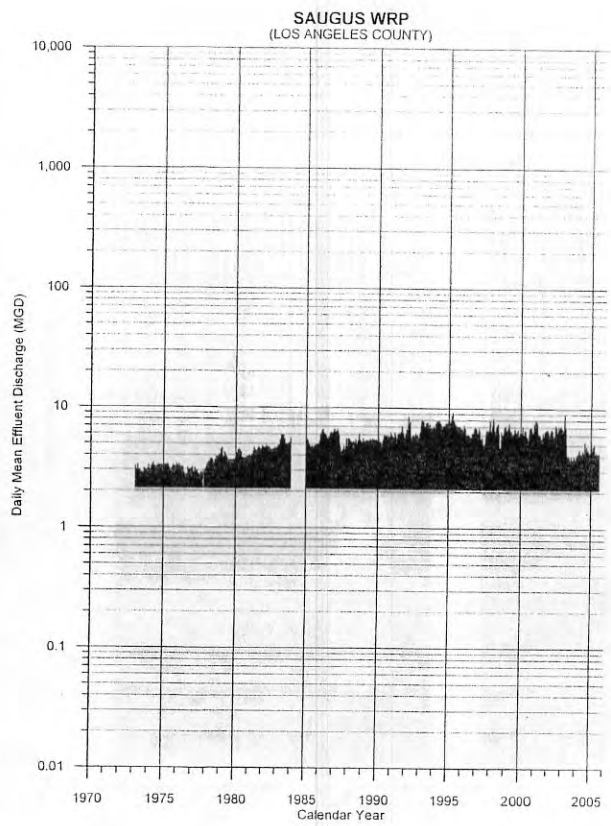
LITERATURE REVIEW AND DATA ACQUISITION
TASK 1A - EVALUATE EXISTING MODELS, LITERATURE, AND DATA
UPPER SANTA CLARA RIVER CHLORIDE TMDL COLLABORATIVE PROCESS

5-1215

WEST ← → EAST

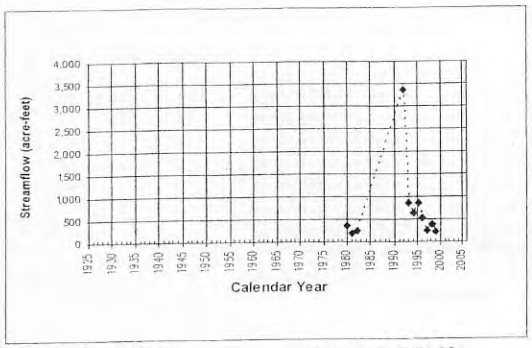




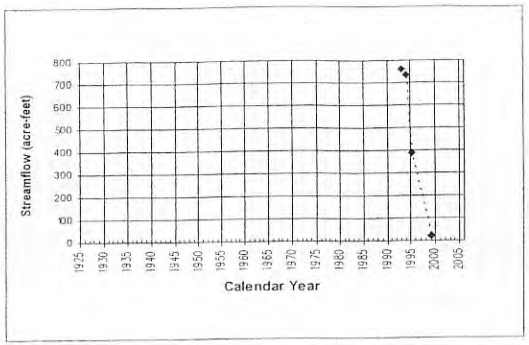


MGD = MILLION GALLONS PER DAY

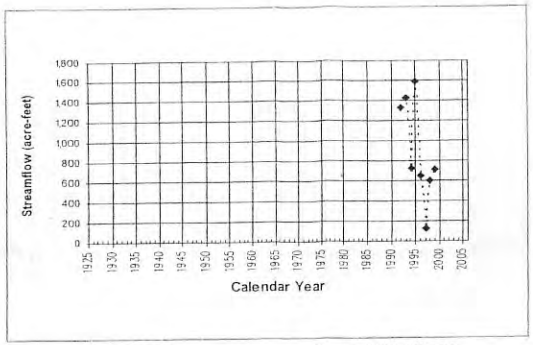
RDD %DIN\PROJ\COUNTYSANDISTLA\332056GSW\DOC\TASK1A-LITREVIEW\FIGURES\GRAPHER\APPENDIXE.GRF



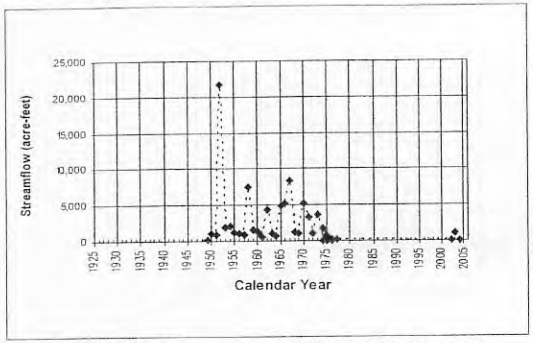
Location: 04N17W29SW1 County: VENTURA CO



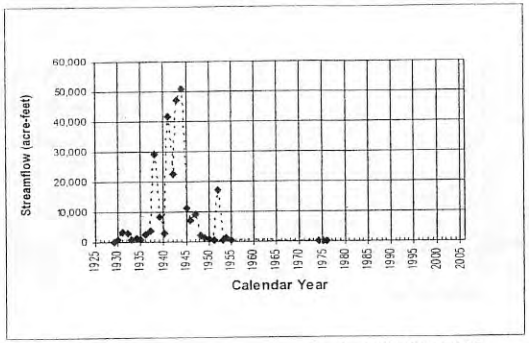
Location: 04N18W30SW1 County: VENTURA CO



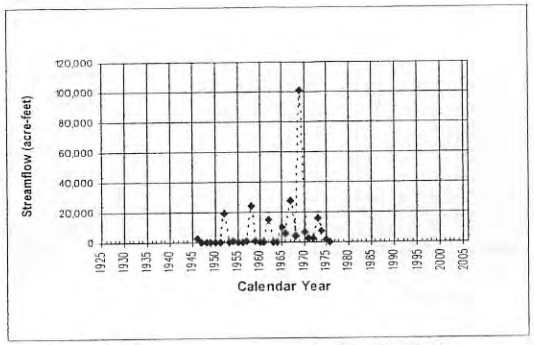
Location: 04N19W33SW1 County: VENTURA CO



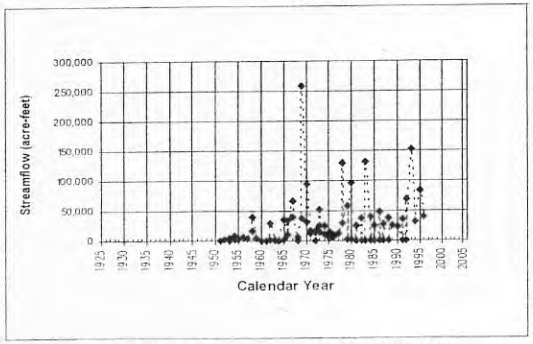
Location: 11107745 (LANG) County: LOS ANGELES CO



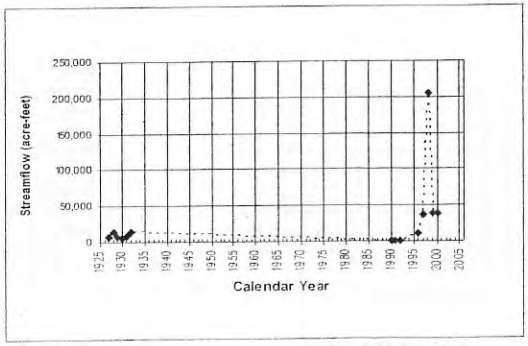
Location: 11108000 County: LOS ANGELES CO



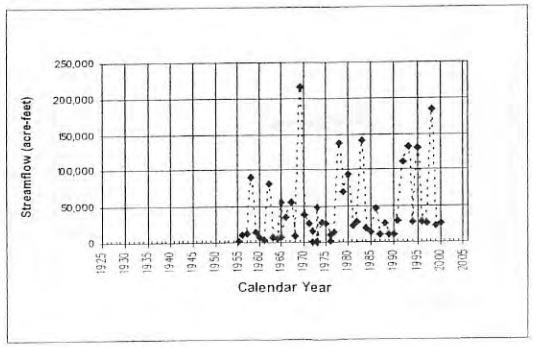
Location: 11108145 County: VENTURA CO



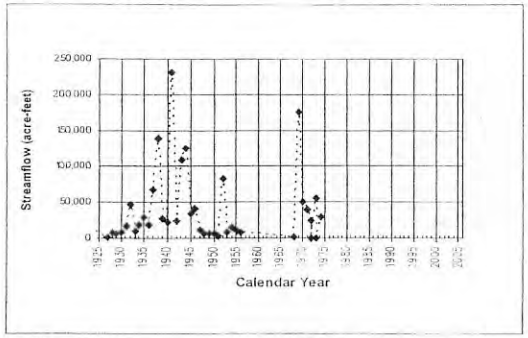
Location: 11108500 (BLUE CUT) County: VENTURA CO



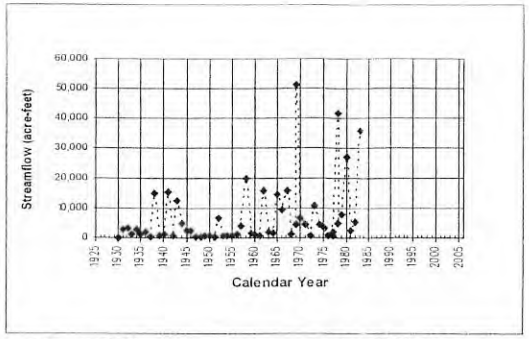
Location: 11109000 County: VENTURA CO



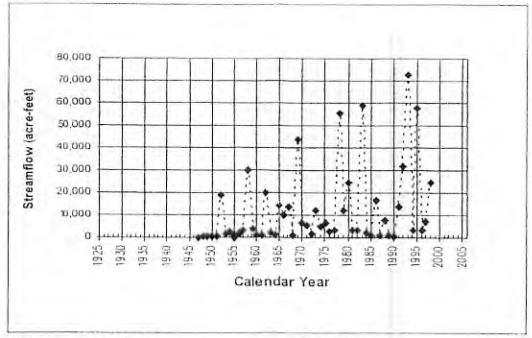
Location: 11109600 County:



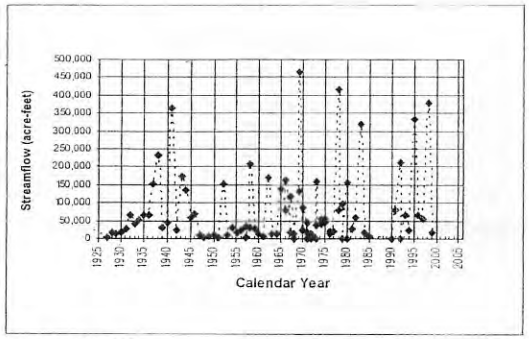
Location: 11110000 County:



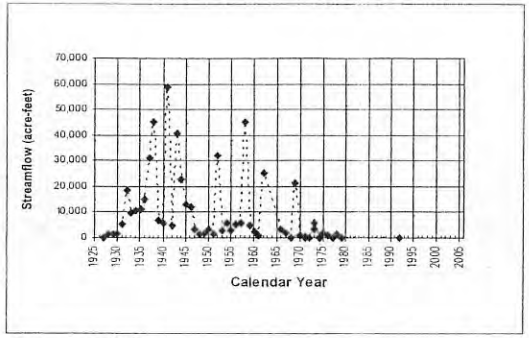
Location: 11110500 County: VENTURA CO



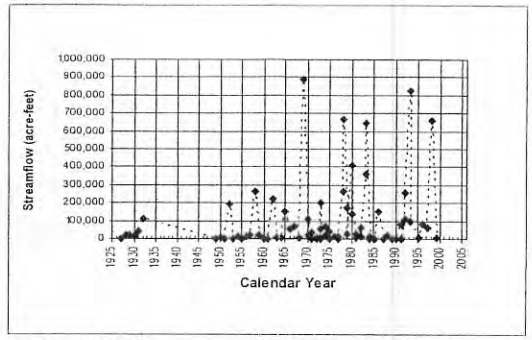
Location: 11111500 County:



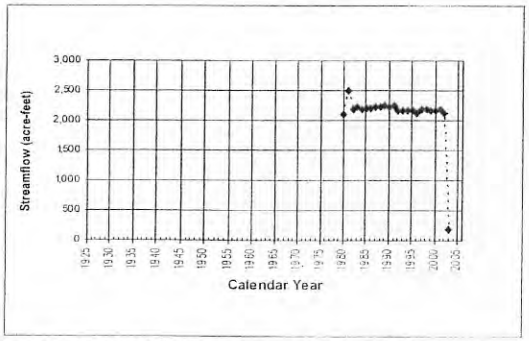
Location: 11113000 County:



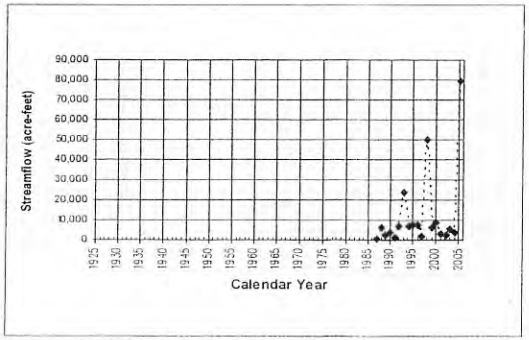
Location: 11113500 County:



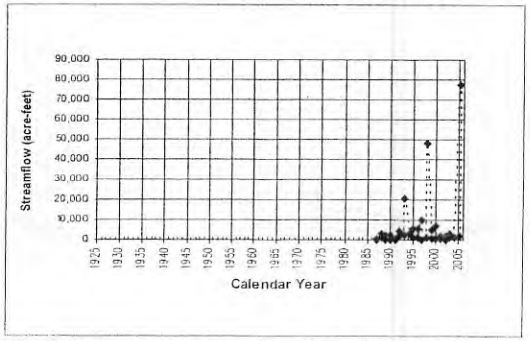
Location: 11114000 County: VENTURA CO



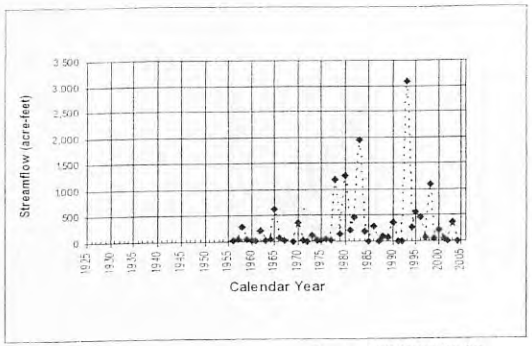
Location: BOUQUET RELEASE County: LOS ANGELES CO



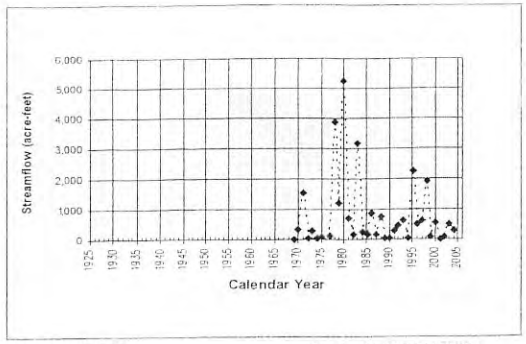
Location: CASTAIC LAKE County:



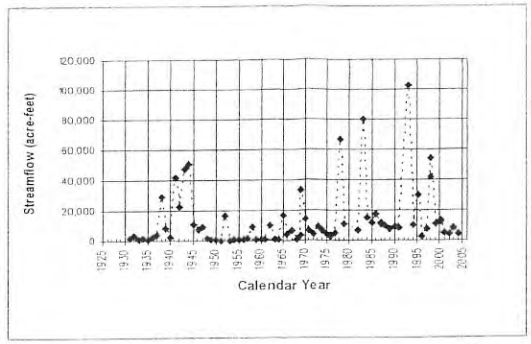
Location: CASTAIC RELEASE County: LOS ANGELES CO



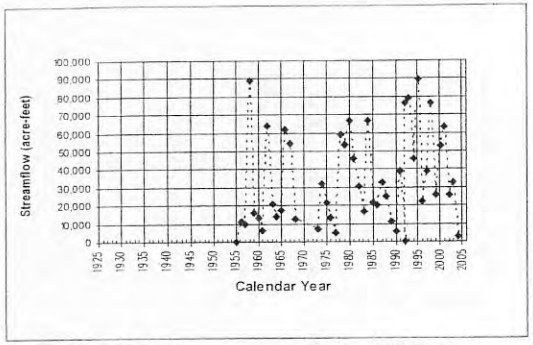
Location: F328-R County: LOS ANGELES CO



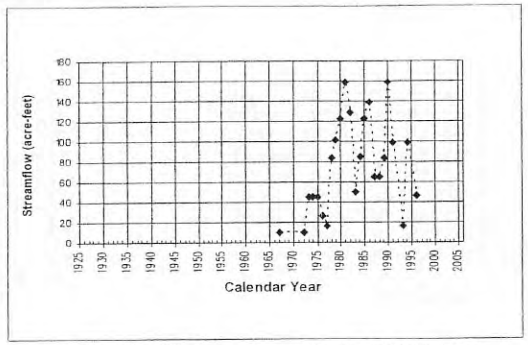
Location: F377-R County: LOS ANGELES CO



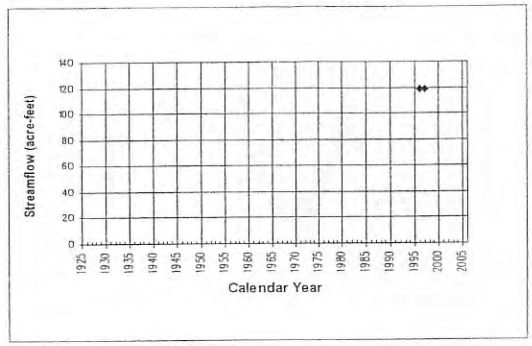
Location: F92C-R County: LOS ANGELES CO



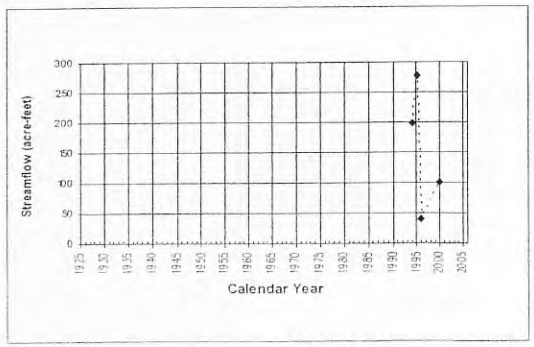
Location: PIRU RELEASE County: VENTURA CO



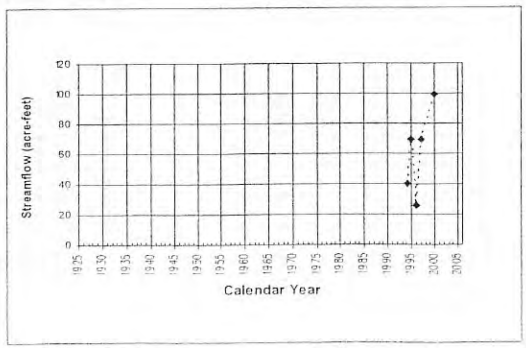
Location: SCR-OldHWY99Bridge County: LOS ANGELES CO



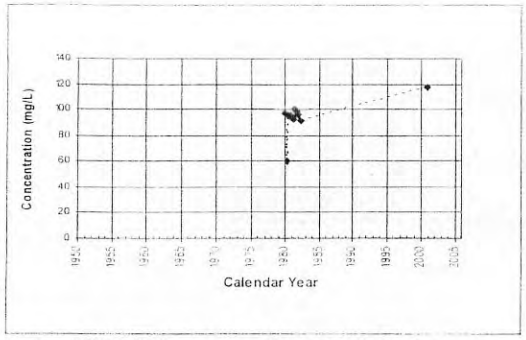
Location: Z2129550 County:



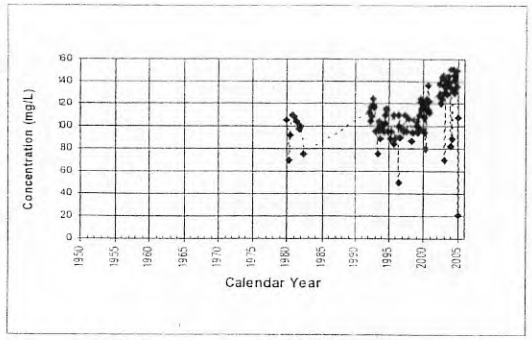
Location: Z2136010 County:



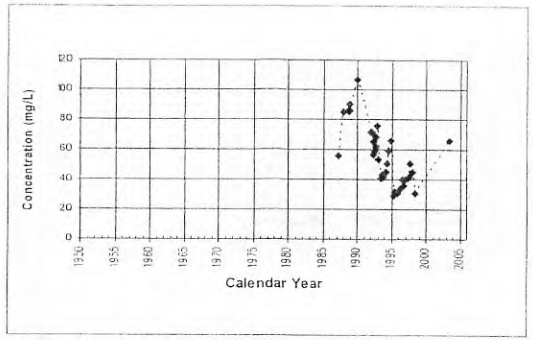
Location: Z2170200 County:



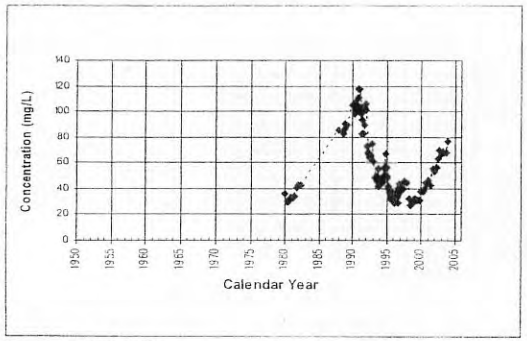
Location: 04N16W17SW1 County: LOS ANGELES CO



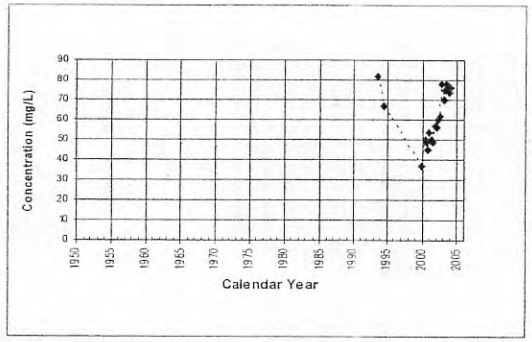
Location: 04N17W29SW1 County: VENTURA CO



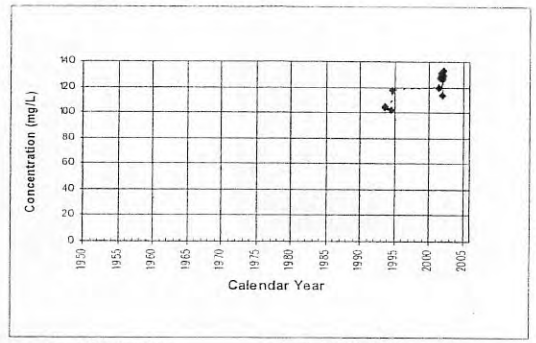
Location: 04N18W03SW1 County: VENTURA CO



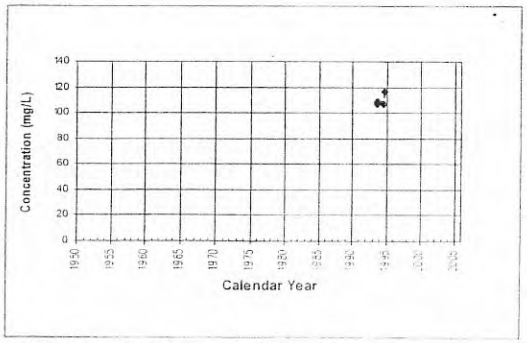
Location: 04N18W03SW2 County: VENTURA CO



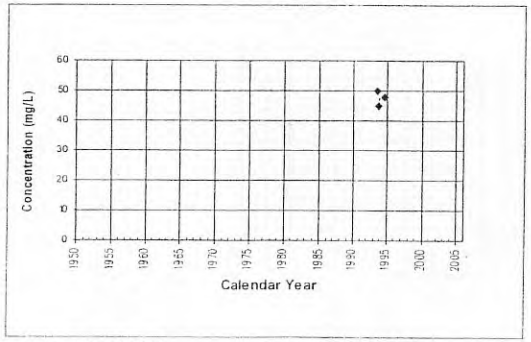
Location: 04N18W20SW1 County: VENTURA CO



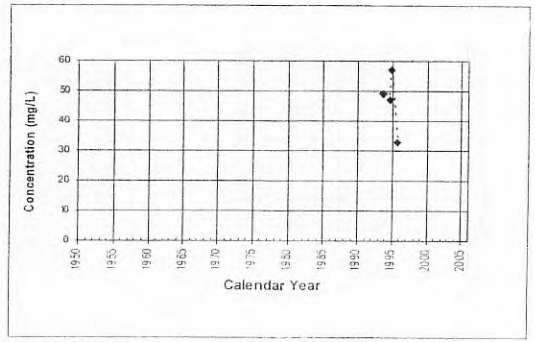
Location: 04N18W25SW1 County: VENTURA CO



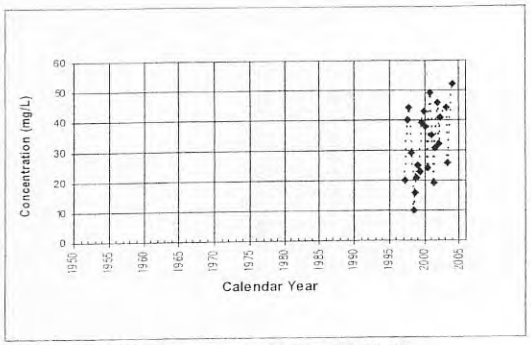
Location: 04N18W26SW1 County: VENTURA CO



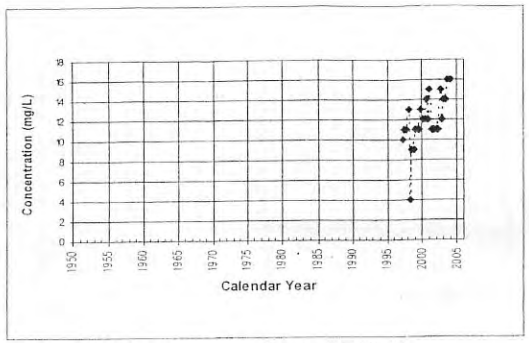
Location: 04N18W29SW1 County: VENTURA CO



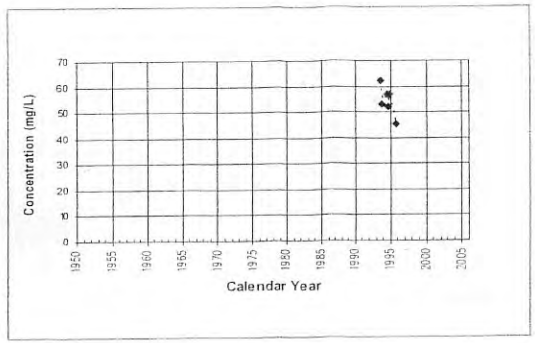
Location: 04N18W30SW1 County: VENTURA CO



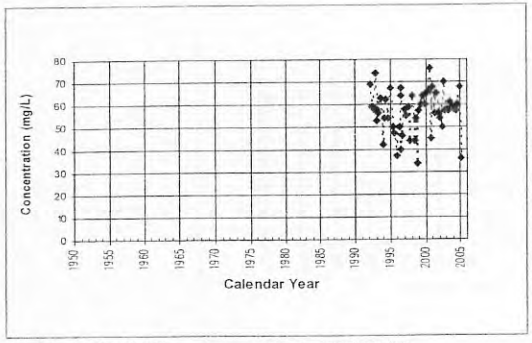
Location: 04N19W25SW1 County: VENTURA CO



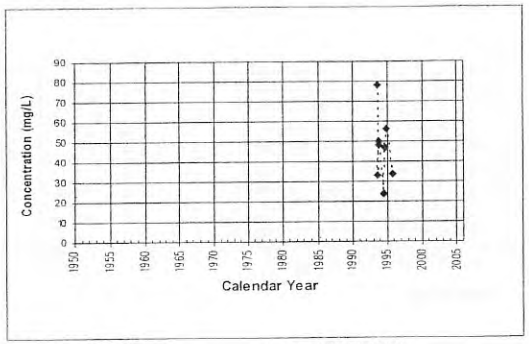
Location: 04N19W30SW1 County: VENTURA CO



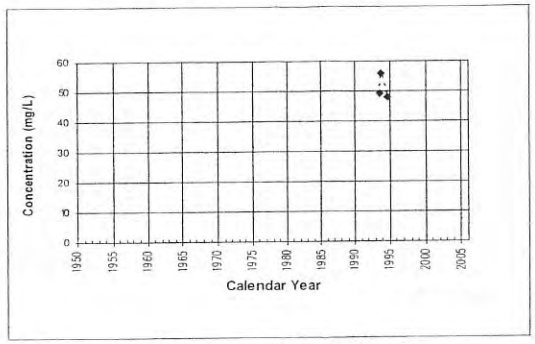
Location: 04N19W31SW1 County: VENTURA CO



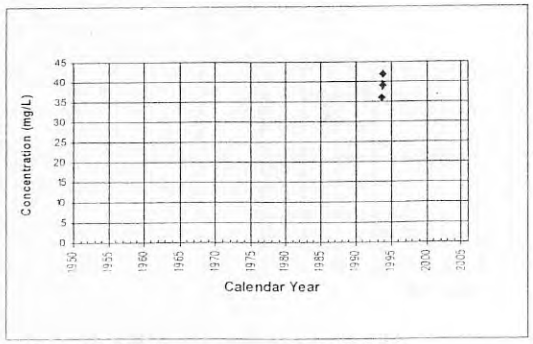
Location: 04N19W33SW1 County: VENTURA CO



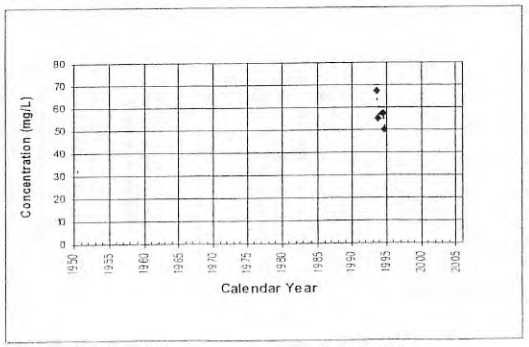
Location: 04N19W35SW1 County: VENTURA CO



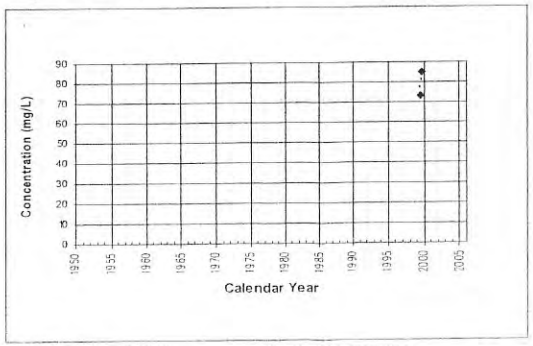
Location: 04N19W36SW1 County: VENTURA CO



Location: 04N20W26SW1 County: VENTURA CO

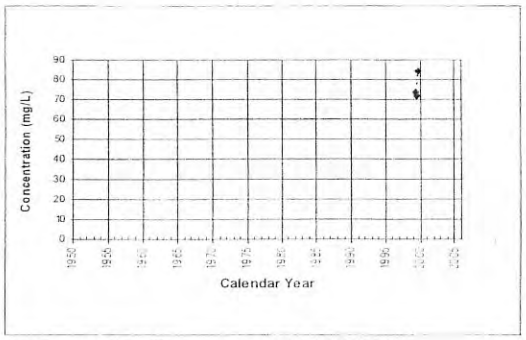


Location: 04N20W35SW1 County: VENTURA CO

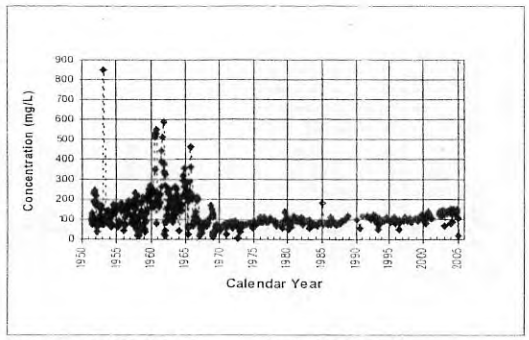


Location: 04N20W36SW1 County: VENTURA CO

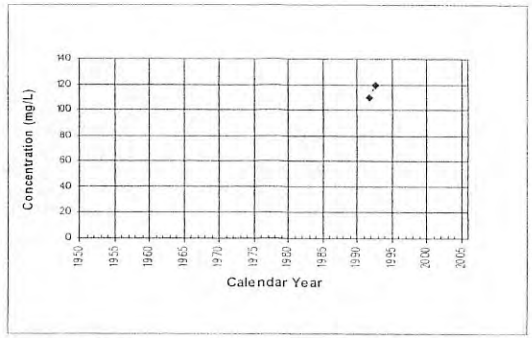
S-1221



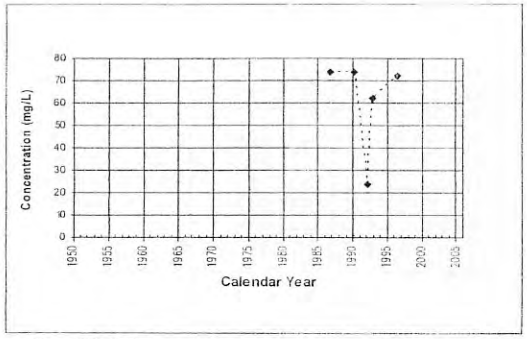
Location: 04N20W36SW2 County: VENTURA CO



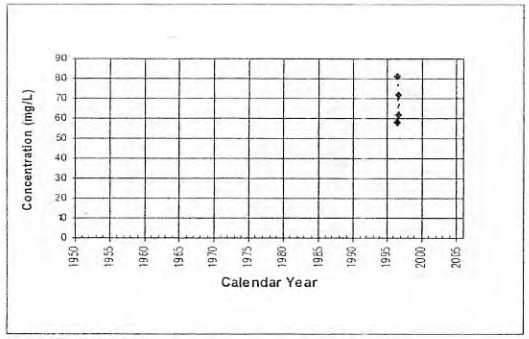
Location: 11108500 (BLUE CUT) County: VENTURA CO



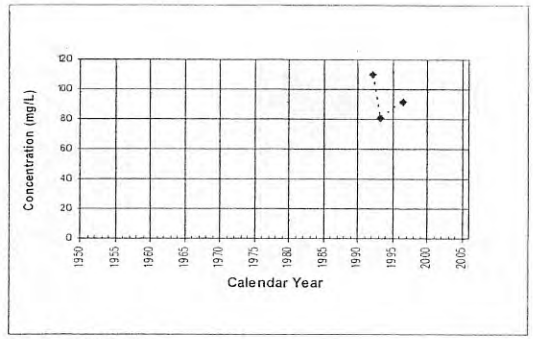
Location: 11109000 County: VENTURA CO



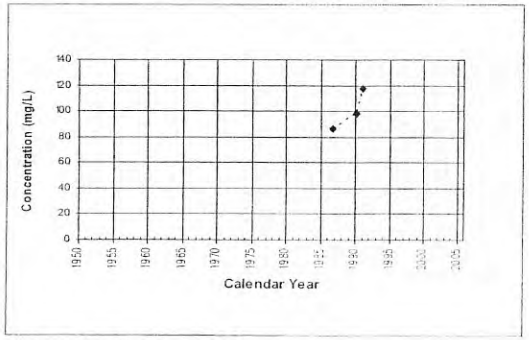
Location: 403SC09500



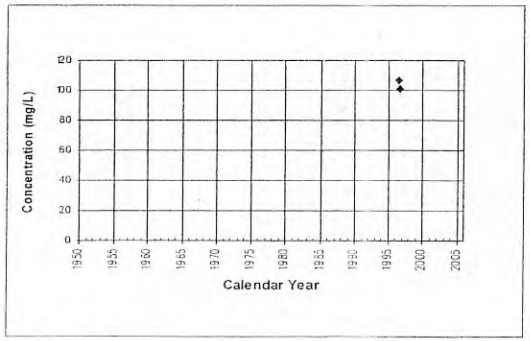
Location: 403SC15750



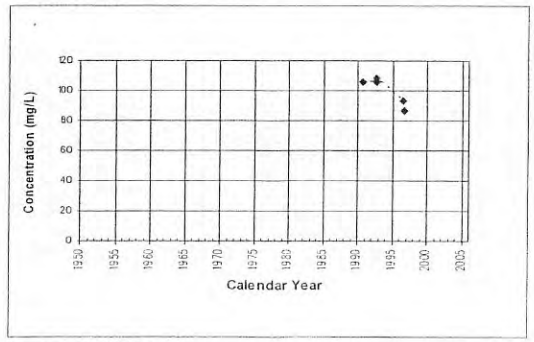
Location: 403SC67000



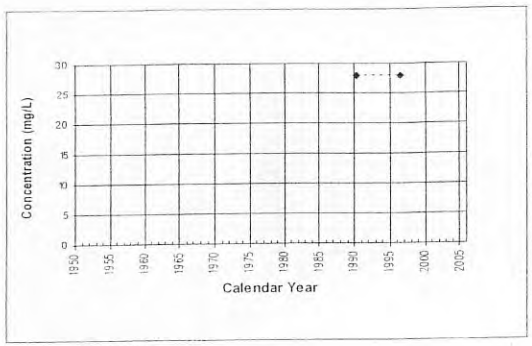
Location: 403SC70500



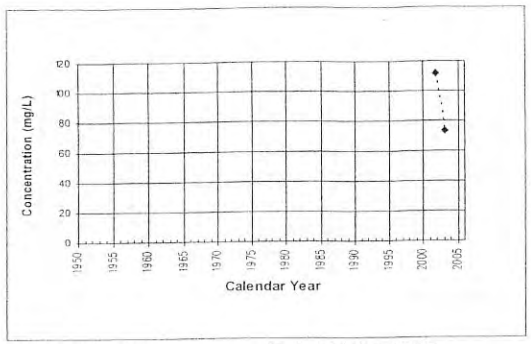
Location: 403SC72000



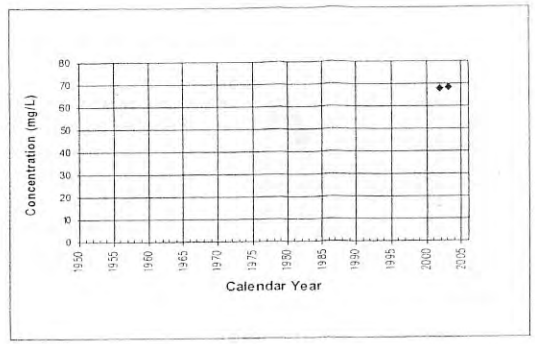
Location: 403SC76000



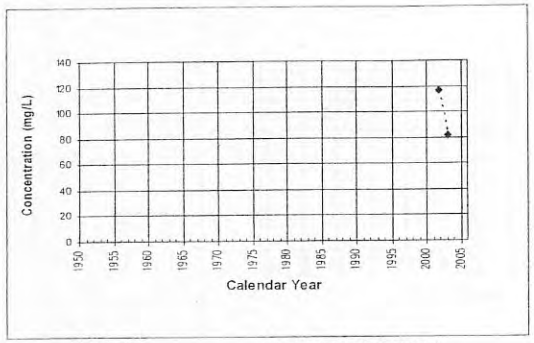
Location: 403SC86000



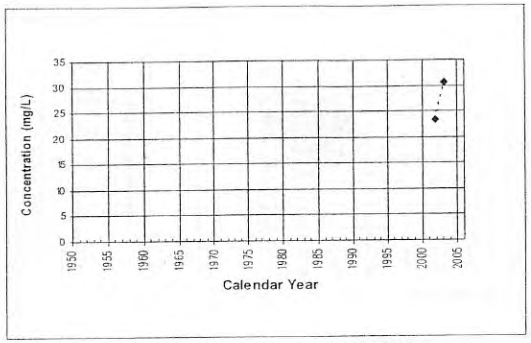
Location: 403STC004 County: LOS ANGELES CO



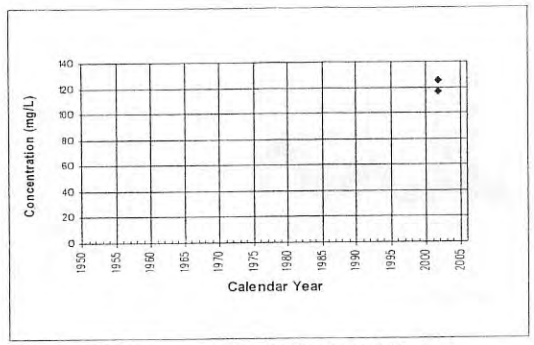
Location: 403STC008 County: VENTURA CO



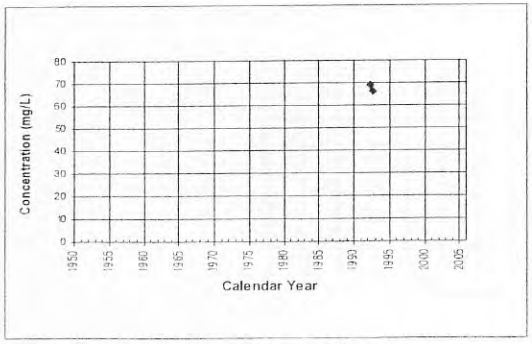
Location: 403STC019 County: LOS ANGELES CO



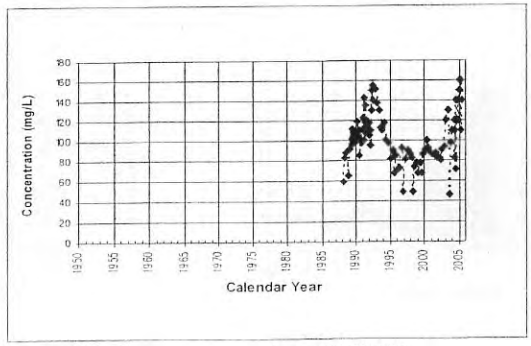
Location: 403STC027 County: LOS ANGELES CO



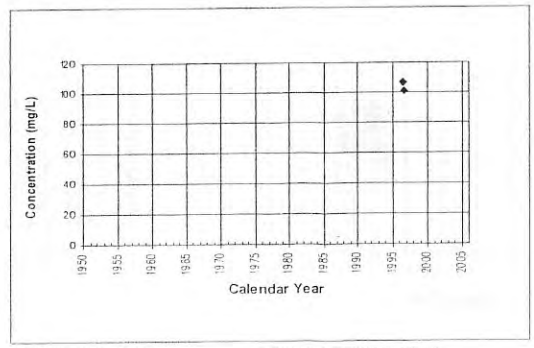
Location: 403STCNRB County: VENTURA CO



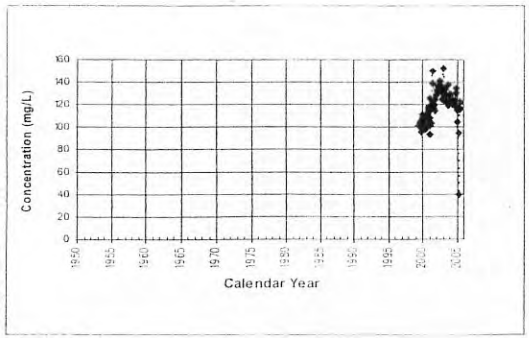
Location: PIRU RELEASE County: VENTURA CO



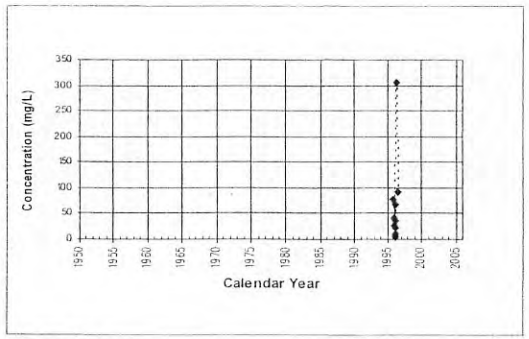
Location: PIRU TP County: VENTURA CO



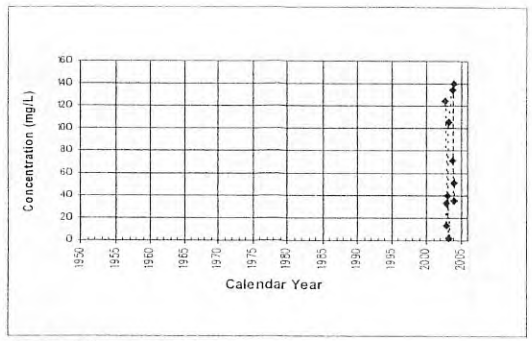
Location: Potrerro Rd County: LOS ANGELES CO



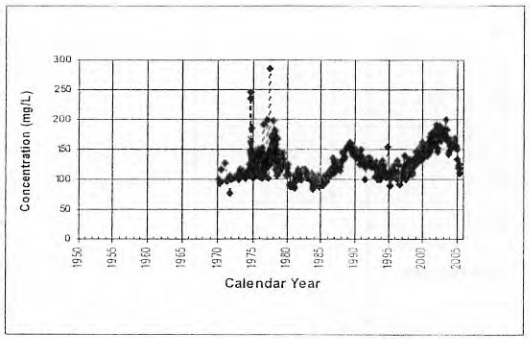
Location: RB01



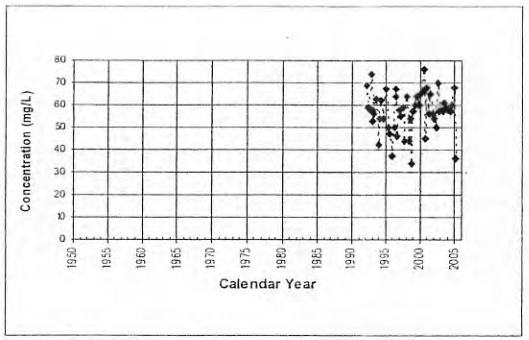
Location: S19



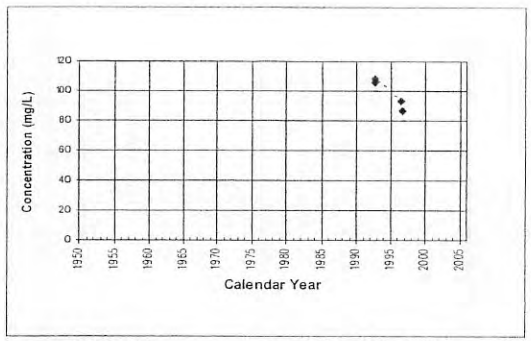
Location: S29



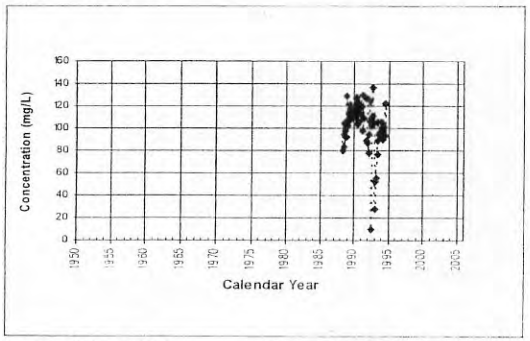
Location: SAUGUS WRP County: LOS ANGELES CO



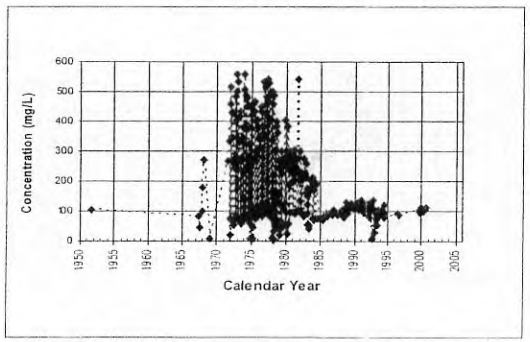
Location: SCR-FillFishHatch



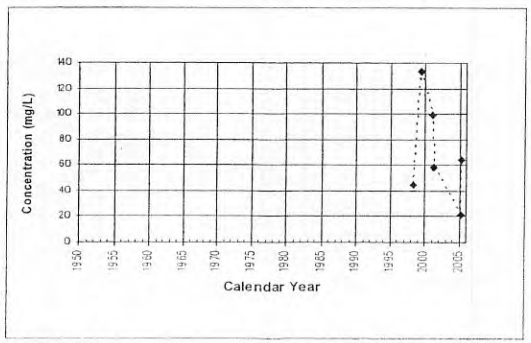
Location: SCR-HWY99 County: LOS ANGELES CO



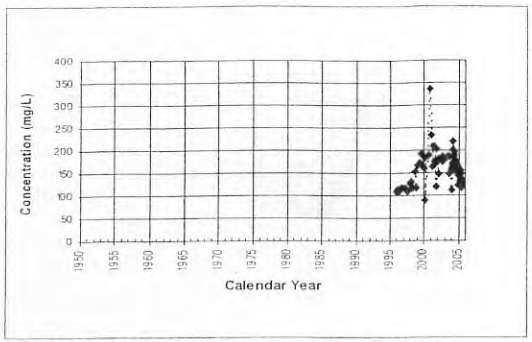
Location: SCR-OldHWY99 County: LOS ANGELES CO



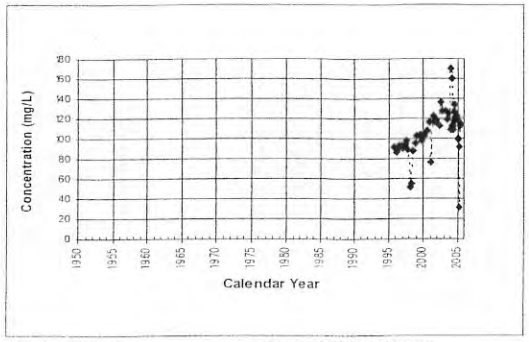
Location: SCR-OldHWY99Bridge County: LOS ANGELES CO



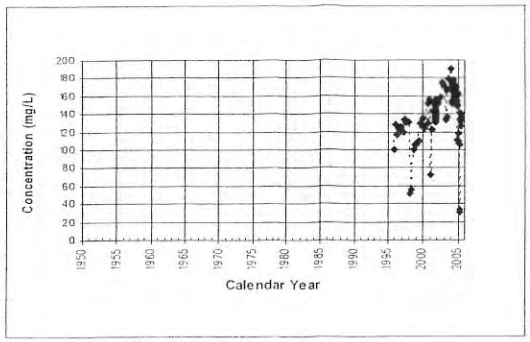
Location: SCR-RA County: LOS ANGELES CO



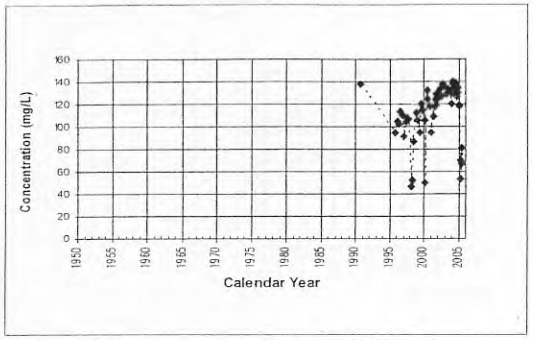
Location: SCR-RB County: LOS ANGELES CO



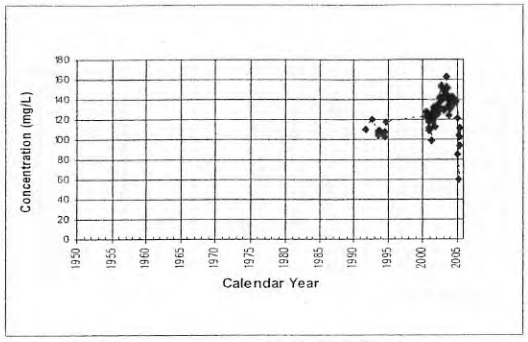
Location: SCR-RC County: LOS ANGELES CO



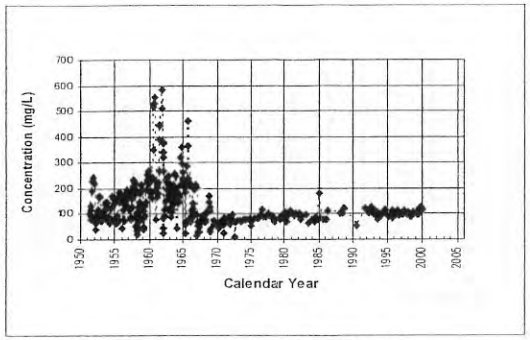
Location: SCR-RD County: LOS ANGELES CO



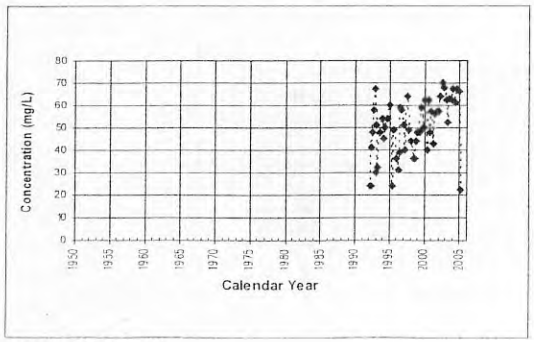
Location: SCR-RE County: LOS ANGELES CO



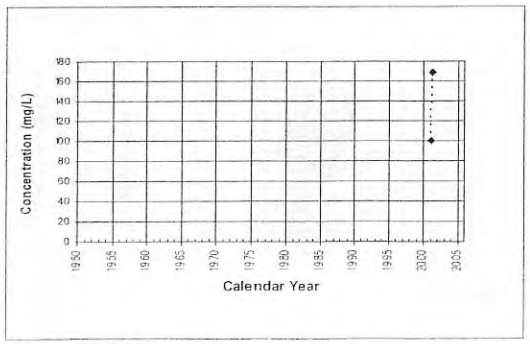
Location: SCR-RF County: VENTURA CO



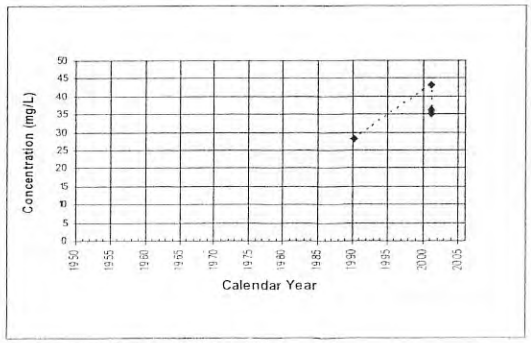
Location: SCR-VCOL County: VENTURA CO



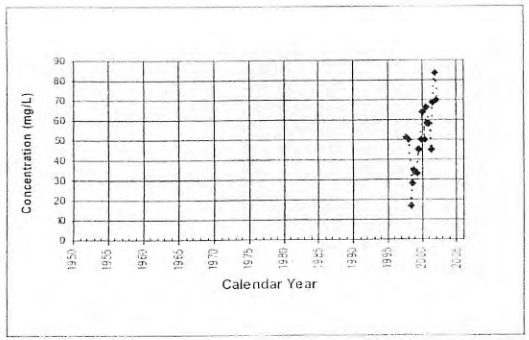
Location: SCR-WillardRd



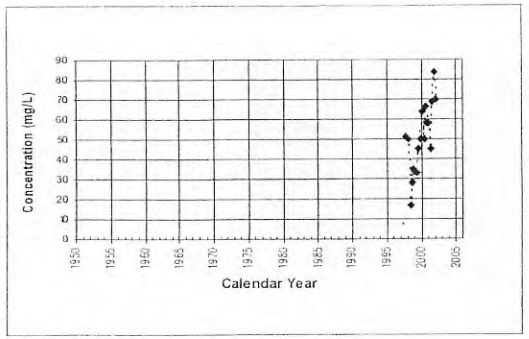
Location: STATION11



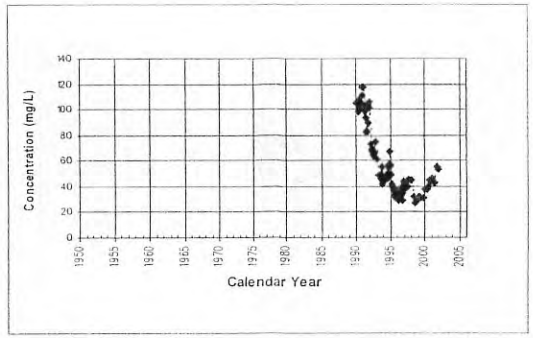
Location: STATION2



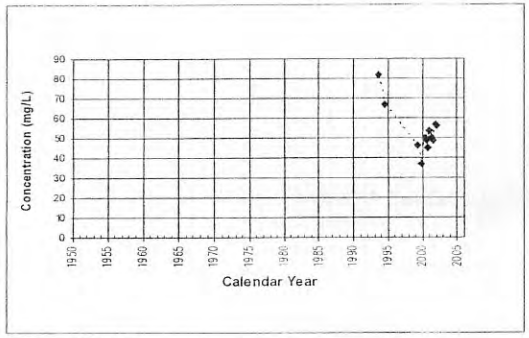
Location: STATION20



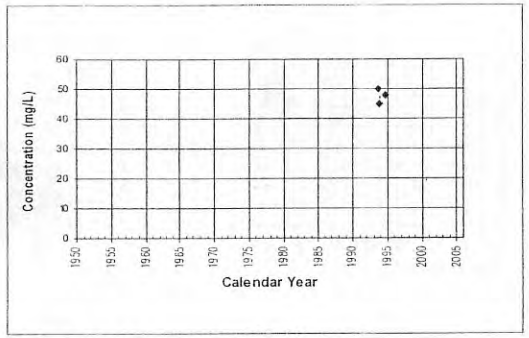
Location: STATION21



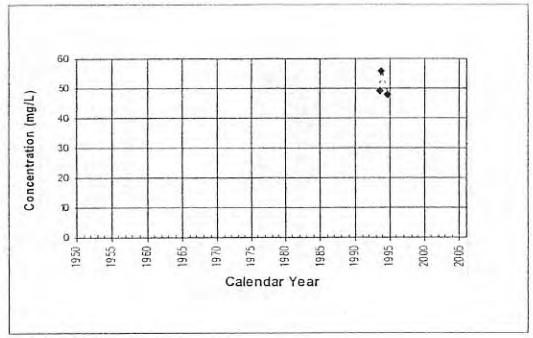
Location: STATION22



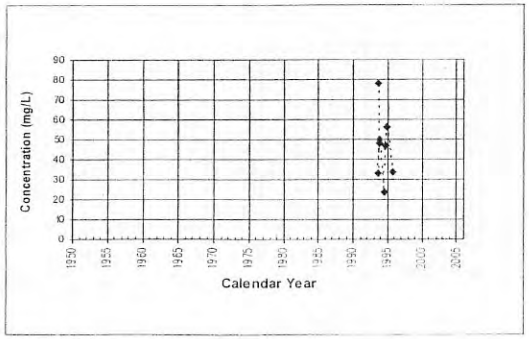
Location: STATION23



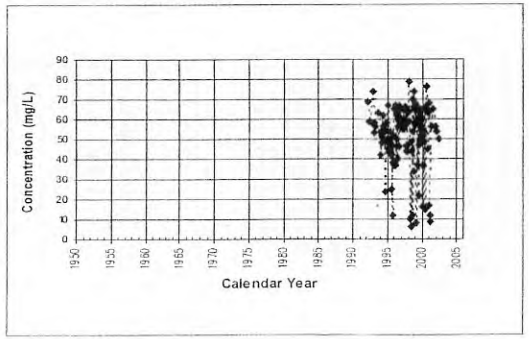
Location: STATION24



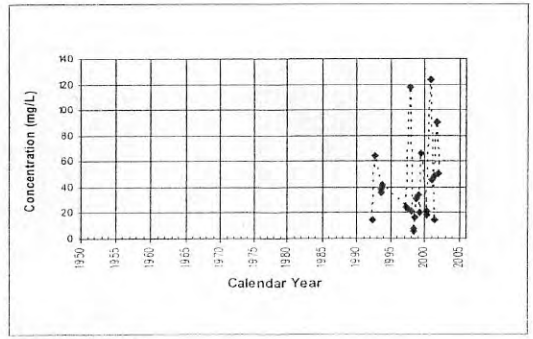
Location: STATION26



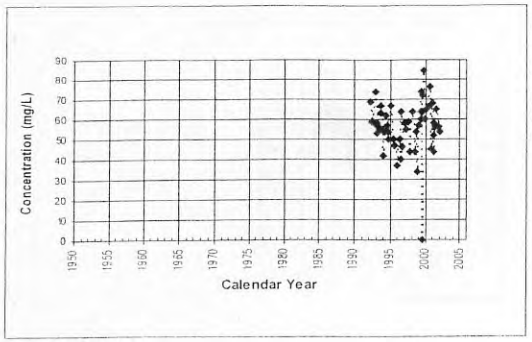
Location: STATION27



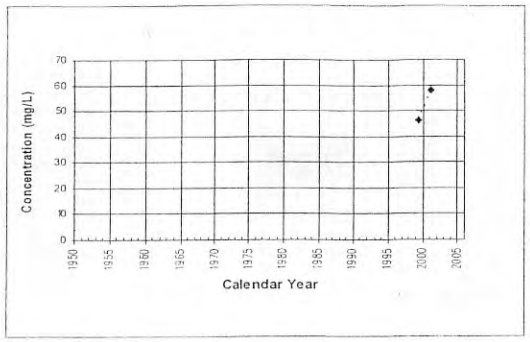
Location: STATION28



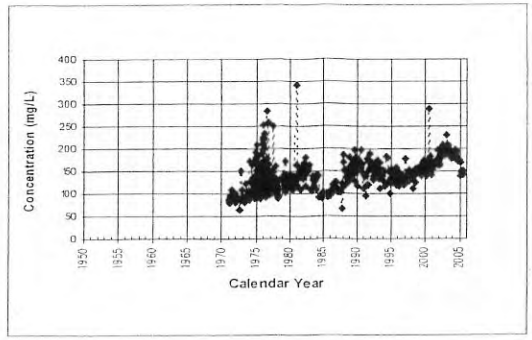
Location: STATION30



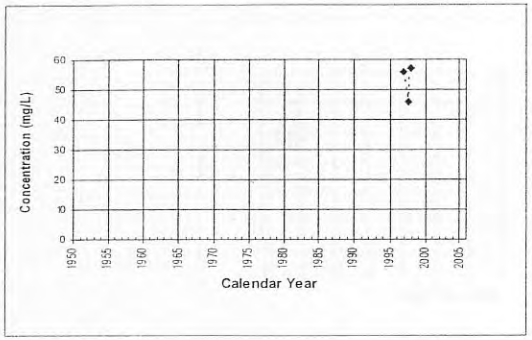
Location: STATION31



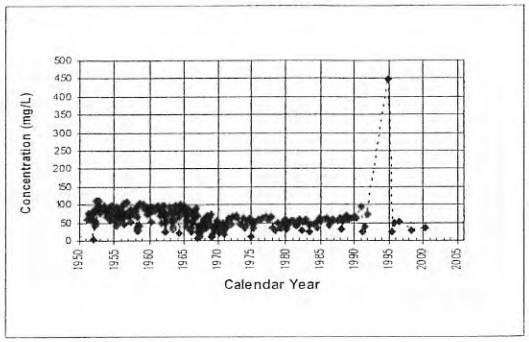
Location: STATION5



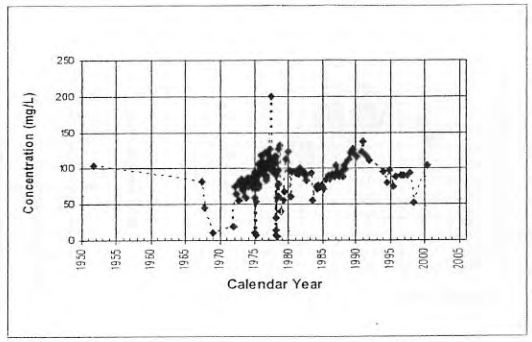
Location: VALENCIA WRP County: LOS ANGELES CO



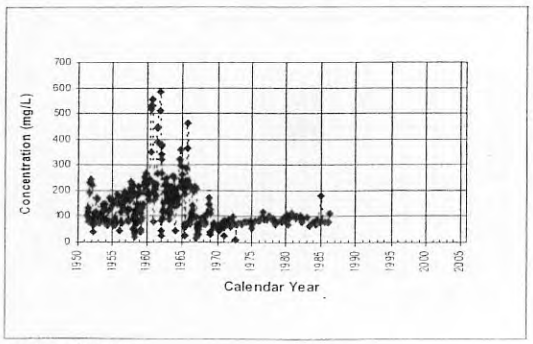
Location: Z2129550



Location: Z2136010

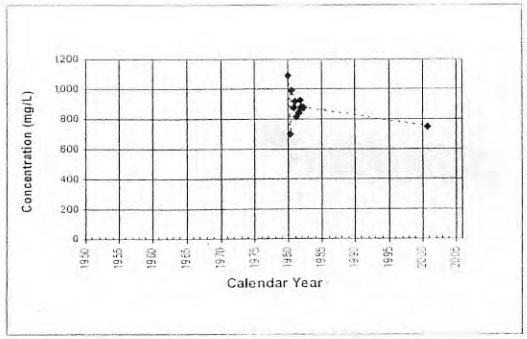


Location: Z2170200

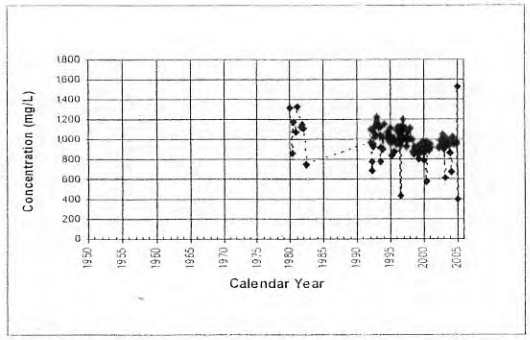


Location: Z3113500

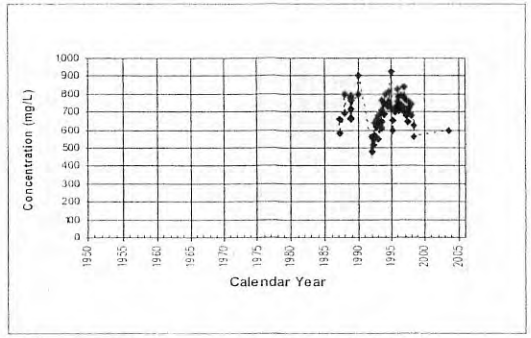
5-1227



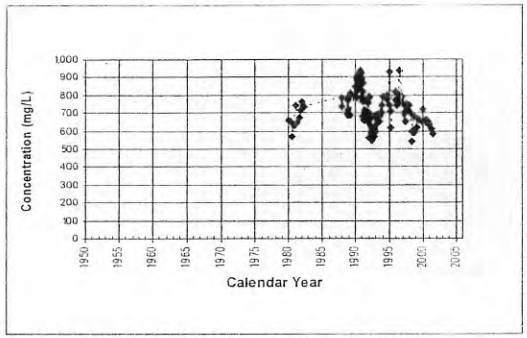
Location: 04N16W17SW1 County: LOS ANGELES CO



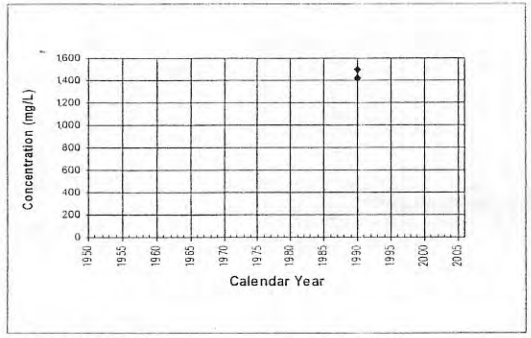
Location: 04N17W29SW1 County: VENTURA CO



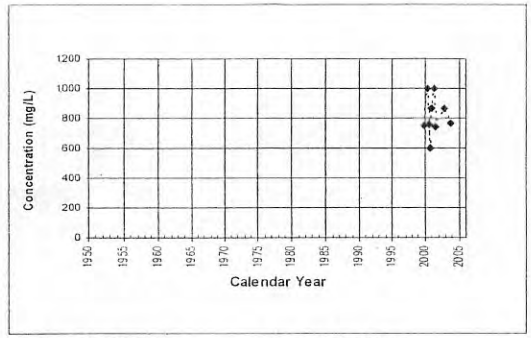
Location: 04N18W03SW1 County: VENTURA CO



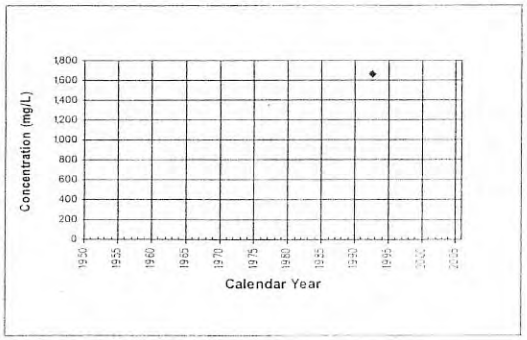
Location: 04N18W03SW2 County: VENTURA CO



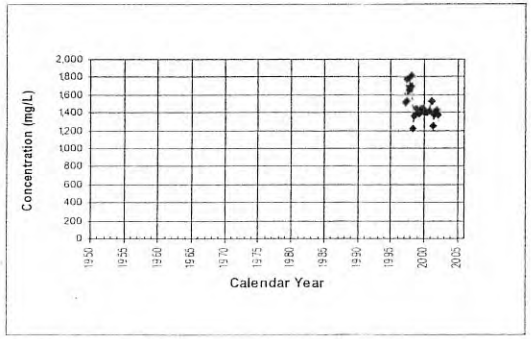
Location: 04N18W03SW3 County: VENTURA CO



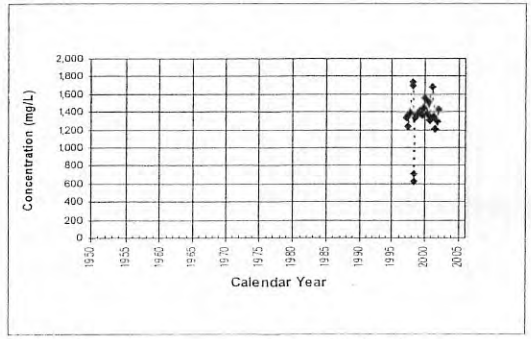
Location: 04N18W20SW1 County: VENTURA CO



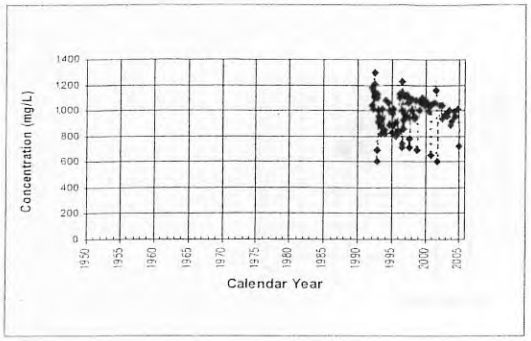
Location: 04N19W25L SW



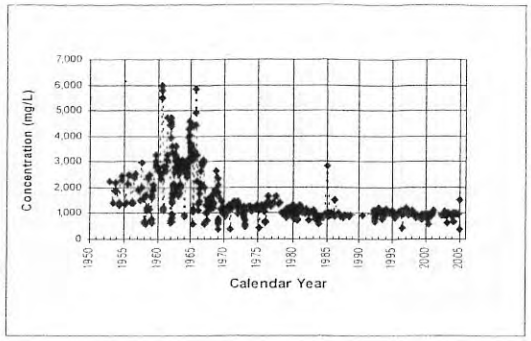
Location: 04N19W25SW1 County: VENTURA CO



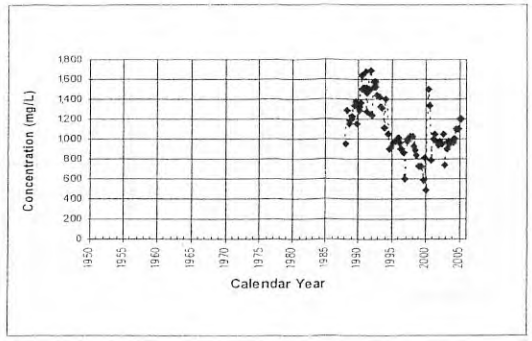
Location: 04N19W30SW1 County: VENTURA CO



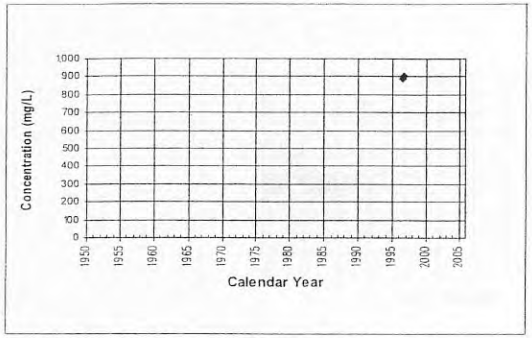
Location: 04N19W33SW1 County: VENTURA CO



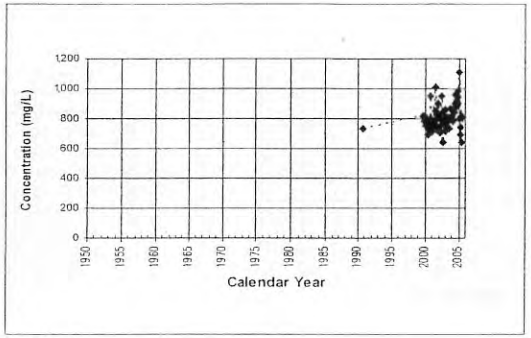
Location: 11108500 (BLUE CUT) County: VENTURA CO



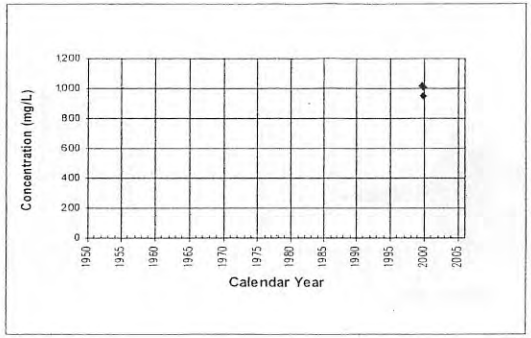
Location: PIRU TP County: VENTURA CO



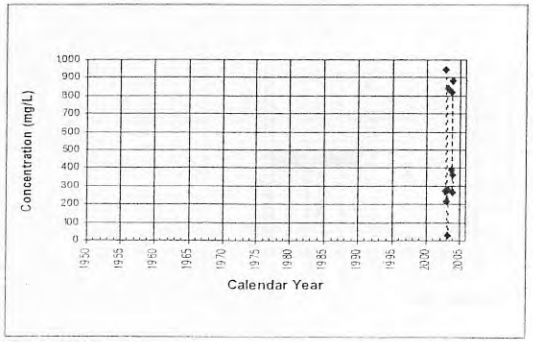
Location: Potrerro Rd County: LOS ANGELES CO



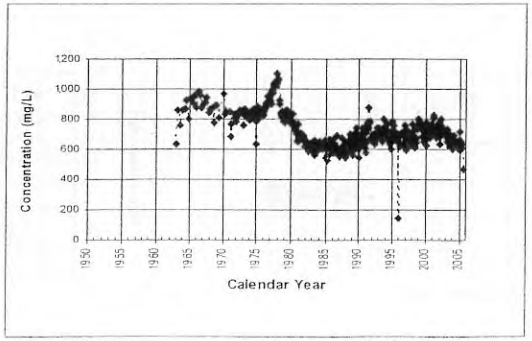
Location: RB01



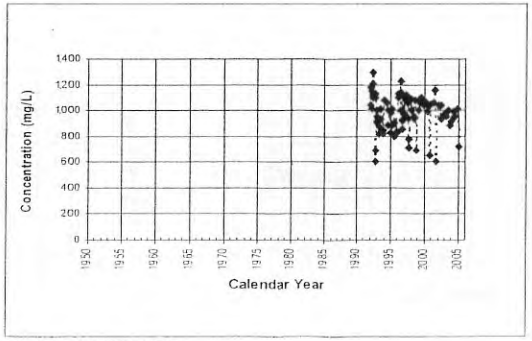
Location: RE01



Location: S29

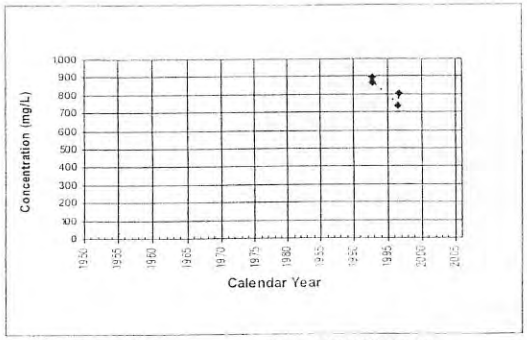


Location: SAUGUS WRP County: LOS ANGELES CO

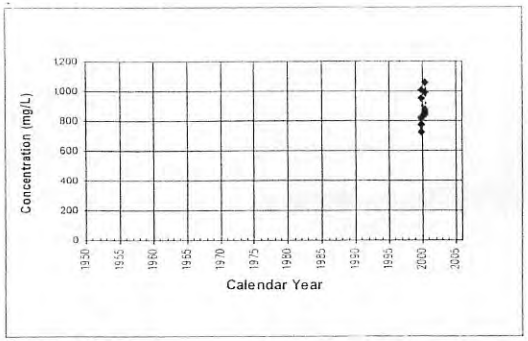


Location: SCR-FillFishHatch

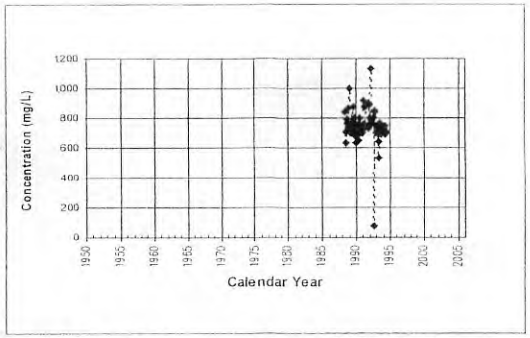
5-1220



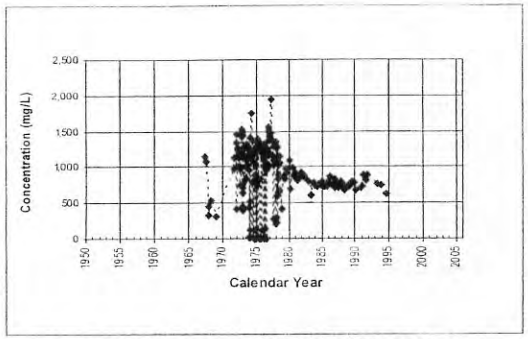
Location: SCR-HWY99 County: LOS ANGELES CO



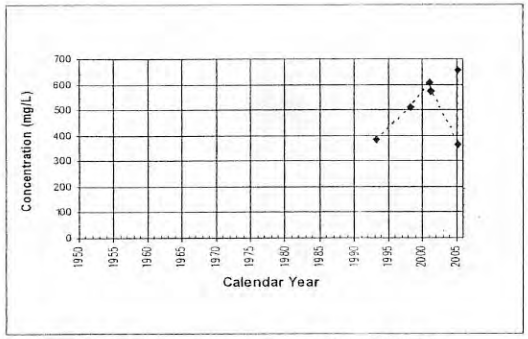
Location: SCR-MISC



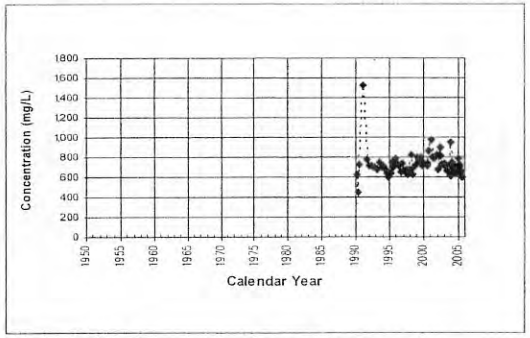
Location: SCR-OldHWY99 County: LOS ANGELES CO



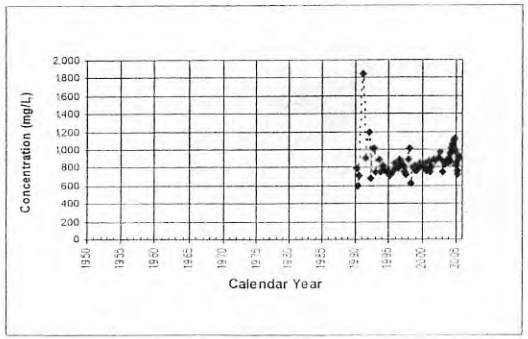
Location: SCR-OldHWY99Bridge County: LOS ANGELES CO



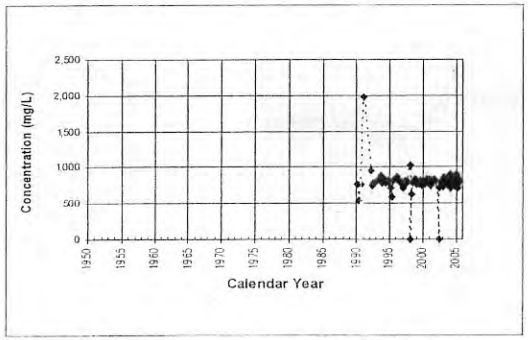
Location: SCR-RA County: LOS ANGELES CO



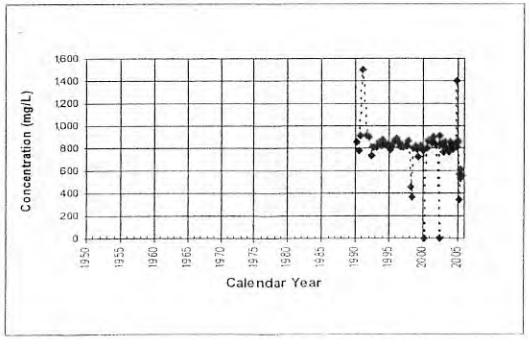
Location: SCR-RB County: LOS ANGELES CO



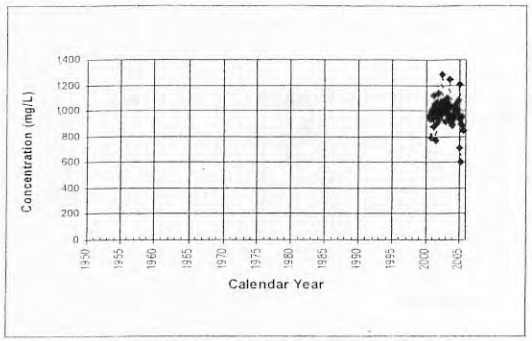
Location: SCR-RC County: LOS ANGELES CO



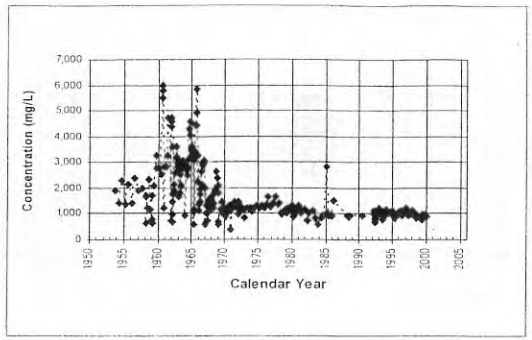
Location: SCR-RD County: LOS ANGELES CO



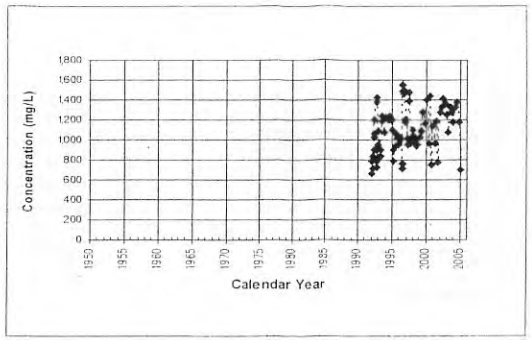
Location: SCR-RE County: LOS ANGELES CO



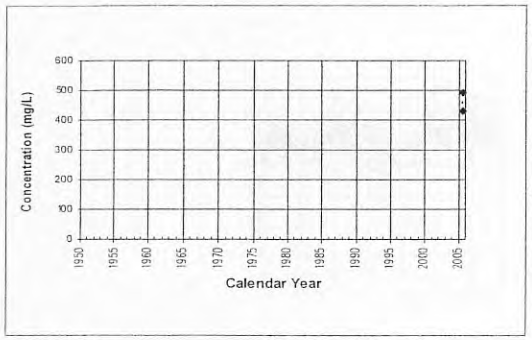
Location: SCR-RF County: VENTURA CO



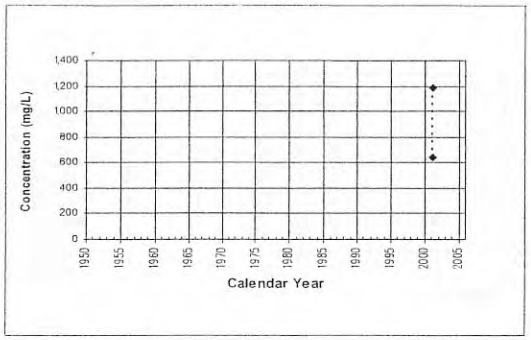
Location: SCR-VCOL County: VENTURA CO



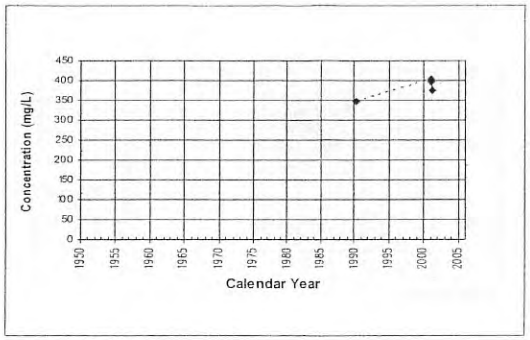
Location: SCR-WillardRd



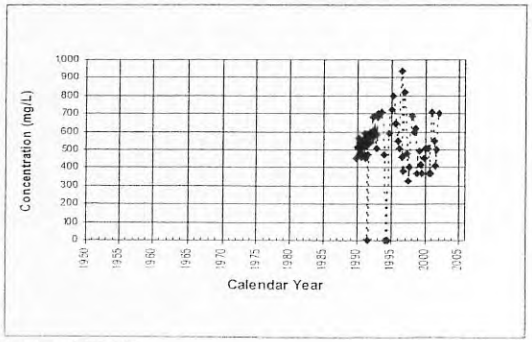
Location: SR102 County: LOS ANGELES CO



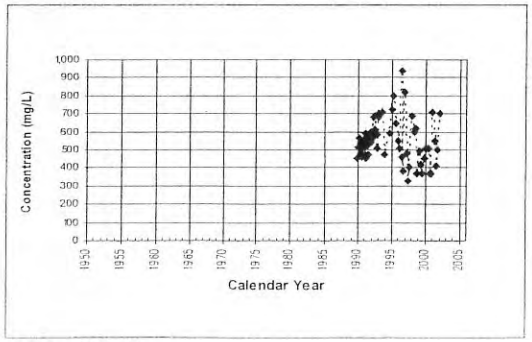
Location: STATION11



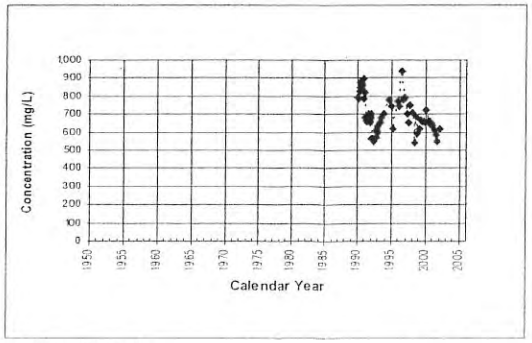
Location: STATION2



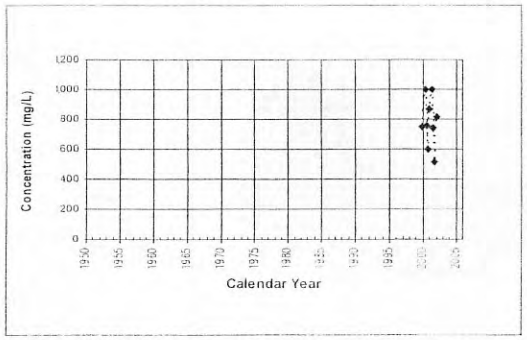
Location: STATION20



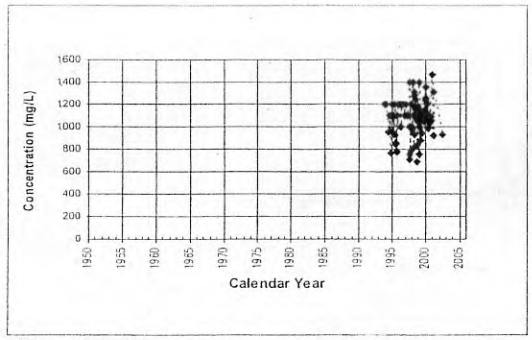
Location: STATION21



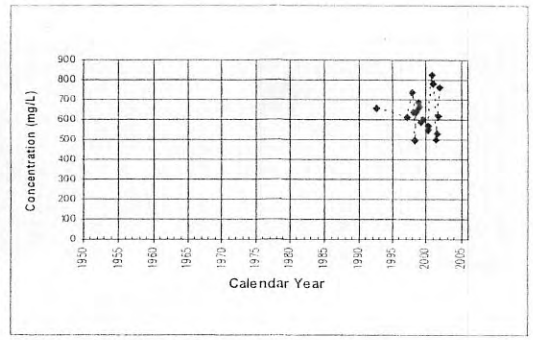
Location: STATION22



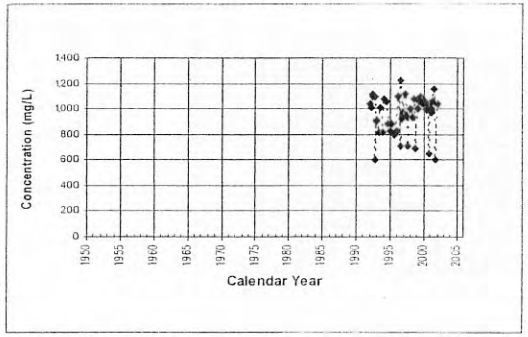
Location: STATION23



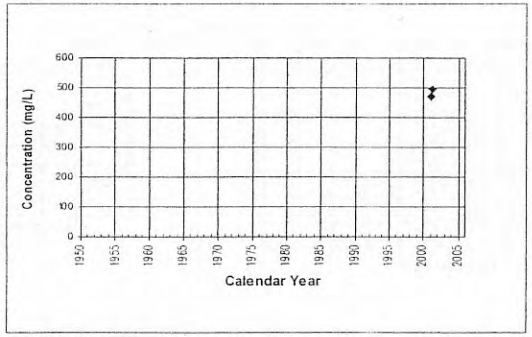
Location: STATION28



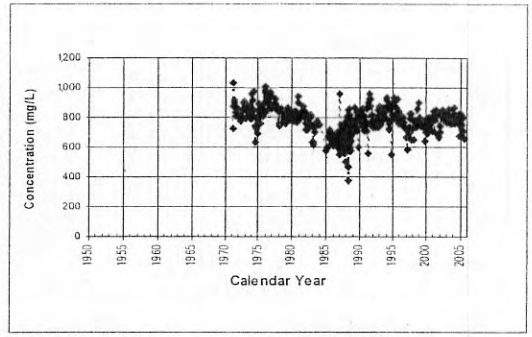
Location: STATION30



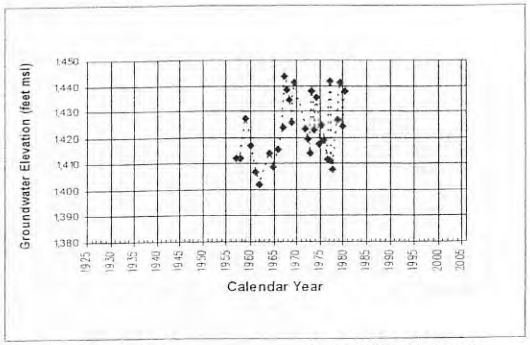
Location: STATION31



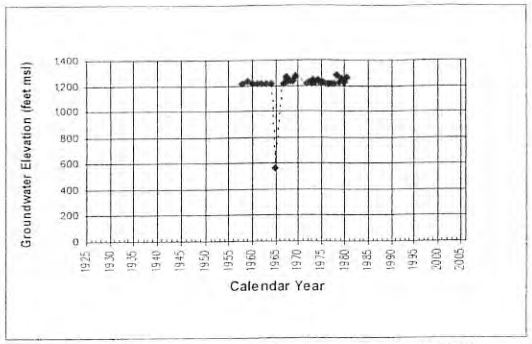
Location: STATION5



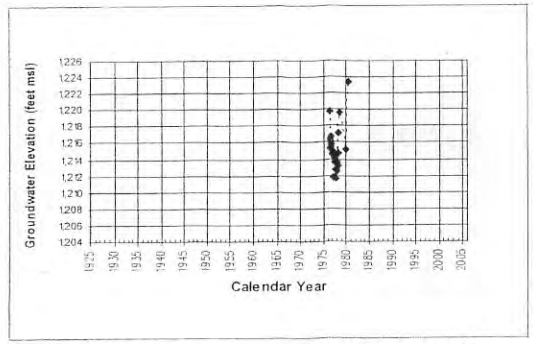
Location: VALENCIA WRP County: LOS ANGELES CO



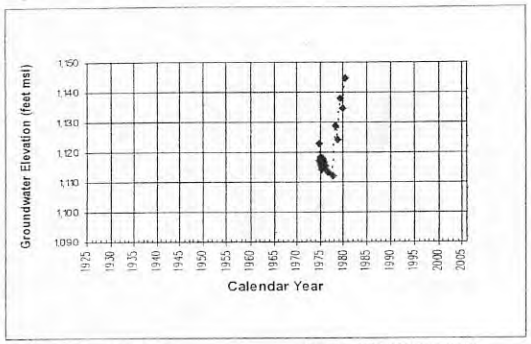
Location: 03N15W06A01S County: LOS ANGELES CO



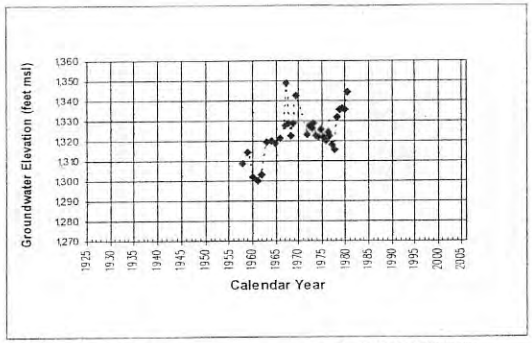
Location: 03N16W01M01S County: LOS ANGELES CO



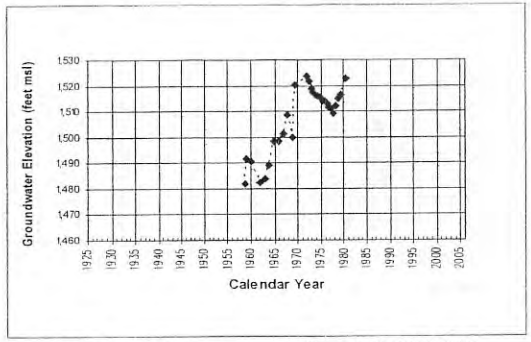
Location: 03N16W02G02S County: LOS ANGELES CO



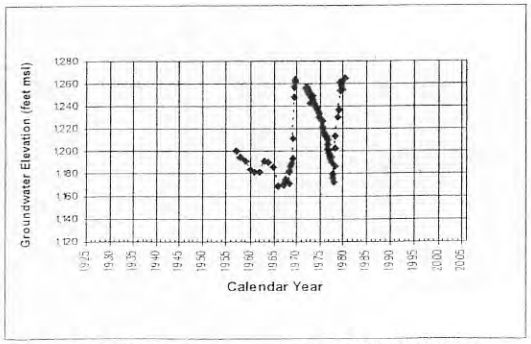
Location: 03N16W04A01S County: LOS ANGELES CO



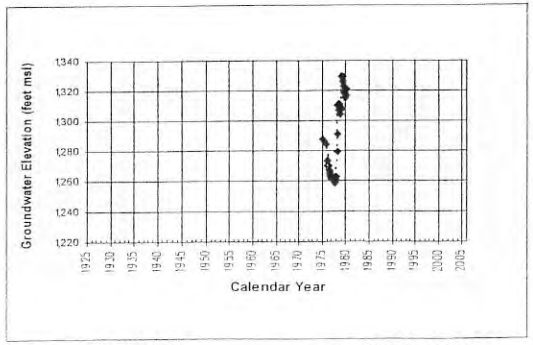
Location: 03N16W11A01S County: LOS ANGELES CO



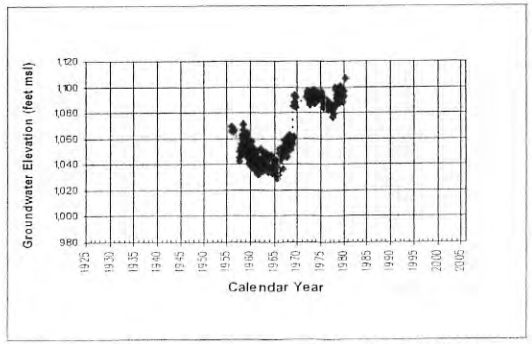
Location: 03N16W13A01S County: LOS ANGELES CO



Location: 04N15W19D01S County: LOS ANGELES CO

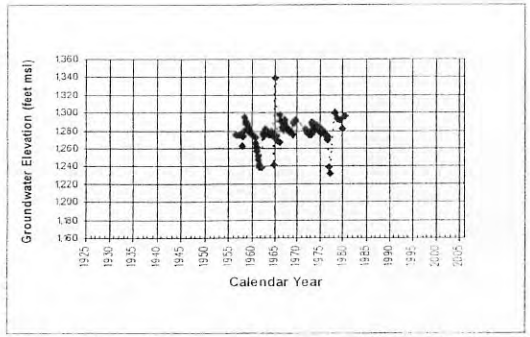


Location: 04N15W20F02S County: LOS ANGELES CO

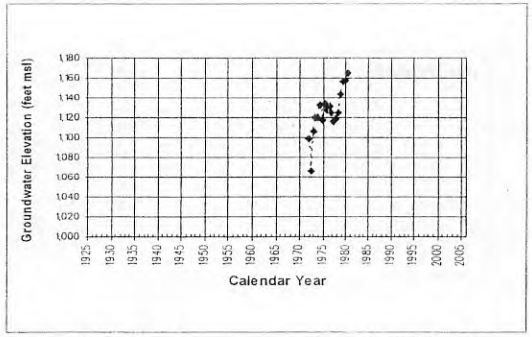


Location: 04N16W21H02S County: LOS ANGELES CO

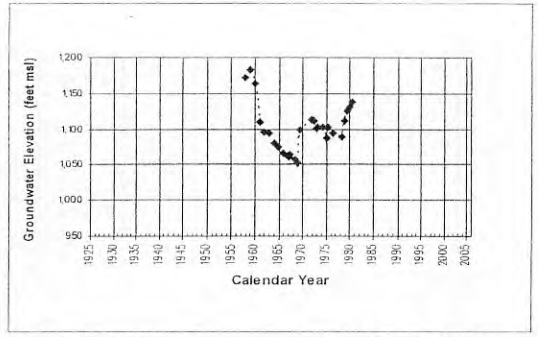
5-1230



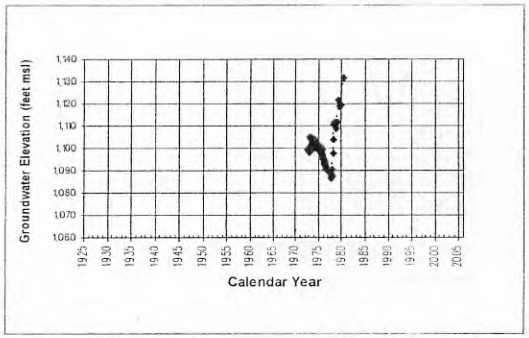
Location: 04N16W32Q01S County: LOS ANGELES CO



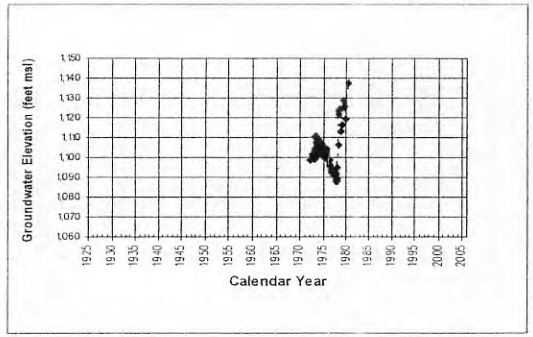
Location: 04N16W33L01S County: LOS ANGELES CO



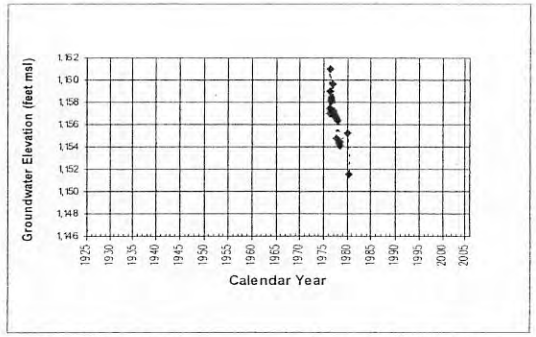
Location: 04N16W34J02S County: LOS ANGELES CO



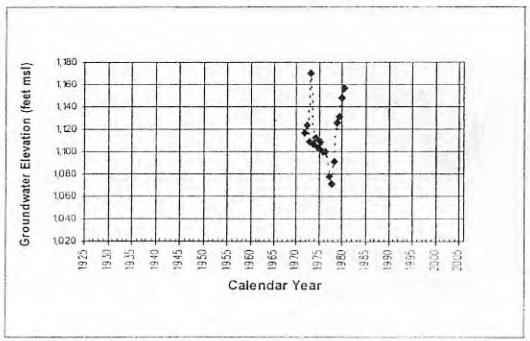
Location: 04N16W34L01S County: LOS ANGELES CO



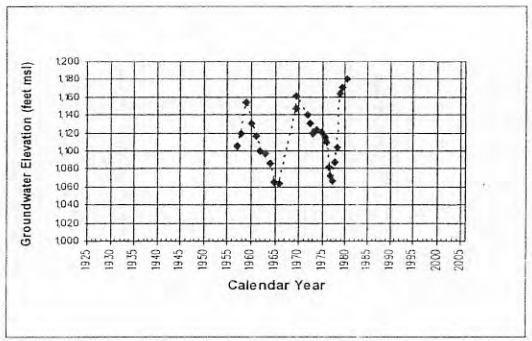
Location: 04N16W34L02S County: LOS ANGELES CO



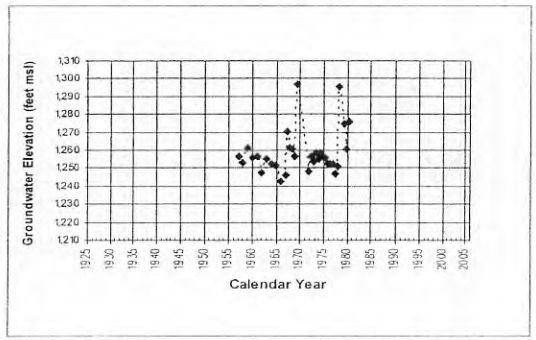
Location: 04N16W35E02S County: LOS ANGELES CO



Location: 04N16W35K01S County: LOS ANGELES CO

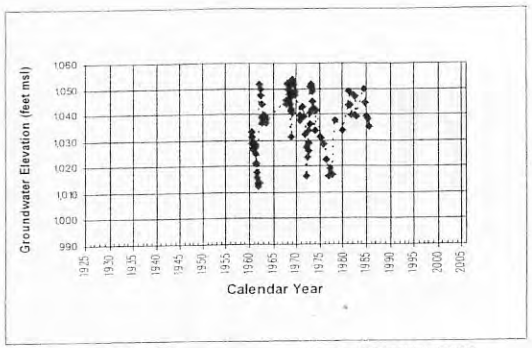


Location: 04N16W36M04S County: LOS ANGELES CO

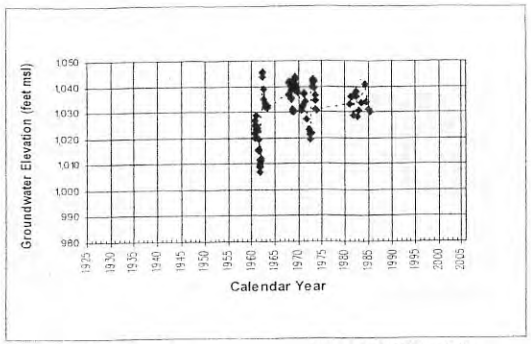


Location: 04N16W36R01S County: LOS ANGELES CO

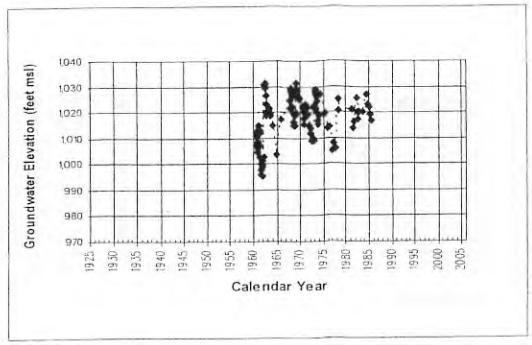
S-1234



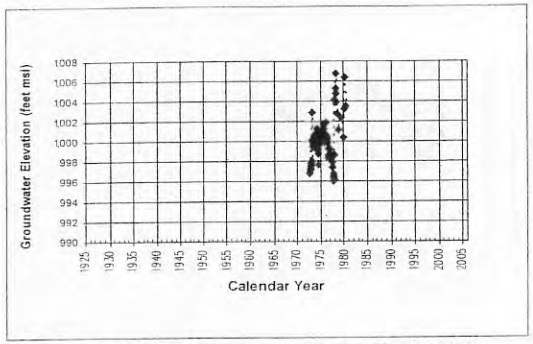
Location: 04N17W01A01S County: LOS ANGELES CO



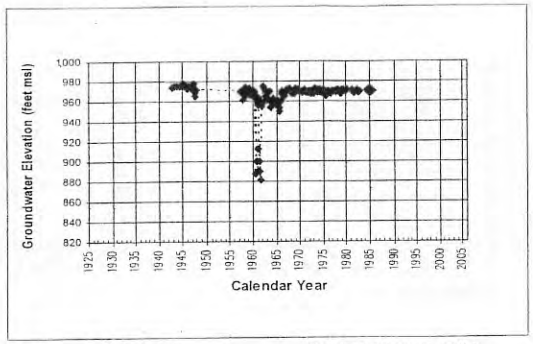
Location: 04N17W01J01S County: LOS ANGELES CO



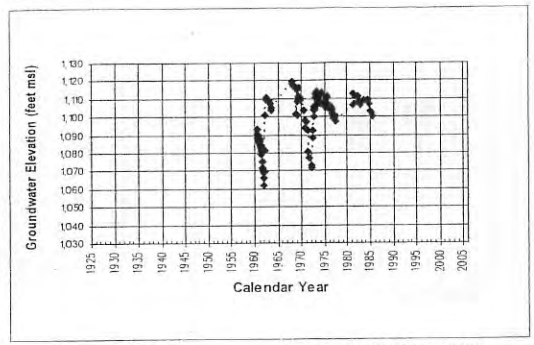
Location: 04N17W12B02S County: LOS ANGELES CO



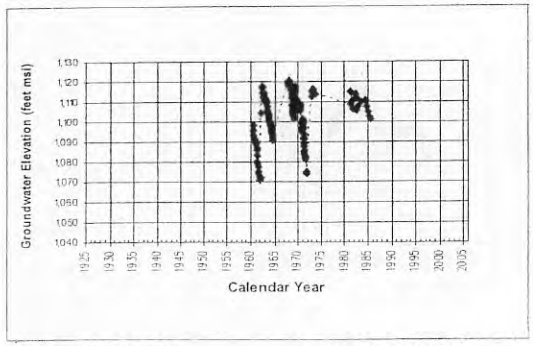
Location: 04N17W12R03S County: LOS ANGELES CO



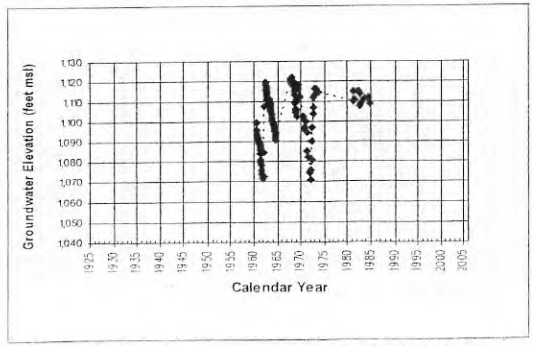
Location: 04N17W13C02S County: LOS ANGELES CO



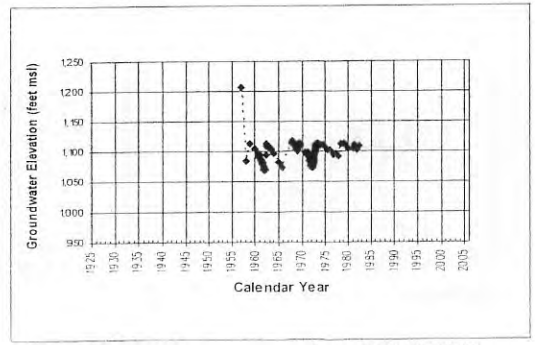
Location: 05N17W25B02S County: LOS ANGELES CO



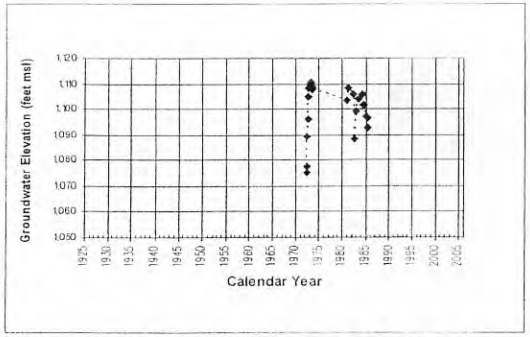
Location: 05N17W25B04S County: LOS ANGELES CO



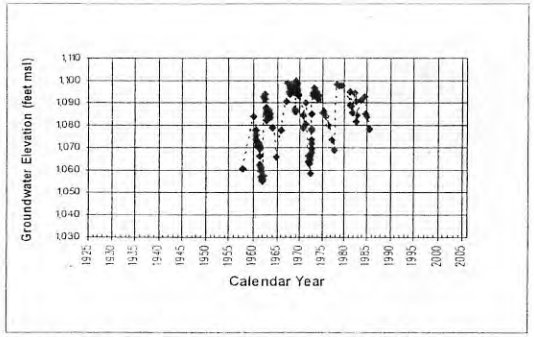
Location: 05N17W25B05S County: LOS ANGELES CO



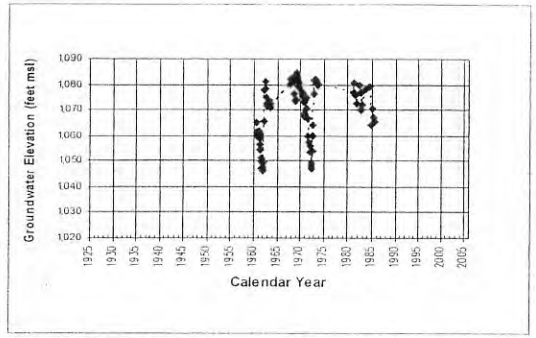
Location: 05N17W25G04S County: LOS ANGELES CO



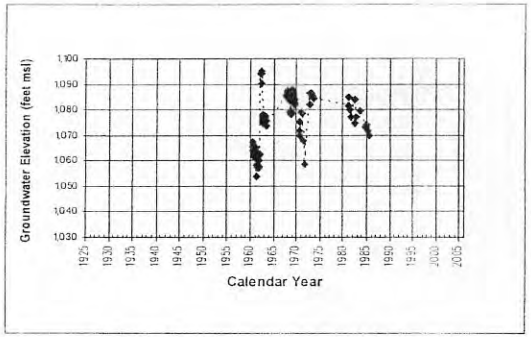
Location: 05N17W25G06S County: LOS ANGELES CO



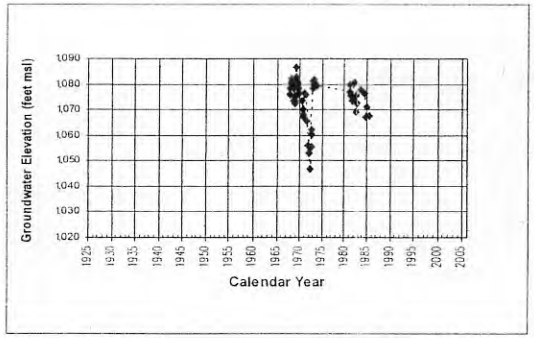
Location: 05N17W36A03S County: LOS ANGELES CO



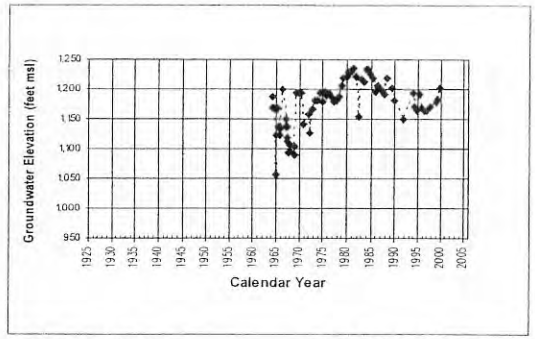
Location: 05N17W36G04S County: LOS ANGELES CO



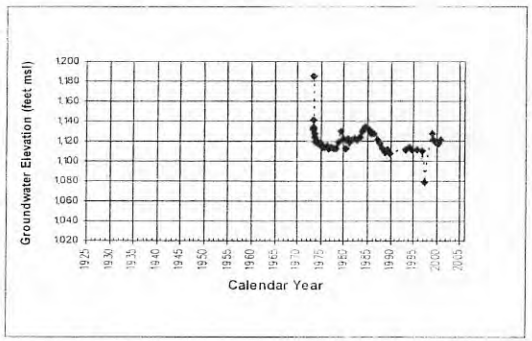
Location: 05N17W36H03S County: LOS ANGELES CO



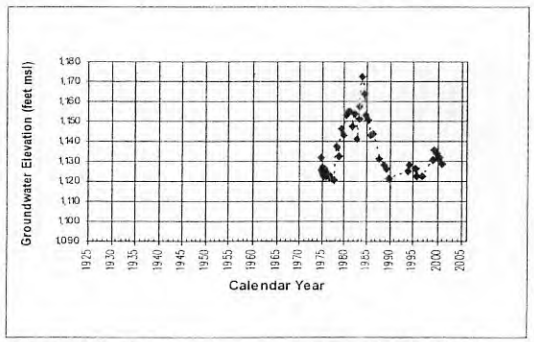
Location: 05N17W36J02S County: LOS ANGELES CO



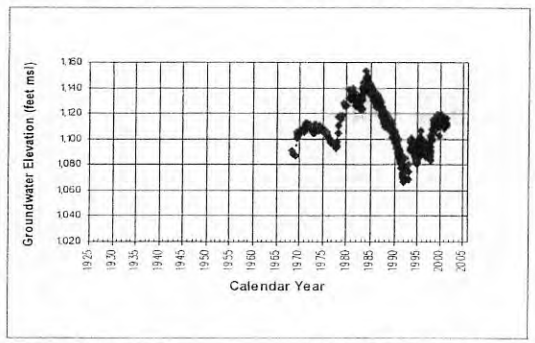
Location: LACFCD-5831 County: LOS ANGELES CO



Location: LACFCD-5841 County: LOS ANGELES CO

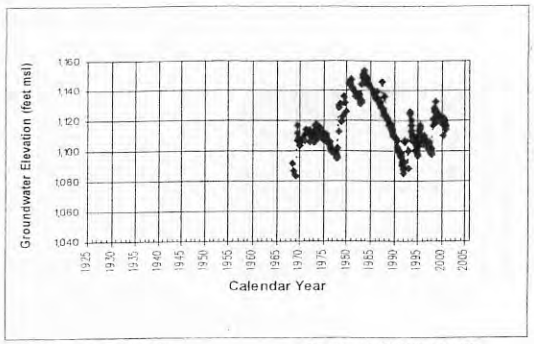


Location: LACFCD-5842F County: LOS ANGELES CO

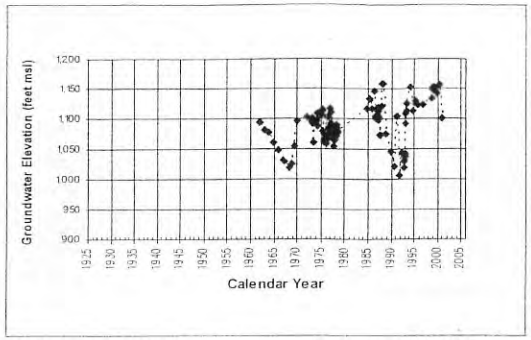


Location: LACFCD-5851 County: LOS ANGELES CO

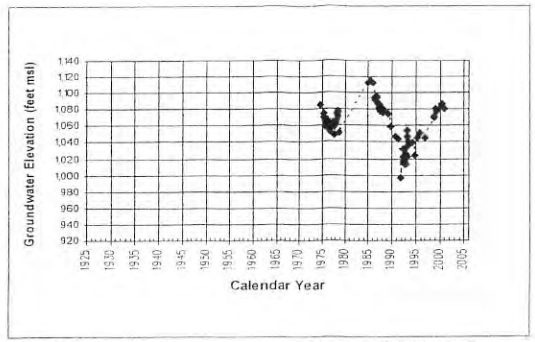
5-1236



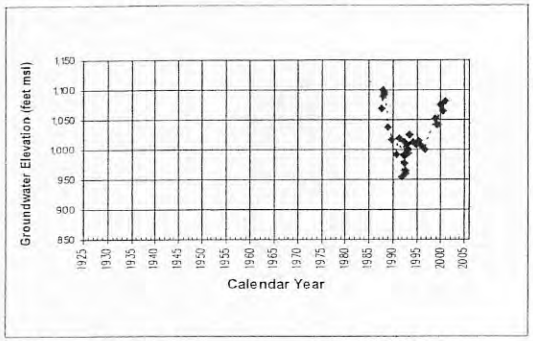
Location: LACFCD-5851A County: LOS ANGELES CO



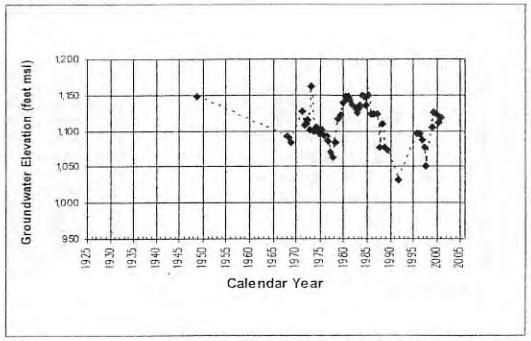
Location: LACFCD-5860C County: LOS ANGELES CO



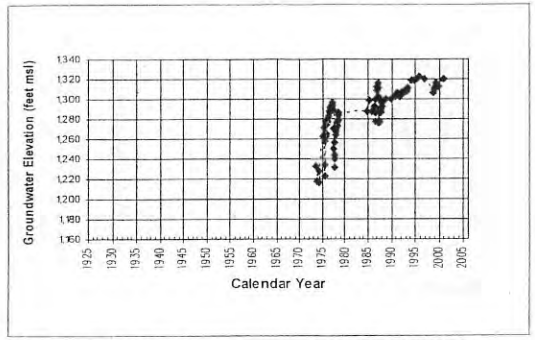
Location: LACFCD-5860D County: LOS ANGELES CO



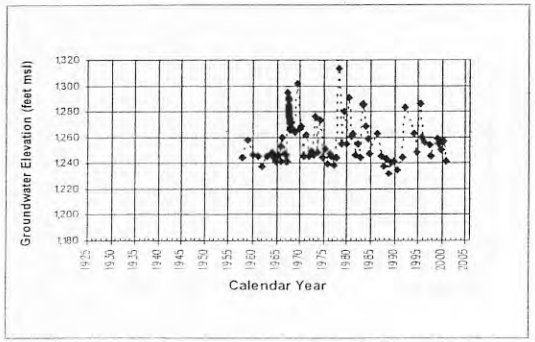
Location: LACFCD-5860E County: LOS ANGELES CO



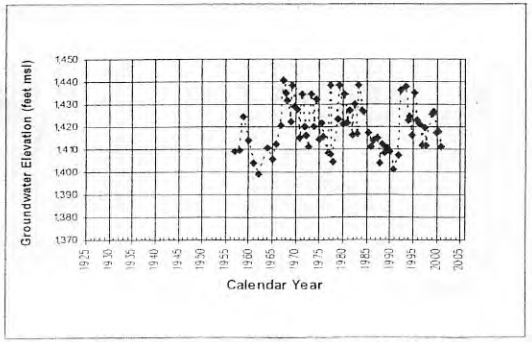
Location: LACFCD-5871D County: LOS ANGELES CO



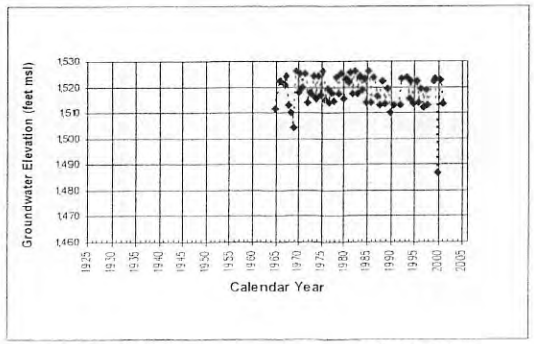
Location: LACFCD-5873E County: LOS ANGELES CO



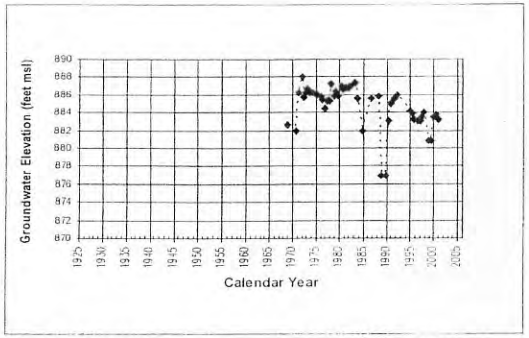
Location: LACFCD-5882 County: LOS ANGELES CO



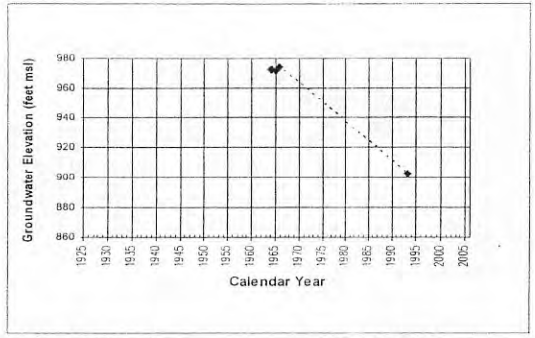
Location: LACFCD-5912A County: LOS ANGELES CO



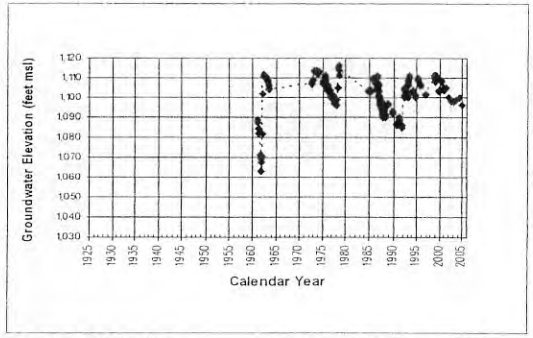
Location: LACFCD-5932 County: LOS ANGELES CO



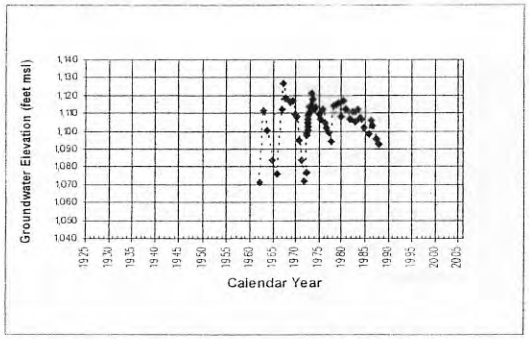
Location: LACFCD-6949 County: LOS ANGELES CO



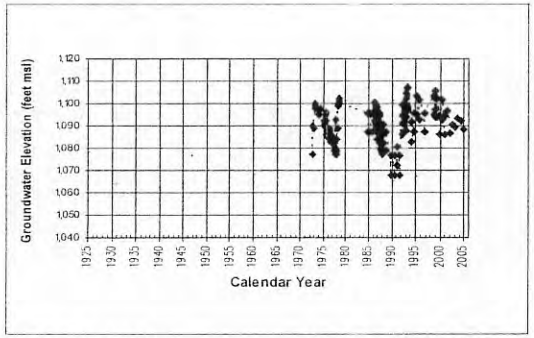
Location: LACFCD-6968 County: LOS ANGELES CO



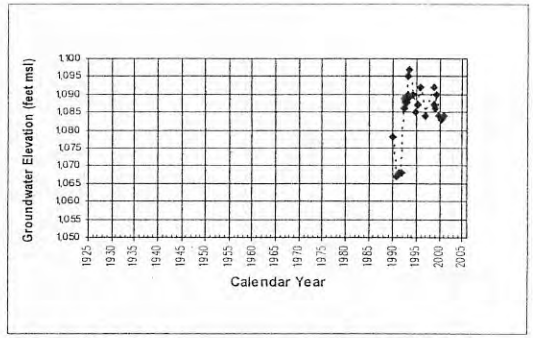
Location: LACFCD-6980E County: LOS ANGELES CO



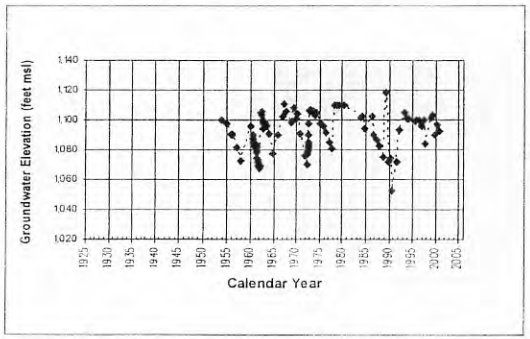
Location: LACFCD-6980G County: LOS ANGELES CO



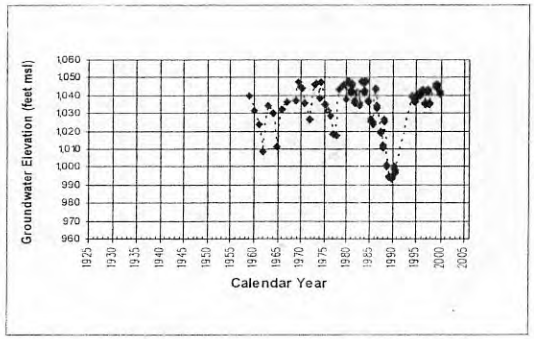
Location: LACFCD-6981D County: LOS ANGELES CO



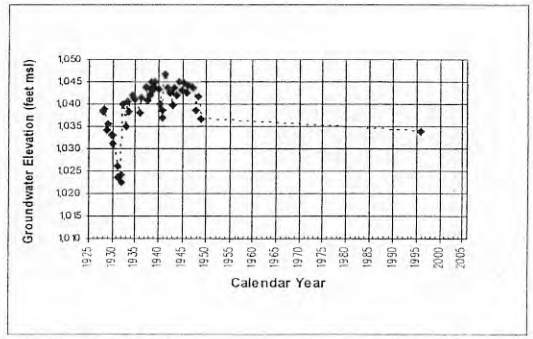
Location: LACFCD-6981E County: LOS ANGELES CO



Location: LACFCD-6991A County: LOS ANGELES CO

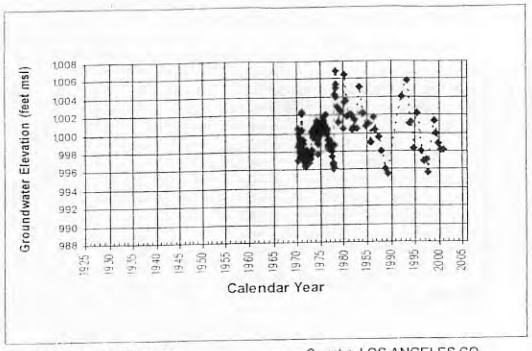


Location: LACFCD-6993A County: LOS ANGELES CO

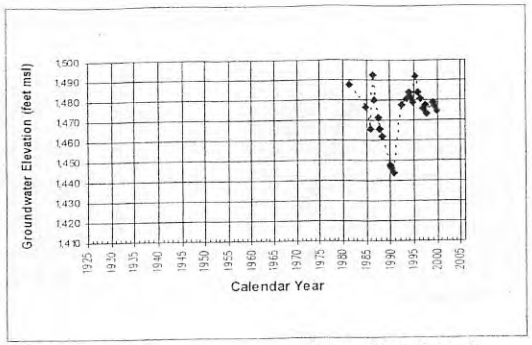


Location: LACFCD-6994A County: LOS ANGELES CO

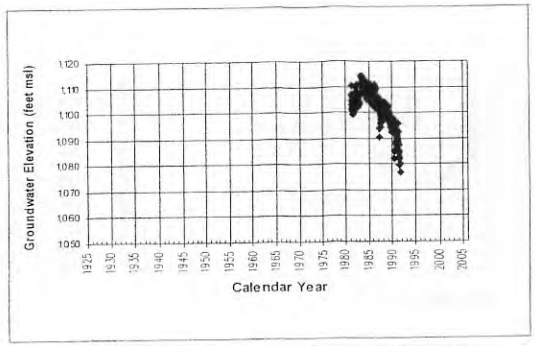
5-1236



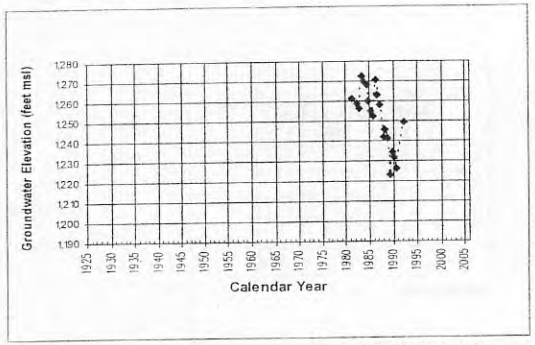
Location: LACFCD-6995D County: LOS ANGELES CO



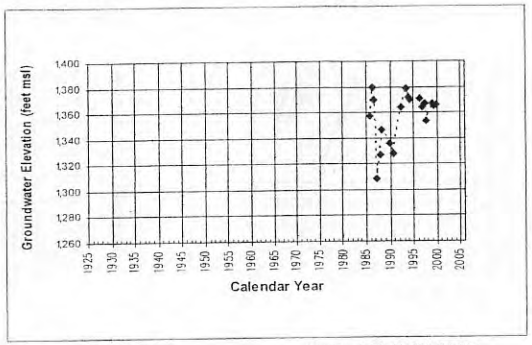
Location: LACFCD-7043C County: LOS ANGELES CO



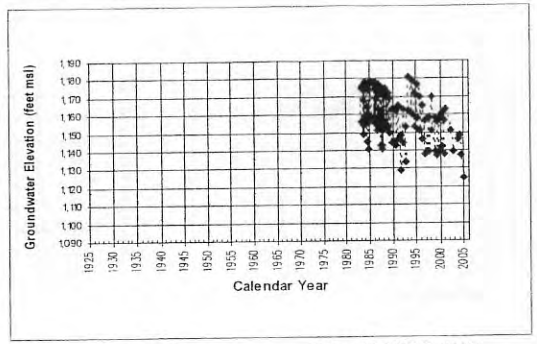
Location: LACFCD-7048C County: LOS ANGELES CO



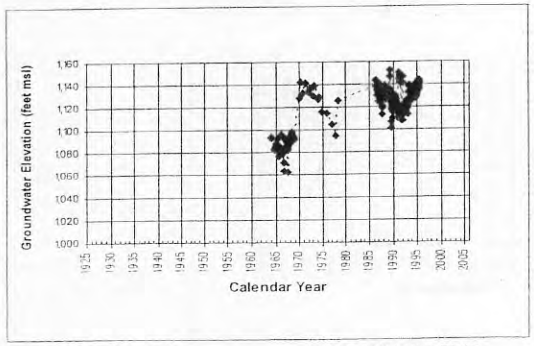
Location: LACFCD-7053C County: LOS ANGELES CO



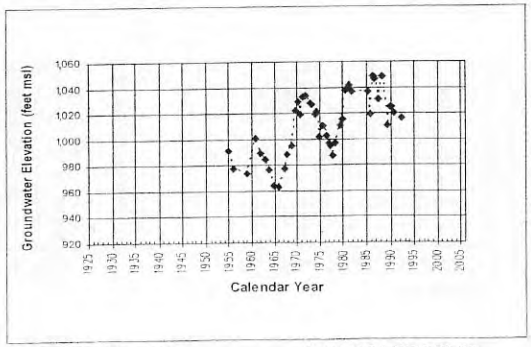
Location: LACFCD-7053D County: LOS ANGELES CO



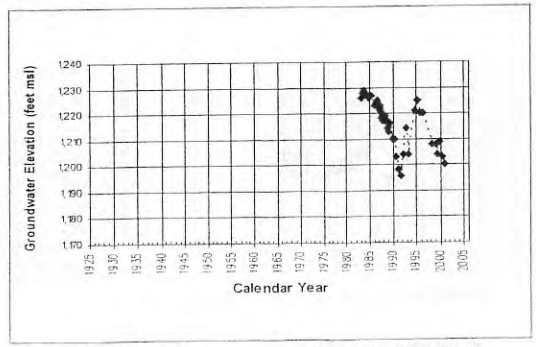
Location: LACFCD-7066D County: LOS ANGELES CO



Location: LACFCD-7067D County: LOS ANGELES CO

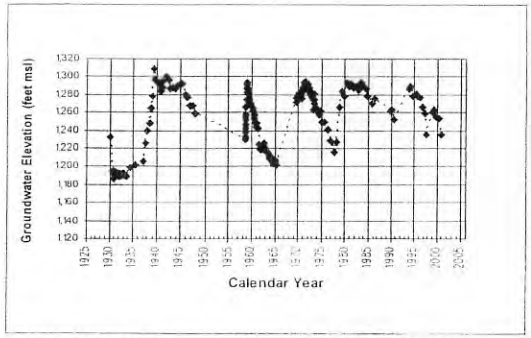


Location: LACFCD-7076C County: LOS ANGELES CO

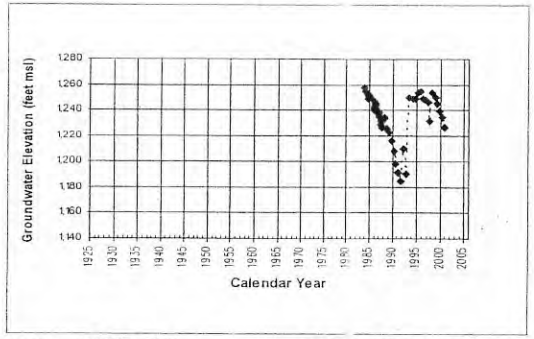


Location: LACFCD-7086B County: LOS ANGELES CO

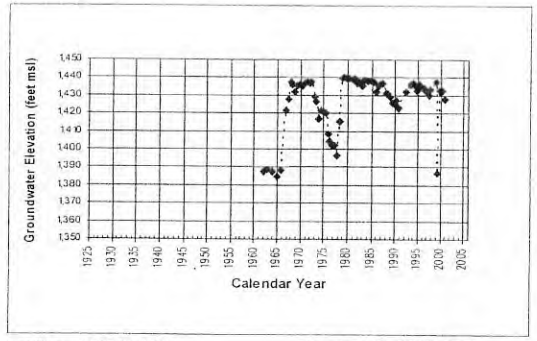
5-1239



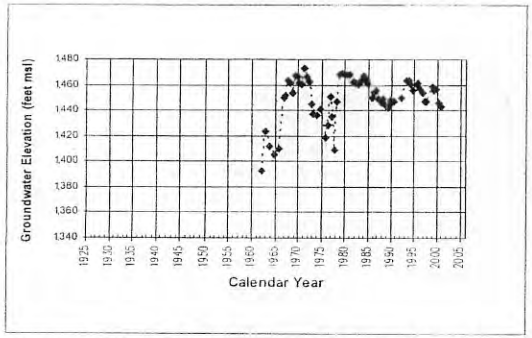
Location: LACFCD-7095 County: LOS ANGELES CO



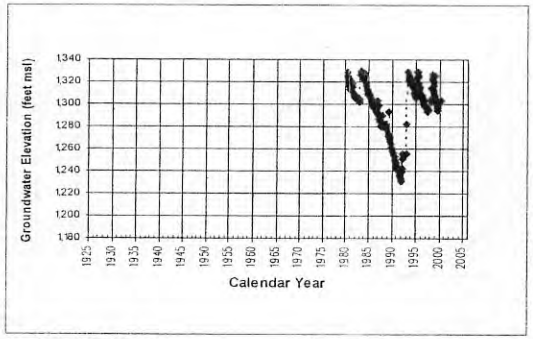
Location: LACFCD-7107K County: LOS ANGELES CO



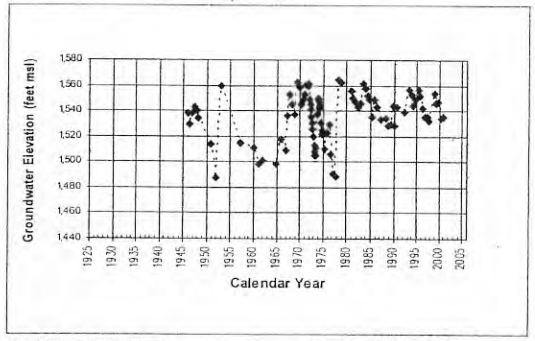
Location: LACFCD-7113 County: LOS ANGELES CO



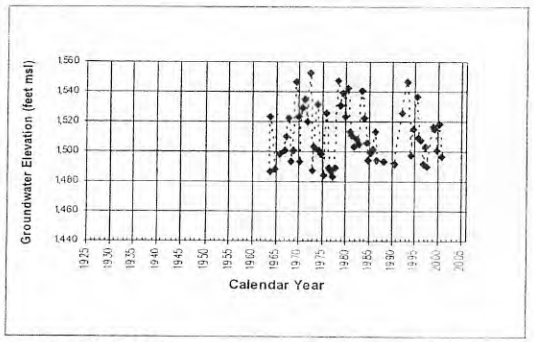
Location: LACFCD-7123B County: LOS ANGELES CO



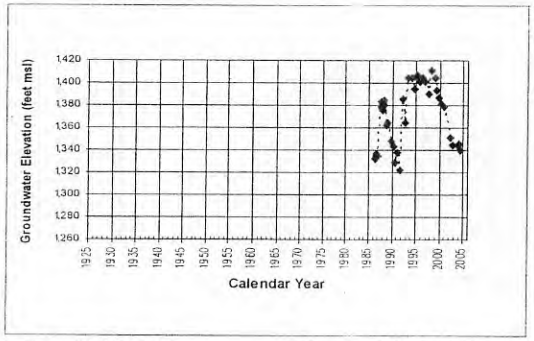
Location: LACFCD-7127D County LOS ANGELES CO



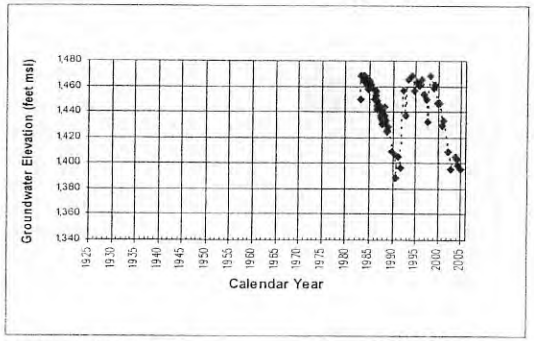
Location: LACFCD-7132 County: LOS ANGELES CO



Location: LACFCD-7140B County: LOS ANGELES CO

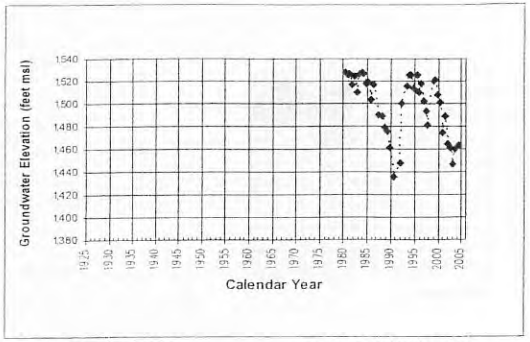


Location: LACFCD-7148K County: LOS ANGELES CO

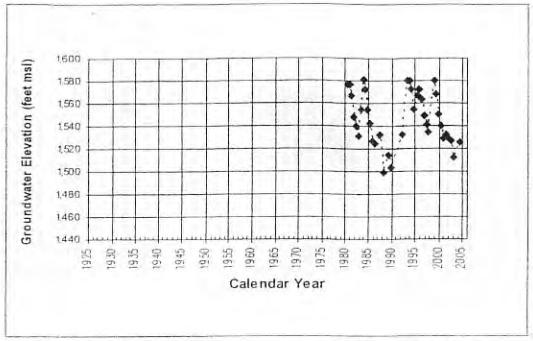


Location: LACFCD-7168C County: LOS ANGELES CO

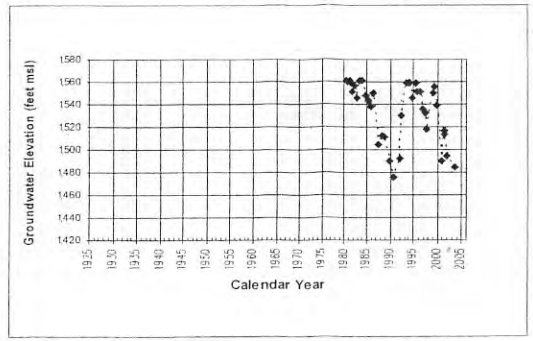
5-1240



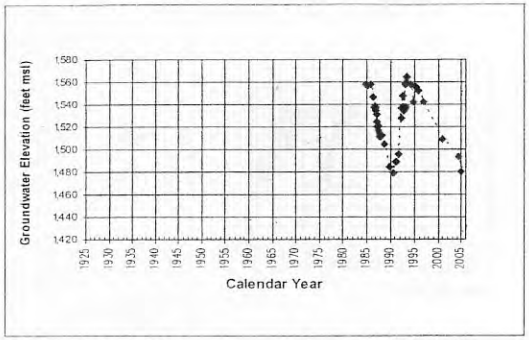
Location: LACFCD-7177B County: LOS ANGELES CO



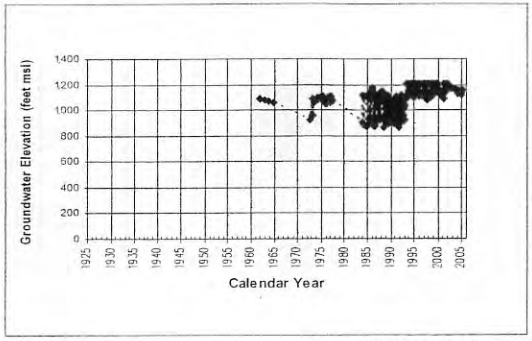
Location: LACFCD-7188A County: LOS ANGELES CO



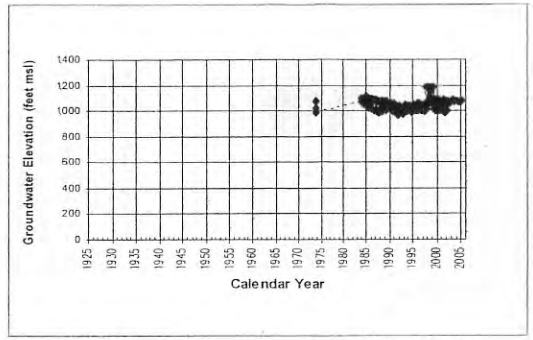
Location: LACFCD-7197 County: LOS ANGELES CO



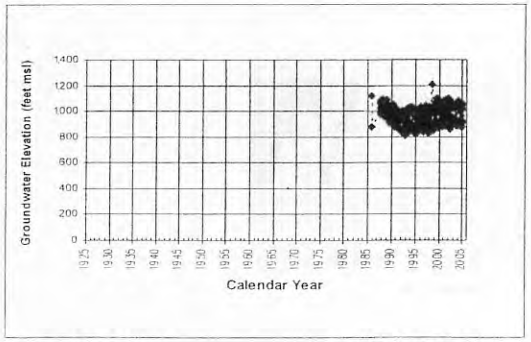
Location: LACFCD-7197D County: LOS ANGELES CO



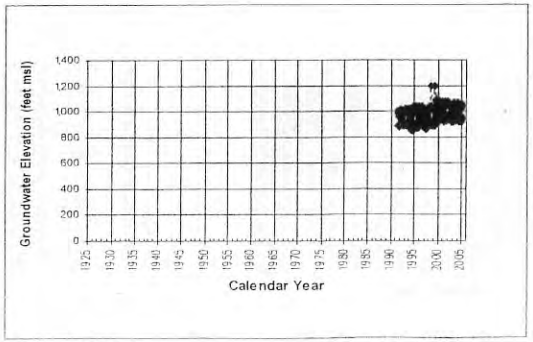
Location: NCWD-10 County: LOS ANGELES CO



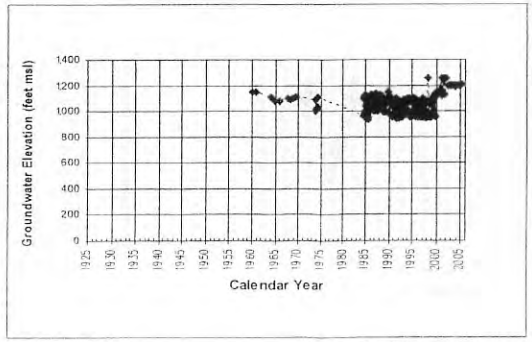
Location: NCWD-11 County: LOS ANGELES CO



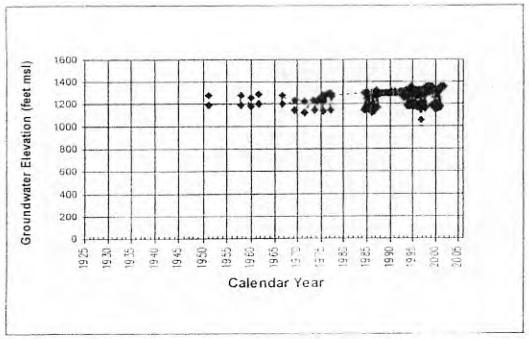
Location: NCWD-12 County: LOS ANGELES CO



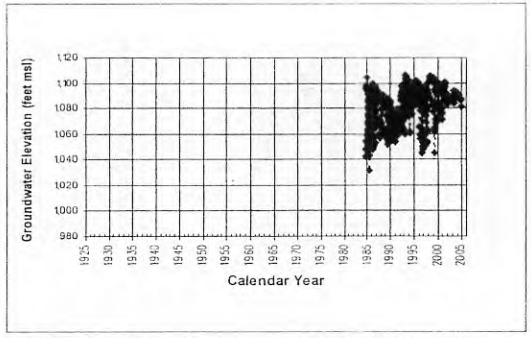
Location: NCWD-13 County: LOS ANGELES CO



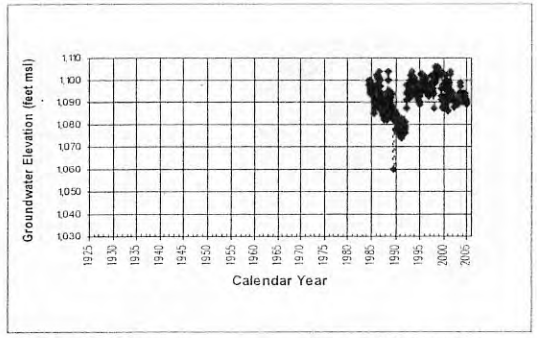
Location: NCWD-7 County: LOS ANGELES CO



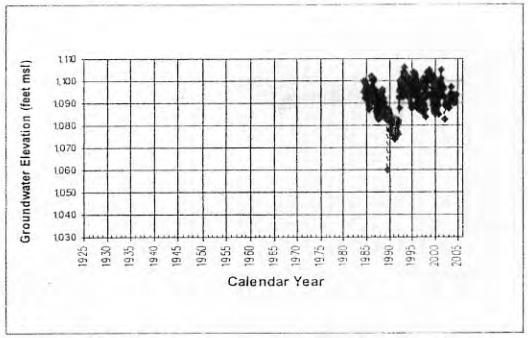
Location: NCWD-9 County: LOS ANGELES CO



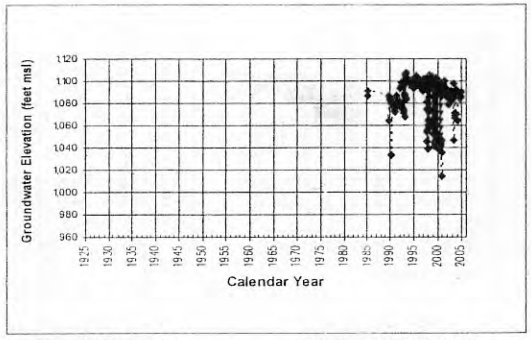
Location: NCWD-Castaic 1 County: LOS ANGELES CO



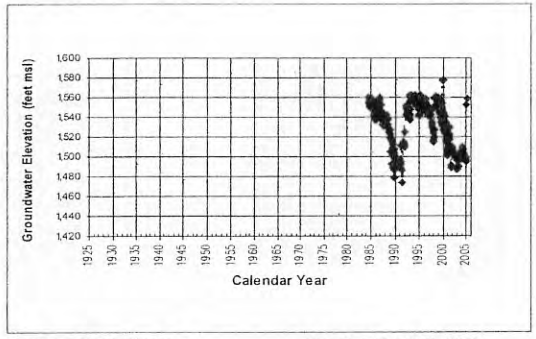
Location: NCWD-Castaic 2 County: LOS ANGELES CO



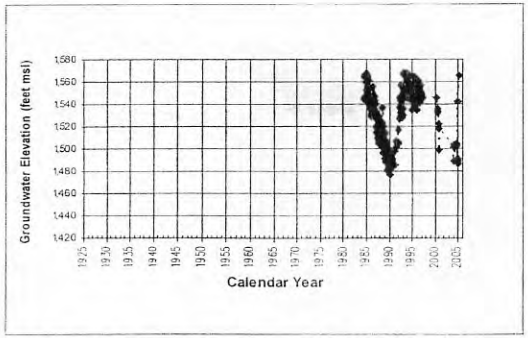
Location: NCWD-Castaic 3 County: LOS ANGELES CO



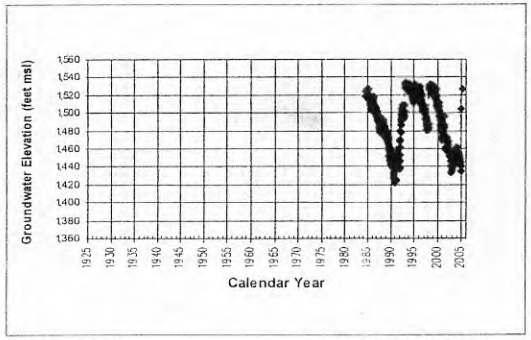
Location: NCWD-Castaic 4 County: LOS ANGELES CO



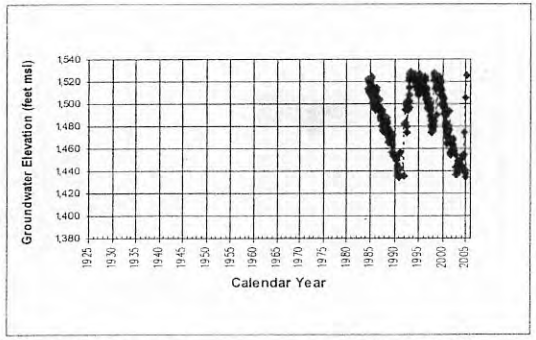
Location: NCWD-Pinetree 1 County: LOS ANGELES CO



Location: NCWD-Pinetree 2 County: LOS ANGELES CO

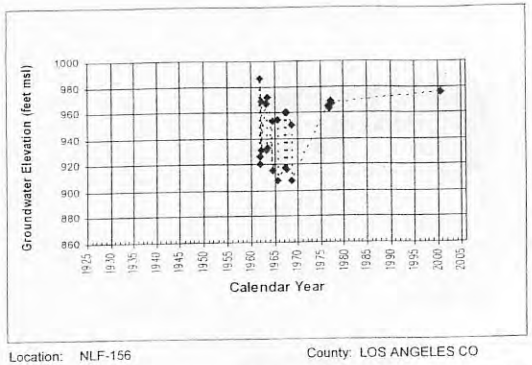


Location: NCWD-Pinetree 3 County: LOS ANGELES CO

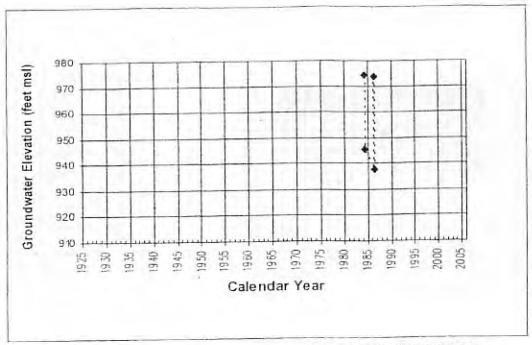


Location: NCWD-Pinetree 4 County: LOS ANGELES CO

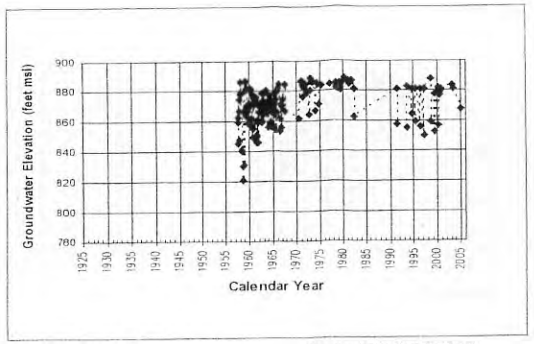
S-1242



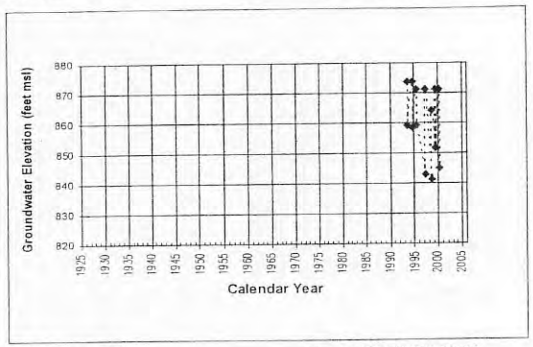
Location: NLF-156 County: LOS ANGELES CO



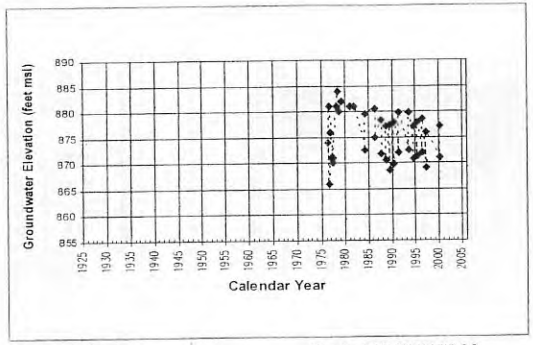
Location: NLF-161 County: LOS ANGELES CO



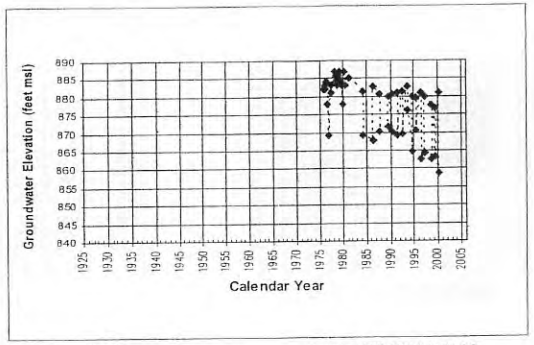
Location: NLF-B10 County: LOS ANGELES CO



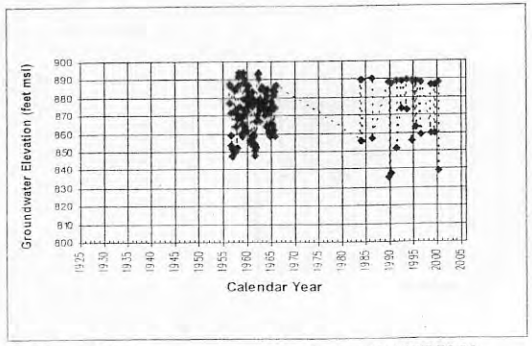
Location: NLF-B11 County: LOS ANGELES CO



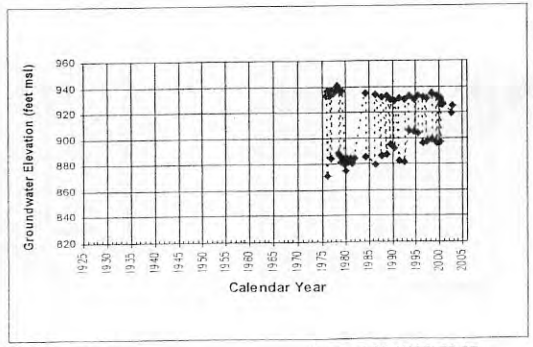
Location: NLF-B5 County: LOS ANGELES CO



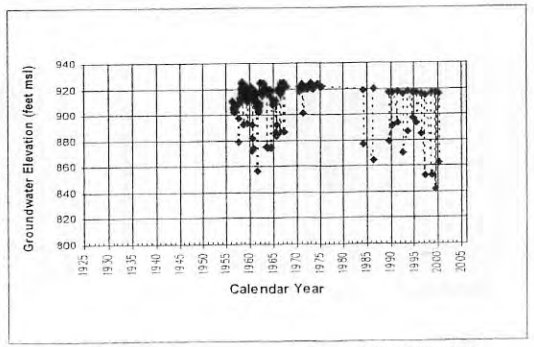
Location: NLF-B6 County: LOS ANGELES CO



Location: NLF-B7 County: LOS ANGELES CO

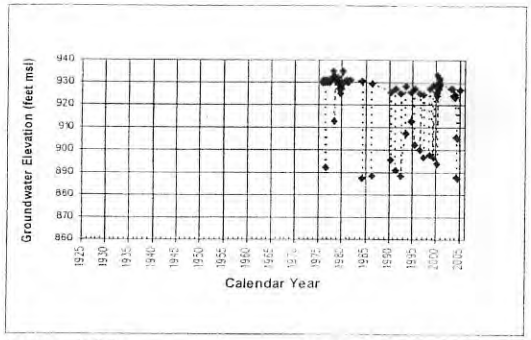


Location: NLF-C County: LOS ANGELES CO

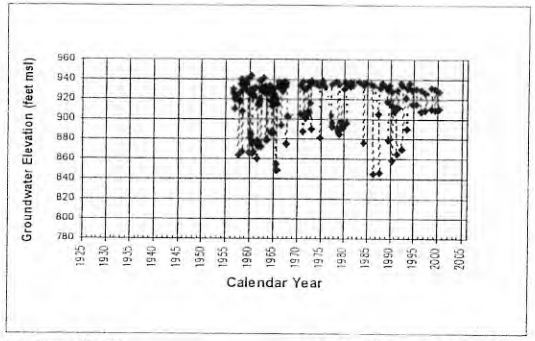


Location: NLF-C3 County: LOS ANGELES CO

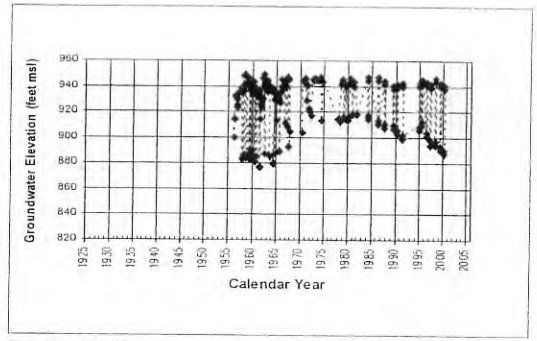
S-1213



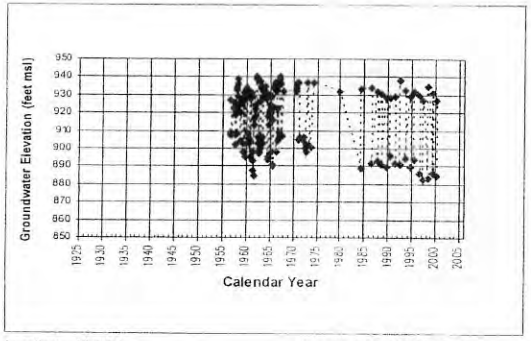
Location: NLF-C4 County: LOS ANGELES CO



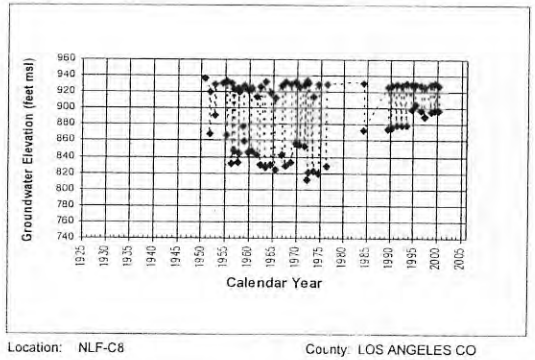
Location: NLF-C5 County: LOS ANGELES CO



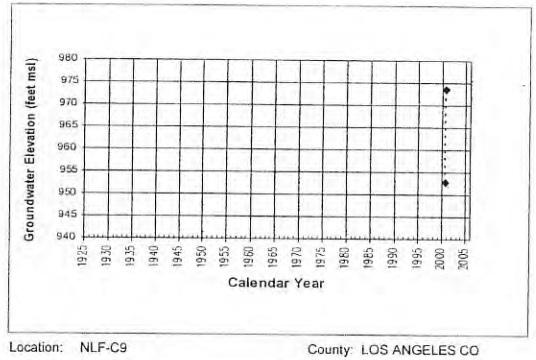
Location: NLF-C6 County: LOS ANGELES CO



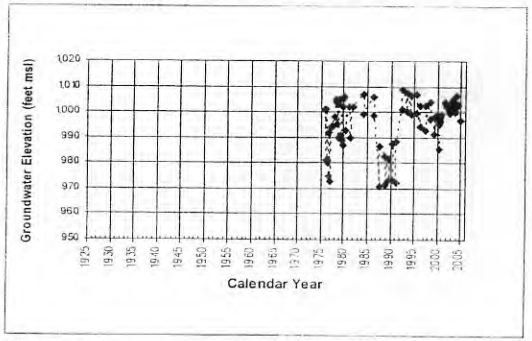
Location: NLF-C7 County: LOS ANGELES CO



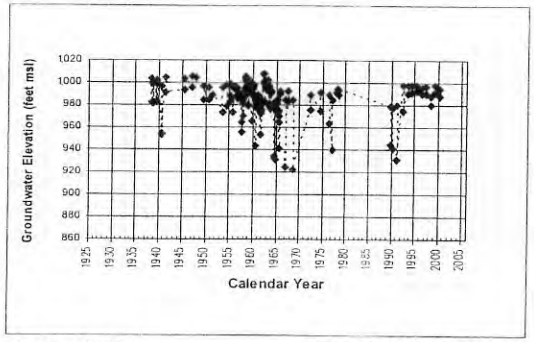
Location: NLF-C8 County: LOS ANGELES CO



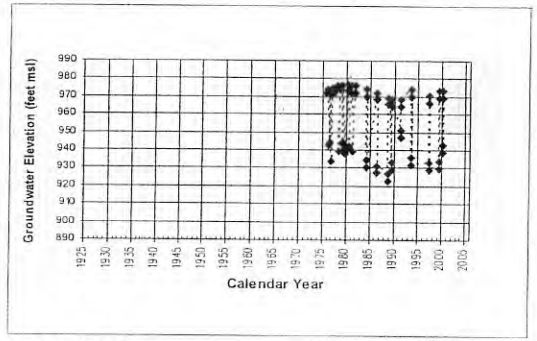
Location: NLF-C9 County: LOS ANGELES CO



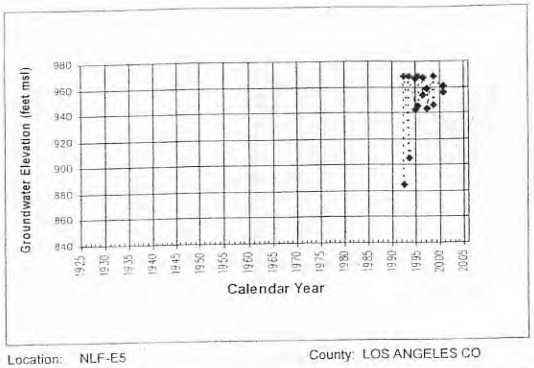
Location: NLF-E County: LOS ANGELES CO



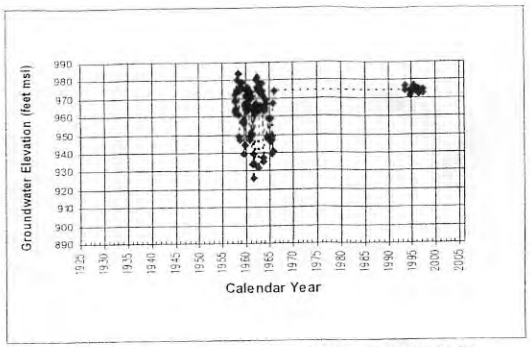
Location: NLF-E2 County: LOS ANGELES CO



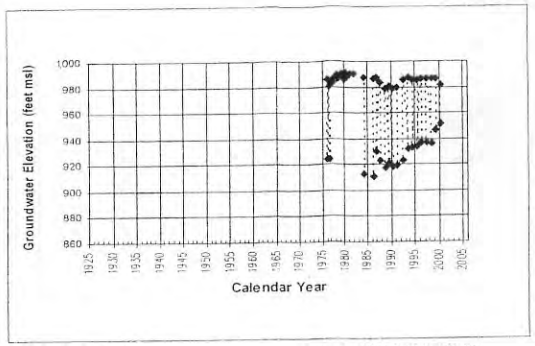
Location: NLF-E4 County: LOS ANGELES CO



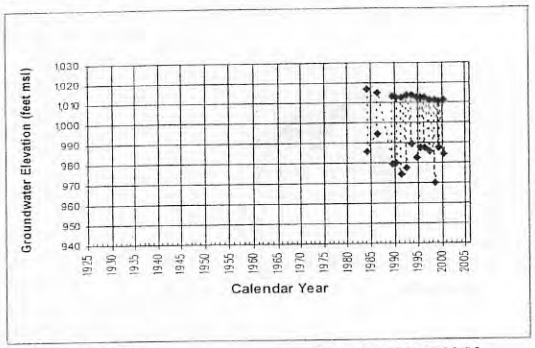
Location: NLF-E5 County: LOS ANGELES CO



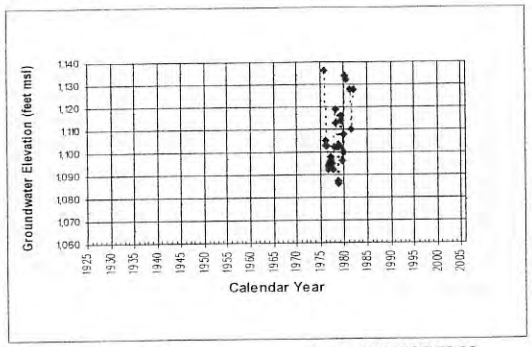
Location: NLF-E7 County: LOS ANGELES CO



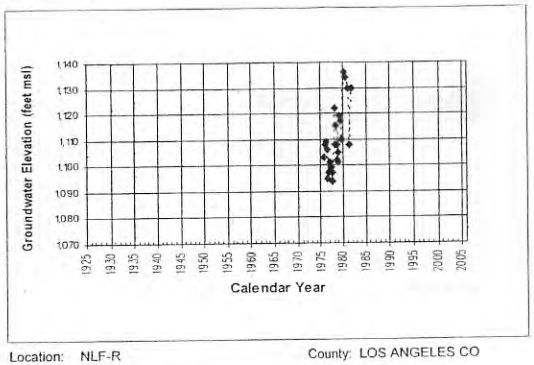
Location: NLF-E9 County: LOS ANGELES CO



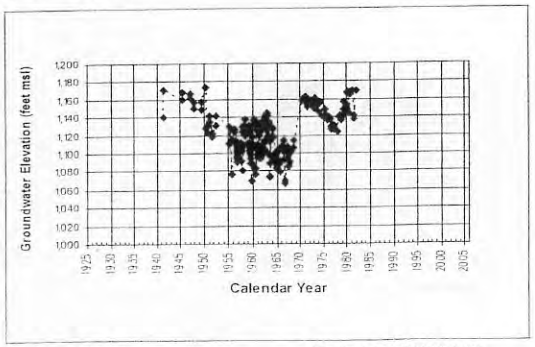
Location: NLF-G45 County: LOS ANGELES CO



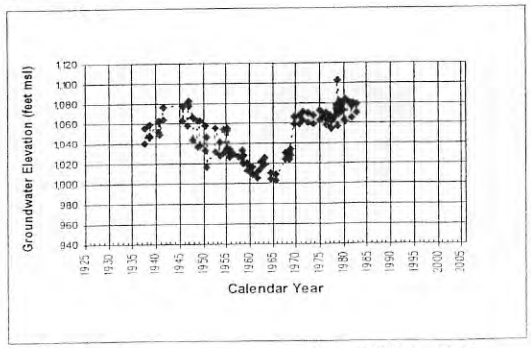
Location: NLF-Q County: LOS ANGELES CO



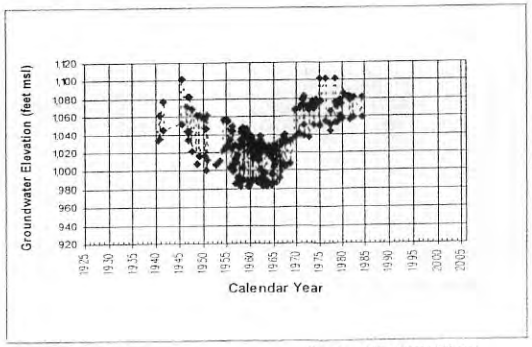
Location: NLF-R County: LOS ANGELES CO



Location: NLF-R2 County: LOS ANGELES CO

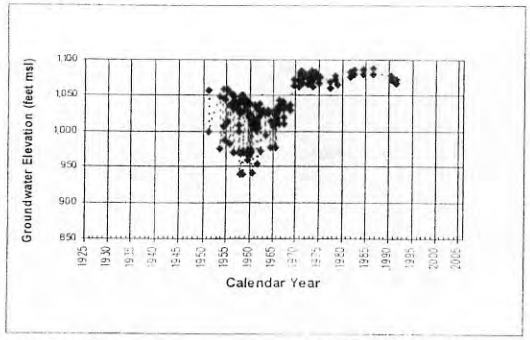


Location: NLF-S County: LOS ANGELES CO

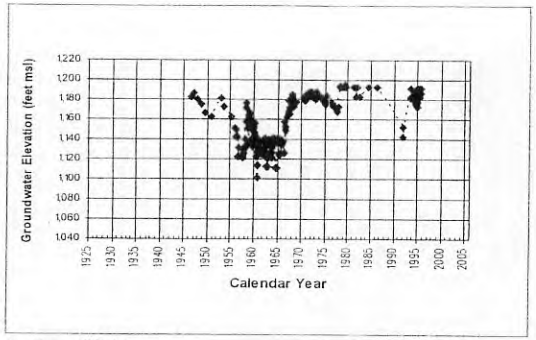


Location: NLF-S2 County: LOS ANGELES CO

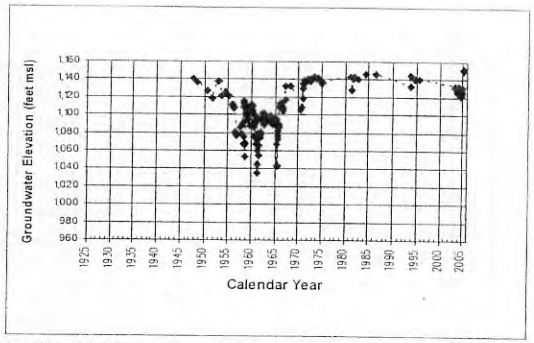
5-12-05



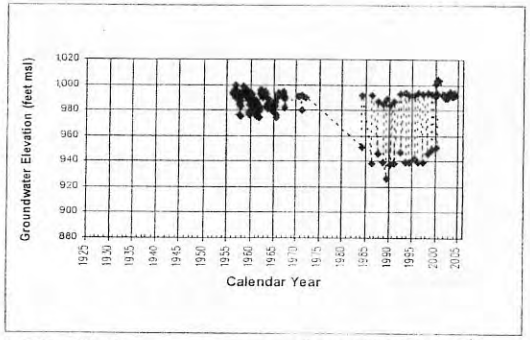
Location: NLF-S3 County: LOS ANGELES CO



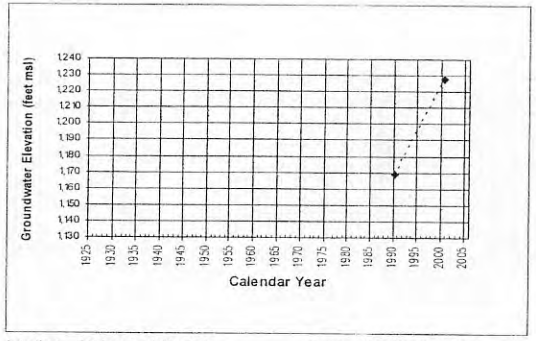
Location: NLF-W4 County: LOS ANGELES CO



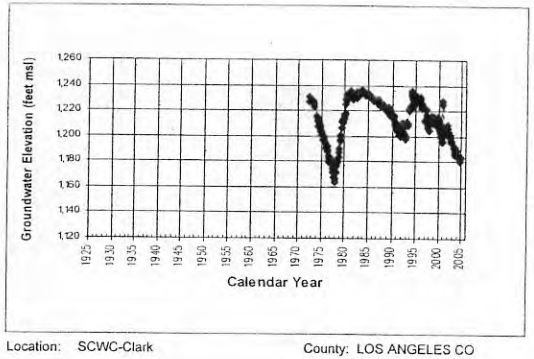
Location: NLF-W5 County: LOS ANGELES CO



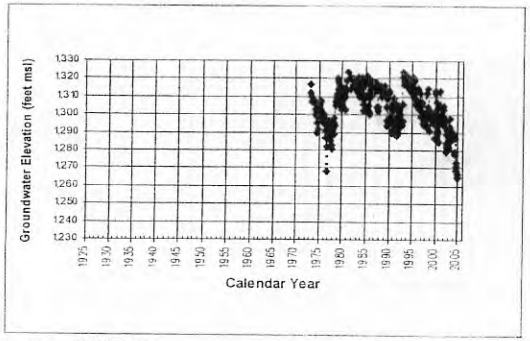
Location: NLF-X3 County: LOS ANGELES CO



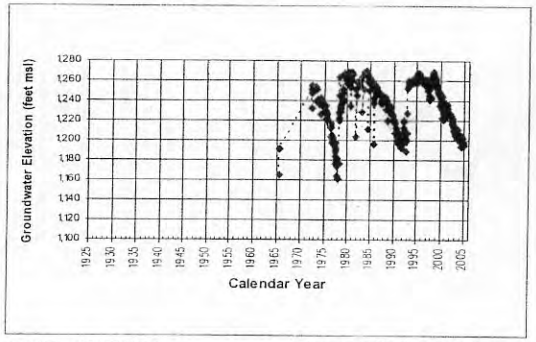
Location: PR-Lombardi (Anden) County: LOS ANGELES CO



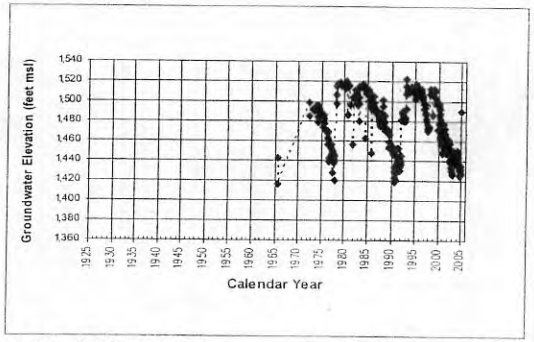
Location: SCWC-Clark County: LOS ANGELES CO



Location: SCWC-Guida County: LOS ANGELES CO

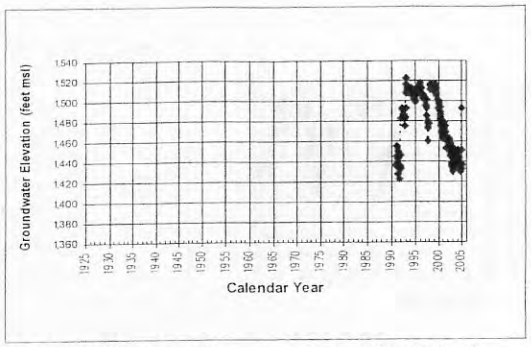


Location: SCWC-Honby County: LOS ANGELES CO

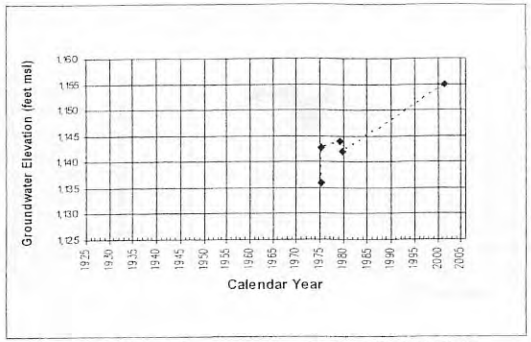


Location: SCWC-Lost Canyon 2 County: LOS ANGELES CO

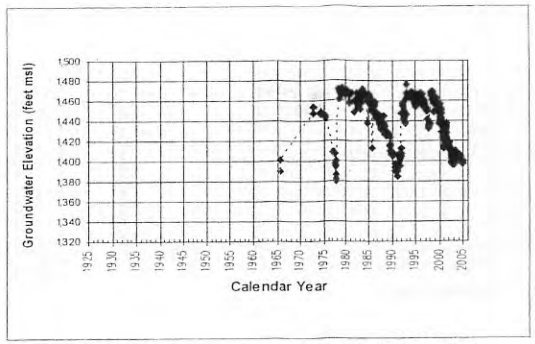
5-1245



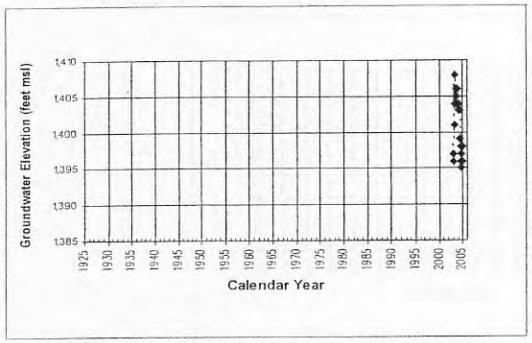
Location: SCWC-Lost Canyon 2A County: LOS ANGELES CO



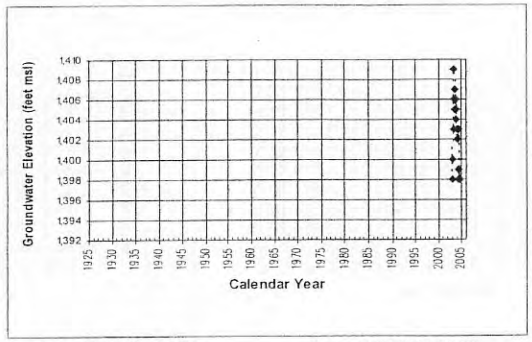
Location: SCWC-Methodist County: LOS ANGELES CO



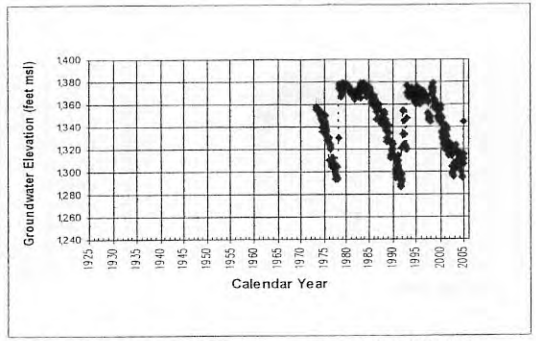
Location: SCWC-Mitchell County: LOS ANGELES CO



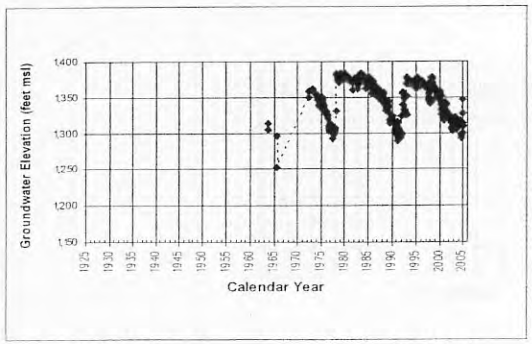
Location: SCWC-Mitchell #5A County: UNK



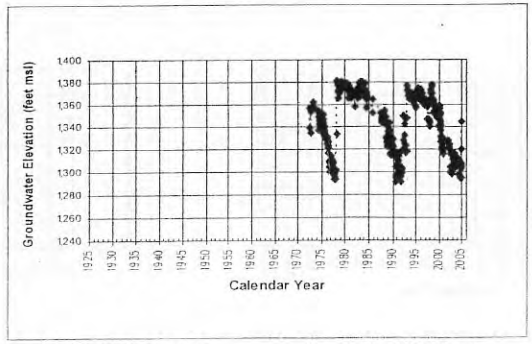
Location: SCWC-Mitchell #5B County: LOS ANGELES CO



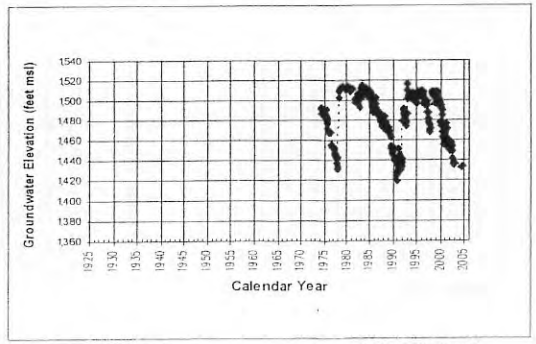
Location: SCWC-N. Oaks Central County: LOS ANGELES CO



Location: SCWC-N. Oaks East County: LOS ANGELES CO

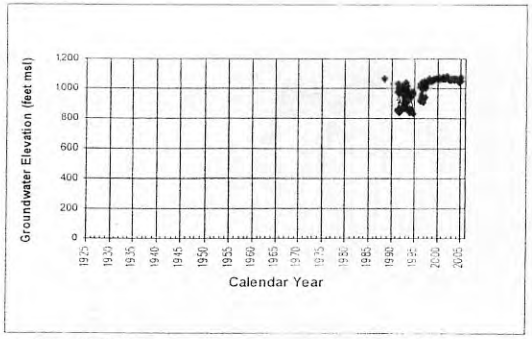


Location: SCWC-N. Oaks West County: LOS ANGELES CO

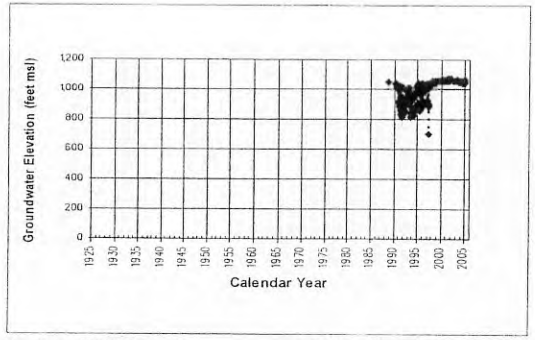


Location: SCWC-Sand Canyon County: LOS ANGELES CO

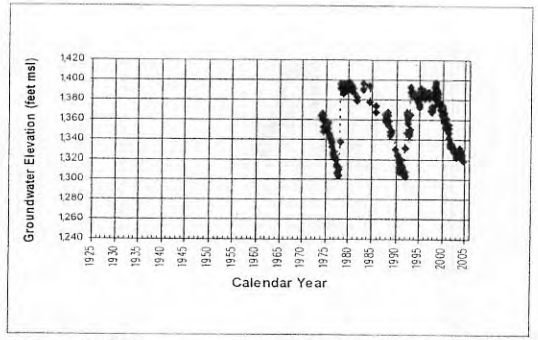
5-124 F



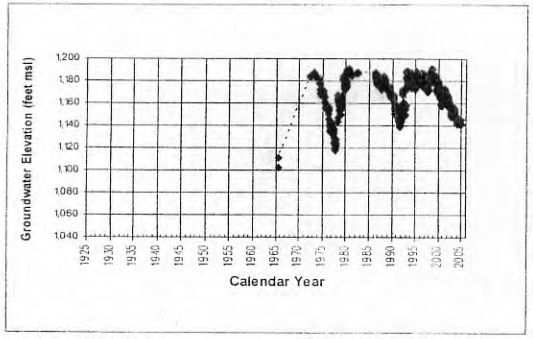
Location: SCWC-Saugus 1 County: LOS ANGELES CO



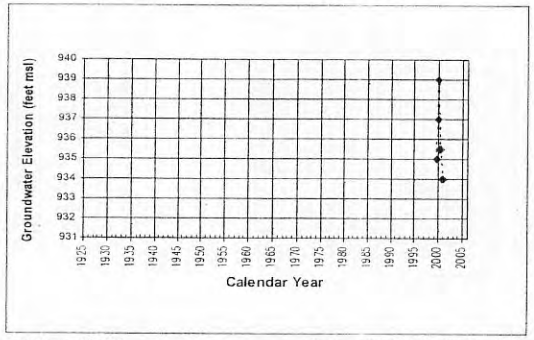
Location: SCWC-Saugus 2 County: LOS ANGELES CO



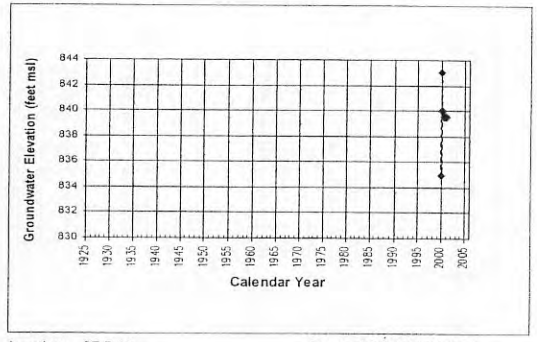
Location: SCWC-Sierra County: LOS ANGELES CO



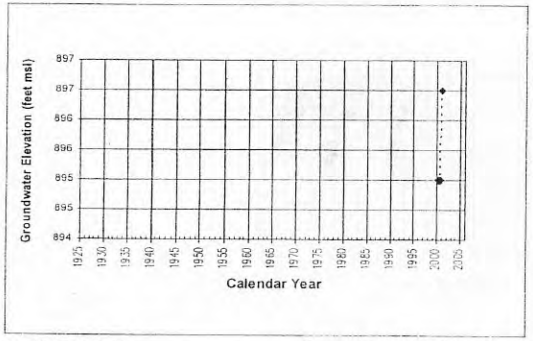
Location: SCWC-Stadium County: LOS ANGELES CO



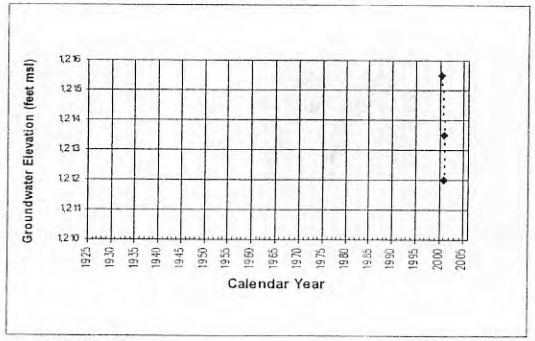
Location: SE-P-1 County: LOS ANGELES CO



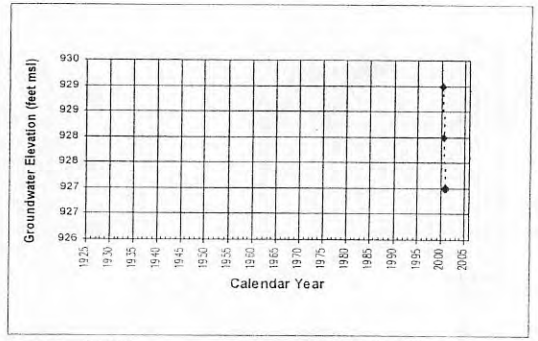
Location: SE-P-10 County: LOS ANGELES CO



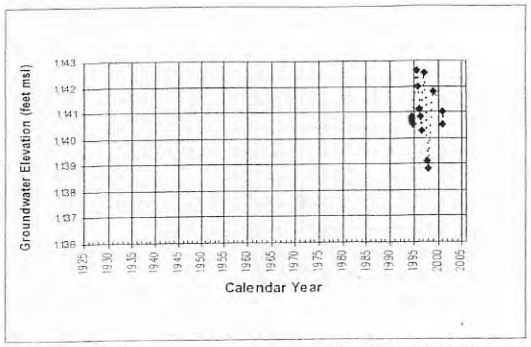
Location: SE-P-11 County: LOS ANGELES CO



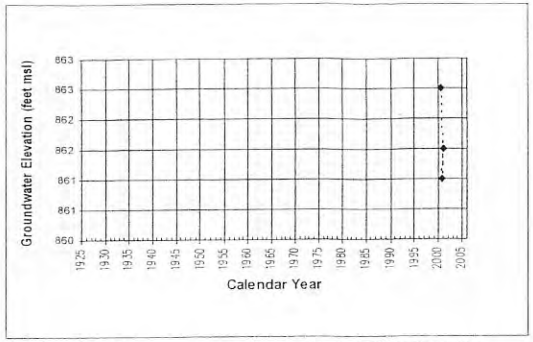
Location: SE-P-12P County: LOS ANGELES CO



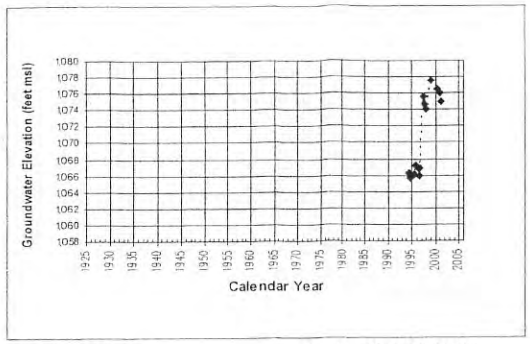
Location: SE-P-13 County: LOS ANGELES CO



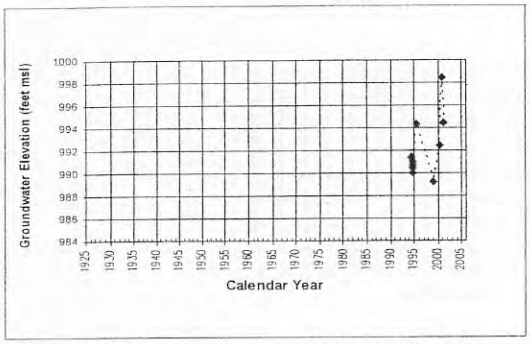
Location: SE-P-18F County: LOS ANGELES CO



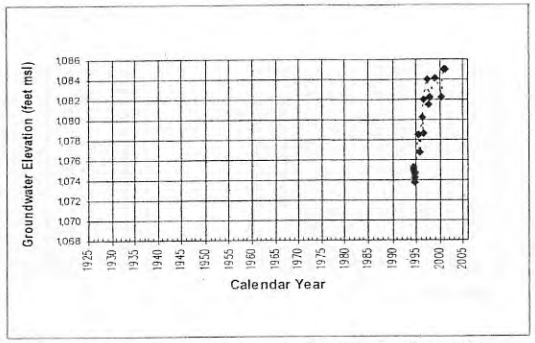
Location: SE-P-1P County: LOS ANGELES CO



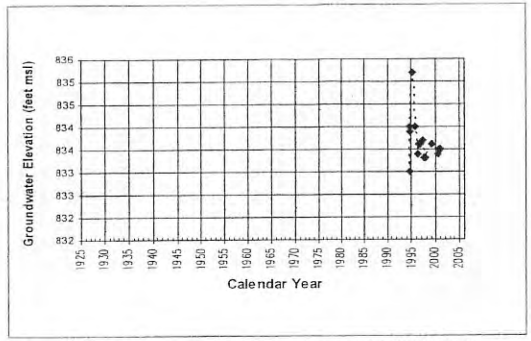
Location: SE-P-22F County: LOS ANGELES CO



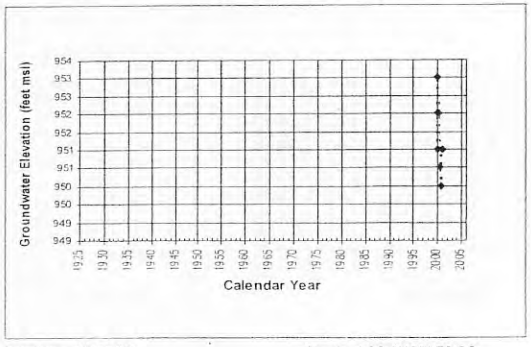
Location: SE-P-23F County: LOS ANGELES CO



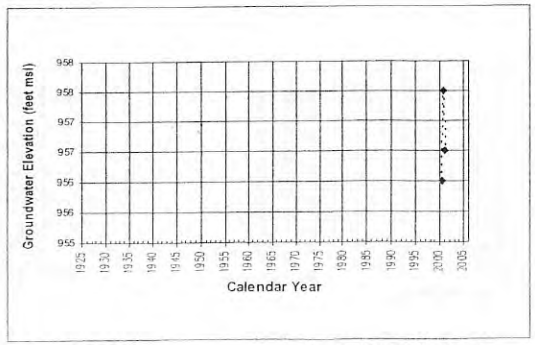
Location: SE-P-27F County: LOS ANGELES CO



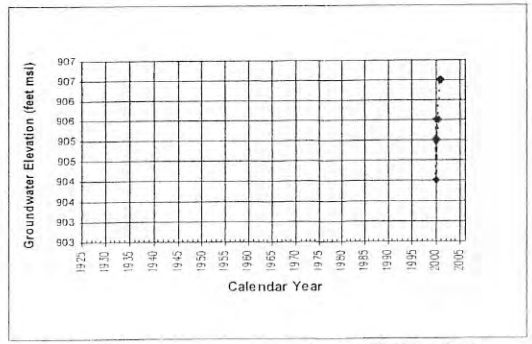
Location: SE-P-29F County: LOS ANGELES CO



Location: SE-P-2M County: LOS ANGELES CO

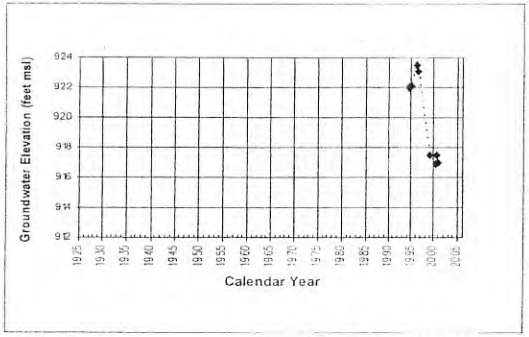


Location: SE-P-2P County: LOS ANGELES CO

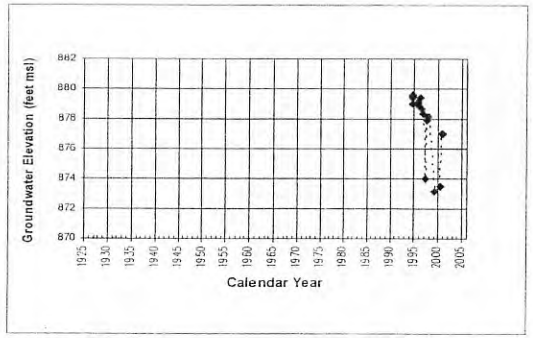


Location: SE-P-3 County: LOS ANGELES CO

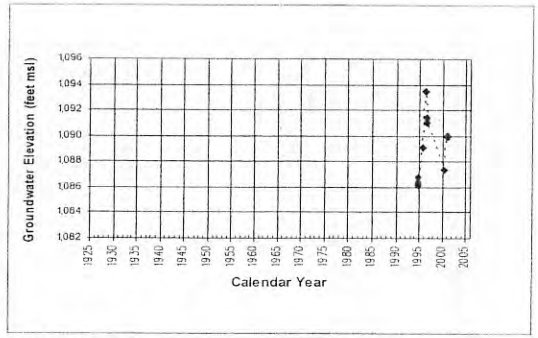
S-1243



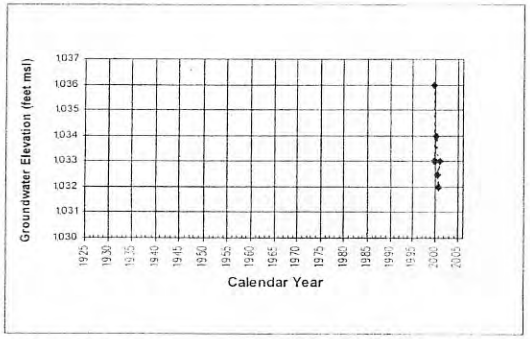
Location: SE-P-32F County: LOS ANGELES CO



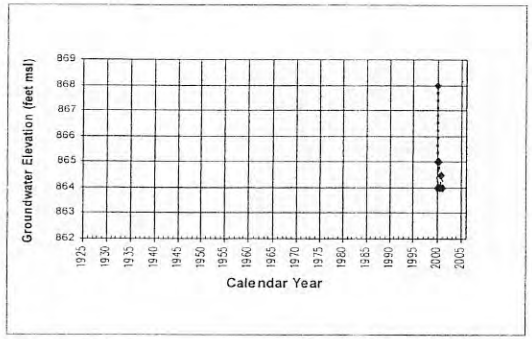
Location: SE-P-35F County: LOS ANGELES CO



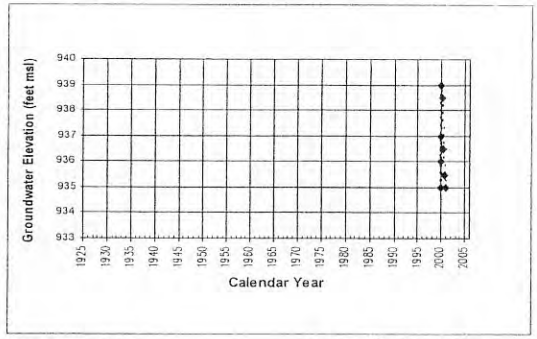
Location: SE-P-37F County: LOS ANGELES CO



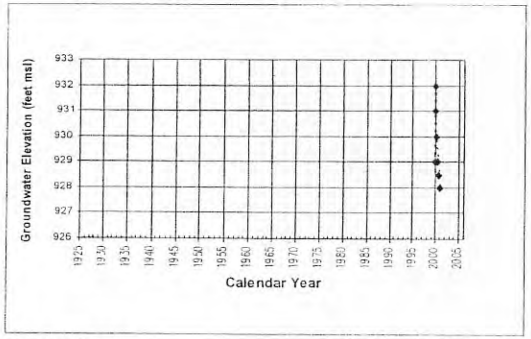
Location: SE-P-3M County: LOS ANGELES CO



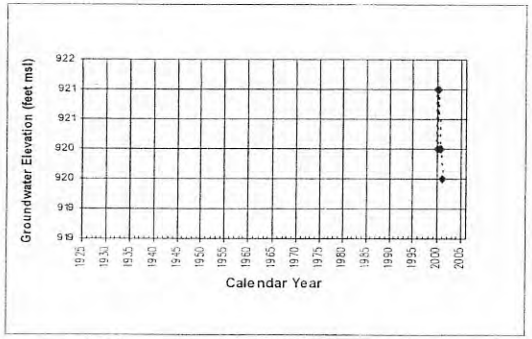
Location: SE-P-4 County: LOS ANGELES CO



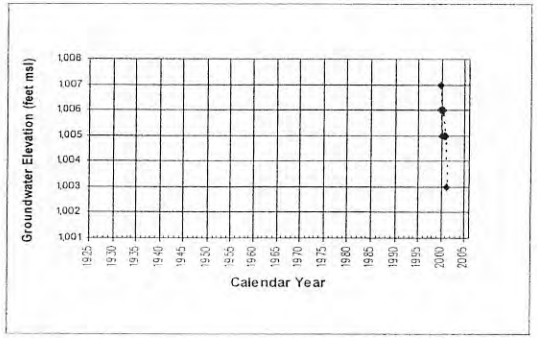
Location: SE-P-5 County: LOS ANGELES CO



Location: SE-P-6 County: LOS ANGELES CO

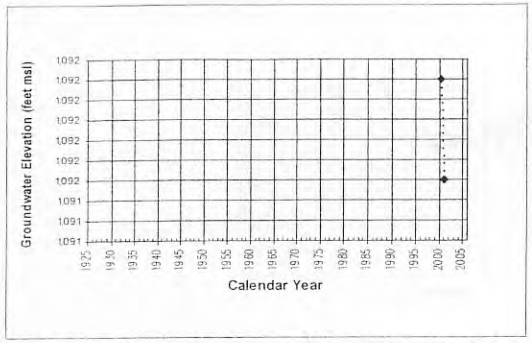


Location: SE-P-7 County: LOS ANGELES CO

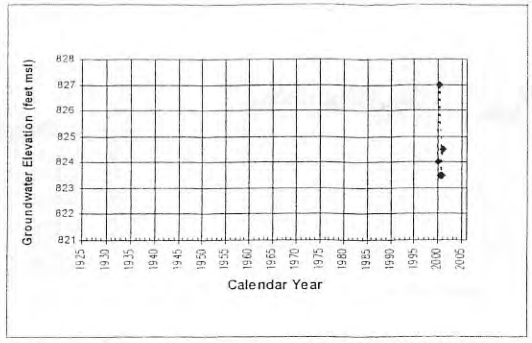


Location: SE-P-8 County: LOS ANGELES CO

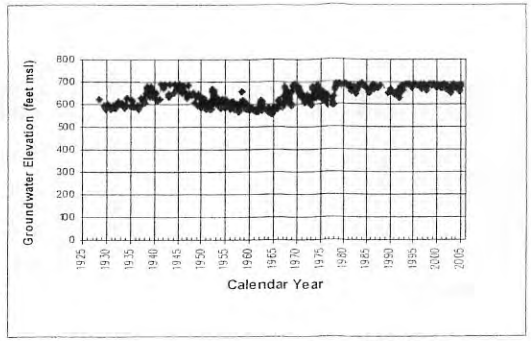
5 - 1250



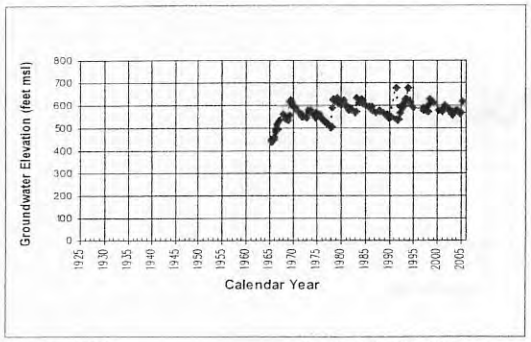
Location: SE-P-8P County: LOS ANGELES CO



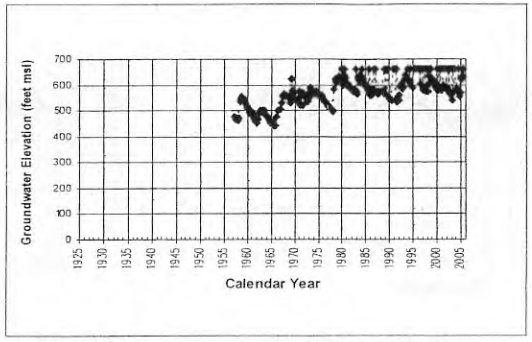
Location: SE-P-9 County: LOS ANGELES CO



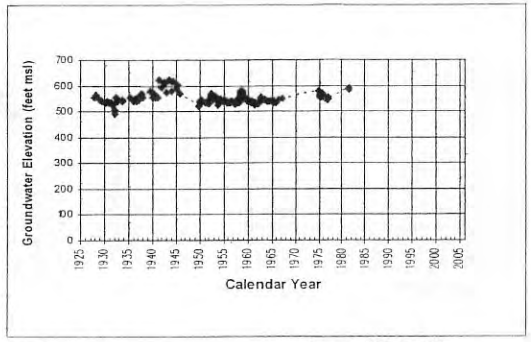
Location: V-0013 County: VENTURA CO



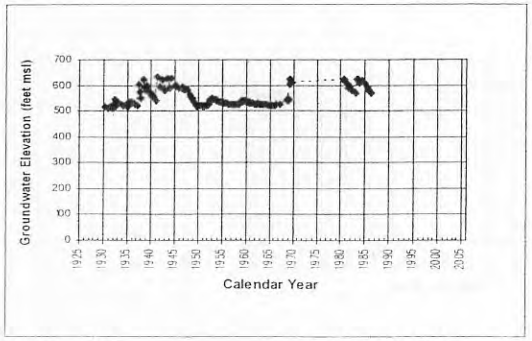
Location: V-0031 County: VENTURA CO



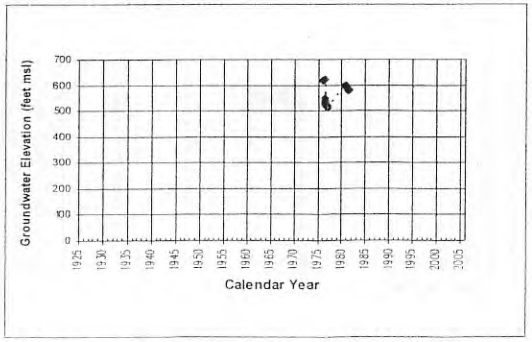
Location: V-0036 County: VENTURA CO



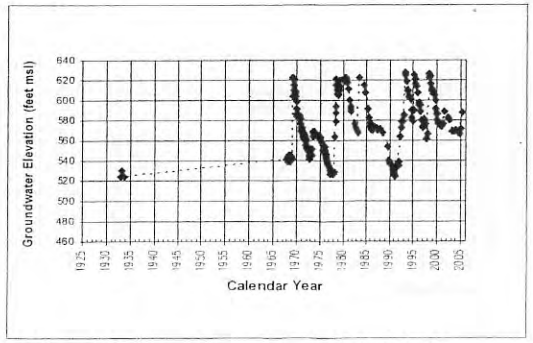
Location: V-0040 County: VENTURA CO



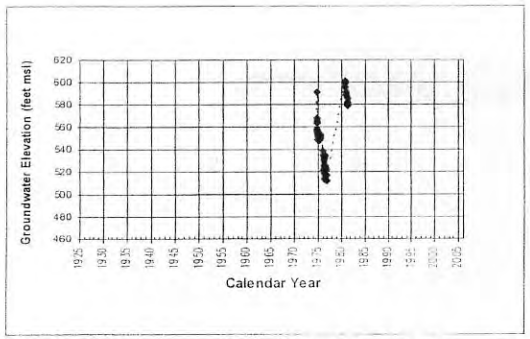
Location: V-0043 County: VENTURA CO



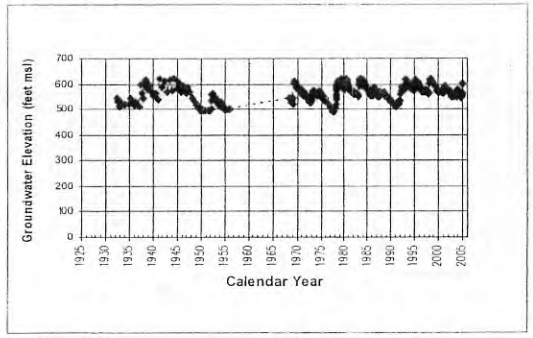
Location: V-0052 County: VENTURA CO



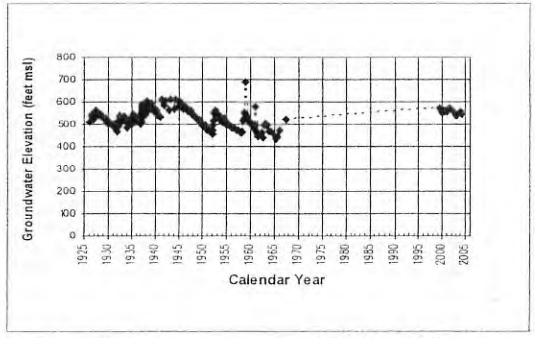
Location: V-0054 County: VENTURA CO



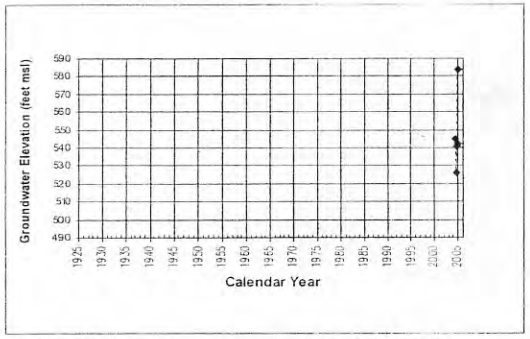
Location: V-0055 County: VENTURA CO



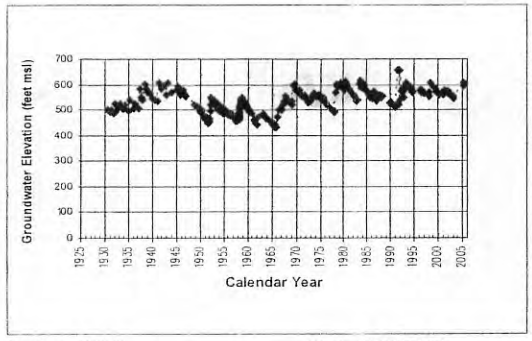
Location: V-0058 County: VENTURA CO



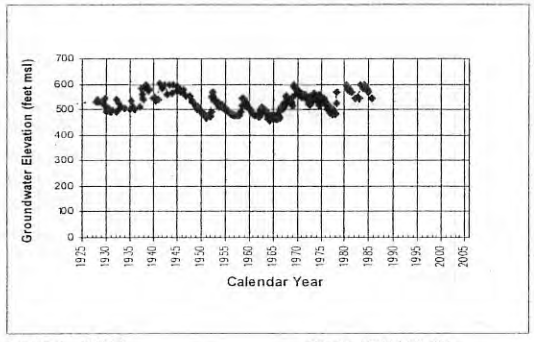
Location: V-0060 County: VENTURA CO



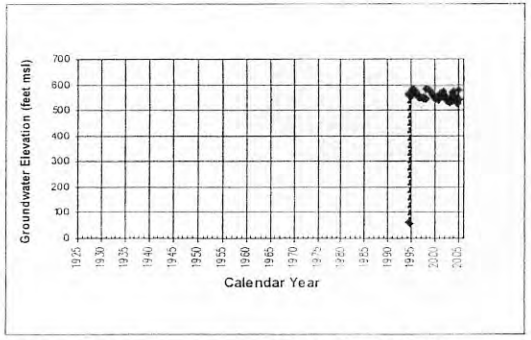
Location: V-0061 County: VENTURA CO



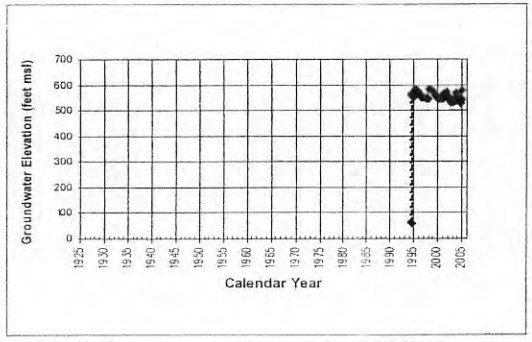
Location: V-0070 County: VENTURA CO



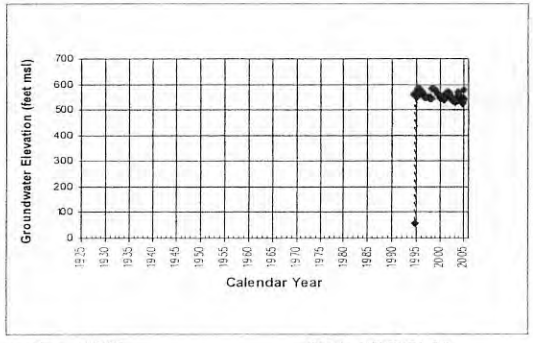
Location: V-0090 County: VENTURA CO



Location: V-0105 County: VENTURA CO

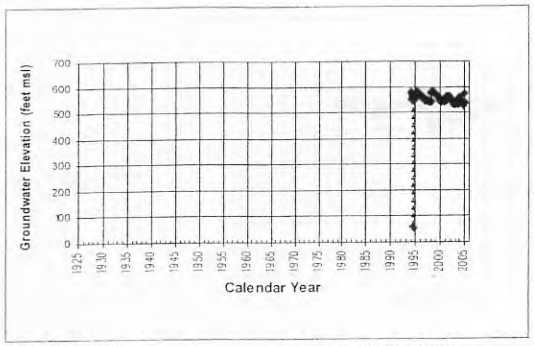


Location: V-0106 County: VENTURA CO

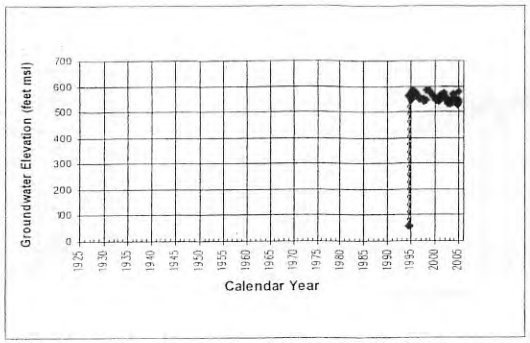


Location: V-0107 County: VENTURA CO

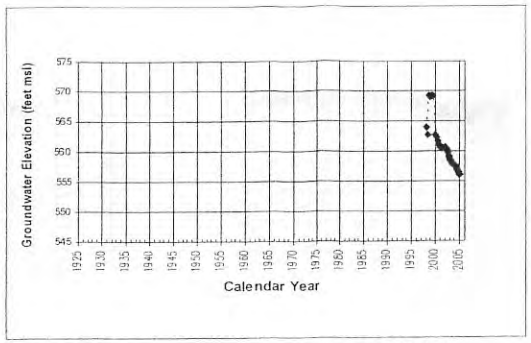
6-1262



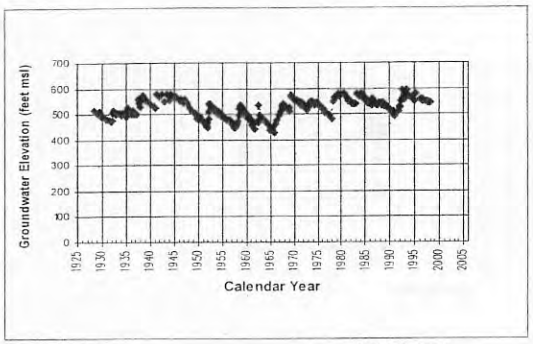
Location: V-0108 County: VENTURA CO



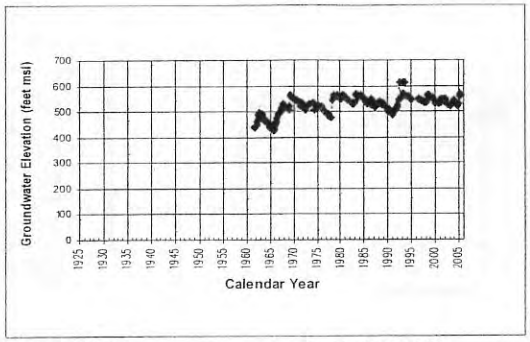
Location: V-0109 County: VENTURA CO



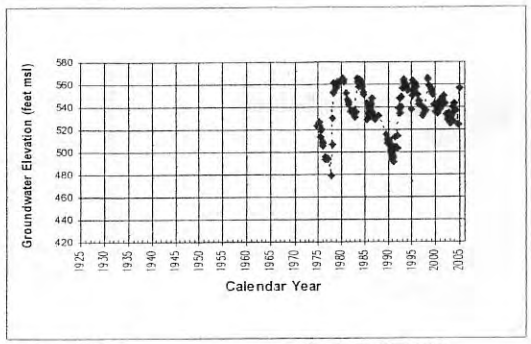
Location: V-0121 County: VENTURA CO



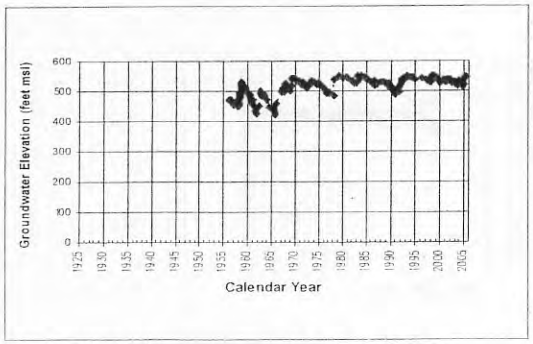
Location: V-0123 County: VENTURA CO



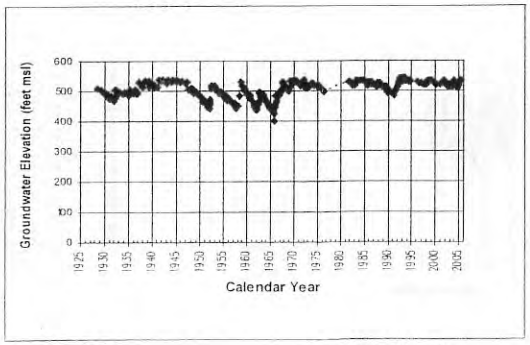
Location: V-0134 County: VENTURA CO



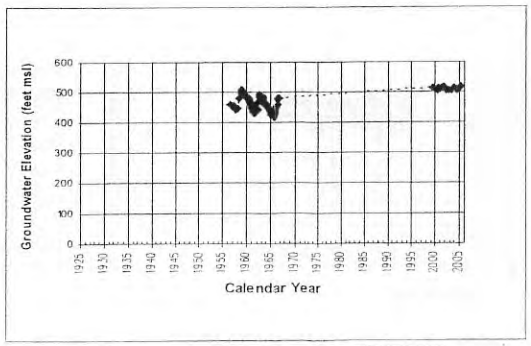
Location: V-0138 County: VENTURA CO



Location: V-0162 County: VENTURA CO

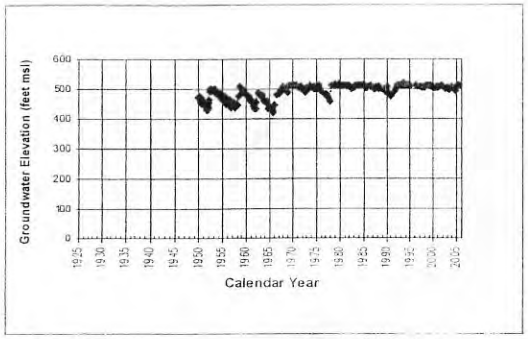


Location: V-0166 County: VENTURA CO

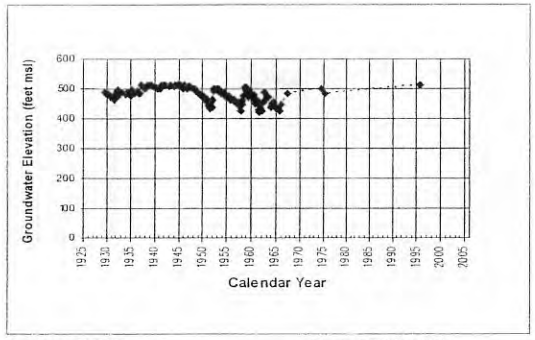


Location: V-0176 County: VENTURA CO

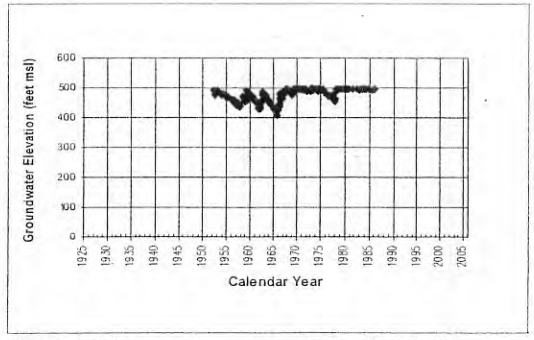
S-1253



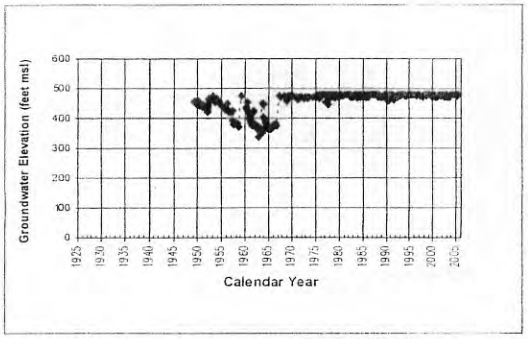
Location: V-0181 County: VENTURA CO



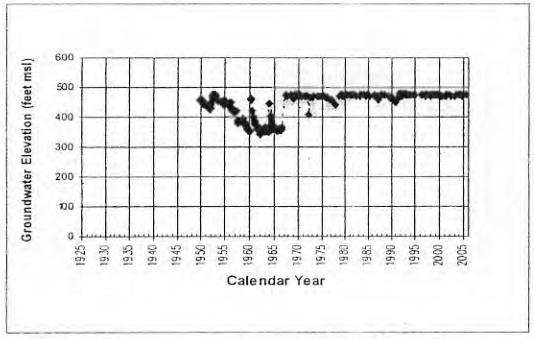
Location: V-0183 County: VENTURA CO



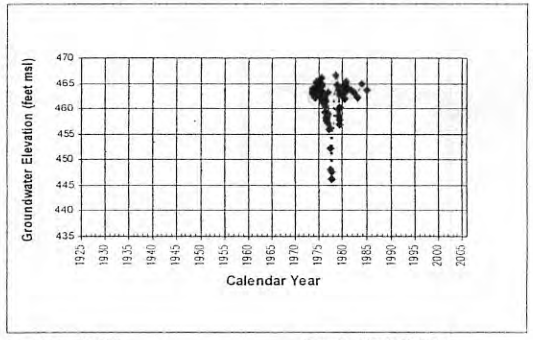
Location: V-0196 County: VENTURA CO



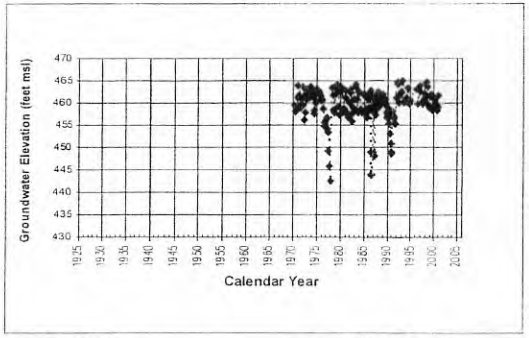
Location: V-0237 County: VENTURA CO



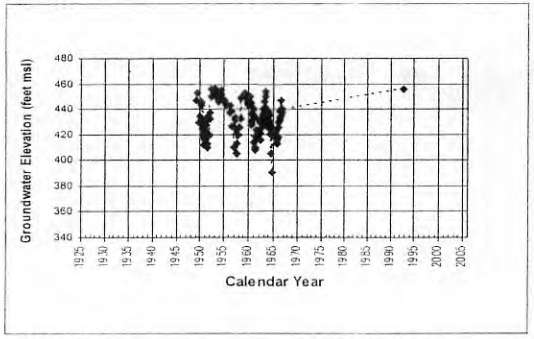
Location: V-0238 County: VENTURA CO



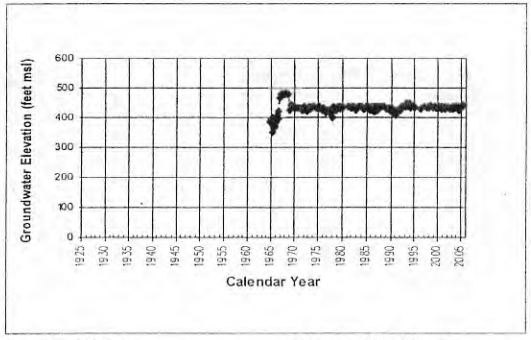
Location: V-0241 County: VENTURA CO



Location: V-0249 County: VENTURA CO

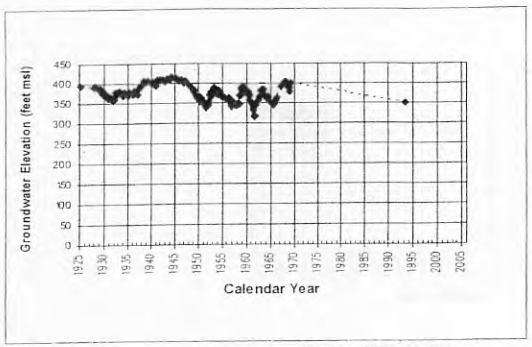


Location: V-0254 County: VENTURA CO

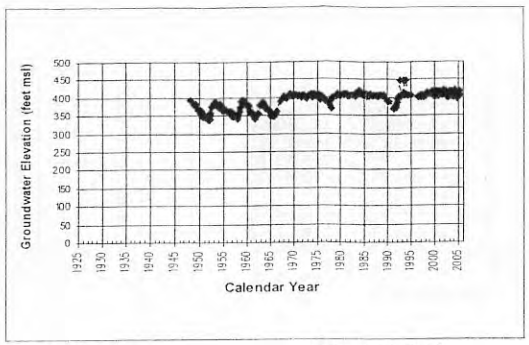


Location: V-0284 County: VENTURA CO

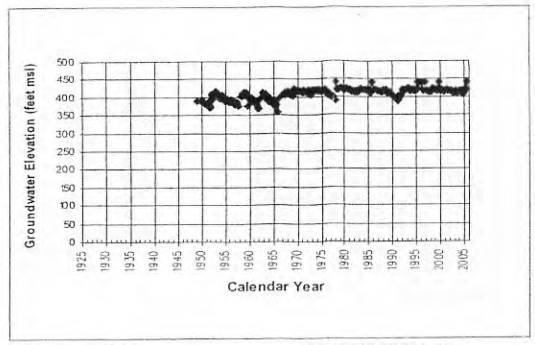
S-1254



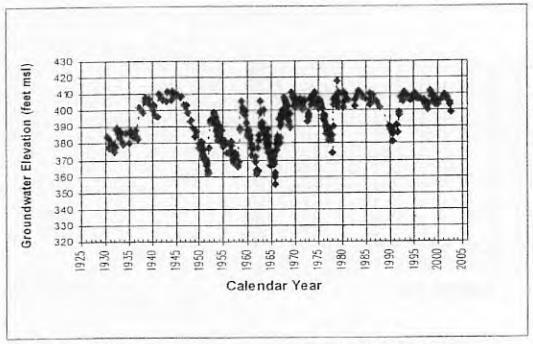
Location: V-0290 County: VENTURA CO



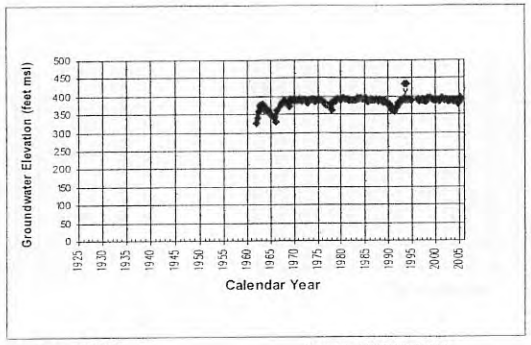
Location: V-0296 County: VENTURA CO



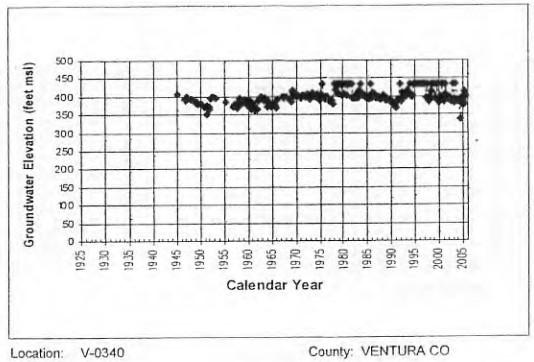
Location: V-0302 County: VENTURA CO



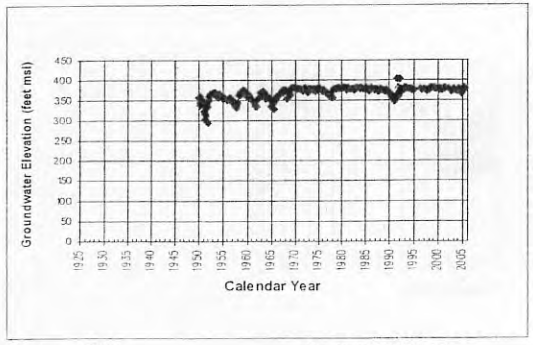
Location: V-0327 County: VENTURA CO



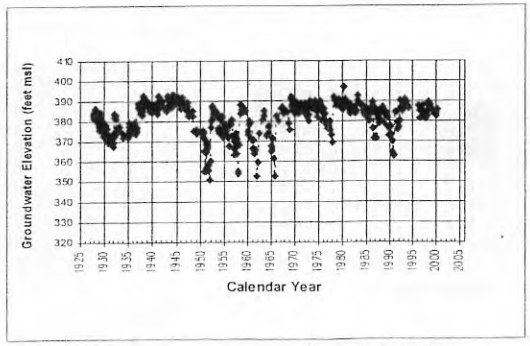
Location: V-0330 County: VENTURA CO



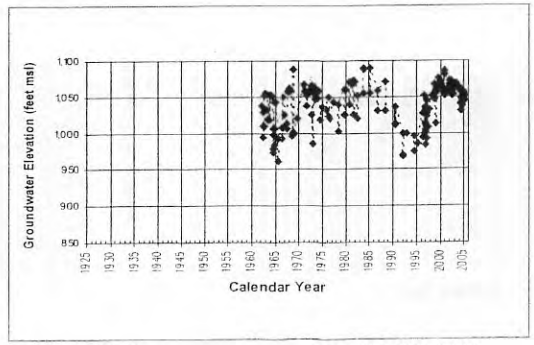
Location: V-0340 County: VENTURA CO



Location: V-0421 County: VENTURA CO

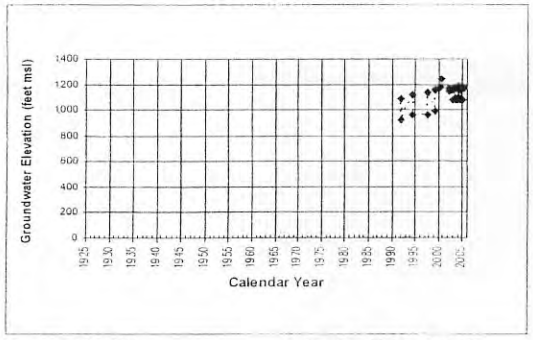


Location: V-0474 County: VENTURA CO

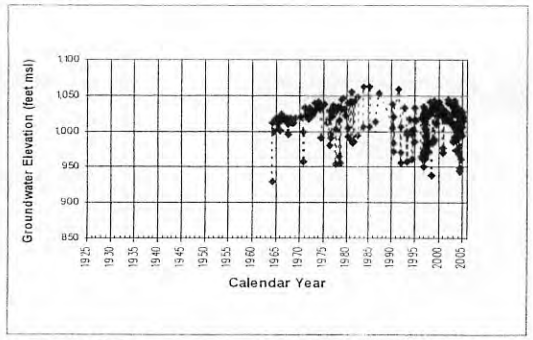


Location: VWC-157 County: LOS ANGELES CO

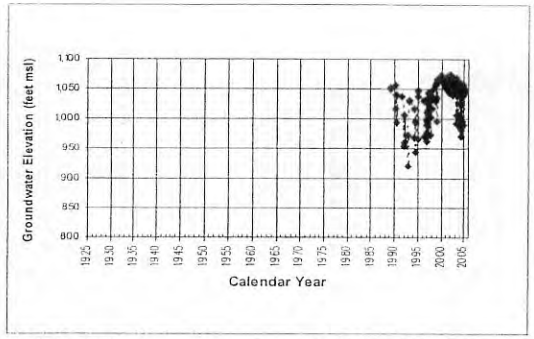
5-1295



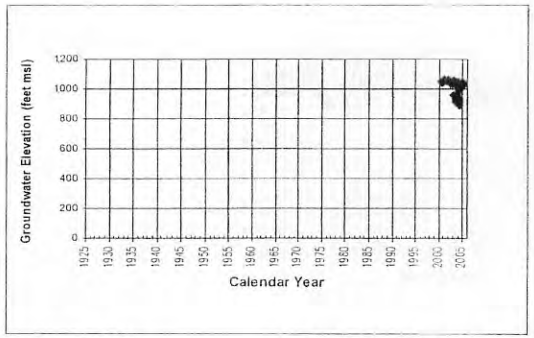
Location: VWC-159 County: LOS ANGELES CO



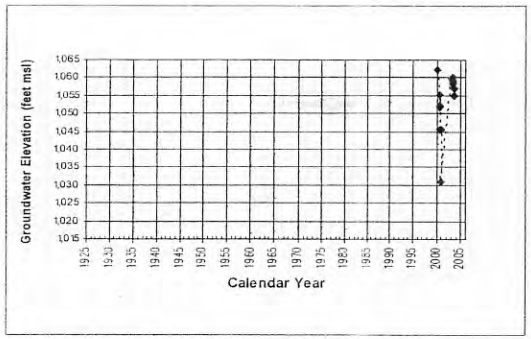
Location: VWC-160 County: LOS ANGELES CO



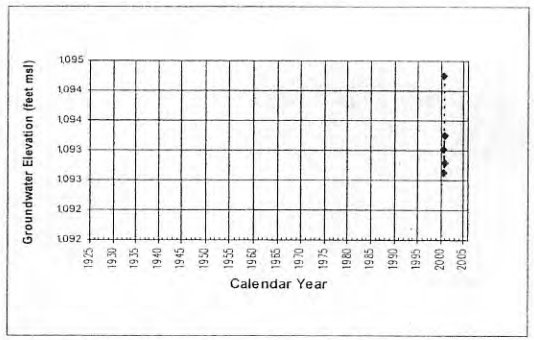
Location: VWC-201 County: LOS ANGELES CO



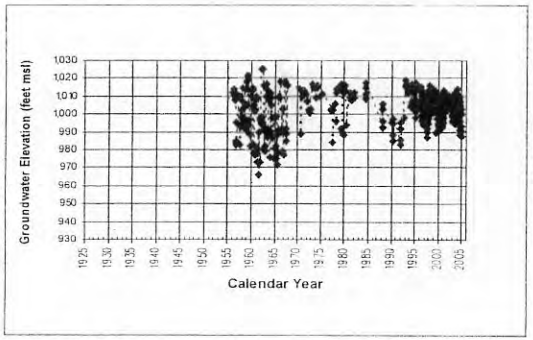
Location: VWC-205 County: LOS ANGELES CO



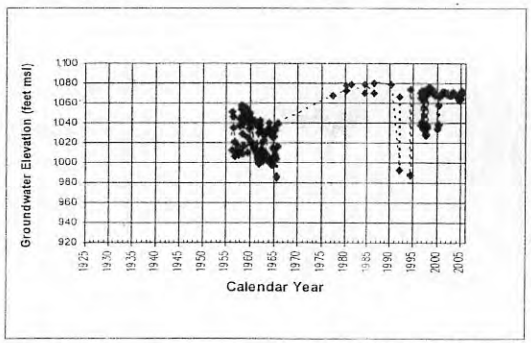
Location: VWC-205M County: LOS ANGELES CO



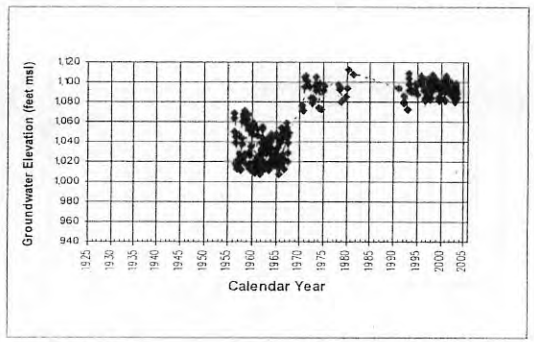
Location: VWC-All. Mon. Well County: LOS ANGELES CO



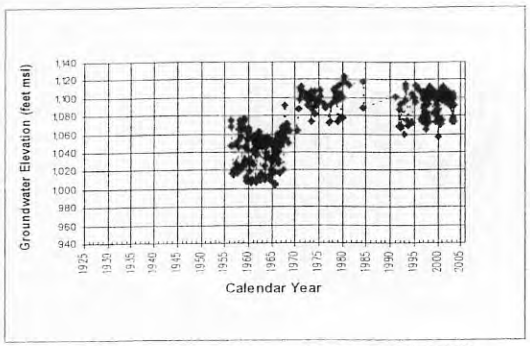
Location: VWC-D County: LOS ANGELES CO



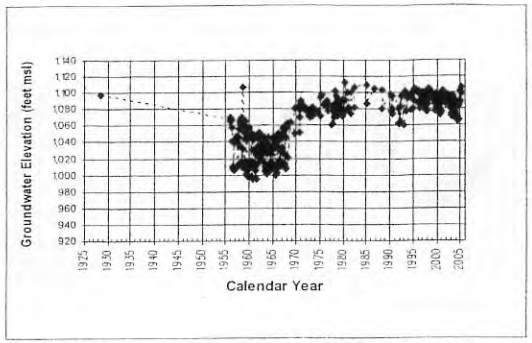
Location: VWC-I County: LOS ANGELES CO



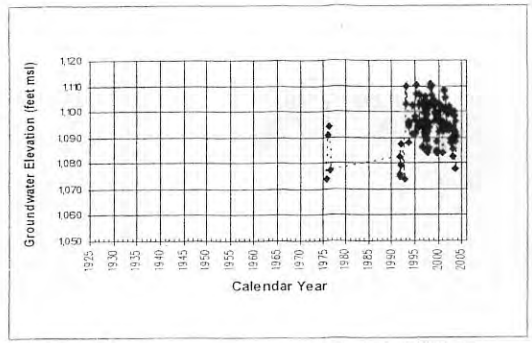
Location: VWC-K2 County: LOS ANGELES CO



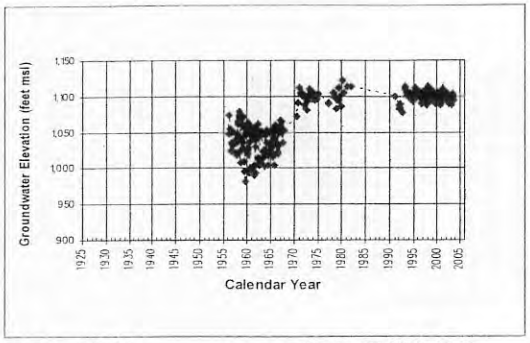
Location: VWC-L2 County: LOS ANGELES CO



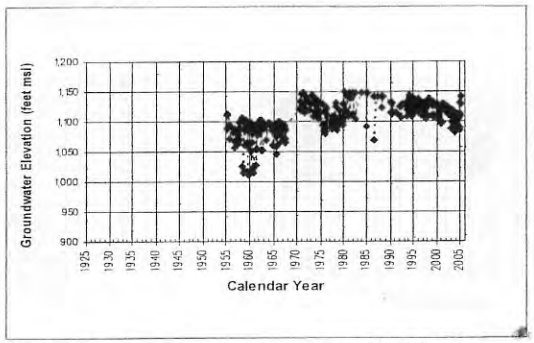
Location: VWC-N County: LOS ANGELES CO



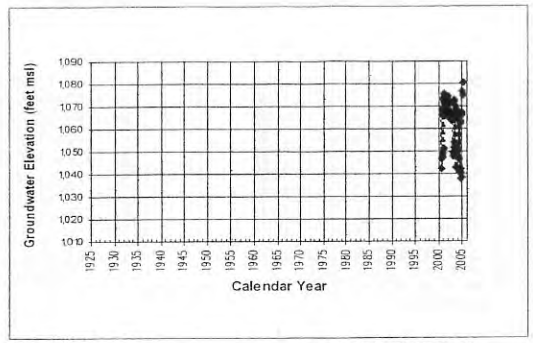
Location: VWC-N3 County: LOS ANGELES CO



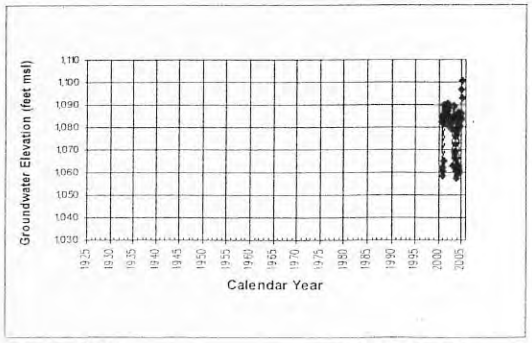
Location: VWC-N4 County: LOS ANGELES CO



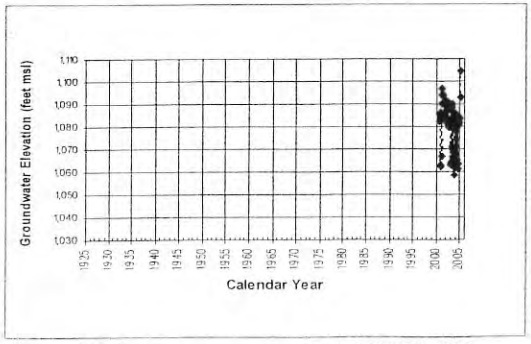
Location: VWC-Q2 County: LOS ANGELES CO



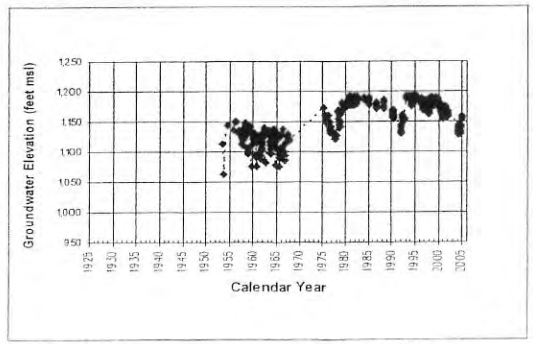
Location: VWC-S6 County: LOS ANGELES CO



Location: VWC-S7 County: LOS ANGELES CO

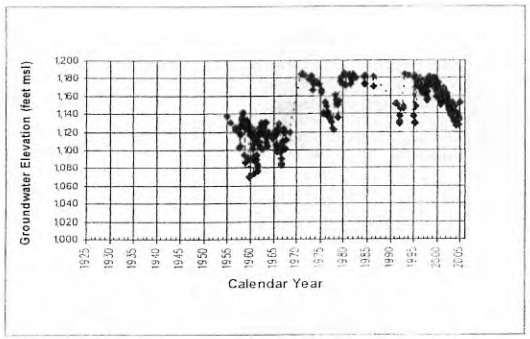


Location: VWC-S8 County: LOS ANGELES CO

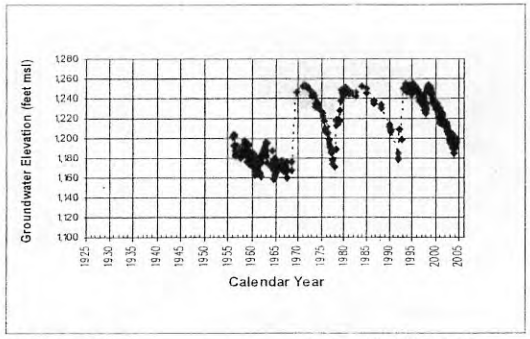


Location: VWC-T2 County: LOS ANGELES CO

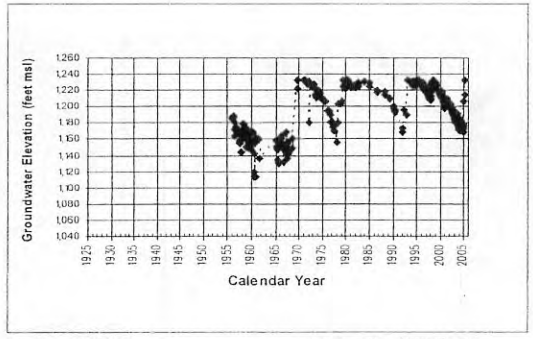
5-125



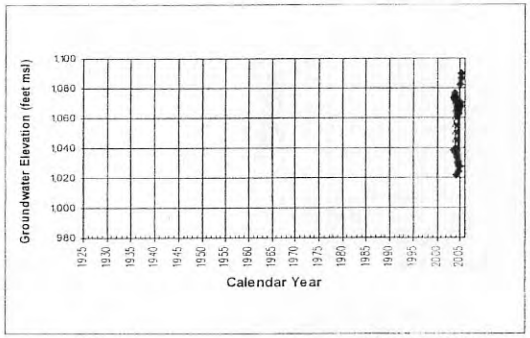
Location: VWC-T4 County: LOS ANGELES CO



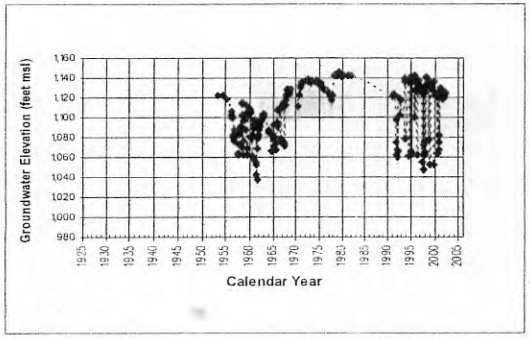
Location: VWC-U3 County: LOS ANGELES CO



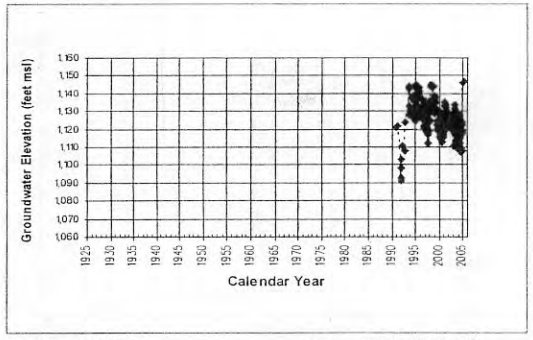
Location: VWC-U4 County: LOS ANGELES CO



Location: VWC-W10 County: LOS ANGELES CO

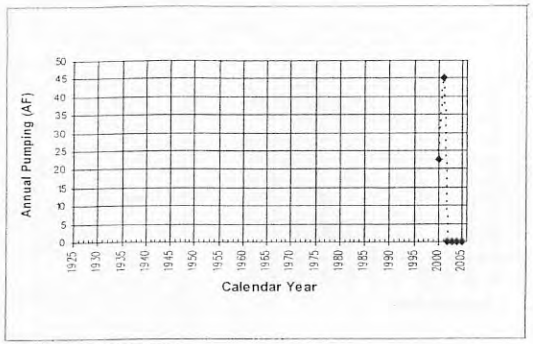


Location: VWC-W6 County: LOS ANGELES CO

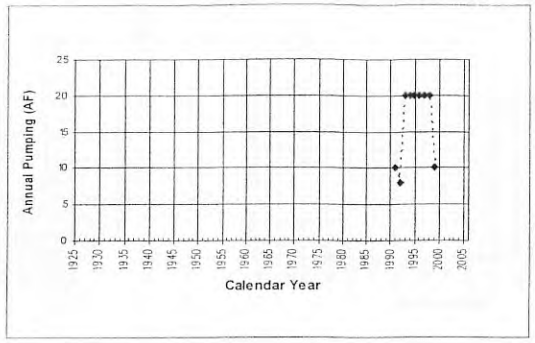


Location: VWC-W9 County: LOS ANGELES CO

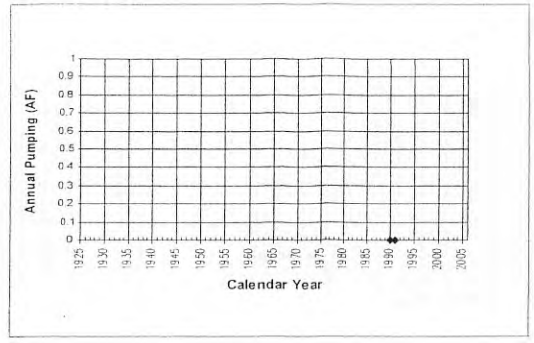
S-126R



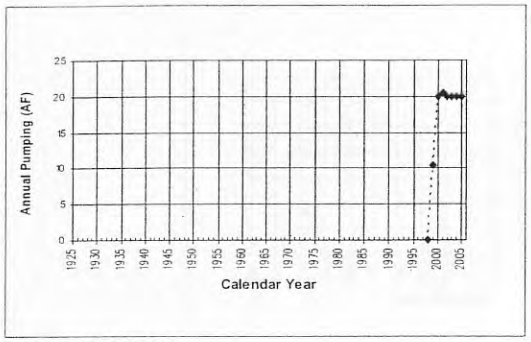
Location: 03N19W06D04S



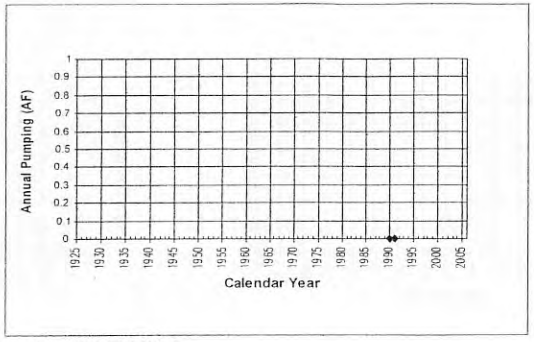
Location: 03N20W02G05S



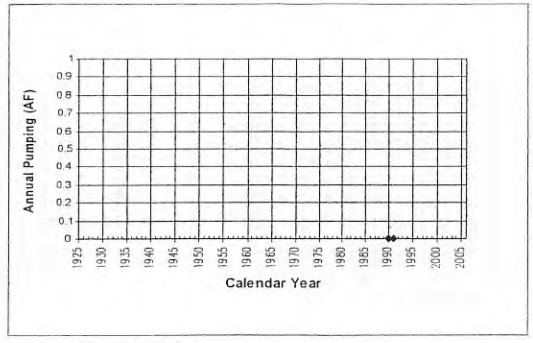
Location: 04N18W12B01S



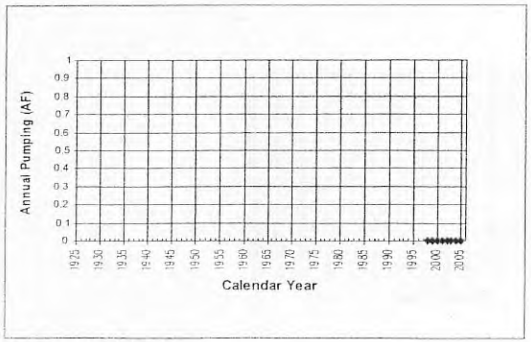
Location: 04N18W20K02S



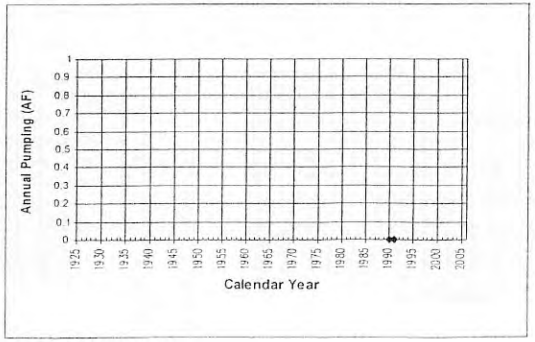
Location: 04N18W23K01S



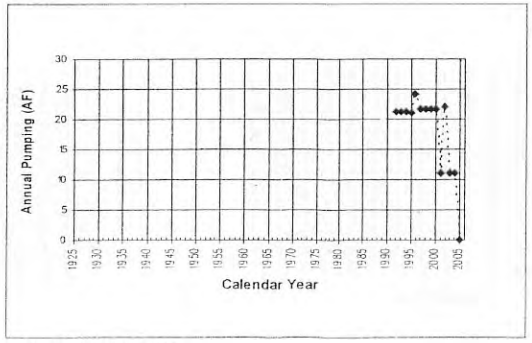
Location: 04N18W31M00S



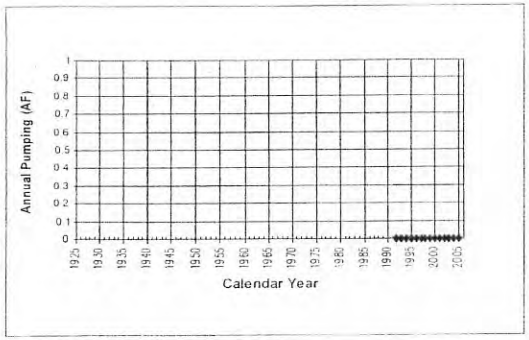
Location: 04N19W19K01S



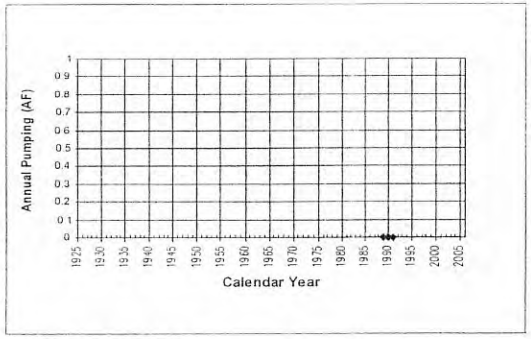
Location: 04N19W22J01S



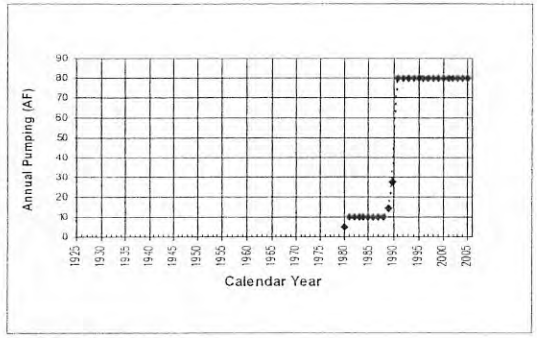
Location: 04N19W23R02S



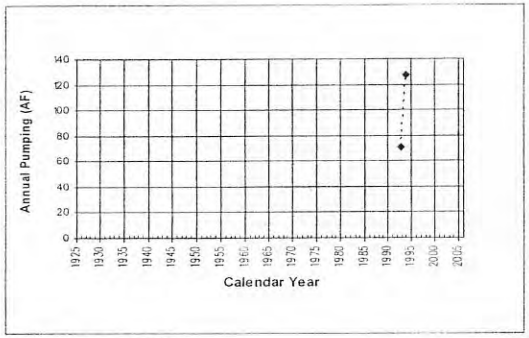
Location: 04N19W24M01S



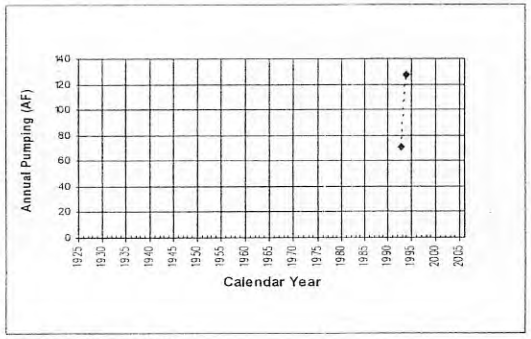
Location: 04N19W25Q02S



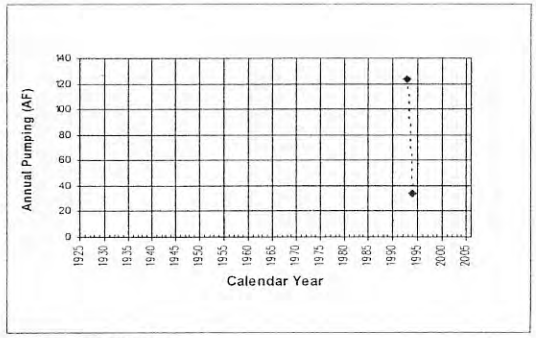
Location: 04N19W29R01S



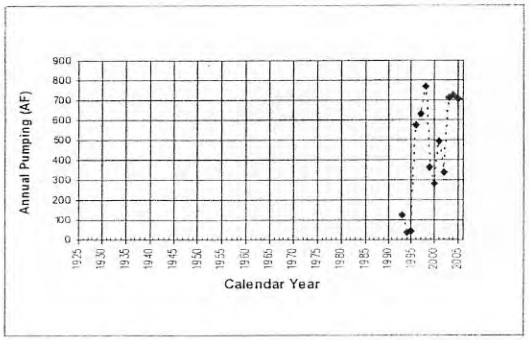
Location: 04N19W31Q00S



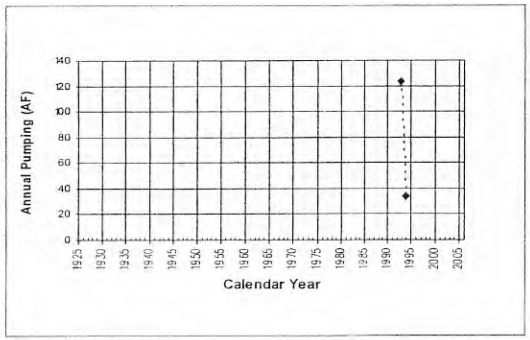
Location: 04N19W31Q0aS



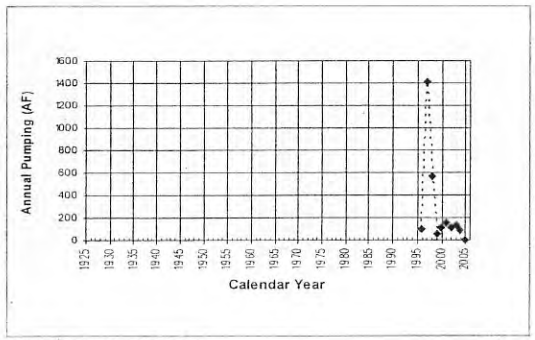
Location: 04N19W32L00S



Location: 04N19W32L02S

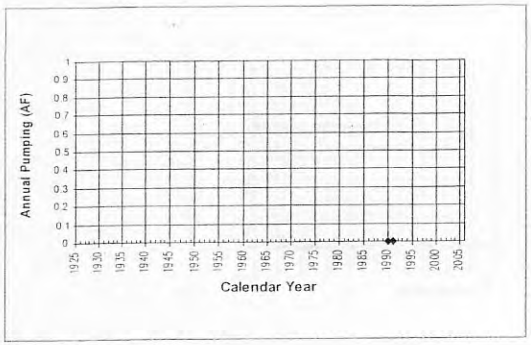


Location: 04N19W32L0aS

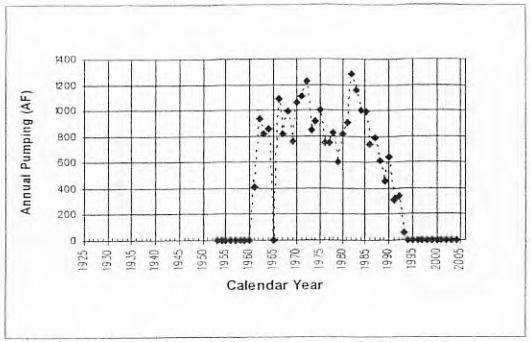


Location: 04N19W33M08S

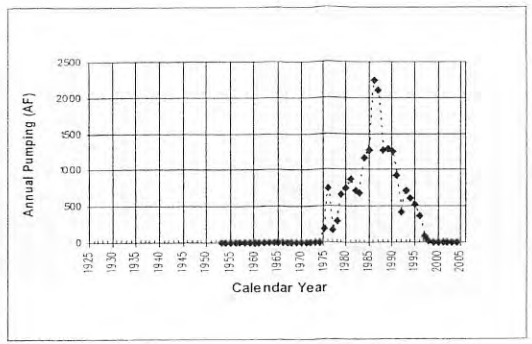
SF-1260



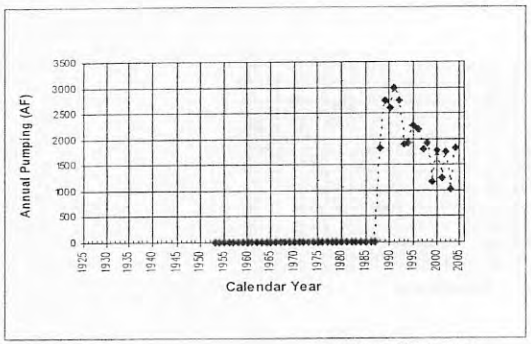
Location: 05N19W31Q01S



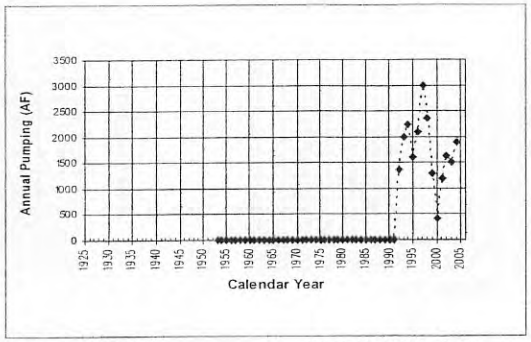
Location: NCWD-10 County: LOS ANGELES CO



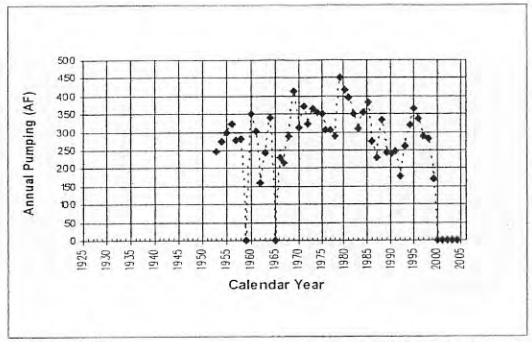
Location: NCWD-11 County: LOS ANGELES CO



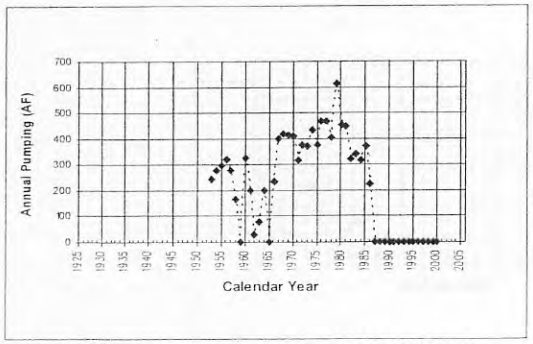
Location: NCWD-12 County: LOS ANGELES CO



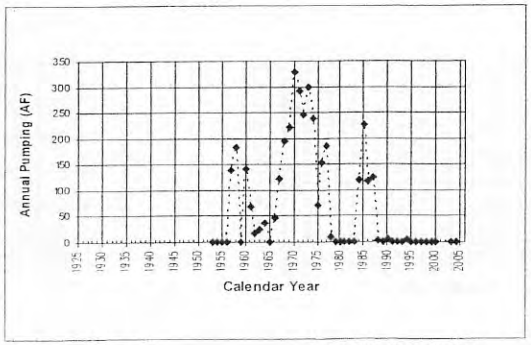
Location: NCWD-13 County: LOS ANGELES CO



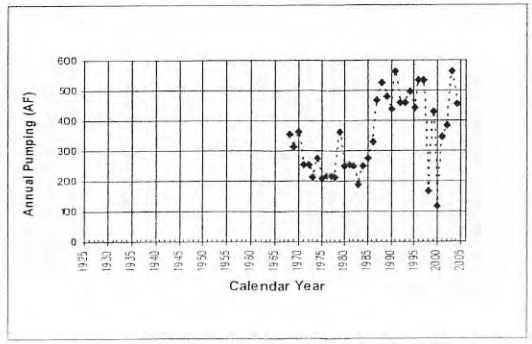
Location: NCWD-7 County: LOS ANGELES CO



Location: NCWD-8 County: LOS ANGELES CO

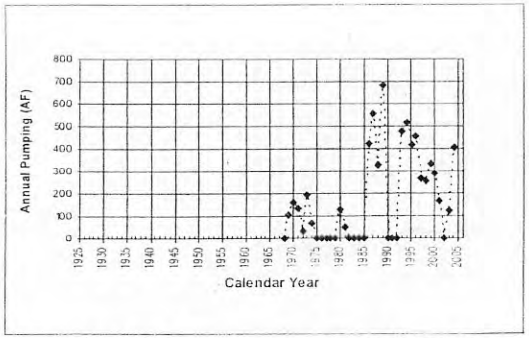


Location: NCWD-9 County: LOS ANGELES CO

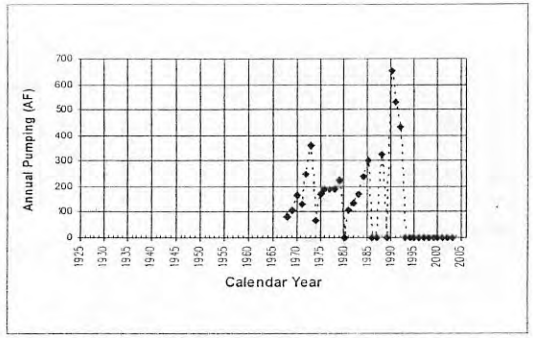


Location: NCWD-Castaic 1 County: LOS ANGELES CO

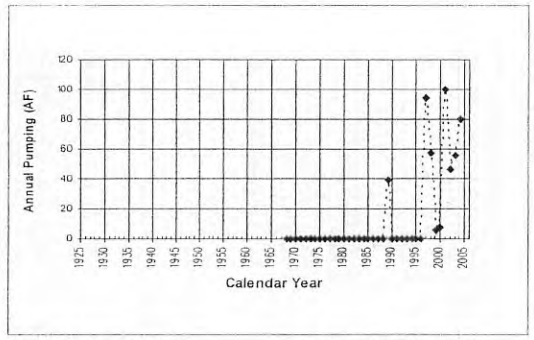
5-1251



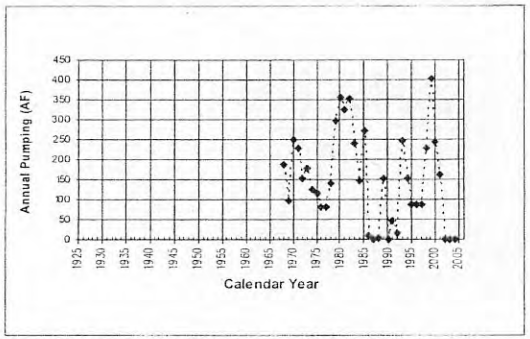
Location: NCWD-Castaic 2 County: LOS ANGELES CO



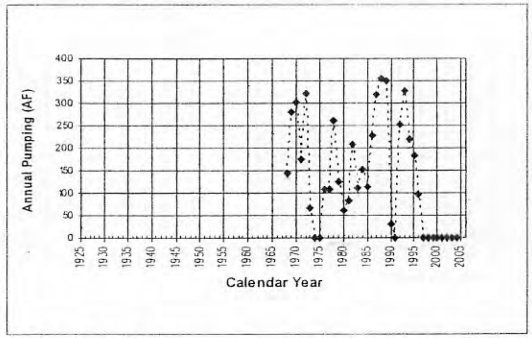
Location: NCWD-Castaic 3 County: LOS ANGELES CO



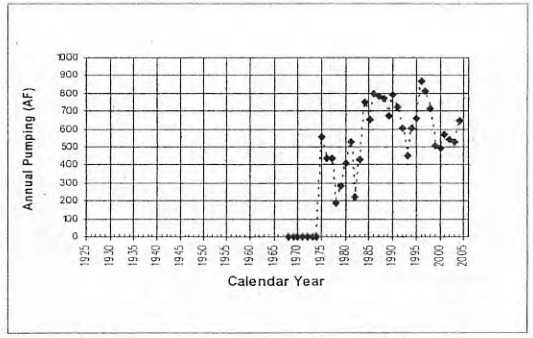
Location: NCWD-Castaic 4 County: LOS ANGELES CO



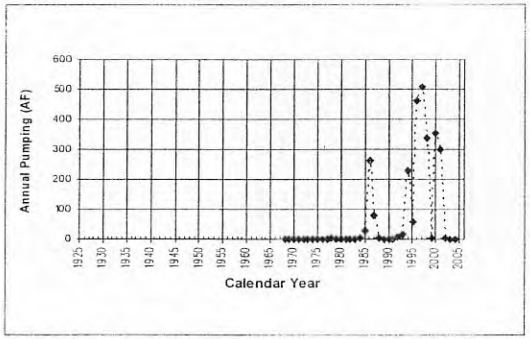
Location: NCWD-Pinetree 1 County: LOS ANGELES CO



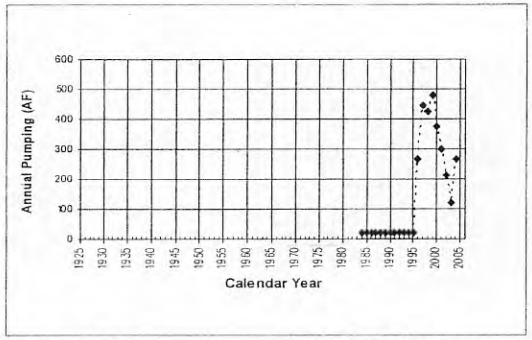
Location: NCWD-Pinetree 2 County: LOS ANGELES CO



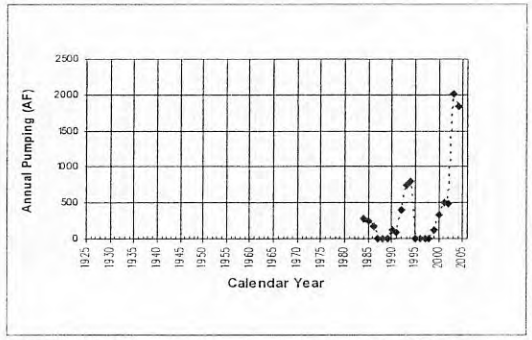
Location: NCWD-Pinetree 3 County: LOS ANGELES CO



Location: NCWD-Pinetree 4 County: LOS ANGELES CO

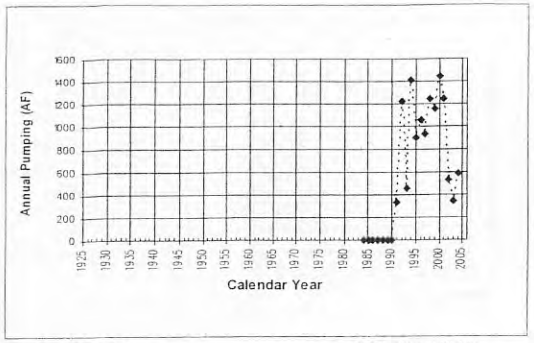


Location: NLF-156 County: LOS ANGELES CO

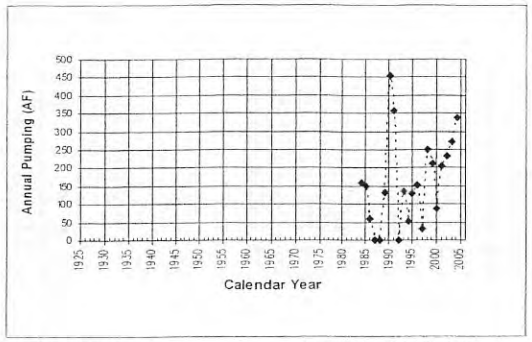


Location: NLF-161 County: LOS ANGELES CO

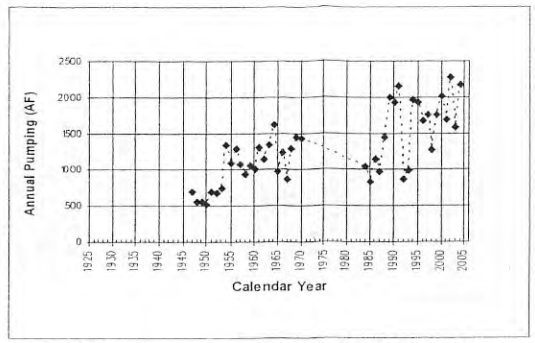
S-1262



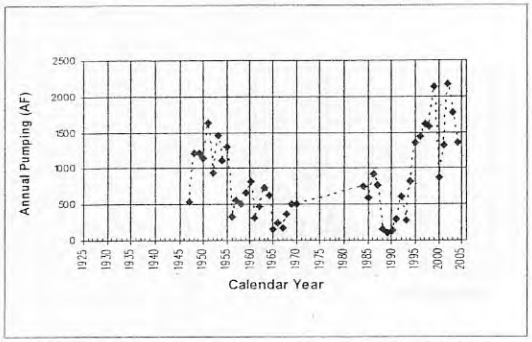
Location: NLF-B10 County: LOS ANGELES CO



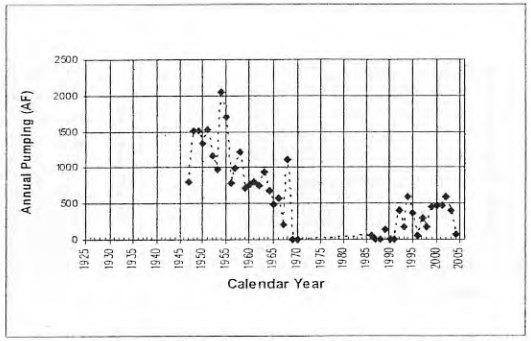
Location: NLF-B11 County: LOS ANGELES CO



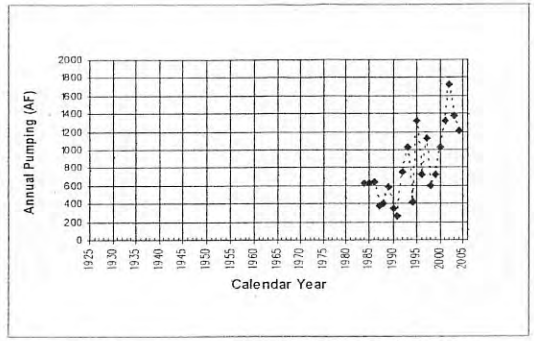
Location: NLF-B5 County: LOS ANGELES CO



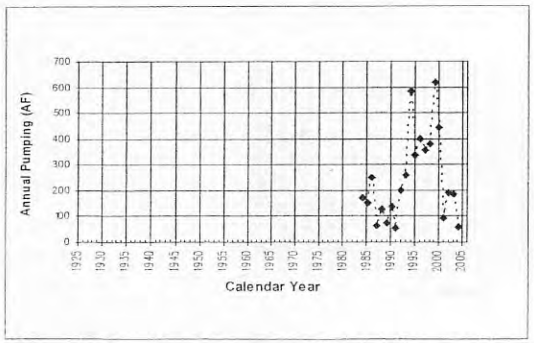
Location: NLF-B6 County: LOS ANGELES CO



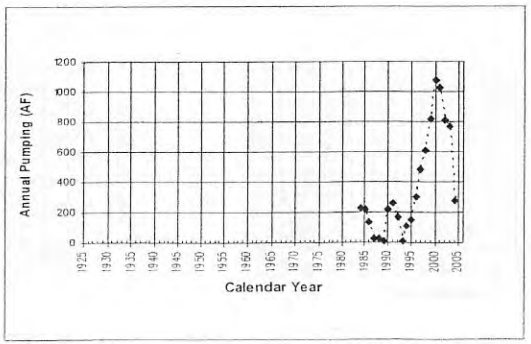
Location: NLF-B7 County: LOS ANGELES CO



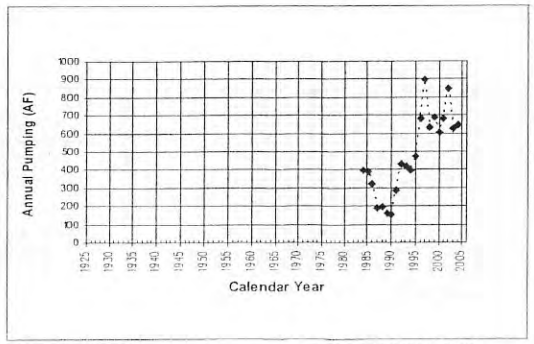
Location: NLF-C County: LOS ANGELES CO



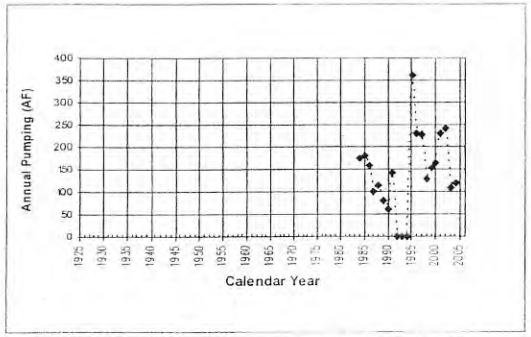
Location: NLF-C3 County: LOS ANGELES CO



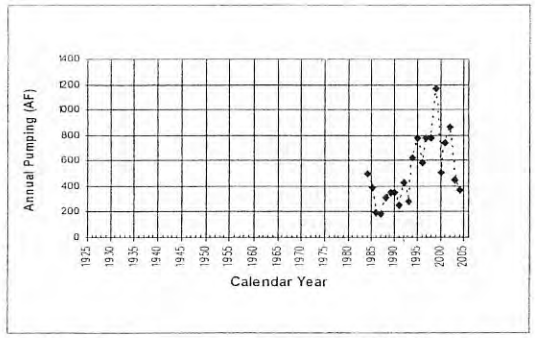
Location: NLF-C4 County: LOS ANGELES CO



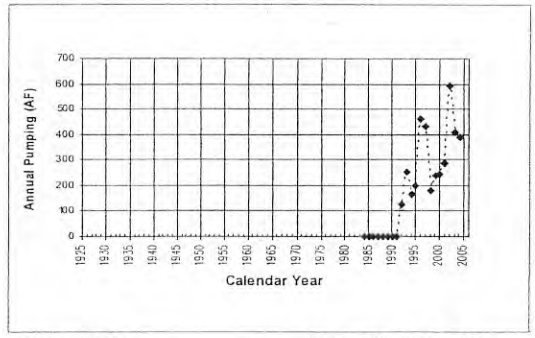
Location: NLF-C5 County: LOS ANGELES CO



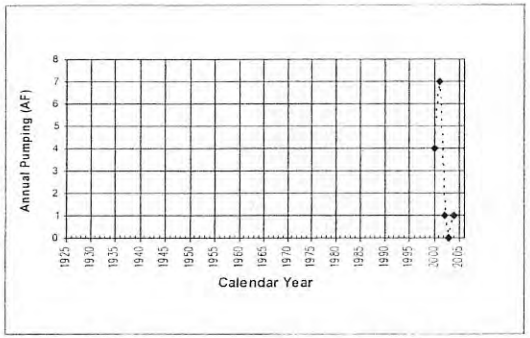
Location: NLF-C6 County: LOS ANGELES CO



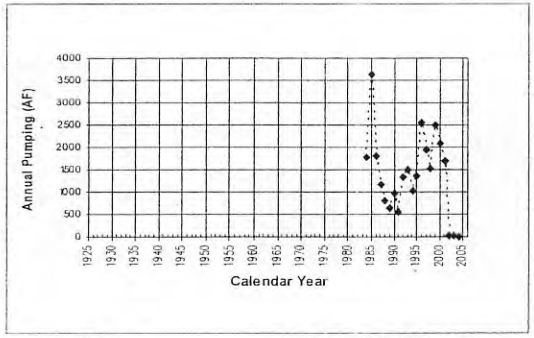
Location: NLF-C7 County: LOS ANGELES CO



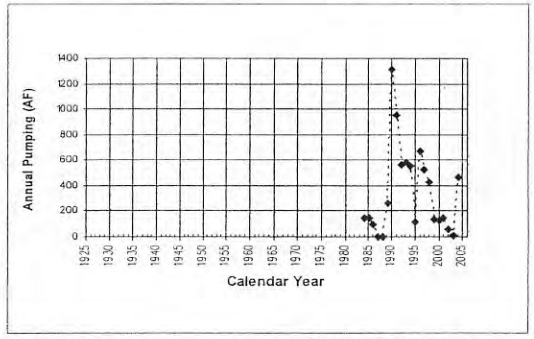
Location: NLF-C8 County: LOS ANGELES CO



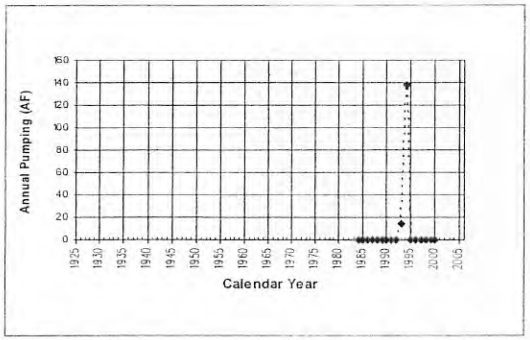
Location: NLF-C9 County: LOS ANGELES CO



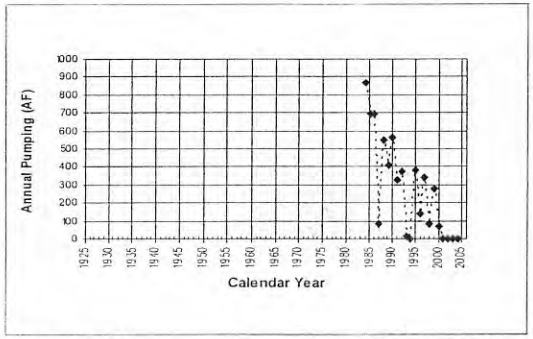
Location: NLF-E County: LOS ANGELES CO



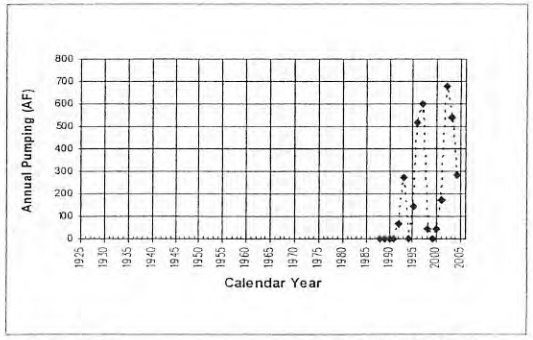
Location: NLF-E2 County: LOS ANGELES CO



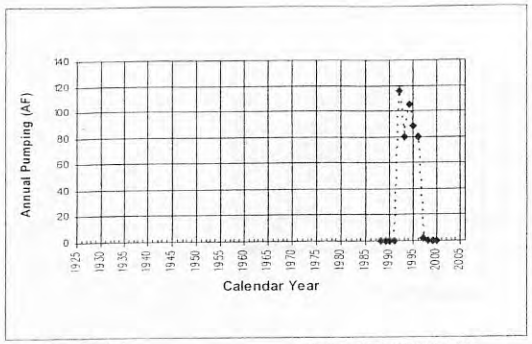
Location: NLF-E3 County: LOS ANGELES CO



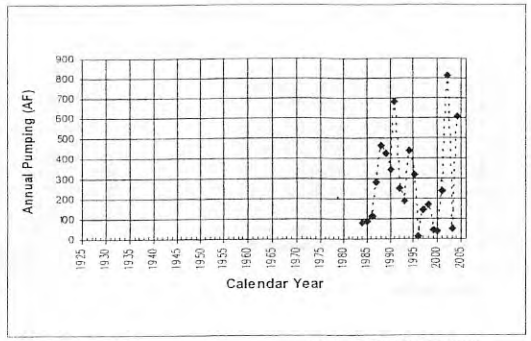
Location: NLF-E4 County: LOS ANGELES CO



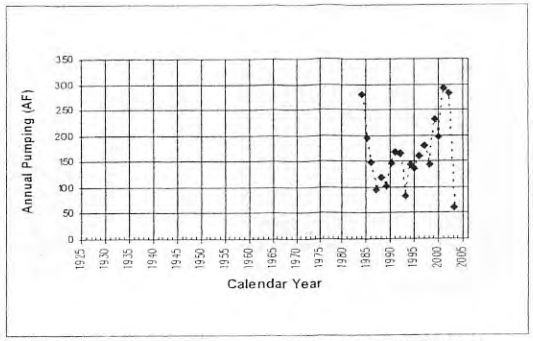
Location: NLF-E5 County: LOS ANGELES CO



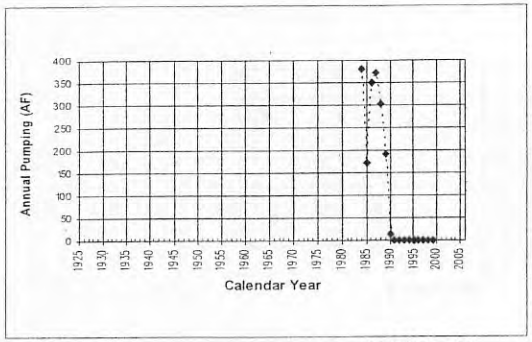
Location: NLF-E7 County: LOS ANGELES CO



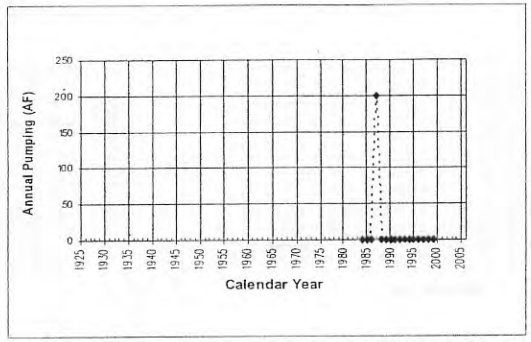
Location: NLF-E9 County: LOS ANGELES CO



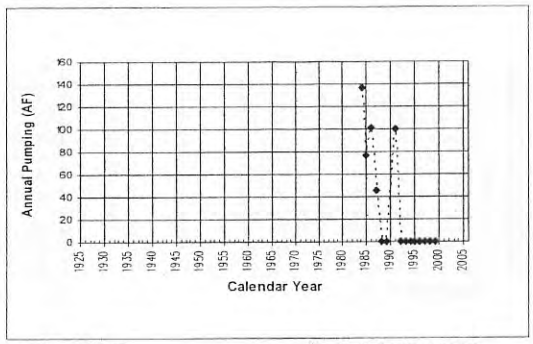
Location: NLF-G45 County: LOS ANGELES CO



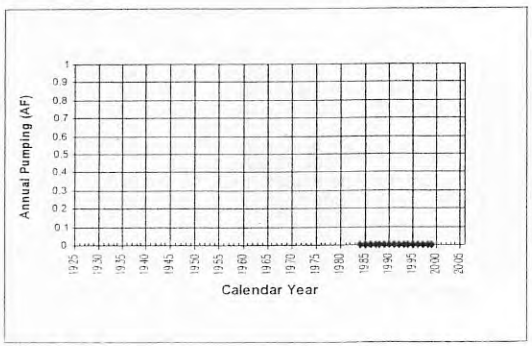
Location: NLF-Q County: LOS ANGELES CO



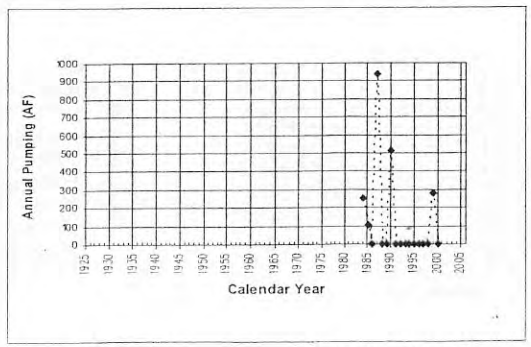
Location: NLF-R County: LOS ANGELES CO



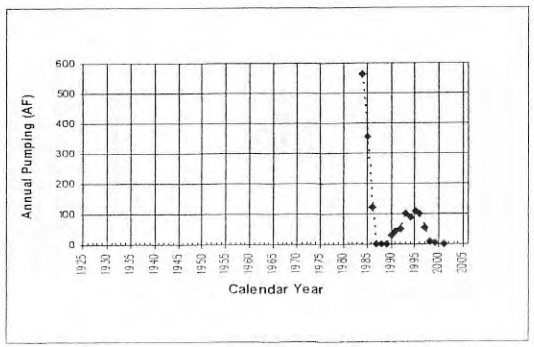
Location: NLF-R2 County: LOS ANGELES CO



Location: NLF-S County: LOS ANGELES CO

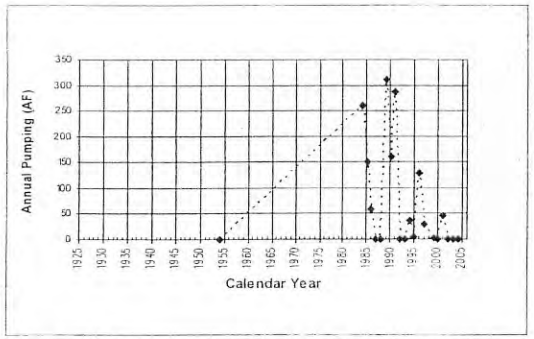


Location: NLF-S2 County: LOS ANGELES CO

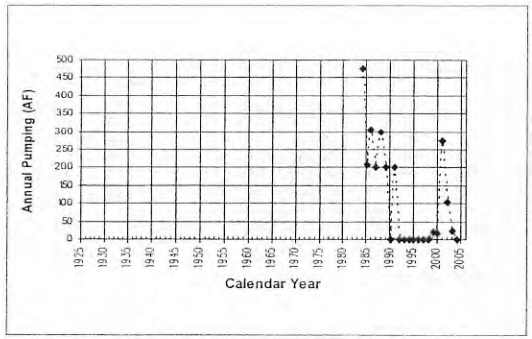


Location: NLF-S3 County: LOS ANGELES CO

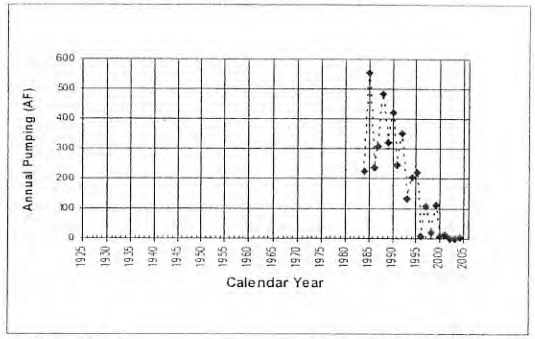
5-1255



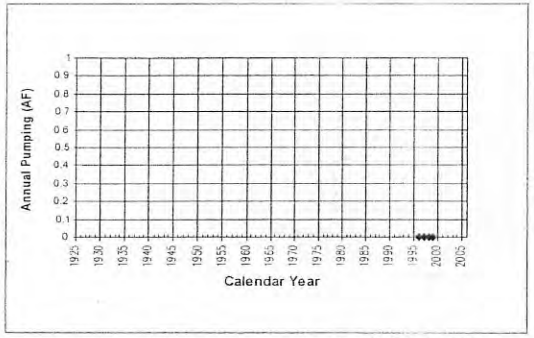
Location: NLF-W4 County: LOS ANGELES CO



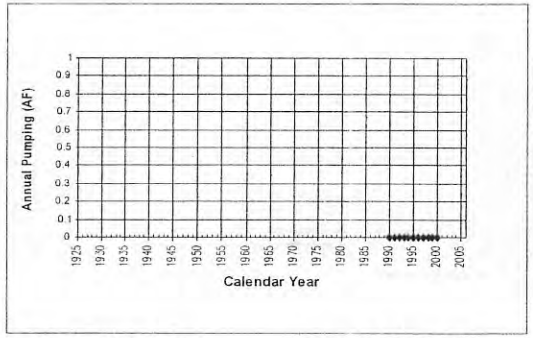
Location: NLF-W5 County: LOS ANGELES CO



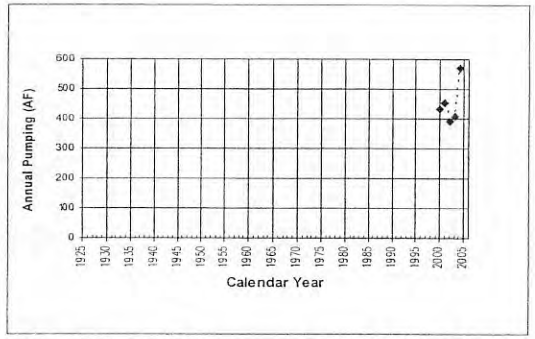
Location: NLF-X3 County: LOS ANGELES CO



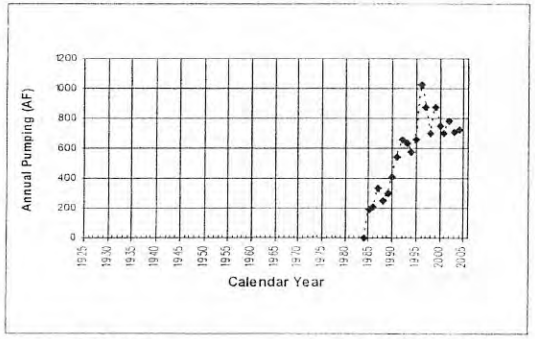
Location: PR-Lennar (D. Poe) County: LOS ANGELES CO



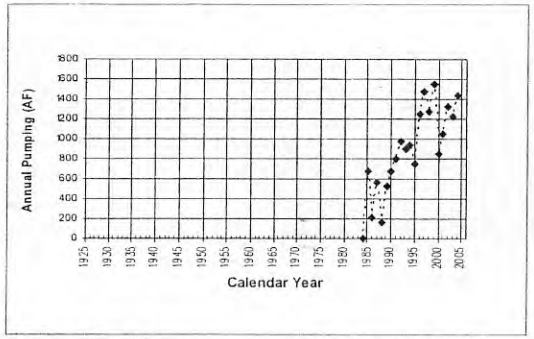
Location: PR-Lombardi (Anden) County: LOS ANGELES CO



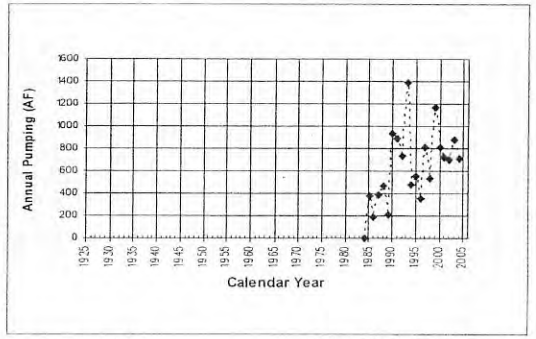
Location: PR-Robinson Ranch County: LOS ANGELES CO



Location: SCWC-Clark County: LOS ANGELES CO

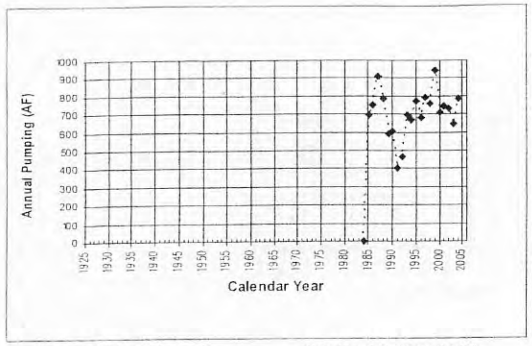


Location: SCWC-Guida County: LOS ANGELES CO

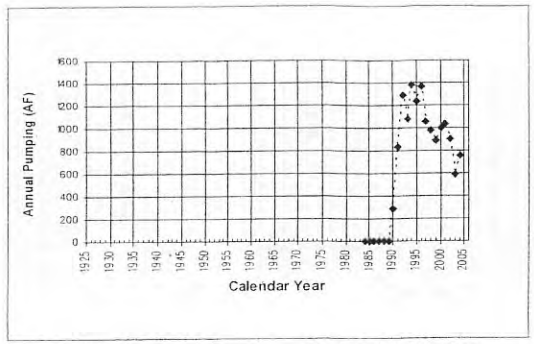


Location: SCWC-Honby County: LOS ANGELES CO

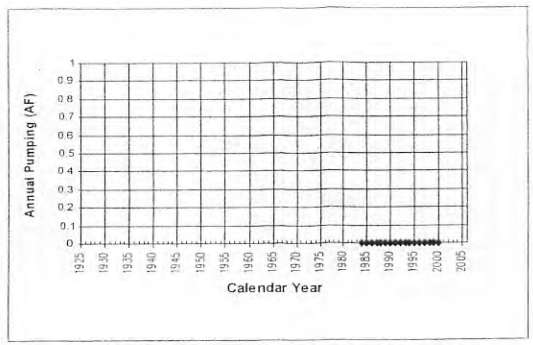
5-12ec



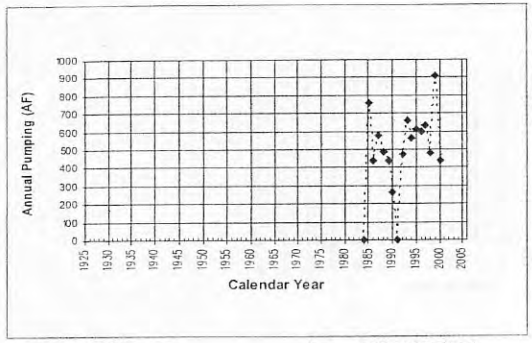
Location: SCWC-Lost Canyon 2 County: LOS ANGELES CO



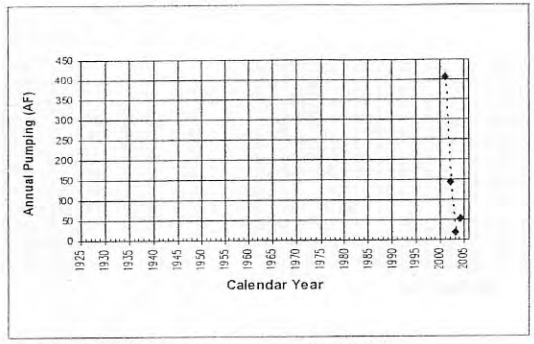
Location: SCWC-Lost Canyon 2A County: LOS ANGELES CO



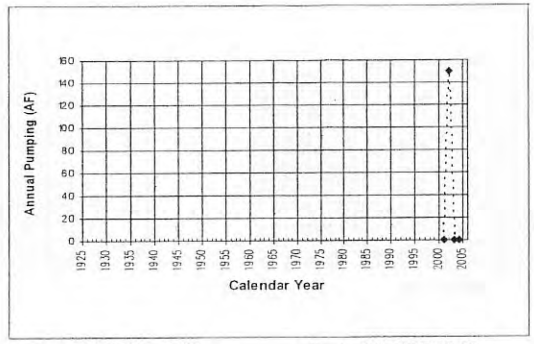
Location: SCWC-Methodist County: LOS ANGELES CO



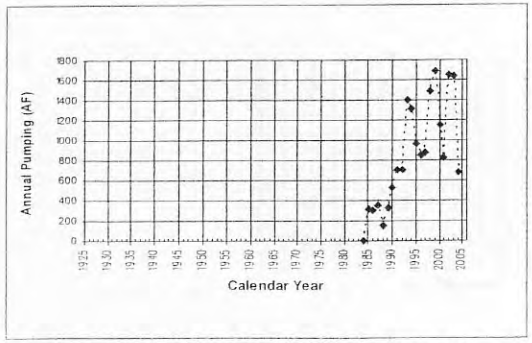
Location: SCWC-Mitchell County: LOS ANGELES CO



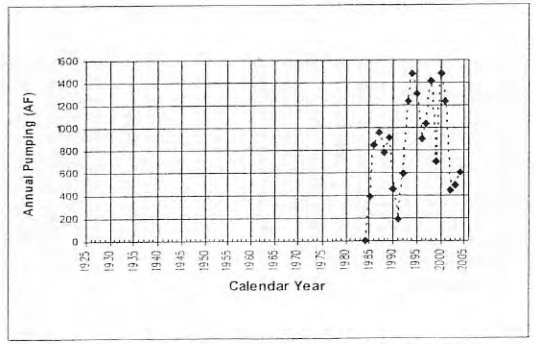
Location: SCWC-Mitchell #5A County: UNK



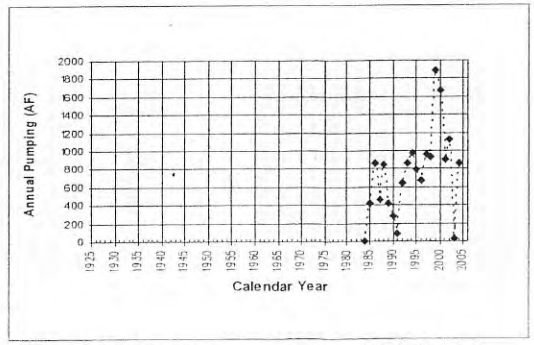
Location: SCWC-Mitchell #5B County: LOS ANGELES CO



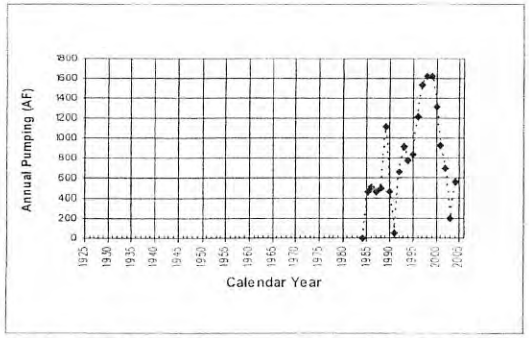
Location: SCWC-N. Oaks Central County: LOS ANGELES CO



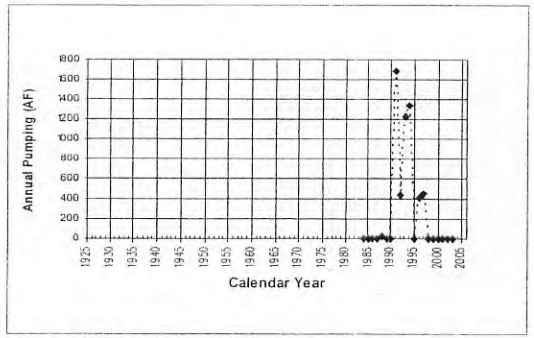
Location: SCWC-N. Oaks East County: LOS ANGELES CO



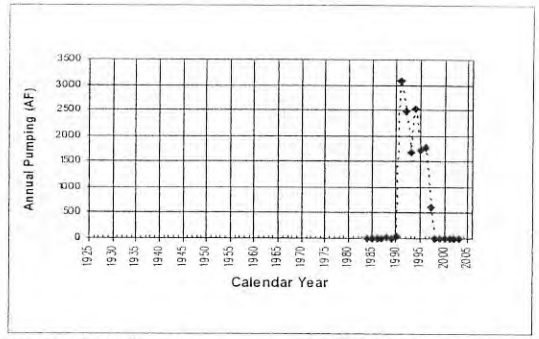
Location: SCWC-N. Oaks West County: LOS ANGELES CO



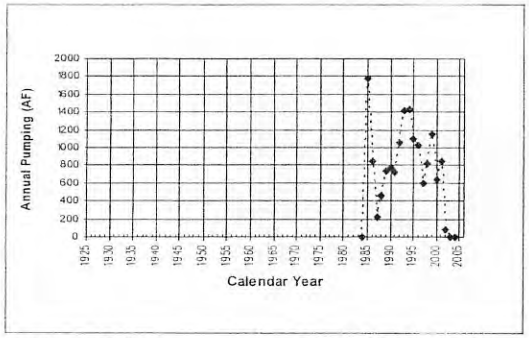
Location: SCWC-Sand Canyon County: LOS ANGELES CO



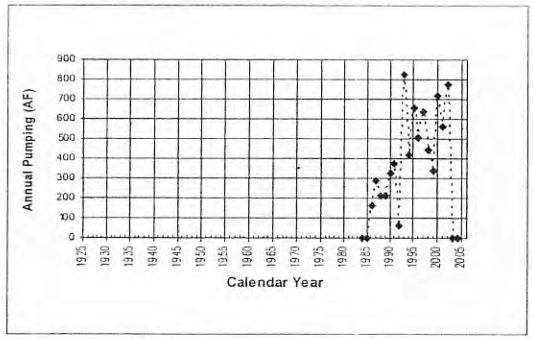
Location: SCWC-Saugus 1 County: LOS ANGELES CO



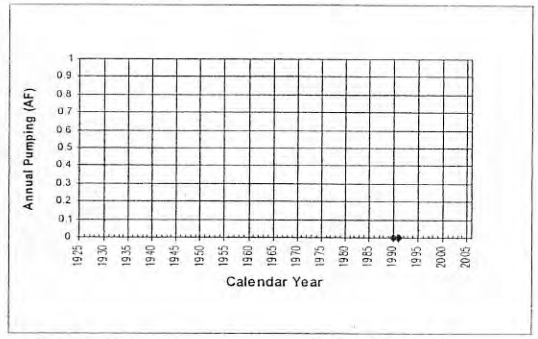
Location: SCWC-Saugus 2 County: LOS ANGELES CO



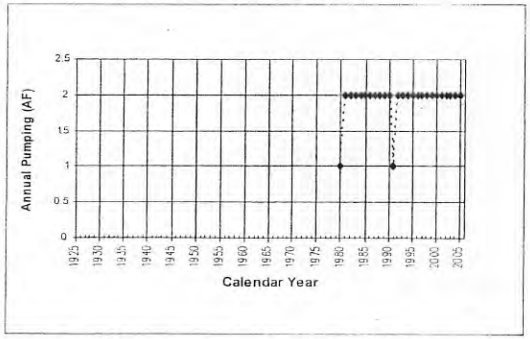
Location: SCWC-Sierra County: LOS ANGELES CO



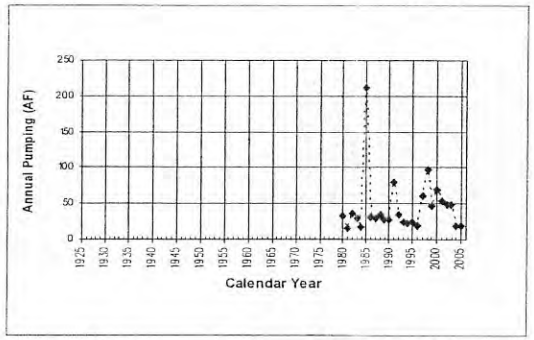
Location: SCWC-Stadium County: LOS ANGELES CO



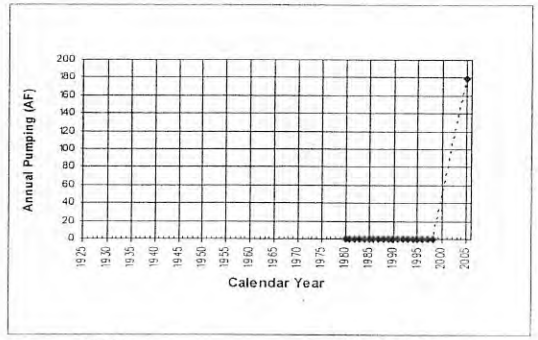
Location: V-0008 County: VENTURA CO



Location: V-0009 County: VENTURA CO

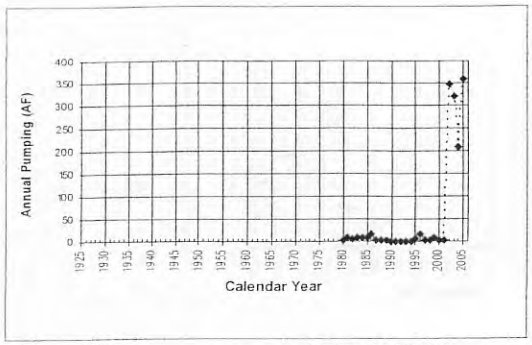


Location: V-0012 County: VENTURA CO

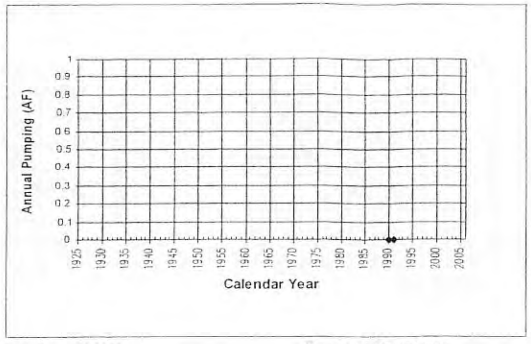


Location: V-0013 County: VENTURA CO

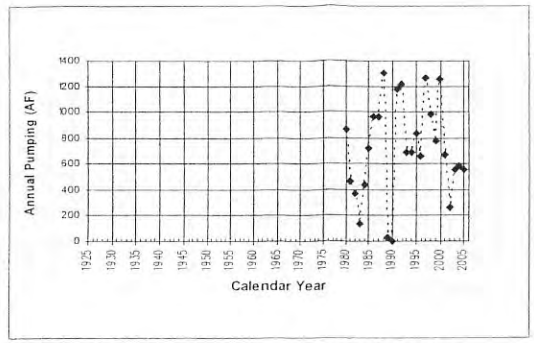
5-1258



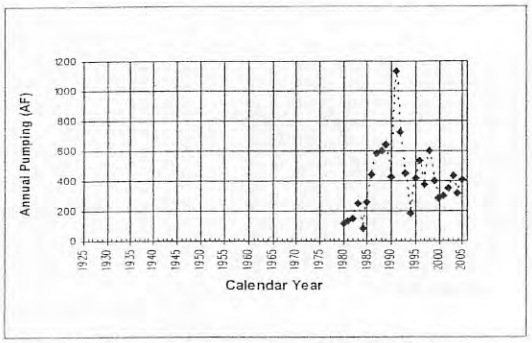
Location: V-0015 County: VENTURA CO



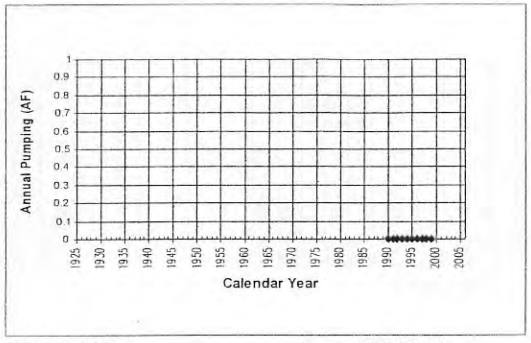
Location: V-0026 County: VENTURA CO



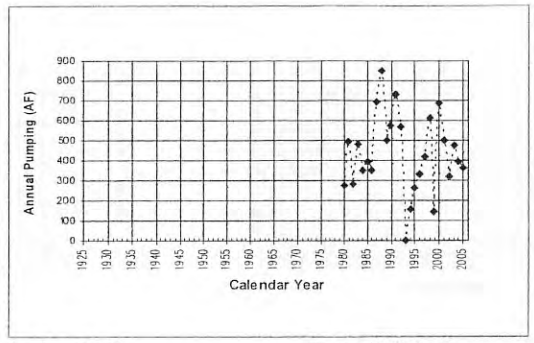
Location: V-0031 County: VENTURA CO



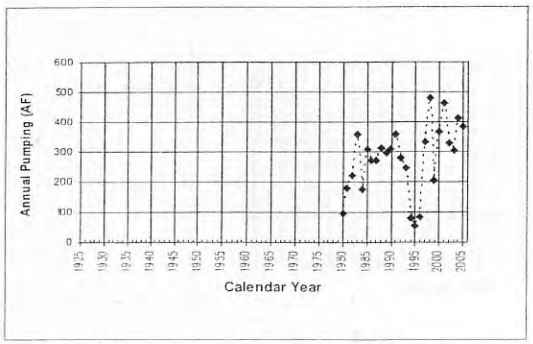
Location: V-0036 County: VENTURA CO



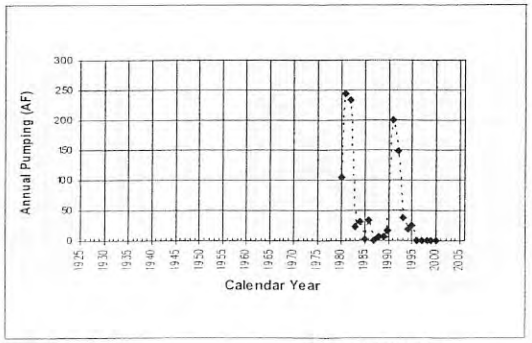
Location: V-0037 County: VENTURA CO



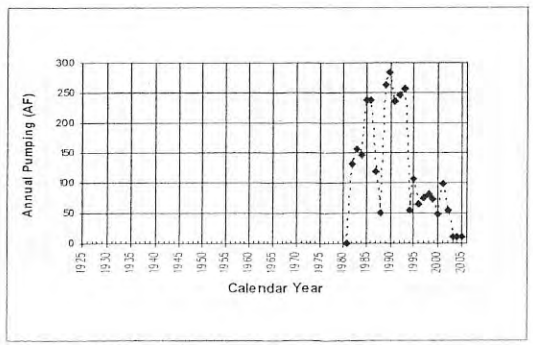
Location: V-0039 County: VENTURA CO



Location: V-0042 County: VENTURA CO

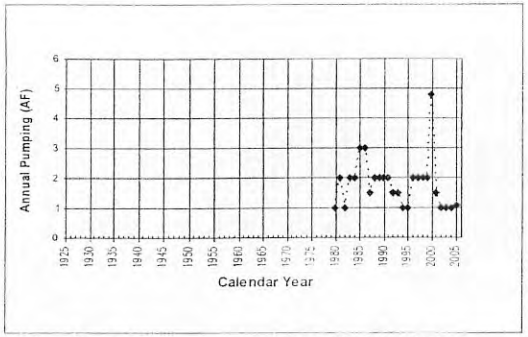


Location: V-0045 County: VENTURA CO

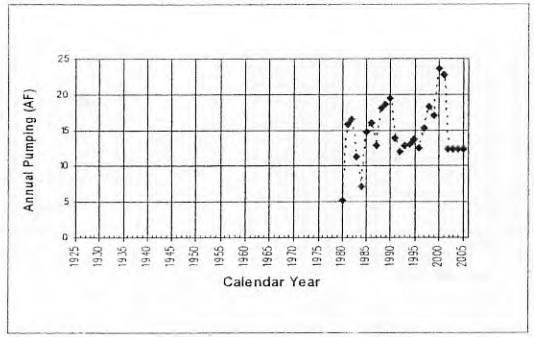


Location: V-0053 County: VENTURA CO

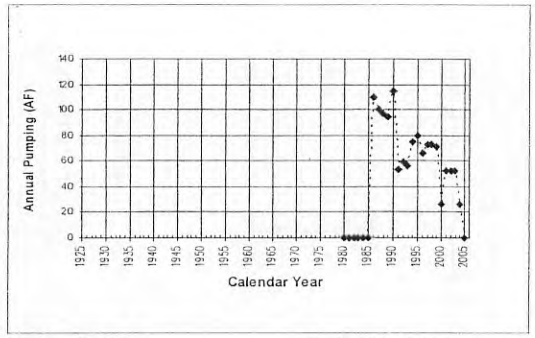
5-1269



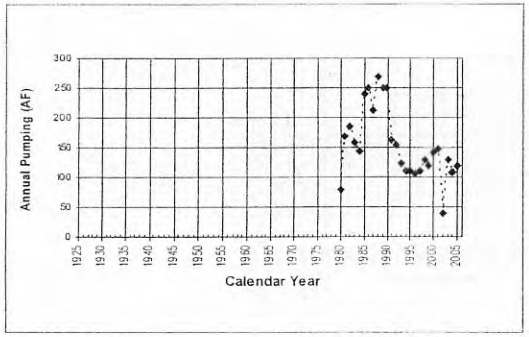
Location: V-0054 County: VENTURA CO



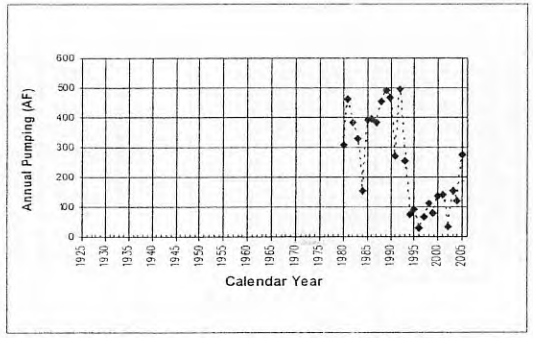
Location: V-0055 County: VENTURA CO



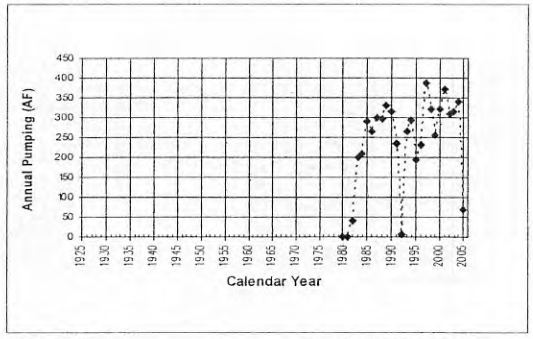
Location: V-0058 County: VENTURA CO



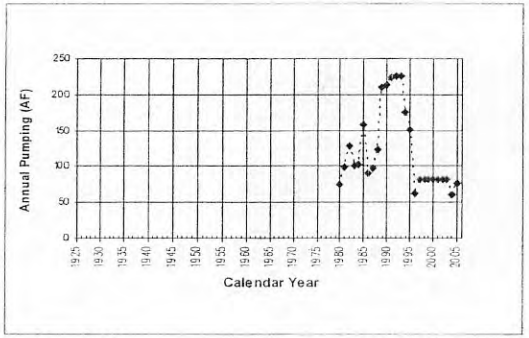
Location: V-0059 County: VENTURA CO



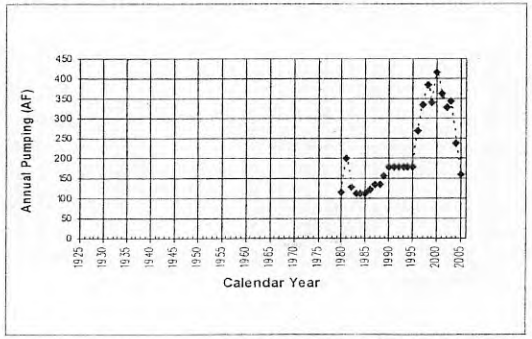
Location: V-0060 County: VENTURA CO



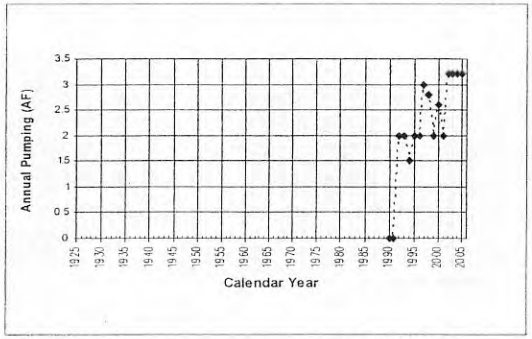
Location: V-0061 County: VENTURA CO



Location: V-0063 County: VENTURA CO

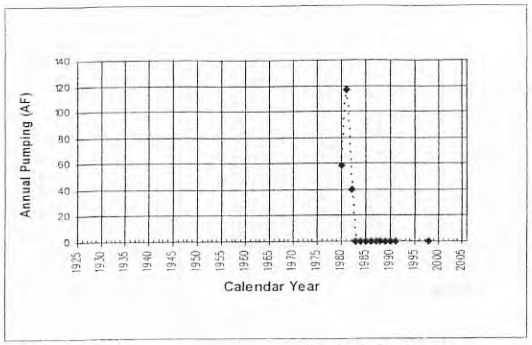


Location: V-0064 County: VENTURA CO

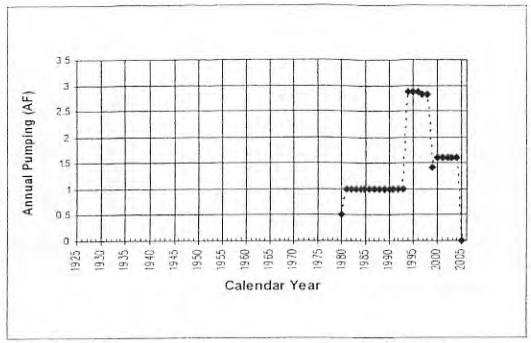


Location: V-0068 County: VENTURA CO

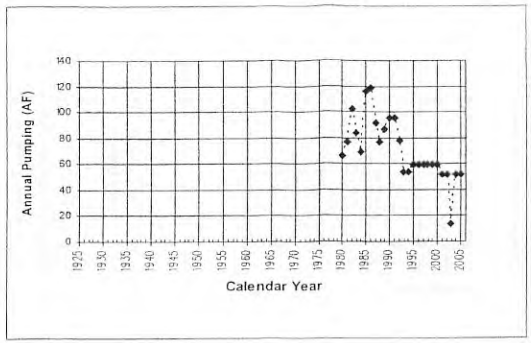
5-1276



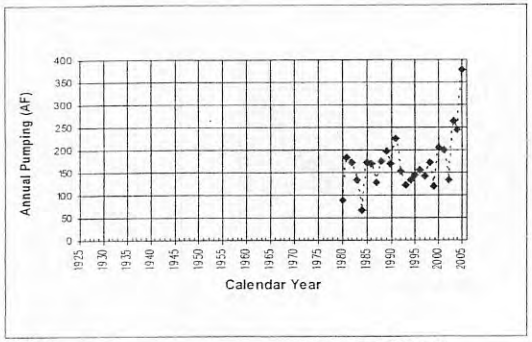
Location: V-0070 County: VENTURA CO



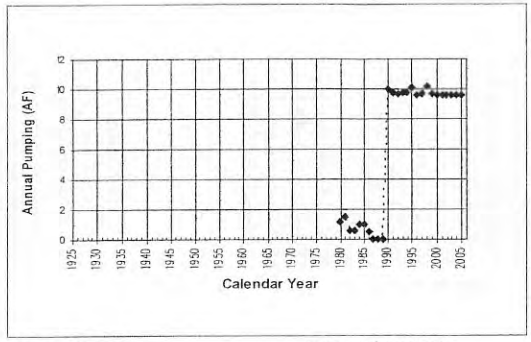
Location: V-0071 County: VENTURA CO



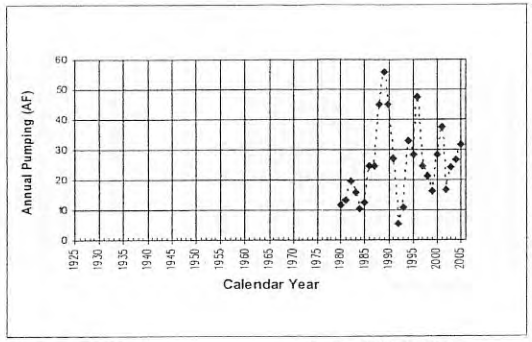
Location: V-0078 County: VENTURA CO



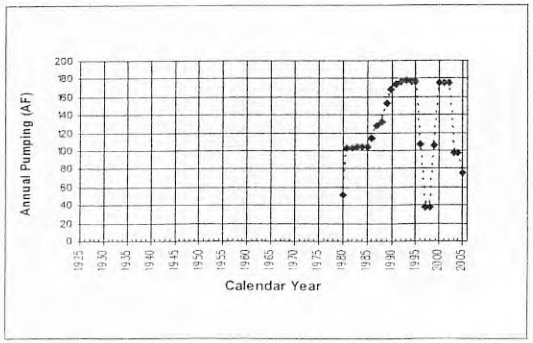
Location: V-0079 County: VENTURA CO



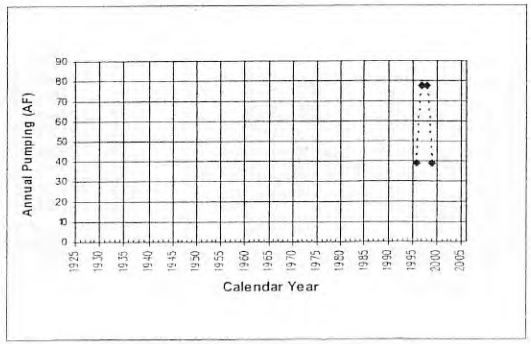
Location: V-0080 County: VENTURA CO



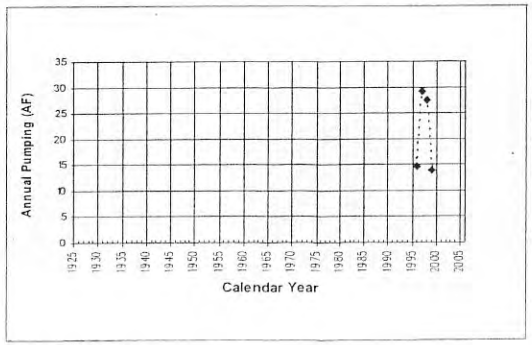
Location: V-0081 County: VENTURA CO



Location: V-0082 County: VENTURA CO

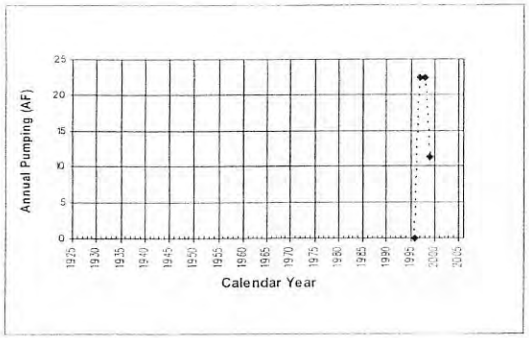


Location: V-0082a

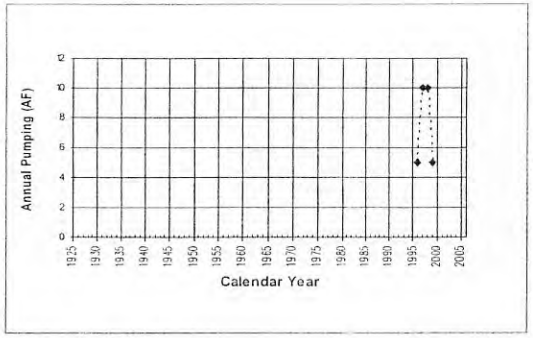


Location: V-0082b

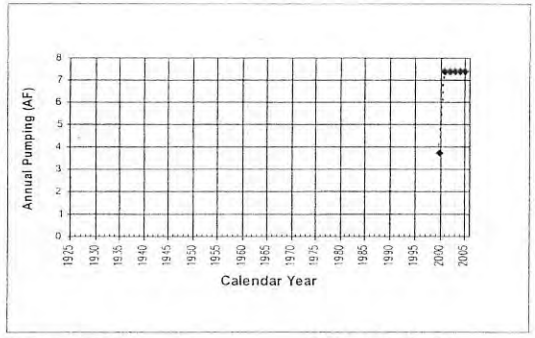
5-1271



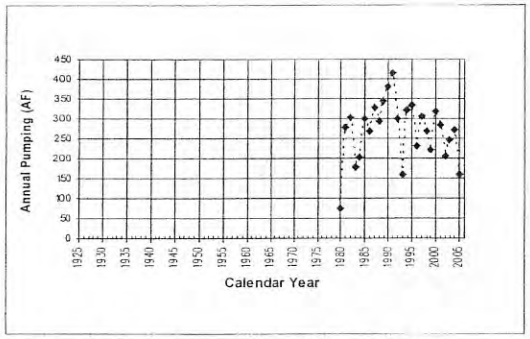
Location: V-0082c



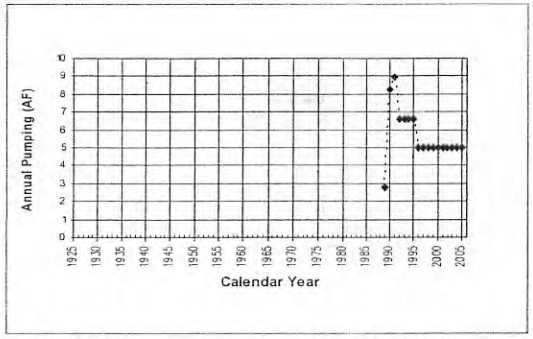
Location: V-0082d



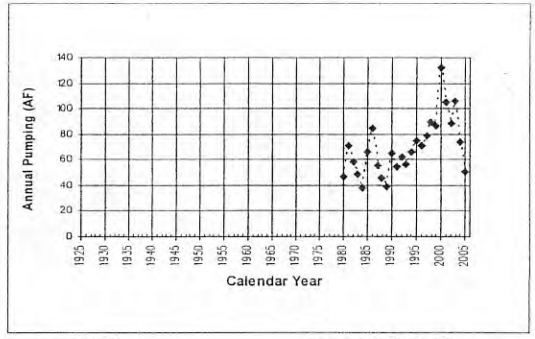
Location: V-0086 County: VENTURA CO



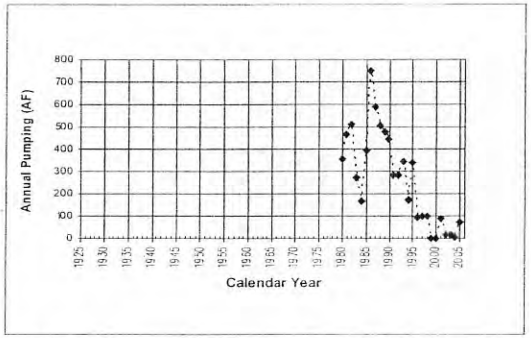
Location: V-0087 County: VENTURA CO



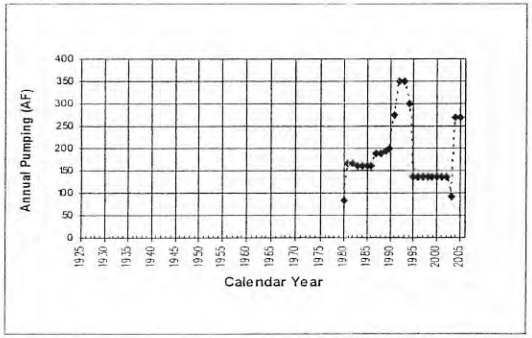
Location: V-0092 County: VENTURA CO



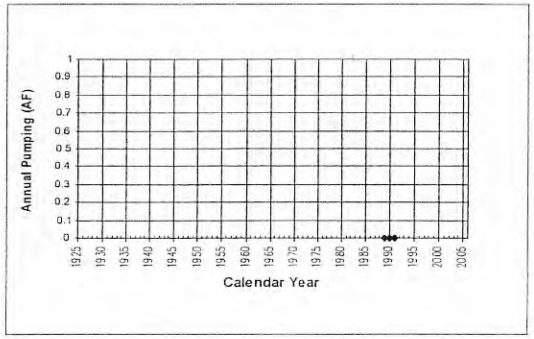
Location: V-0093 County: VENTURA CO



Location: V-0095 County: VENTURA CO

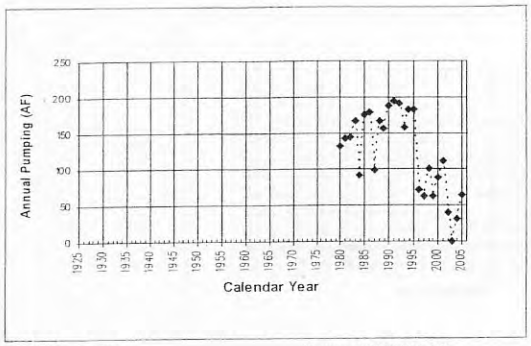


Location: V-0098 County: VENTURA CO

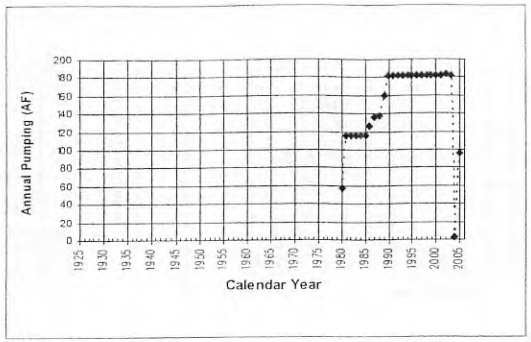


Location: V-0100 County: VENTURA CO

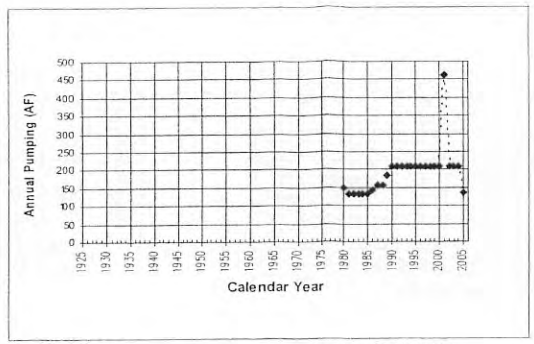
5-1272



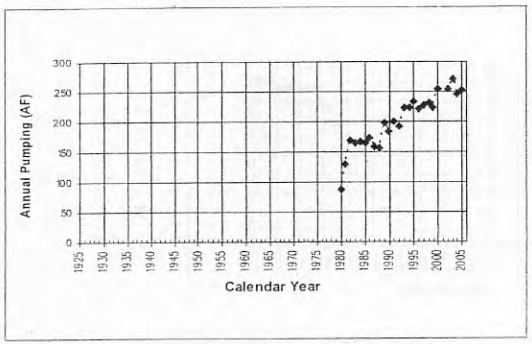
Location: V-0102 County: VENTURA CO



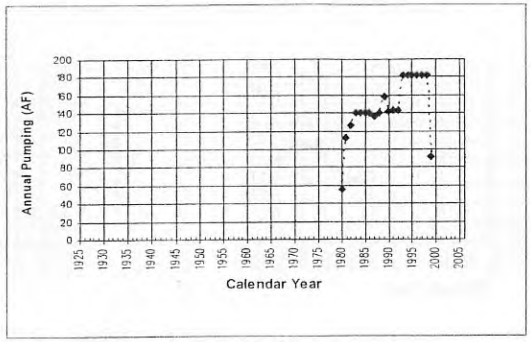
Location: V-0103 County: VENTURA CO



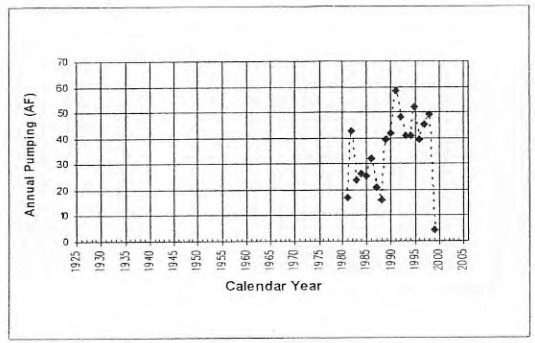
Location: V-0104 County: VENTURA CO



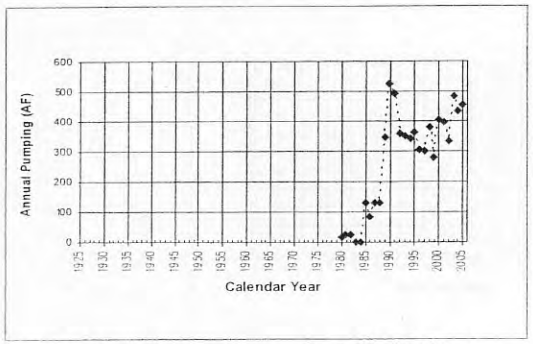
Location: V-0110 County: VENTURA CO



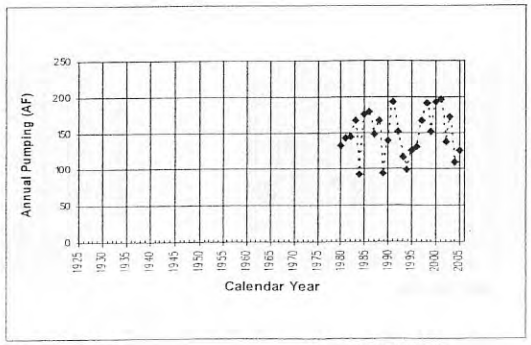
Location: V-0110a



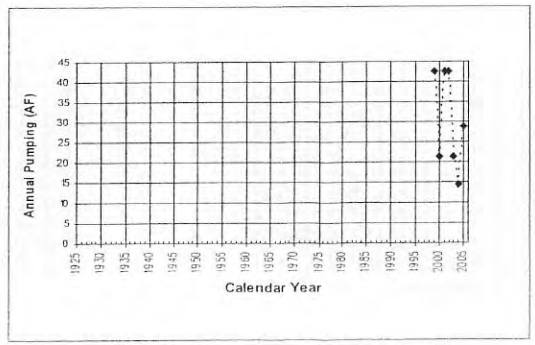
Location: V-0110b



Location: V-0111 County: VENTURA CO

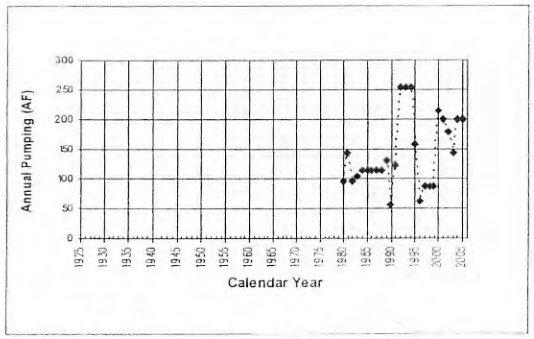


Location: V-0117 County: VENTURA CO

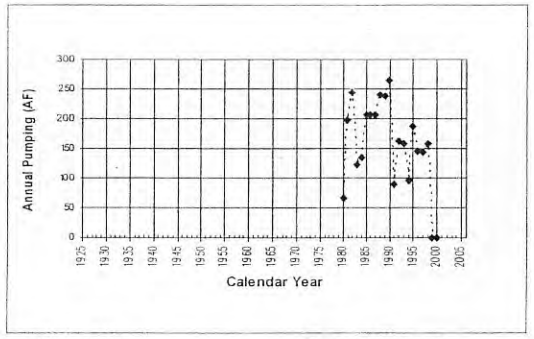


Location: V-0121 County: VENTURA CO

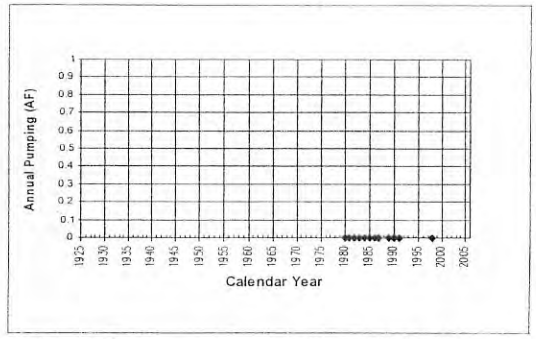
S-1273



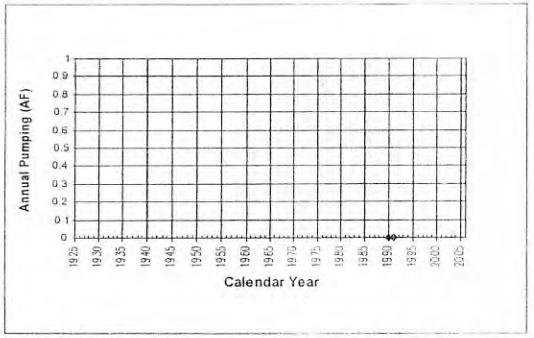
Location: V-0122 County: VENTURA CO



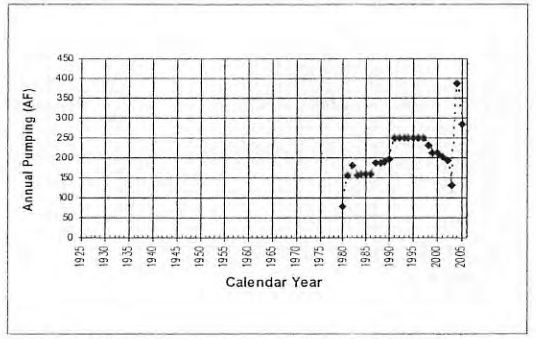
Location: V-0123 County: VENTURA CO



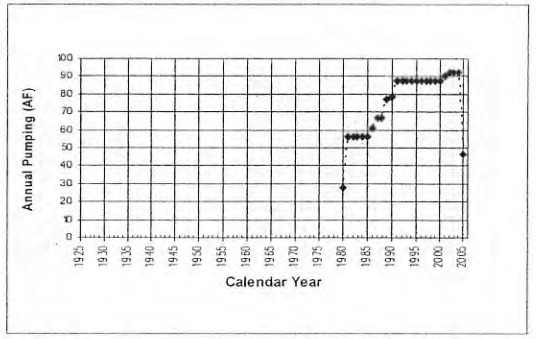
Location: V-0125 County: VENTURA CO



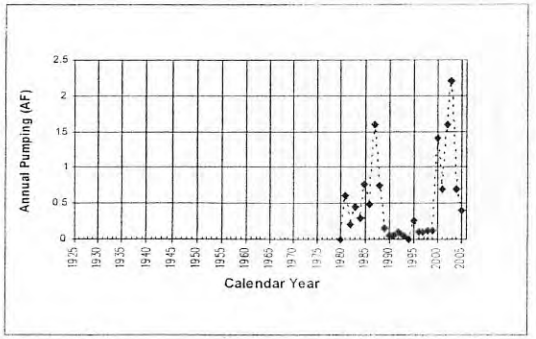
Location: V-0126 County: VENTURA CO



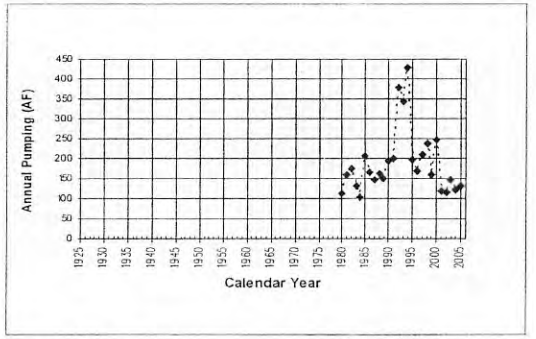
Location: V-0127 County: VENTURA CO



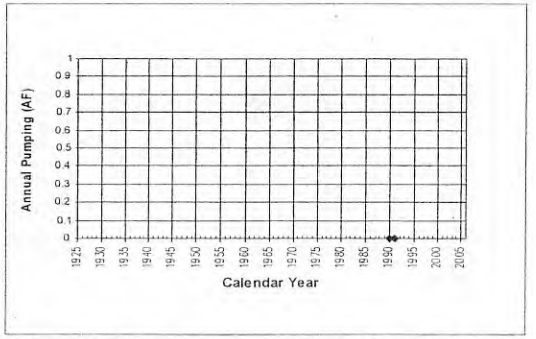
Location: V-0134 County: VENTURA CO



Location: V-0138 County: VENTURA CO

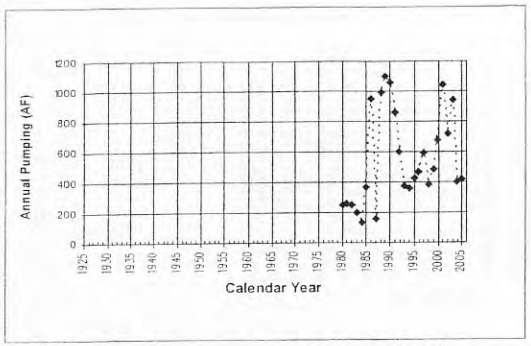


Location: V-0139 County: VENTURA CO

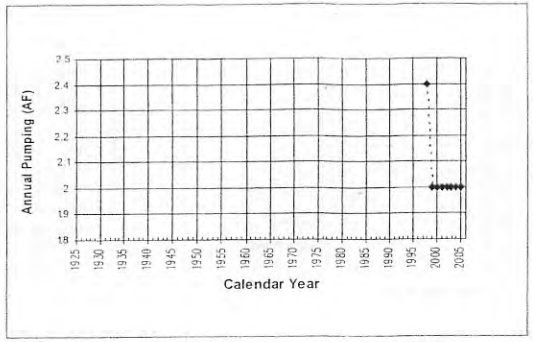


Location: V-0142 County: VENTURA CO

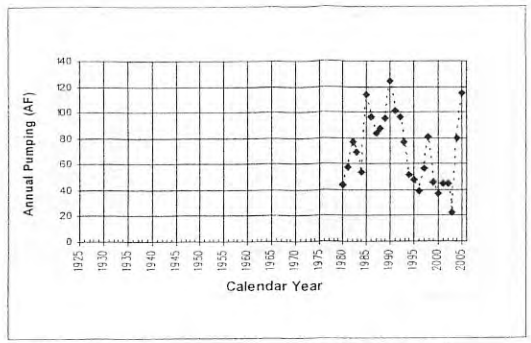
S-1274



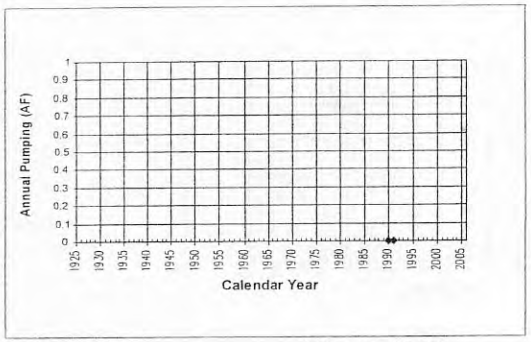
Location: V-0143 County: VENTURA CO



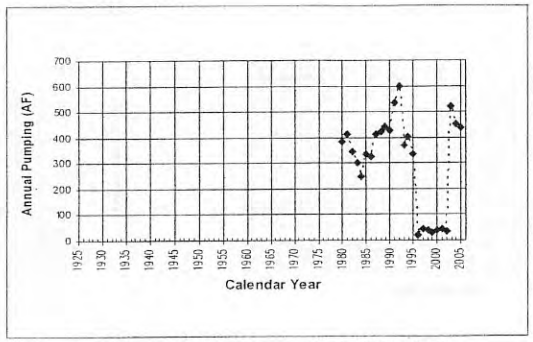
Location: V-0144 County: VENTURA CO



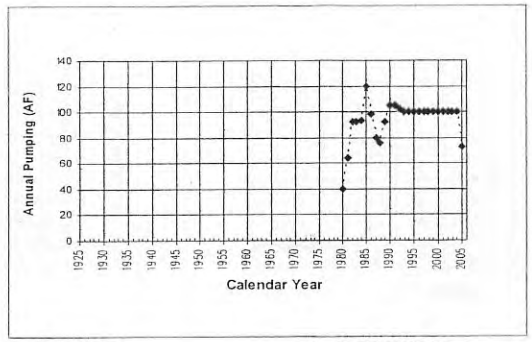
Location: V-0145 County: VENTURA CO



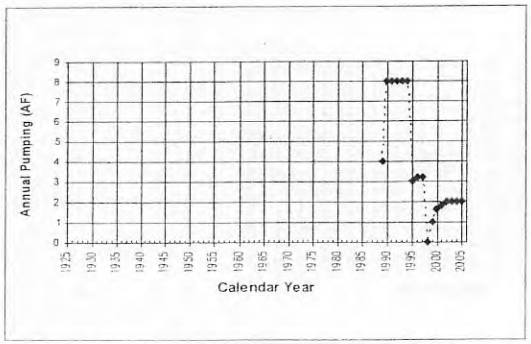
Location: V-0148 County: VENTURA CO



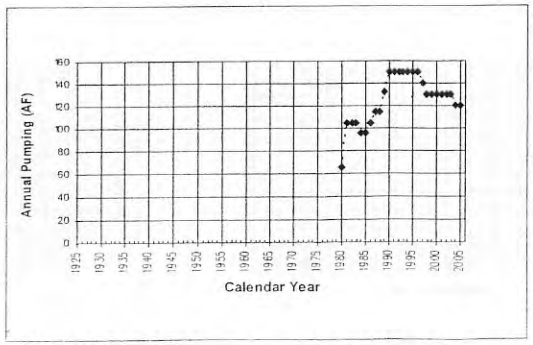
Location: V-0152 County: VENTURA CO



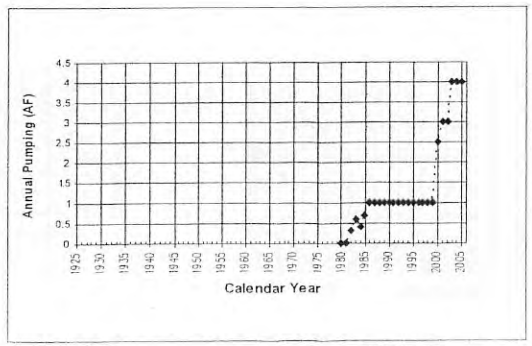
Location: V-0154 County: VENTURA CO



Location: V-0157 County: VENTURA CO

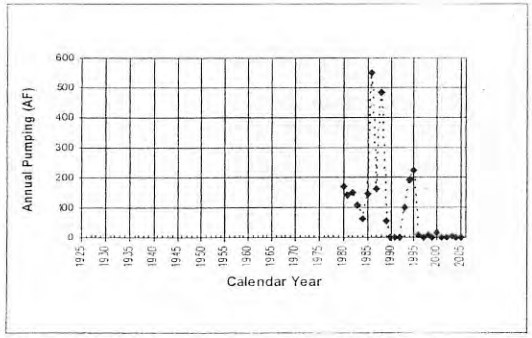


Location: V-0158 County: VENTURA CO

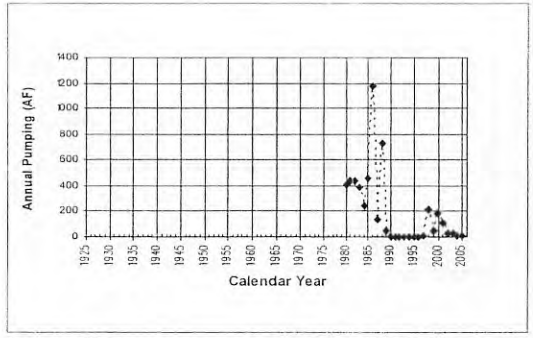


Location: V-0159 County: VENTURA CO

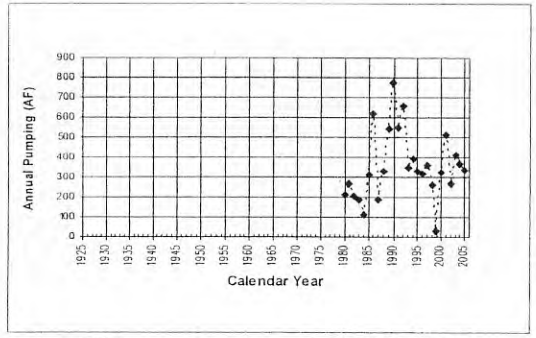
5-1275



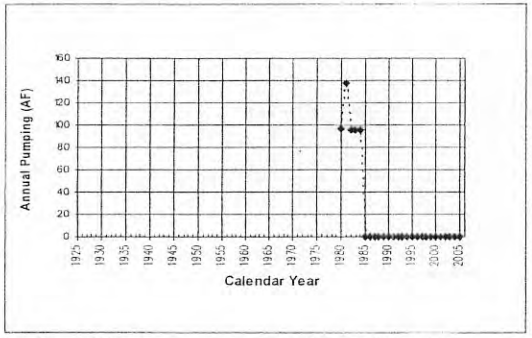
Location: V-0160 County: VENTURA CO



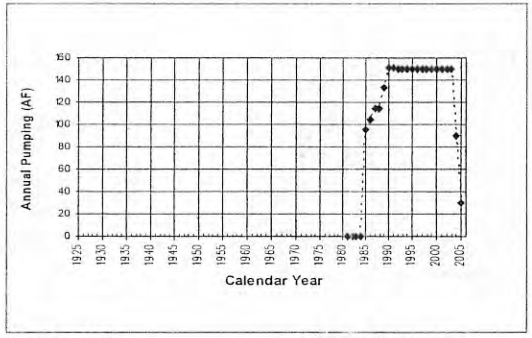
Location: V-0161 County: VENTURA CO



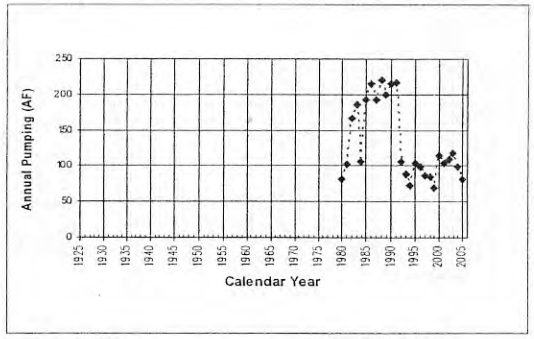
Location: V-0162 County: VENTURA CO



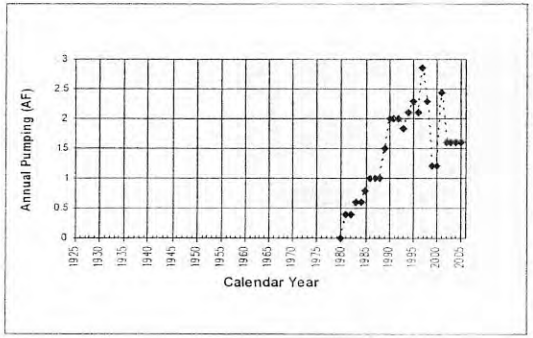
Location: V-0164 County: VENTURA CO



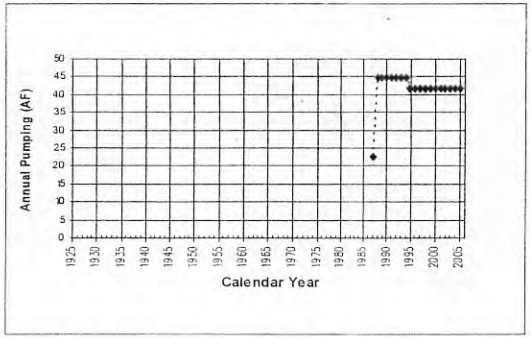
Location: V-0165 County VENTURA CO



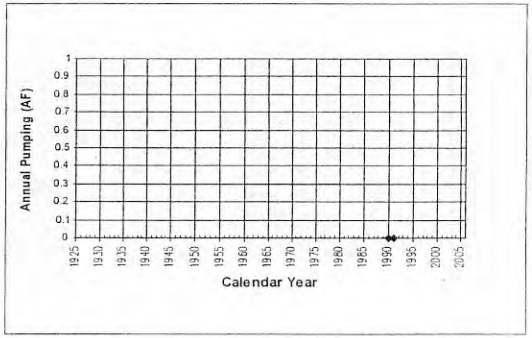
Location: V-0168 County: VENTURA CO



Location: V-0172 County: VENTURA CO

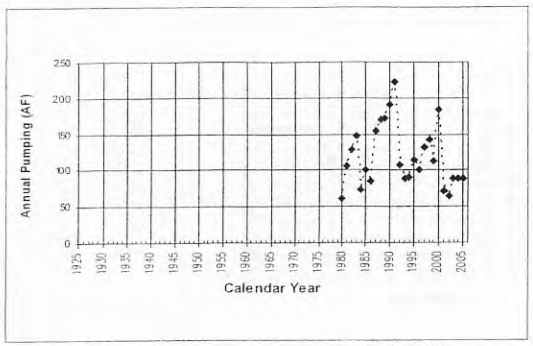


Location: V-0174 County: VENTURA CO

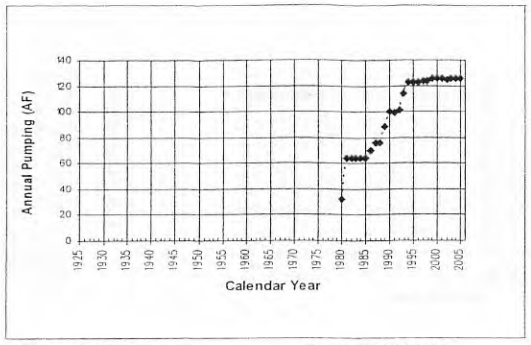


Location: V-0175 County: VENTURA CO

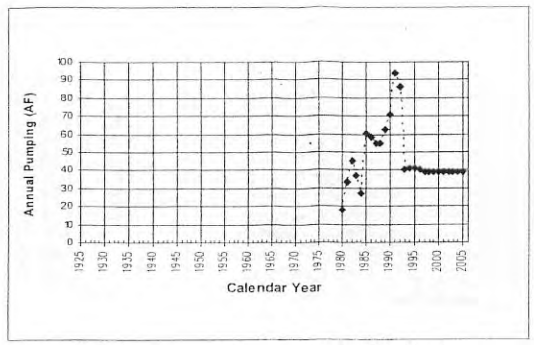
5-1276



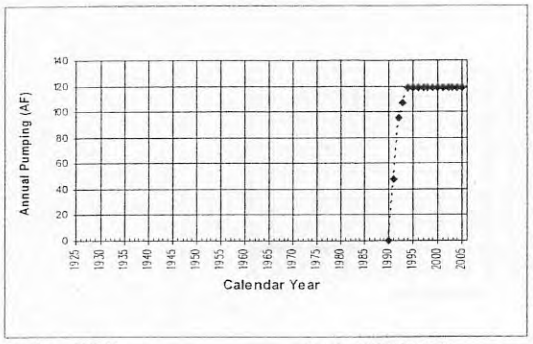
Location: V-0176 County: VENTURA CO



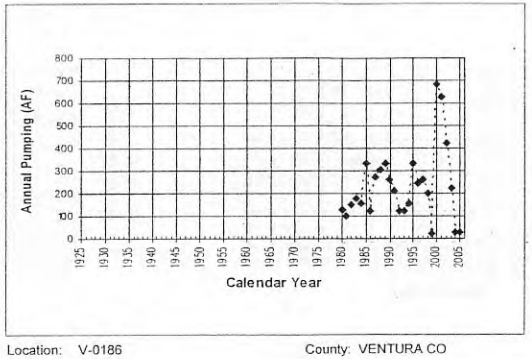
Location: V-0178 County: VENTURA CO



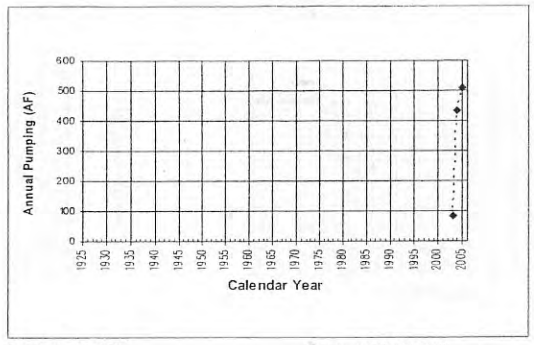
Location: V-0184 County: VENTURA CO



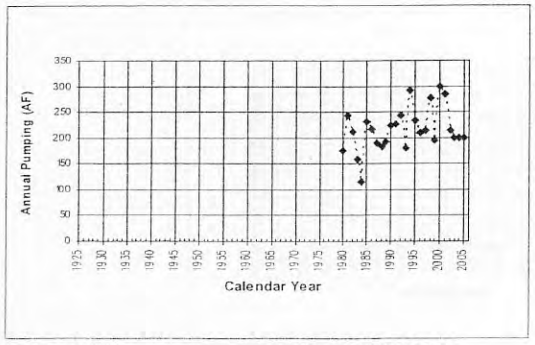
Location: V-0185 County: VENTURA CO



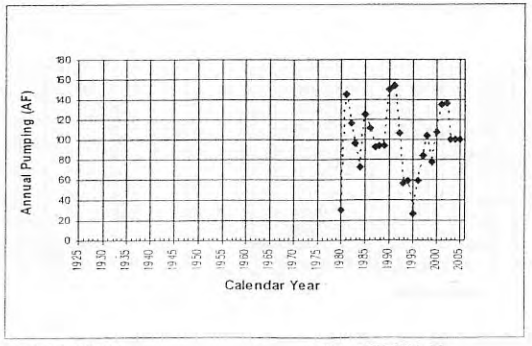
Location: V-0186 County: VENTURA CO



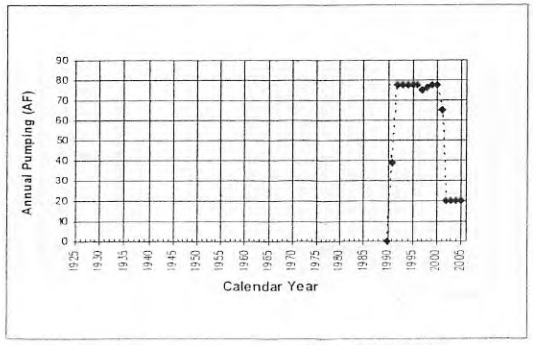
Location: V-0187 County: VENTURA CO



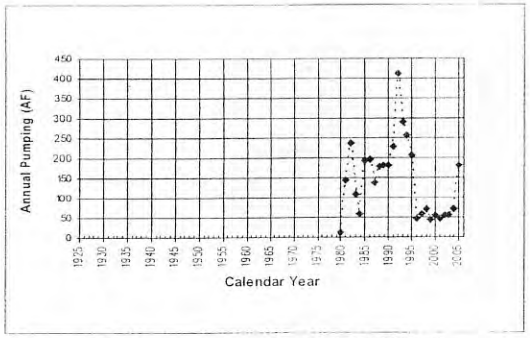
Location: V-0190 County: VENTURA CO



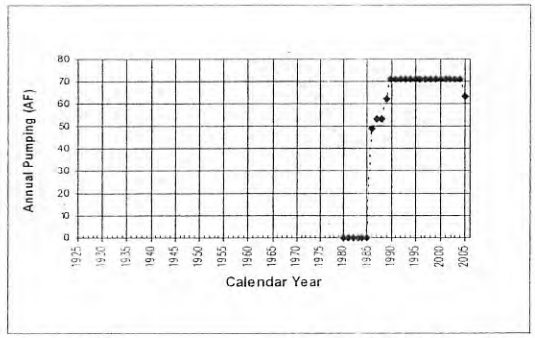
Location: V-0192 County: VENTURA CO



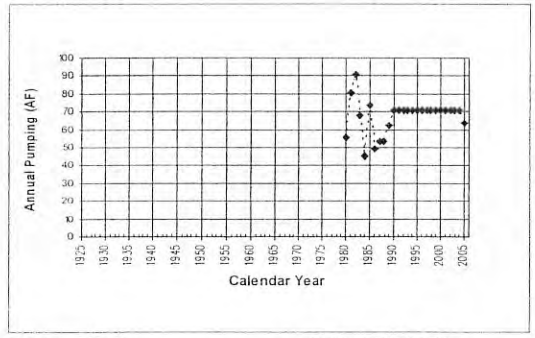
Location: V-0193 County: VENTURA CO



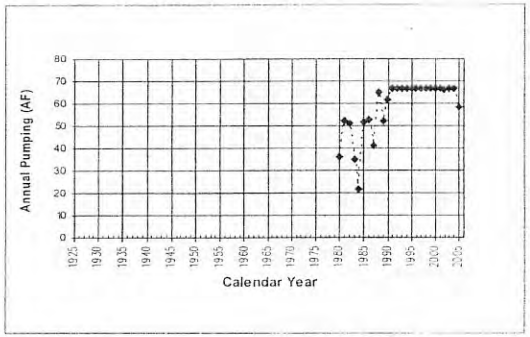
Location: V-0196 County: VENTURA CO



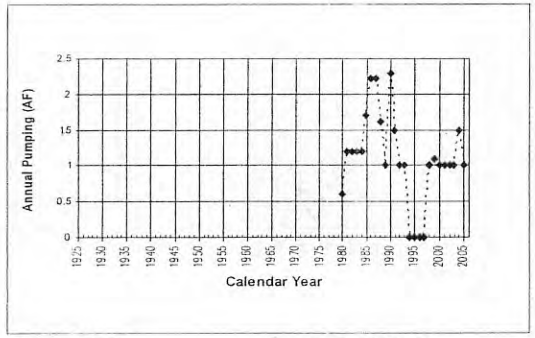
Location: V-0199 County: VENTURA CO



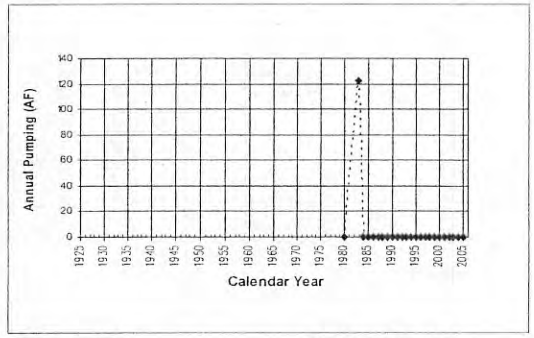
Location: V-0200 County: VENTURA CO



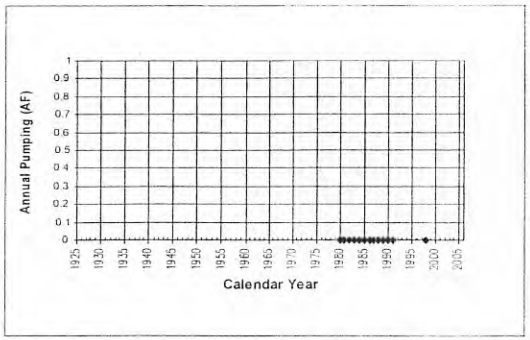
Location: V-0202 County: VENTURA CO



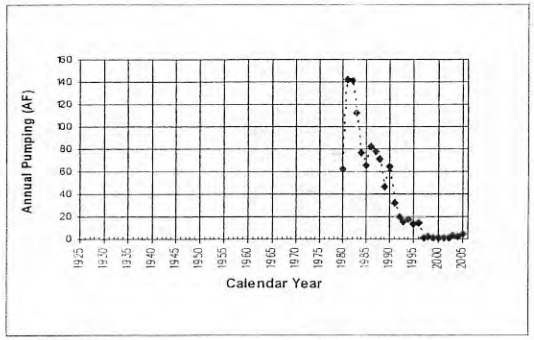
Location: V-0203 County: VENTURA CO



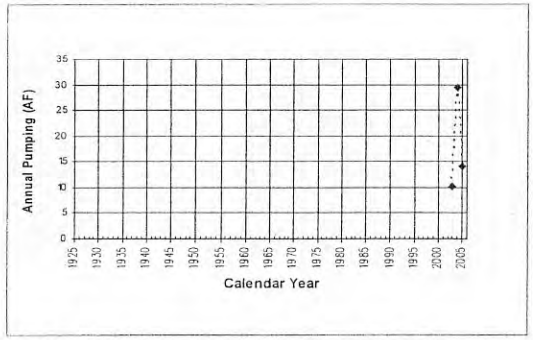
Location: V-0204 County: VENTURA CO



Location: V-0205 County: VENTURA CO

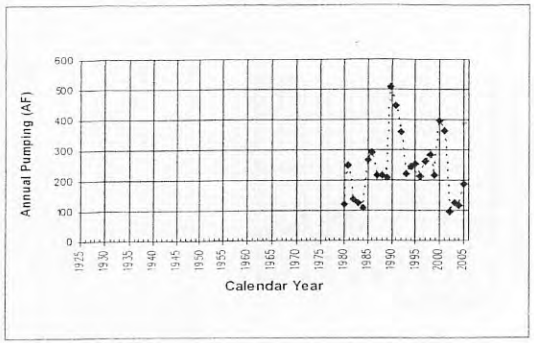


Location: V-0210 County: VENTURA CO

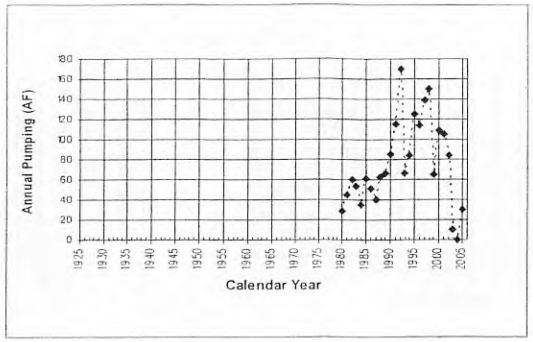


Location: V-0212 County: VENTURA CO

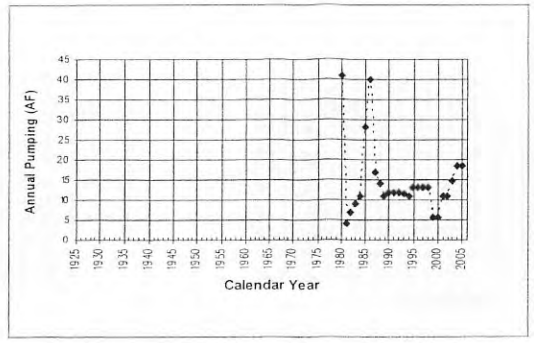
5-1278



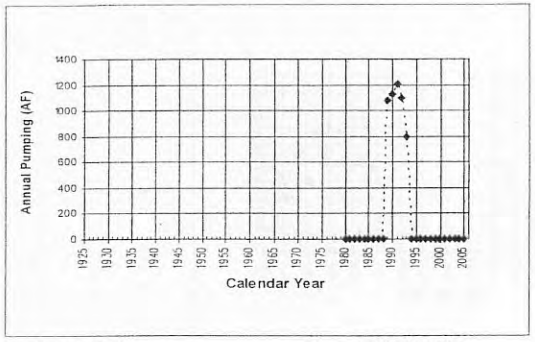
Location: V-0213 County: VENTURA CO



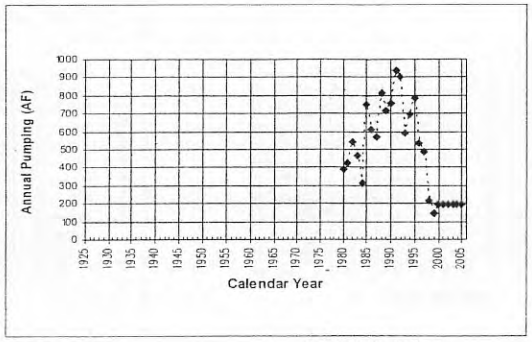
Location: V-0214 County: VENTURA CO



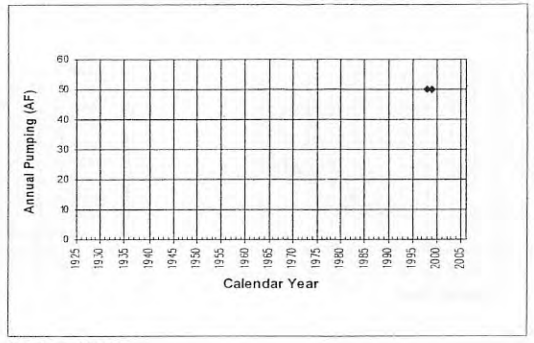
Location: V-0216 County: VENTURA CO



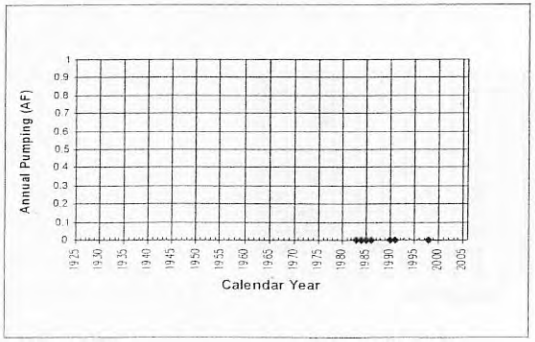
Location: V-0217 County: VENTURA CO



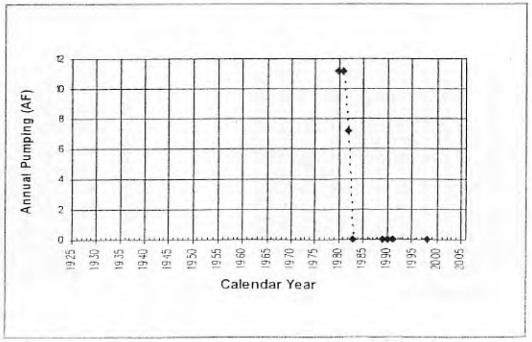
Location: V-0219 County: VENTURA CO



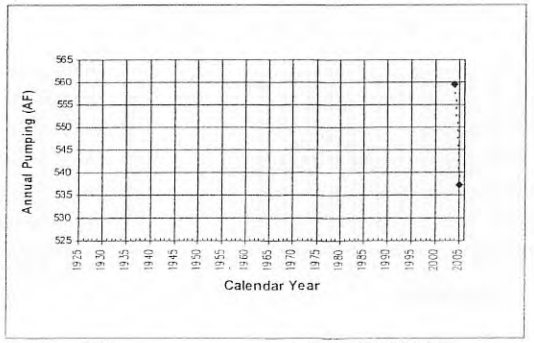
Location: V-0219a



Location: V-0220 County: VENTURA CO

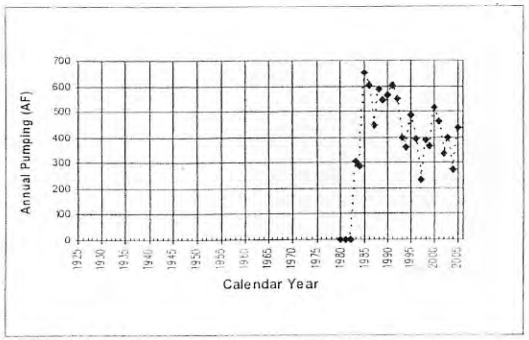


Location: V-0221 County: VENTURA CO

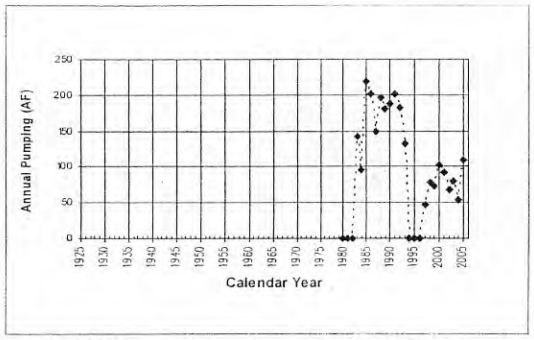


Location: V-0224 County: VENTURA CO

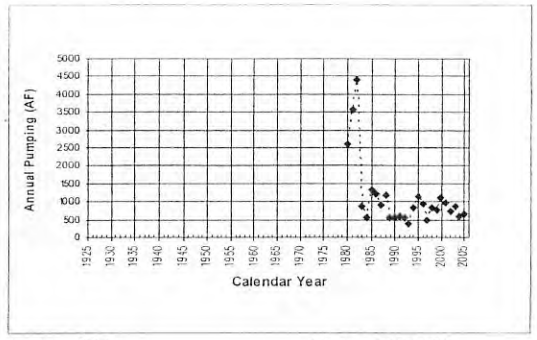
B-1279



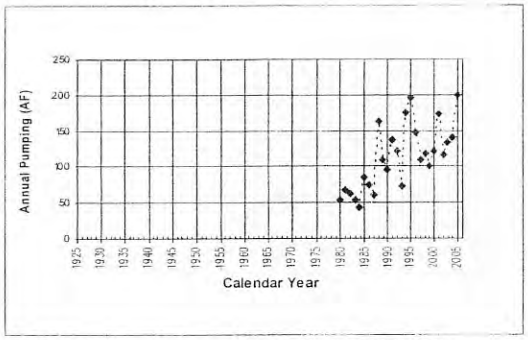
Location: V-0229 County: VENTURA CO



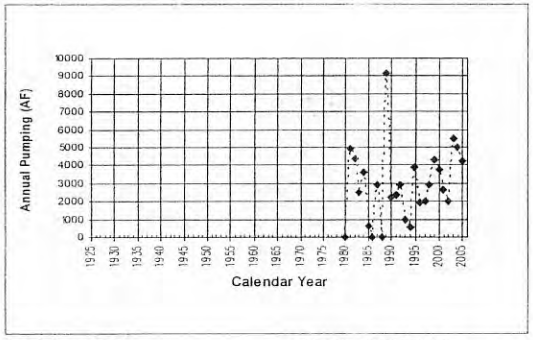
Location: V-0231 County: VENTURA CO



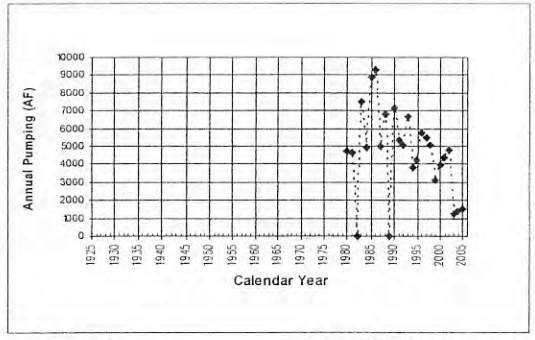
Location: V-0232 County: VENTURA CO



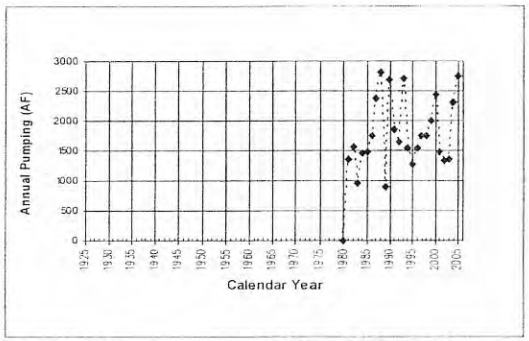
Location: V-0233 County: VENTURA CO



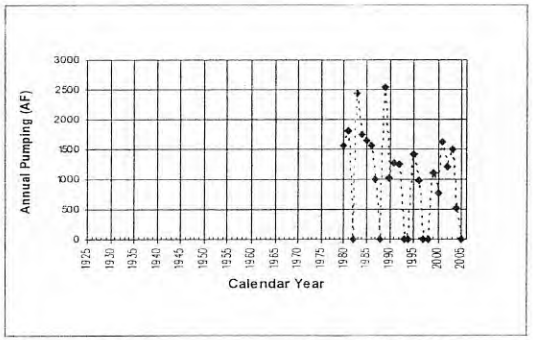
Location: V-0234 County: VENTURA CO



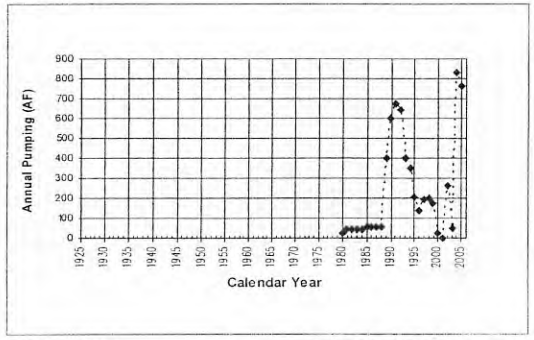
Location: V-0235 County: VENTURA CO



Location: V-0237 County: VENTURA CO

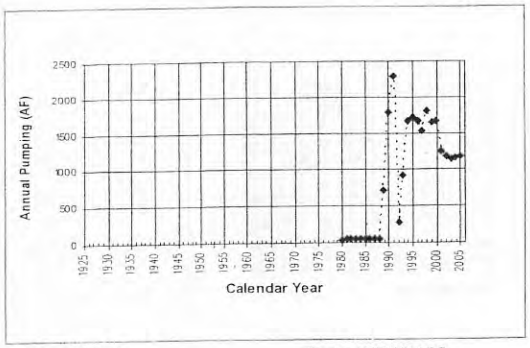


Location: V-0238 County: VENTURA CO

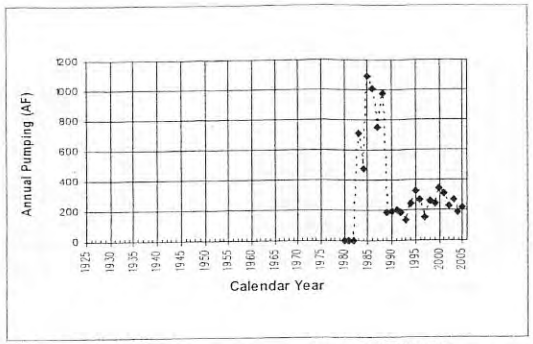


Location: V-0242 County: VENTURA CO

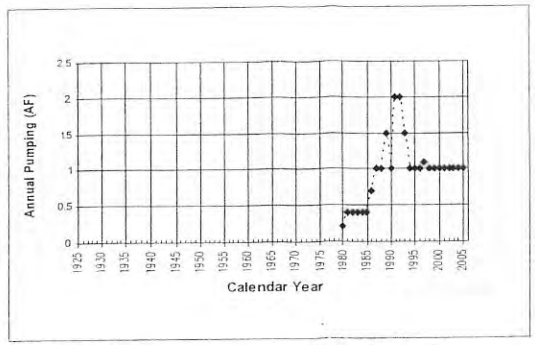
G-1260



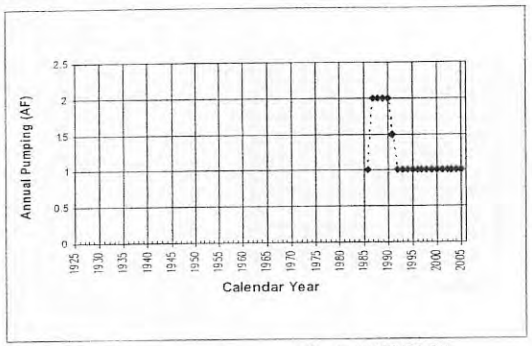
Location: V-0243 County: VENTURA CO



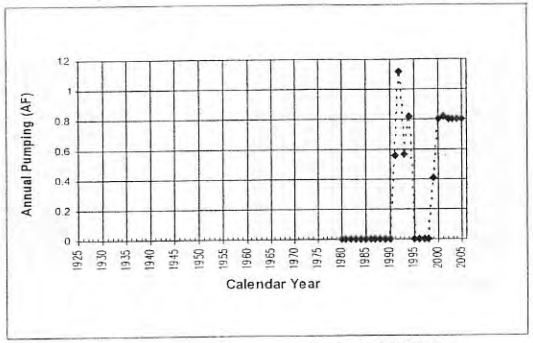
Location: V-0244 County: VENTURA CO



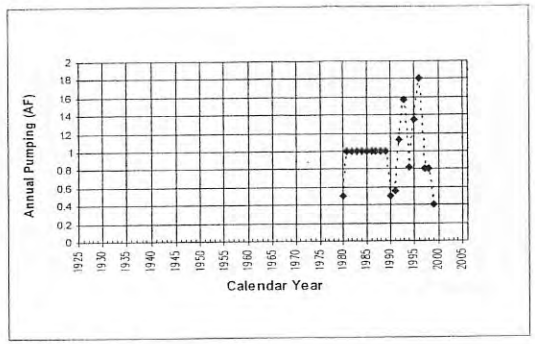
Location: V-0248 County: VENTURA CO



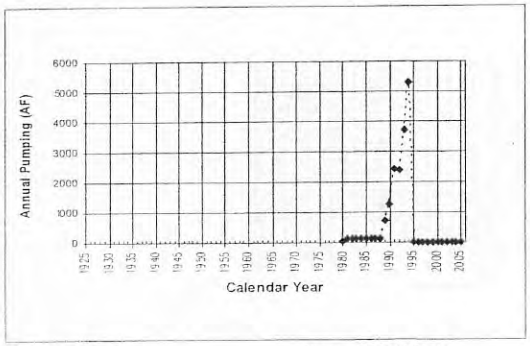
Location: V-0250 County: VENTURA CO



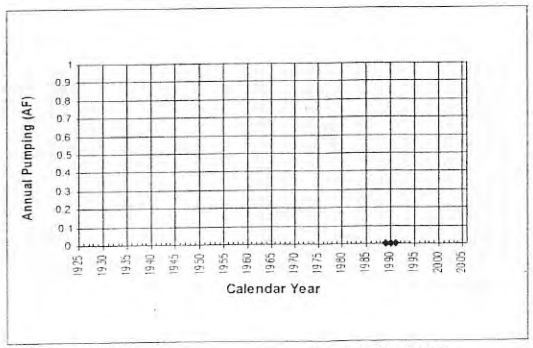
Location: V-0251 County: VENTURA CO



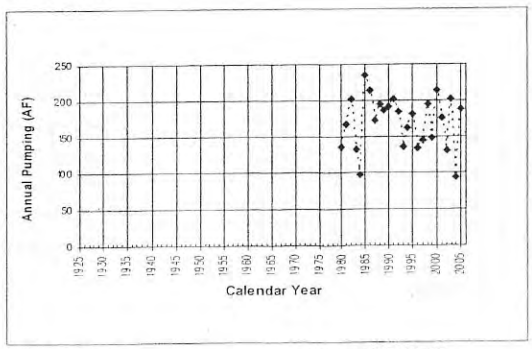
Location: V-0251b



Location: V-0252 County: VENTURA CO

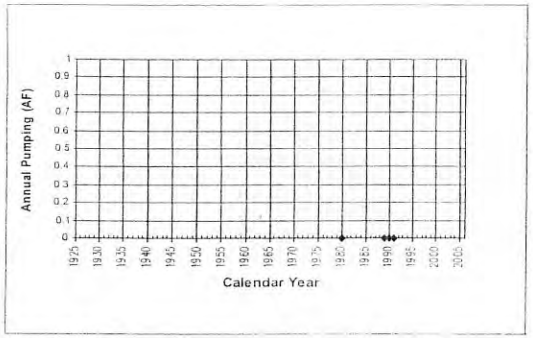


Location: V-0253 County: VENTURA CO

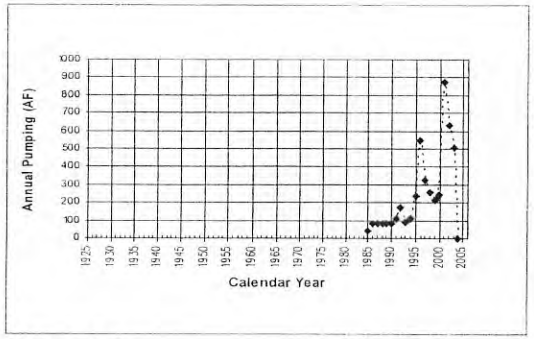


Location: V-0254 County: VENTURA CO

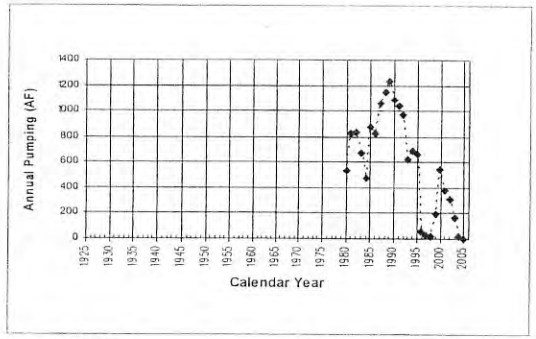
5-1221



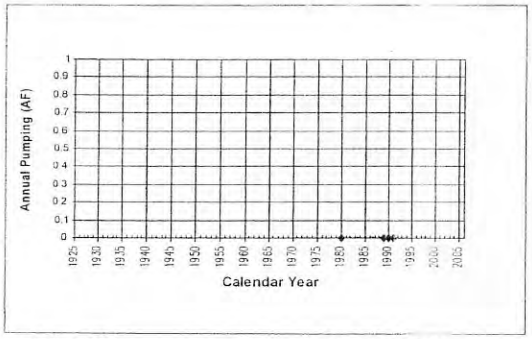
Location: V-0255 County: VENTURA CO



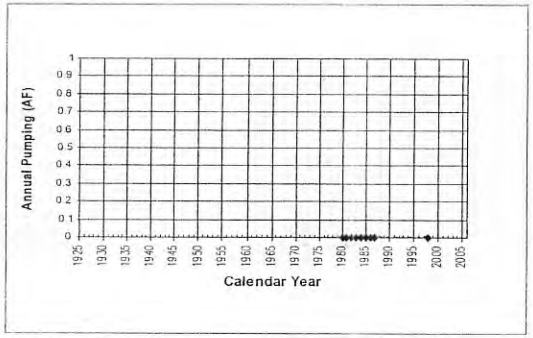
Location: V-0256 County: VENTURA CO



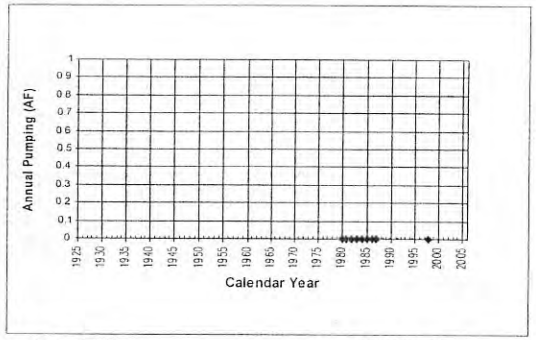
Location: V-0263 County: VENTURA CO



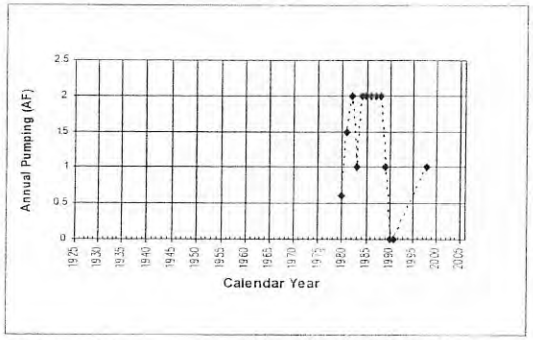
Location: V-0264 County: VENTURA CO



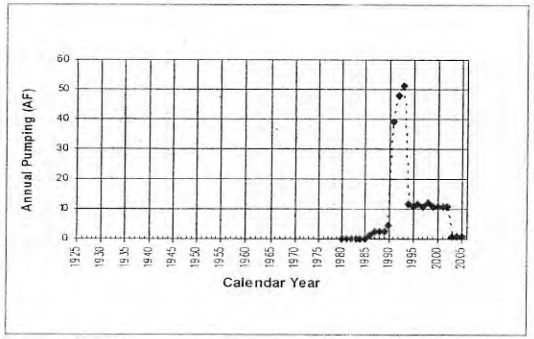
Location: V-0265 County: VENTURA CO



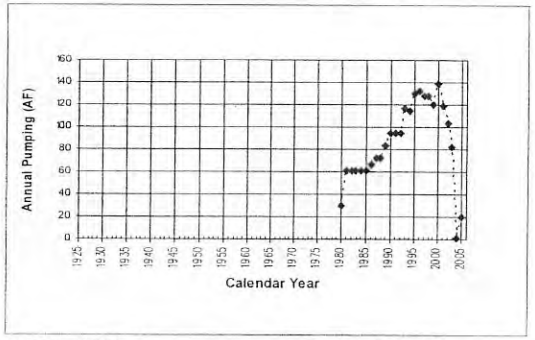
Location: V-0266 County: VENTURA CO



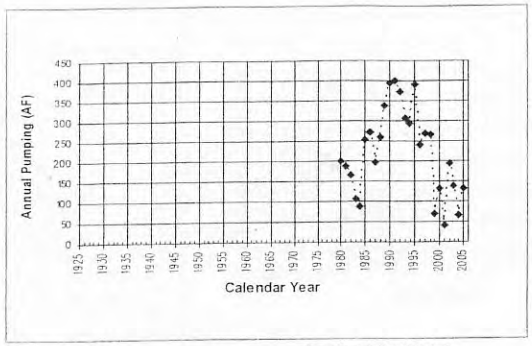
Location: V-0269 County: VENTURA CO



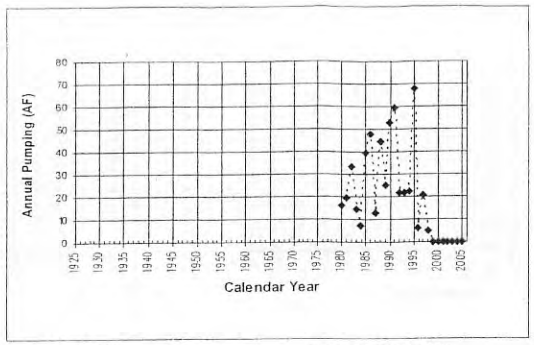
Location: V-0277 County: VENTURA CO



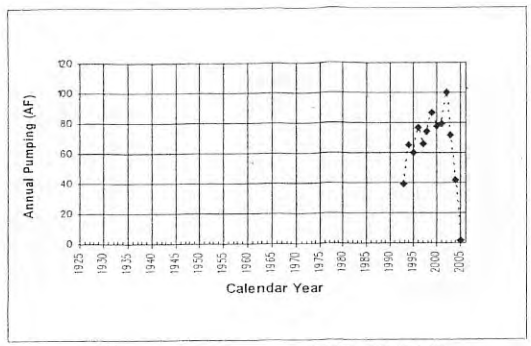
Location: V-0280 County: VENTURA CO



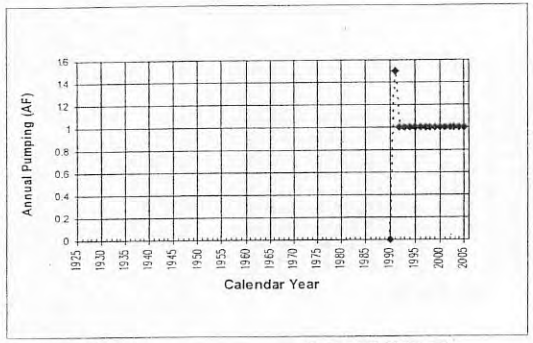
Location: V-0281 County: VENTURA CO



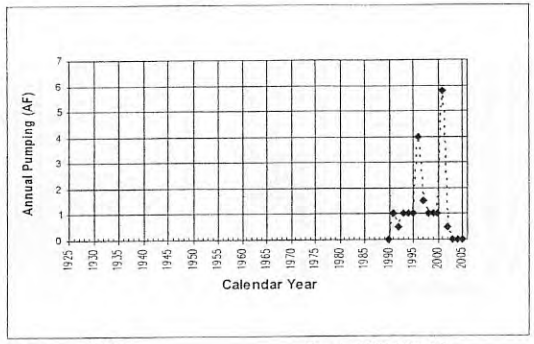
Location: V-0282 County: VENTURA CO



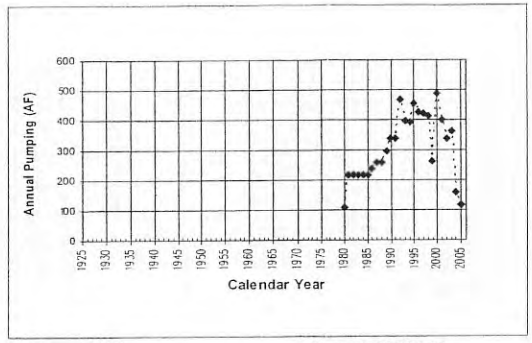
Location: V-0285 County: VENTURA CO



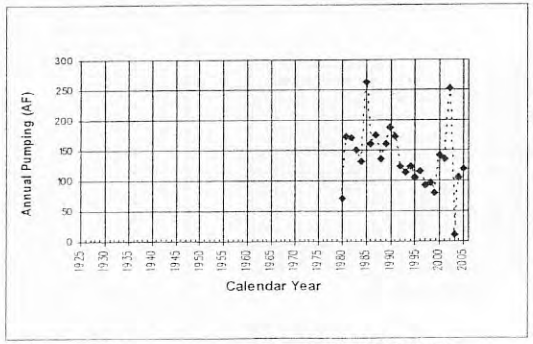
Location: V-0292 County: VENTURA CO



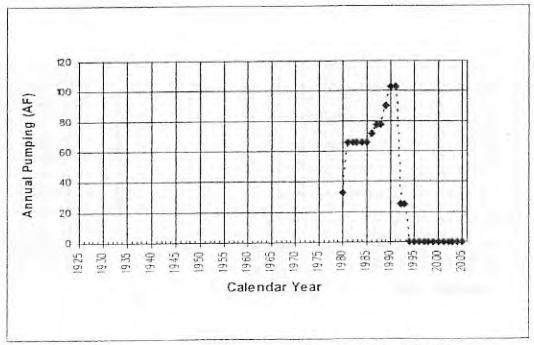
Location: V-0293 County: VENTURA CO



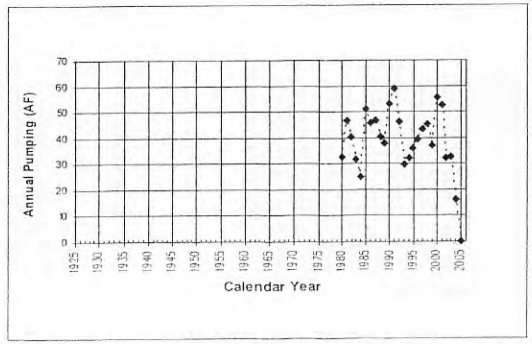
Location: V-0296 County: VENTURA CO



Location: V-0297 County: VENTURA CO

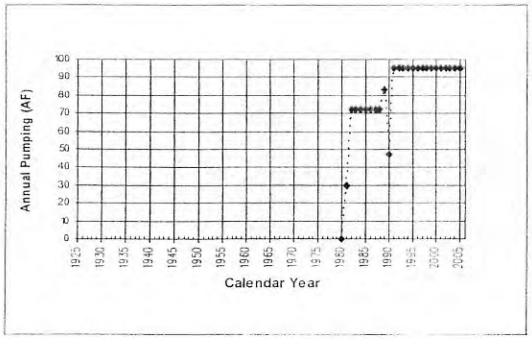


Location: V-0298 County: VENTURA CO

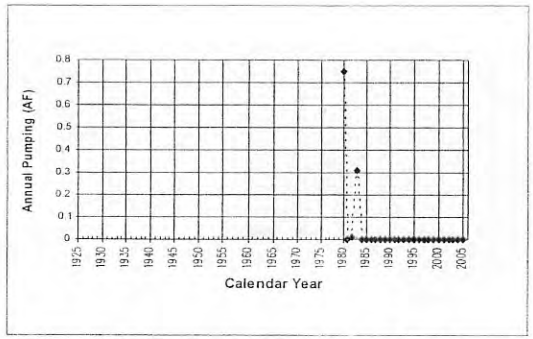


Location: V-0302 County: VENTURA CO

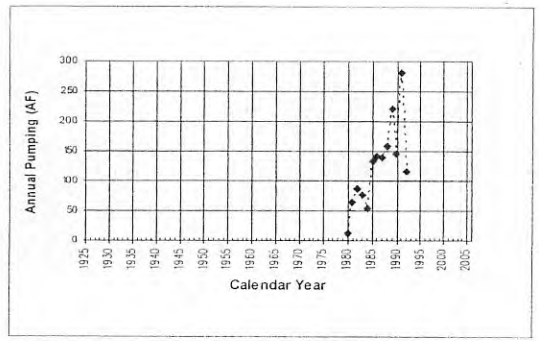
5-1,283



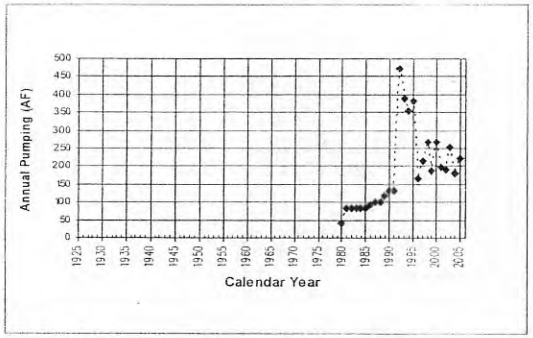
Location: V-0308 County: VENTURA CO



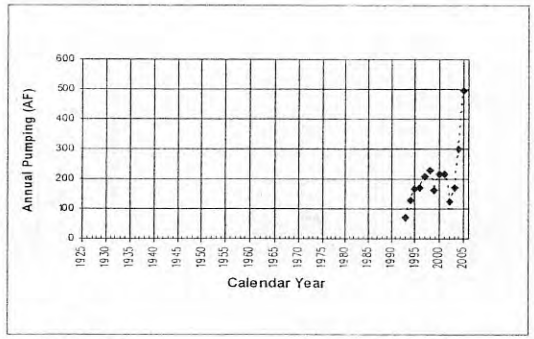
Location: V-0309 County: VENTURA CO



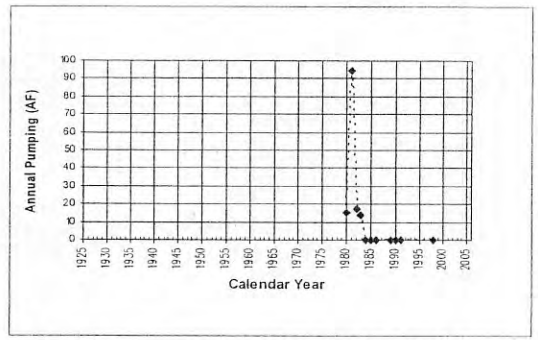
Location: V-0311 County: VENTURA CO



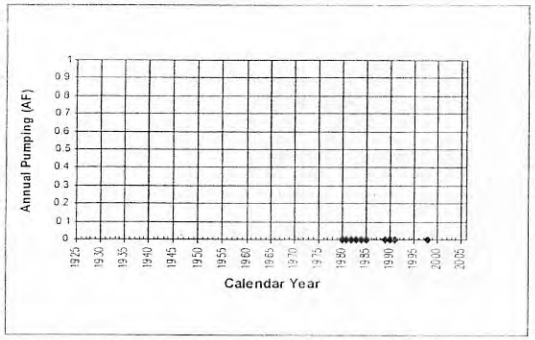
Location: V-0312 County: VENTURA CO



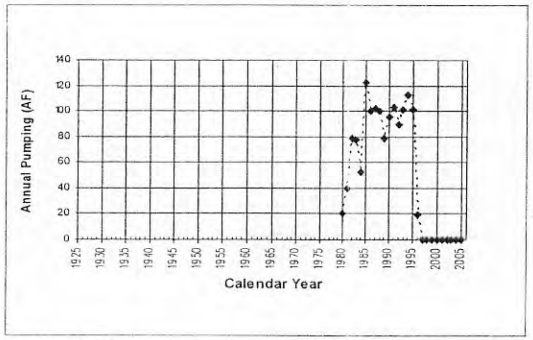
Location: V-0313 County: VENTURA CO



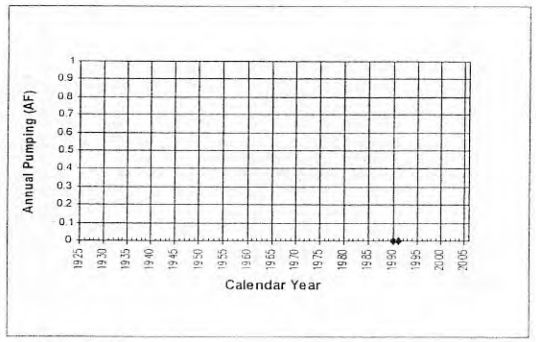
Location: V-0314 County: VENTURA CO



Location: V-0315 County: VENTURA CO

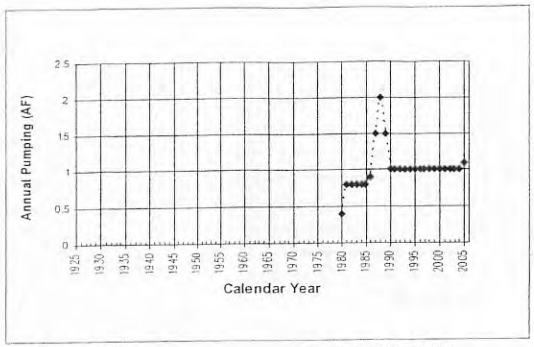


Location: V-0316 County: VENTURA CO

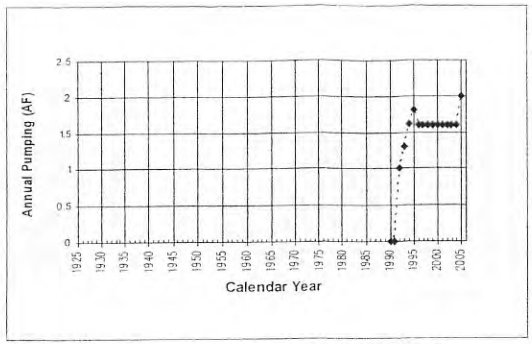


Location: V-0317 County: VENTURA CO

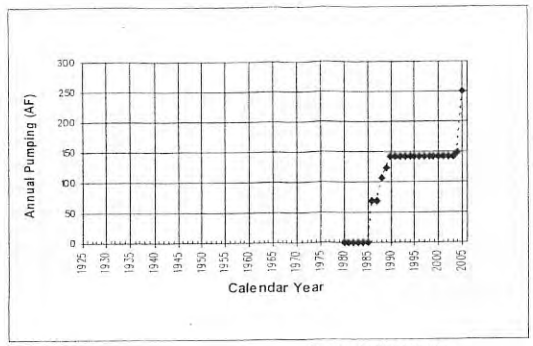
S-1284



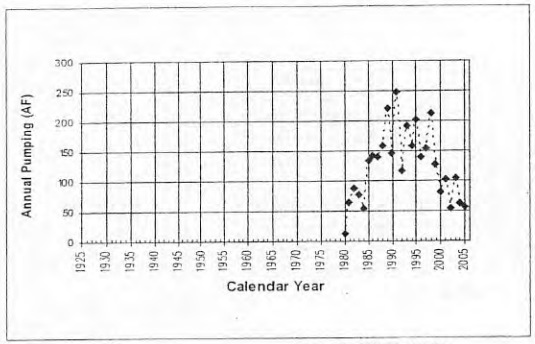
Location: V-0320 County: VENTURA CO



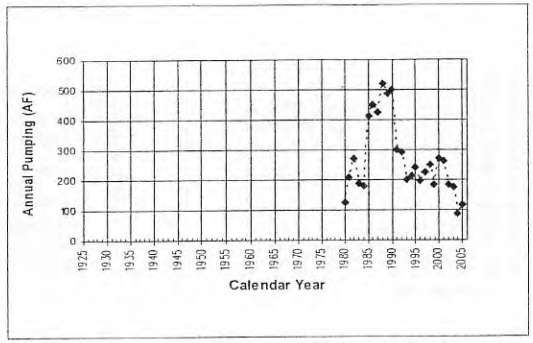
Location: V-0322 County: VENTURA CO



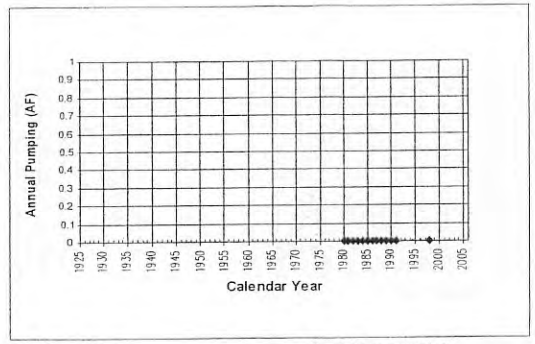
Location: V-0323 County: VENTURA CO



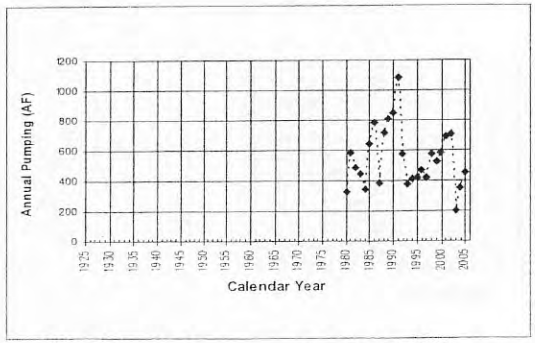
Location: V-0327 County: VENTURA CO



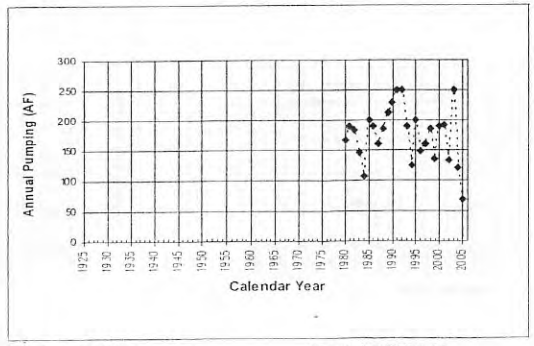
Location: V-0330 County: VENTURA CO



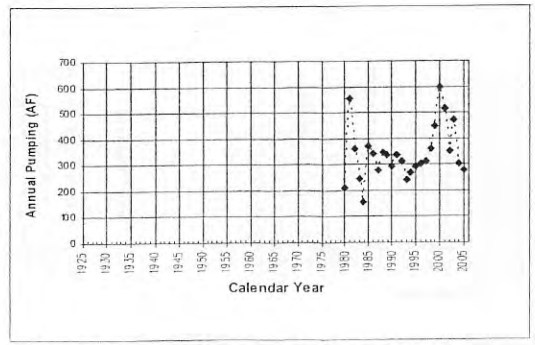
Location: V-0331 County: VENTURA CO



Location: V-0332 County: VENTURA CO

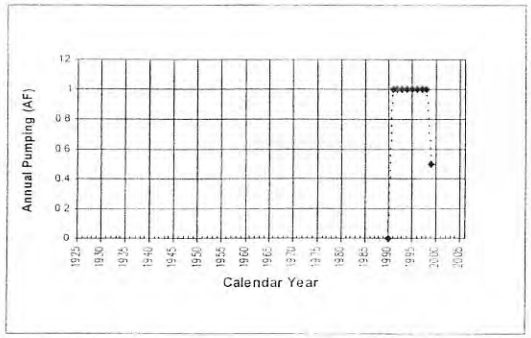


Location: V-0340 County: VENTURA CO

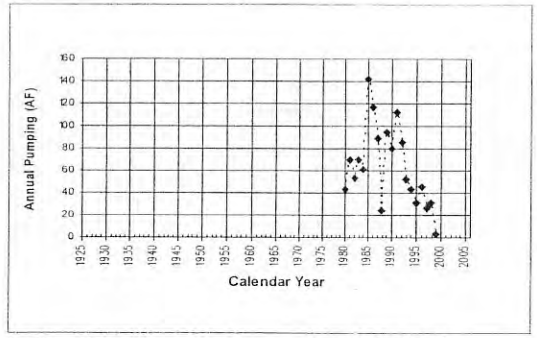


Location: V-0342 County: VENTURA CO

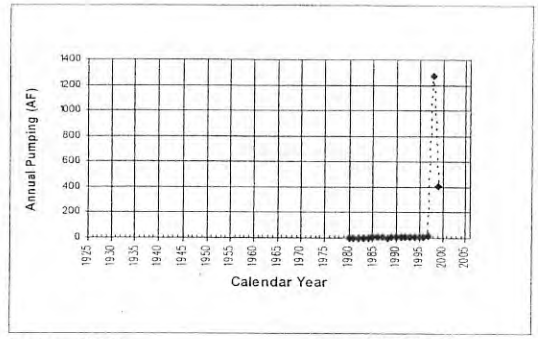
S-1285



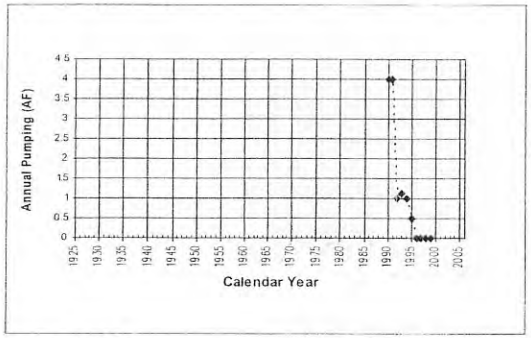
Location: V-0345 County: VENTURA CO



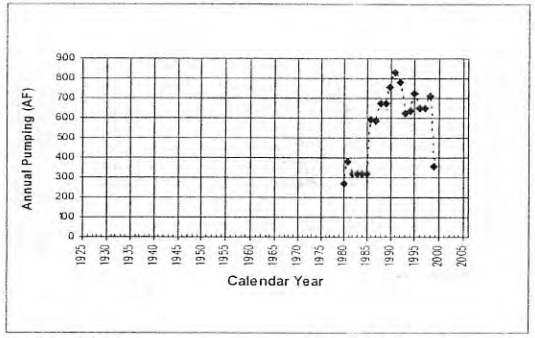
Location: V-0346 County: VENTURA CO



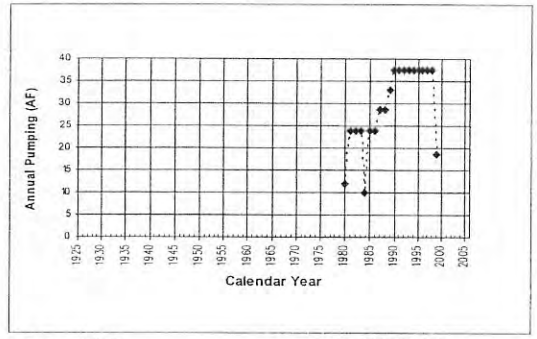
Location: V-0347 County: VENTURA CO



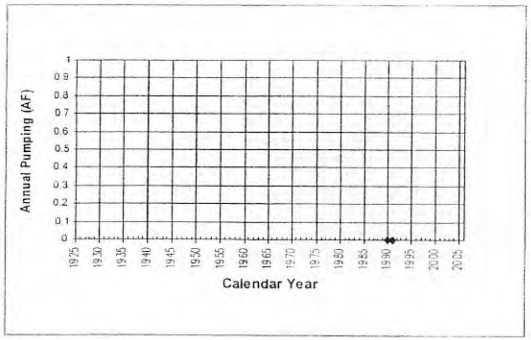
Location: V-0348 County: VENTURA CO



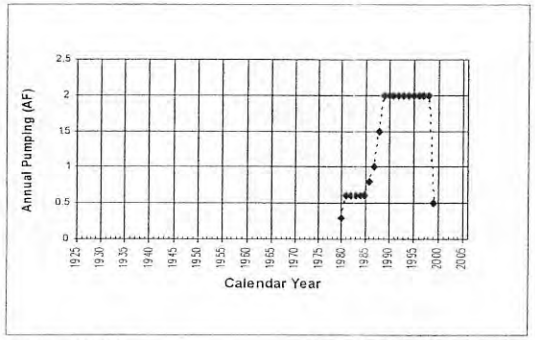
Location: V-0350 County: VENTURA CO



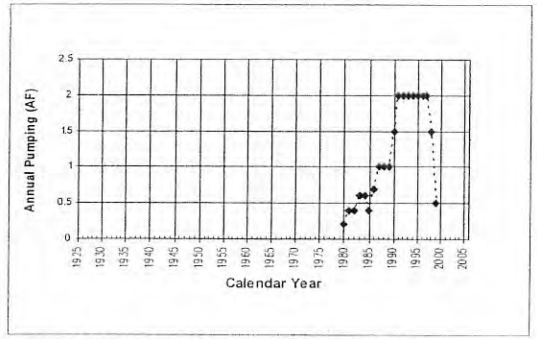
Location: V-0351 County: VENTURA CO



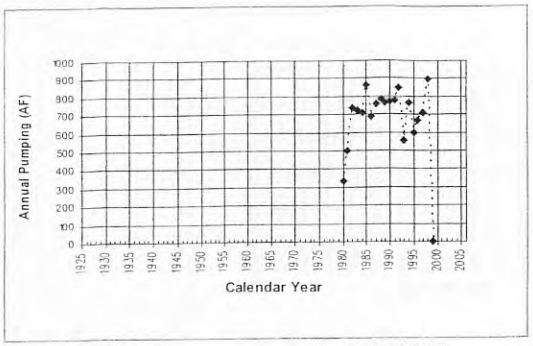
Location: V-0352 County: VENTURA CO



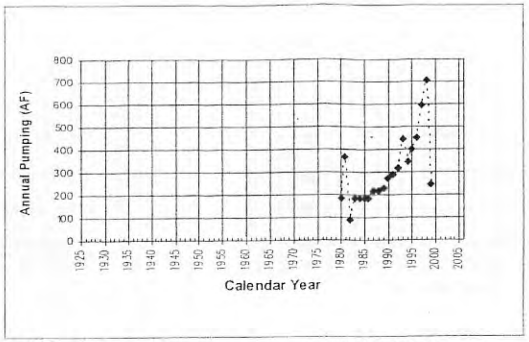
Location: V-0353 County: VENTURA CO



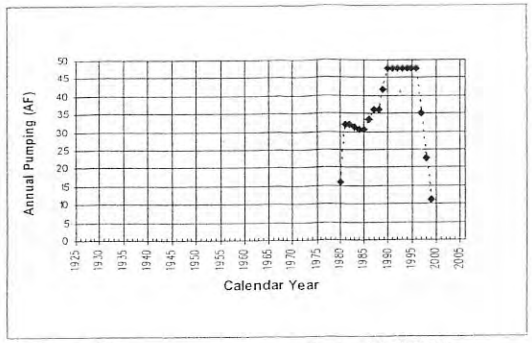
Location: V-0354 County: VENTURA CO



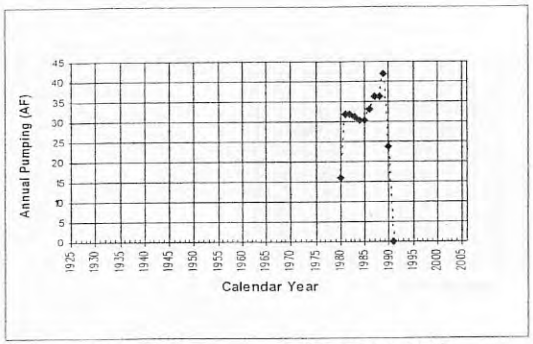
Location: V-0360 County: VENTURA CO



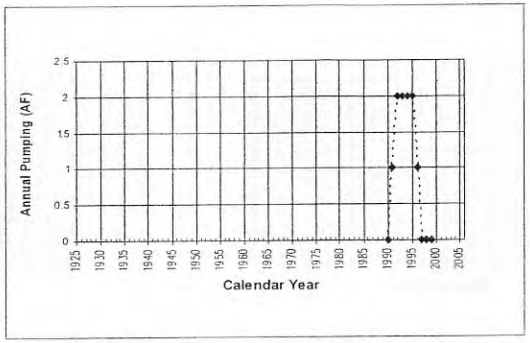
Location: V-0362 County: VENTURA CO



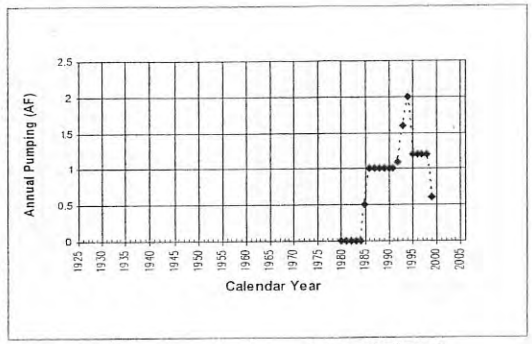
Location: V-0366 County: VENTURA CO



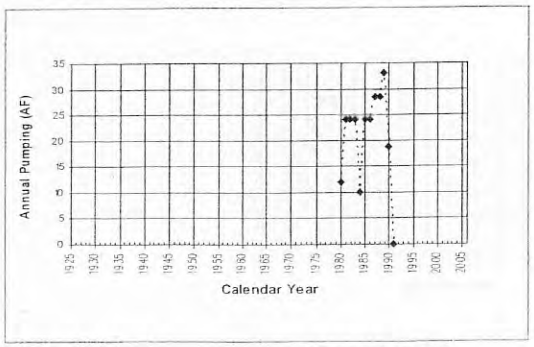
Location: V-0371 County: VENTURA CO



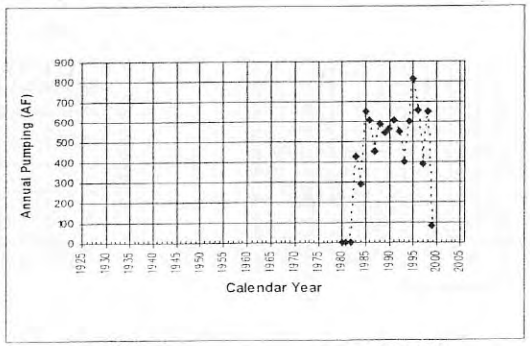
Location: V-0372 County: VENTURA CO



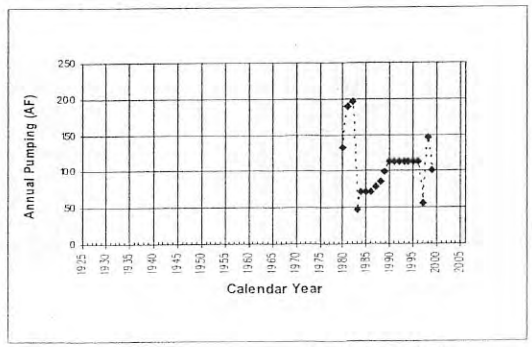
Location: V-0373 County: VENTURA CO



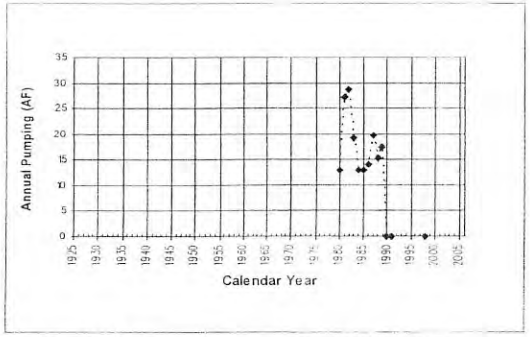
Location: V-0375 County: VENTURA CO



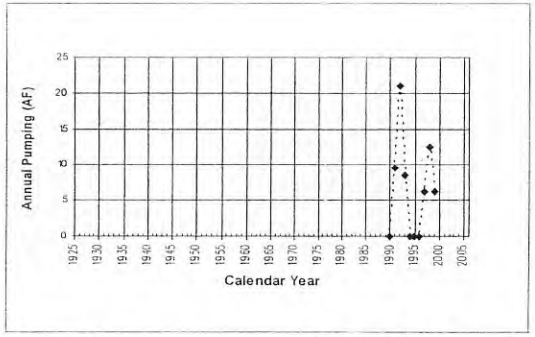
Location: V-0381 County: VENTURA CO



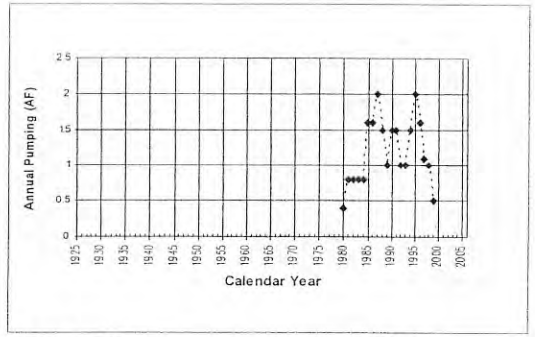
Location: V-0383 County: VENTURA CO



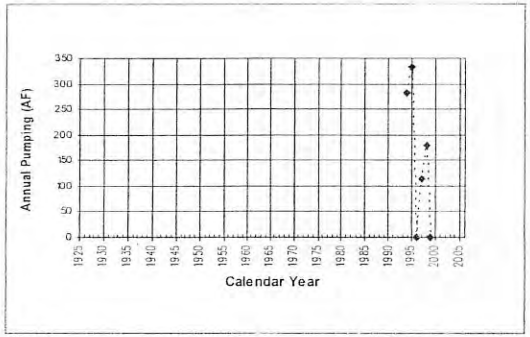
Location: V-0388 County: VENTURA CO



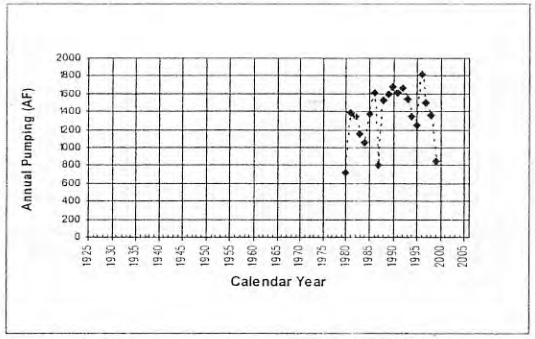
Location: V-0389 County: VENTURA CO



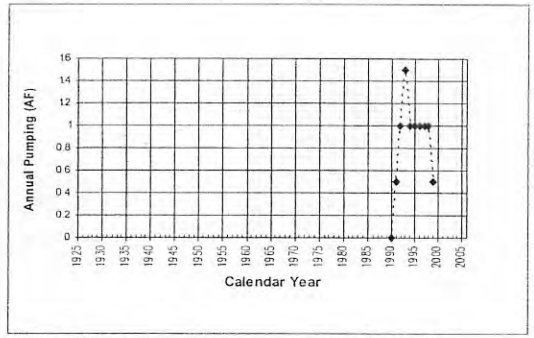
Location: V-0391 County: VENTURA CO



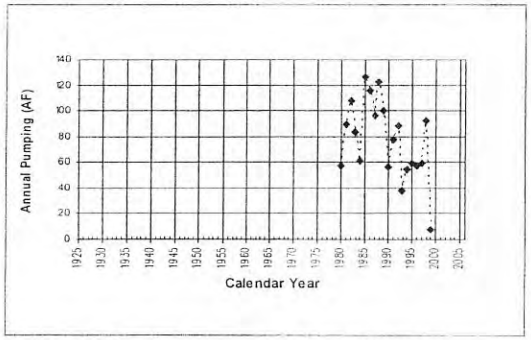
Location: V-0392 County: VENTURA CO



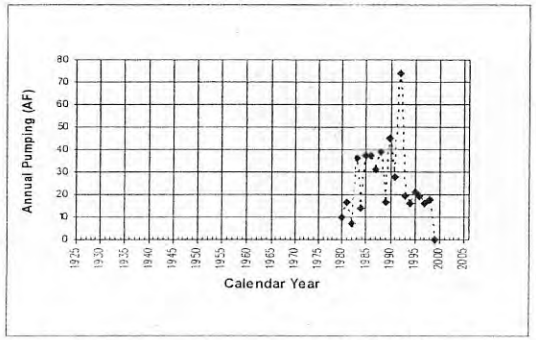
Location: V-0393 County: VENTURA CO



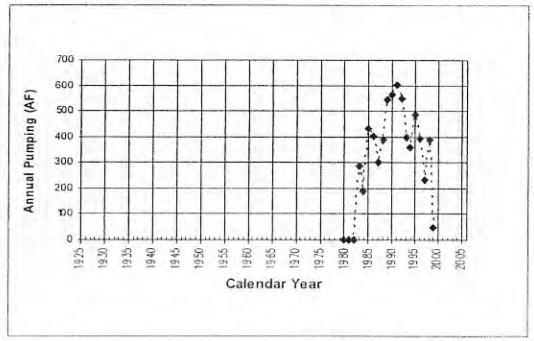
Location: V-0398 County: VENTURA CO



Location: V-0404 County: VENTURA CO

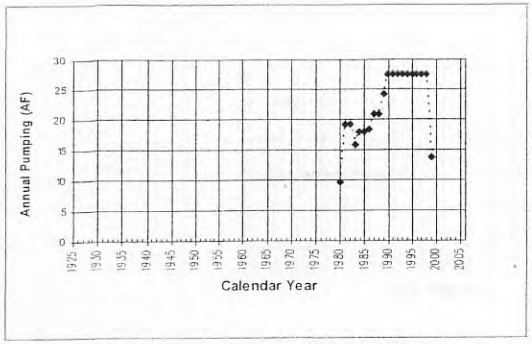


Location: V-0406 County: VENTURA CO

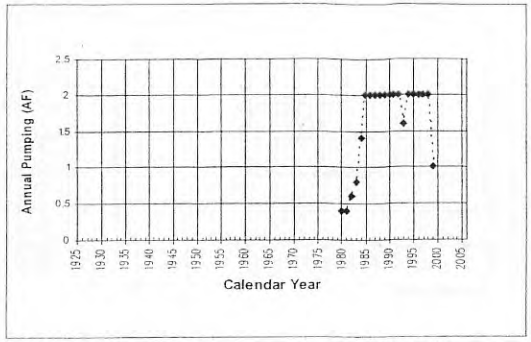


Location: V-0421 County: VENTURA CO

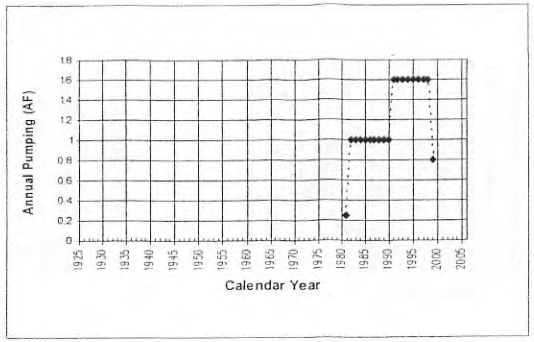
5-1288



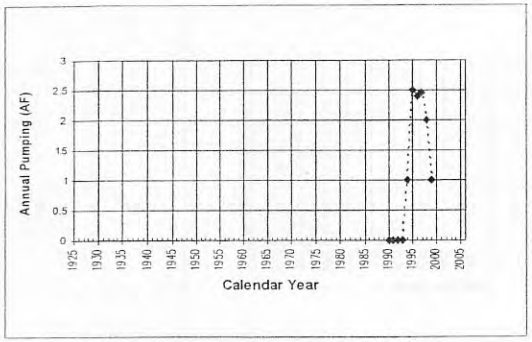
Location: V-0422 County: VENTURA CO



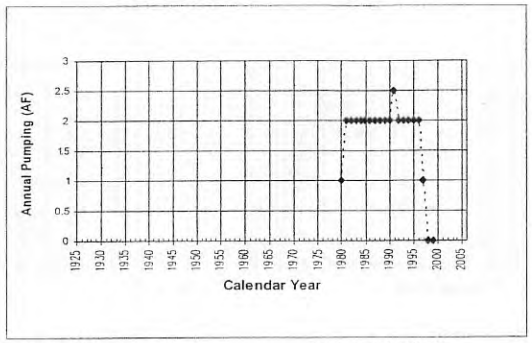
Location: V-0423 County: VENTURA CO



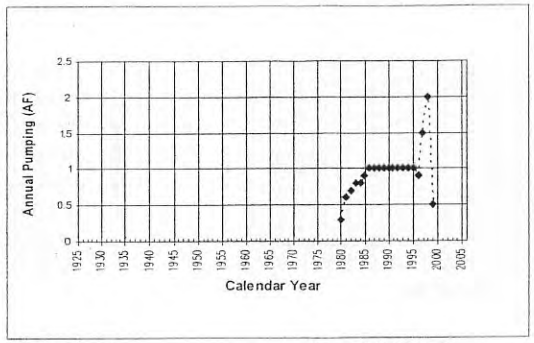
Location: V-0424 County: VENTURA CO



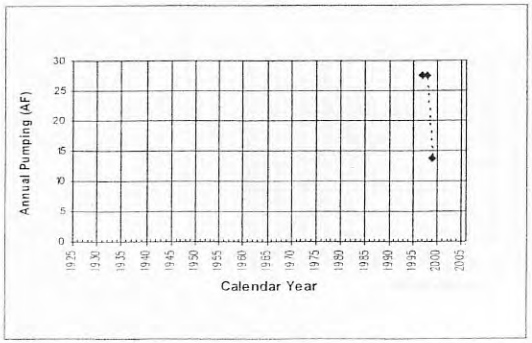
Location: V-0438 County: VENTURA CO



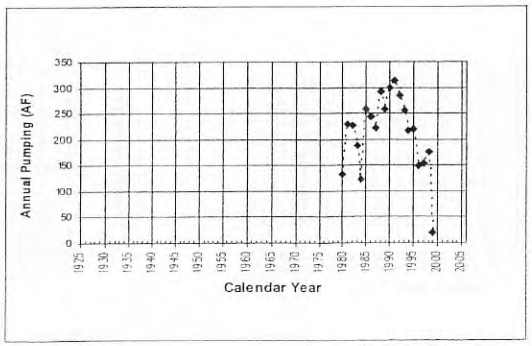
Location: V-0446 County: VENTURA CO



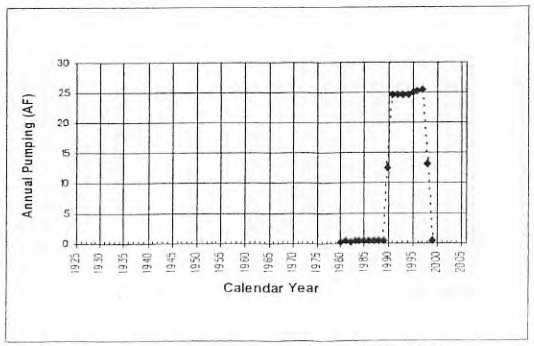
Location: V-0447 County: VENTURA CO



Location: V-0450 County: VENTURA CO

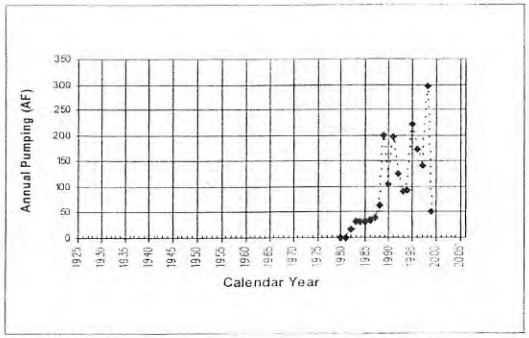


Location: V-0453 County: VENTURA CO

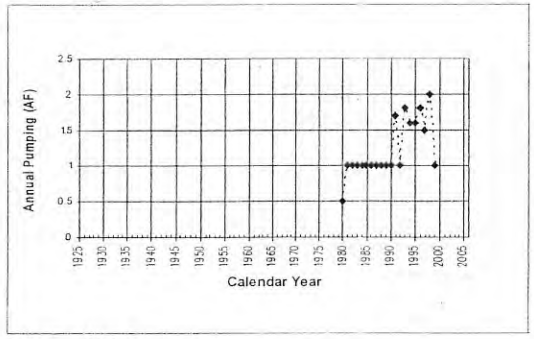


Location: V-0455 County: VENTURA CO

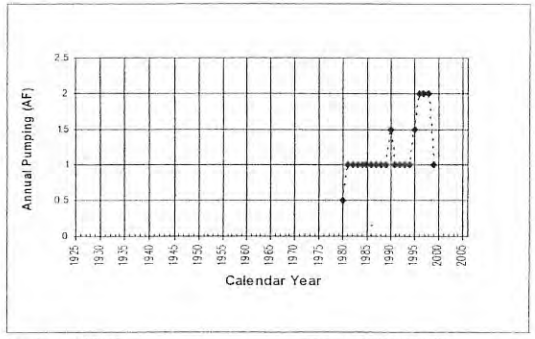
5-1280



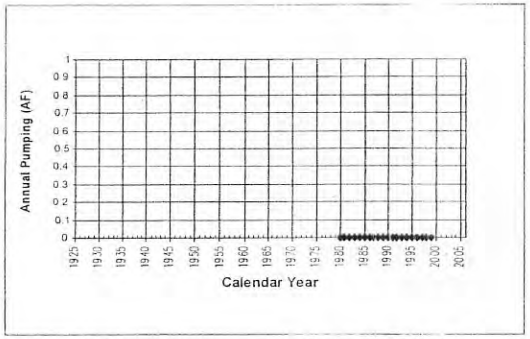
Location: V-0457 County: VENTURA CO



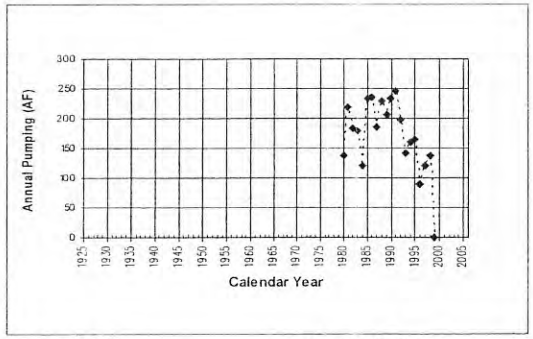
Location: V-0457b



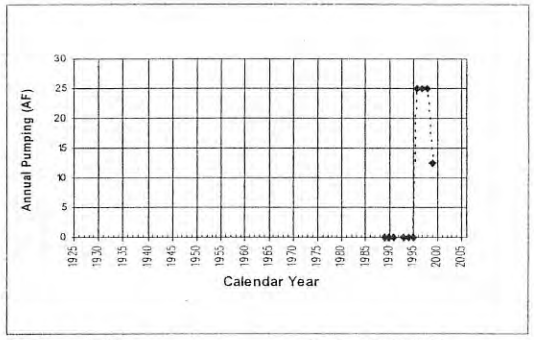
Location: V-0465 County: VENTURA CO



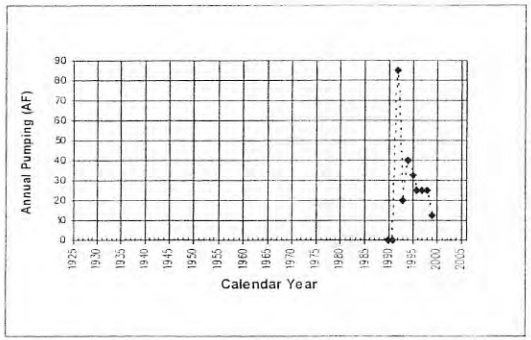
Location: V-0473 County: VENTURA CO



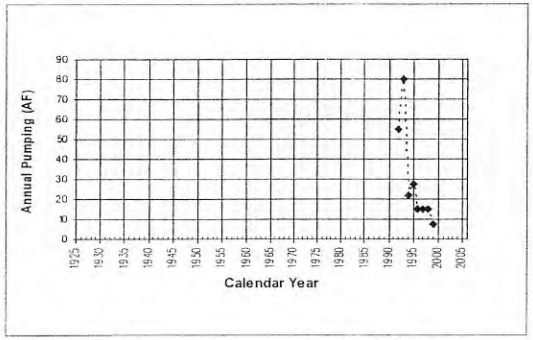
Location: V-0474 County: VENTURA CO



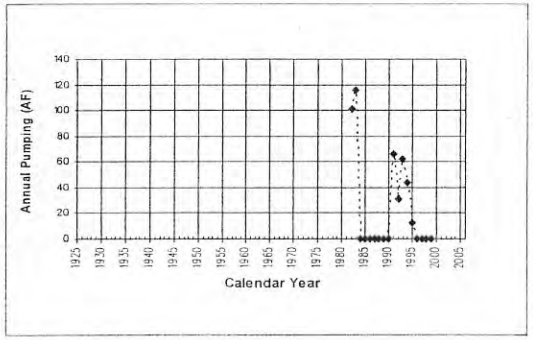
Location: V-0488 County: VENTURA CO



Location: V-0499 County: VENTURA CO

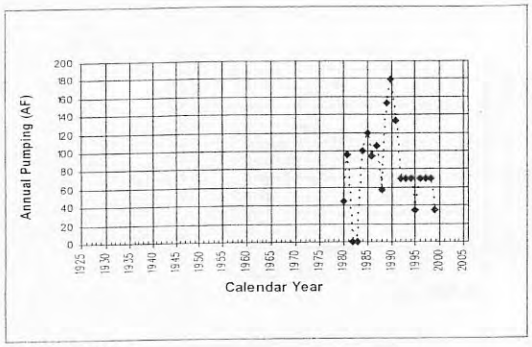


Location: V-0500 County VENTURA CO

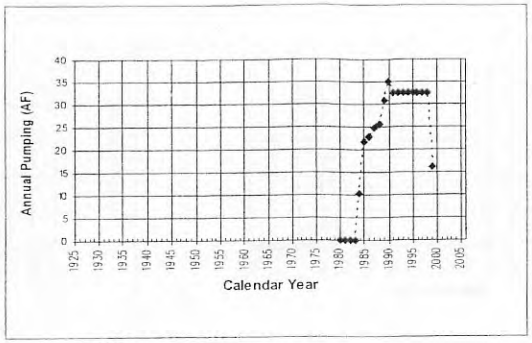


Location: V-0686a

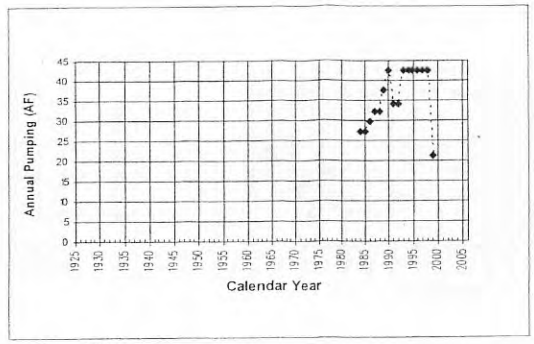
S-1258



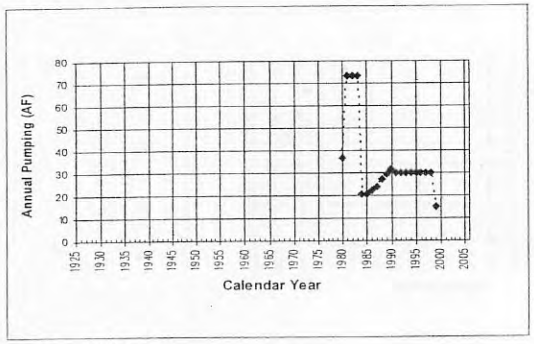
Location: V-0686b



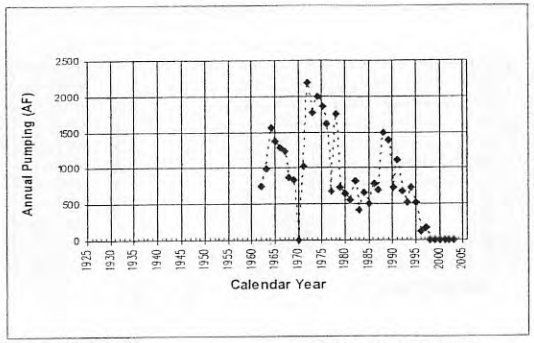
Location: V-0695a



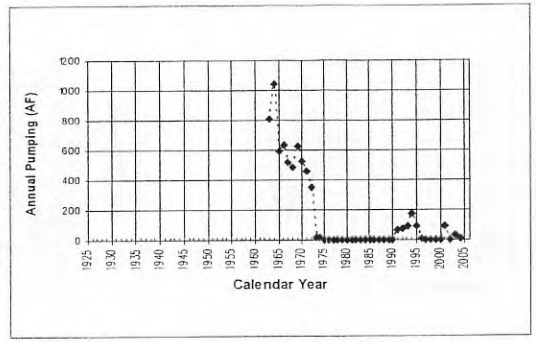
Location: V-0695b



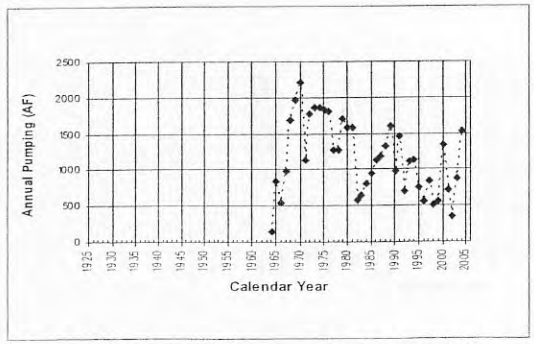
Location: V-0695c



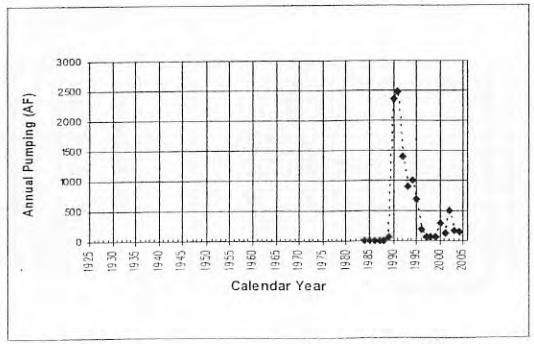
Location: VWC-157 County: LOS ANGELES CO



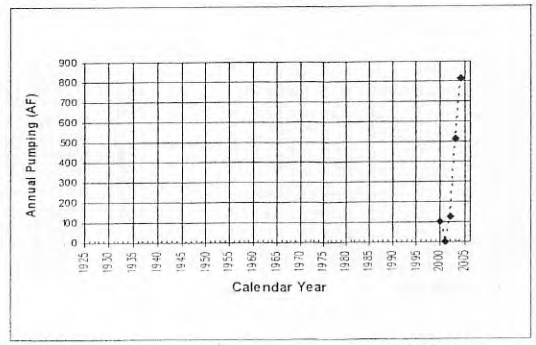
Location: VWC-159 County: LOS ANGELES CO



Location: VWC-160 County: LOS ANGELES CO

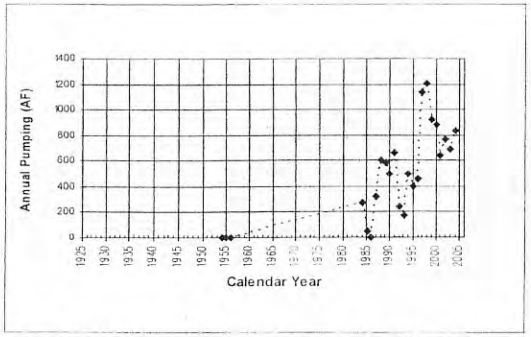


Location: VWC-201 County: LOS ANGELES CO

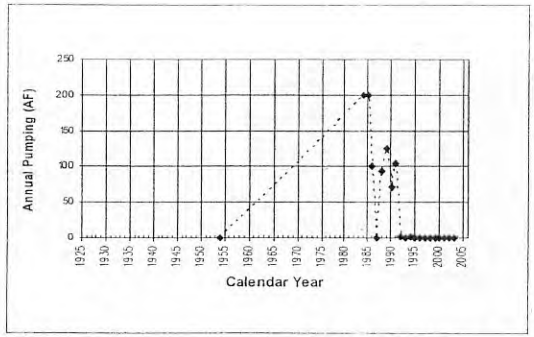


Location: VWC-205 County: LOS ANGELES CO

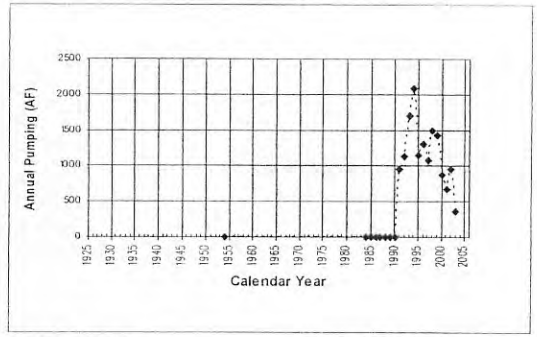
5-1291



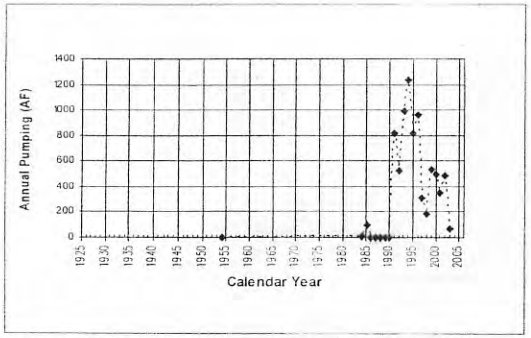
Location: VWC-D County: LOS ANGELES CO



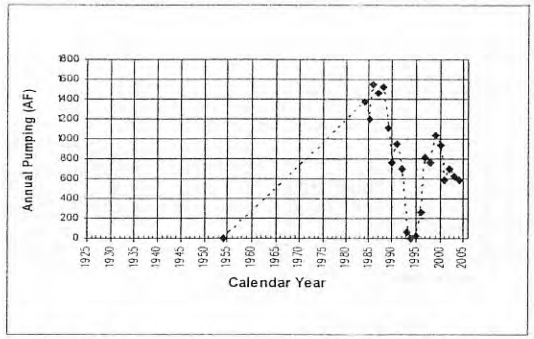
Location: VWC-I County: LOS ANGELES CO



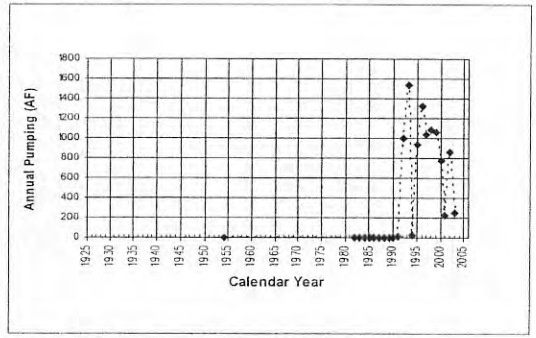
Location: VWC-K2 County: LOS ANGELES CO



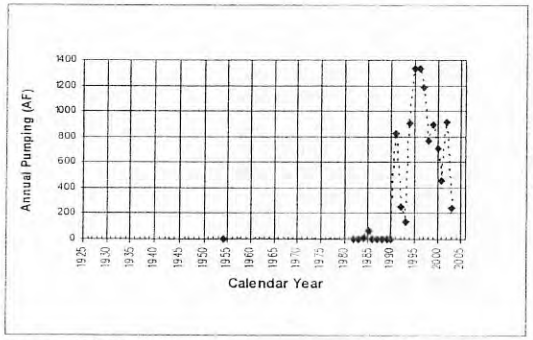
Location: VWC-L2 County: LOS ANGELES CO



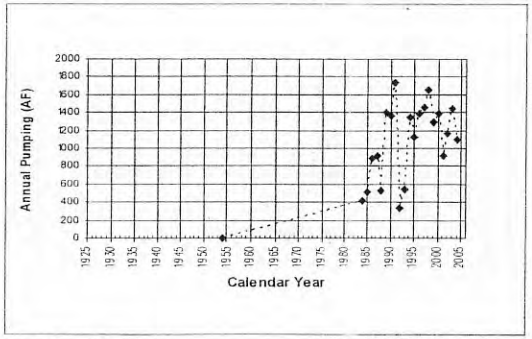
Location: VWC-N County: LOS ANGELES CO



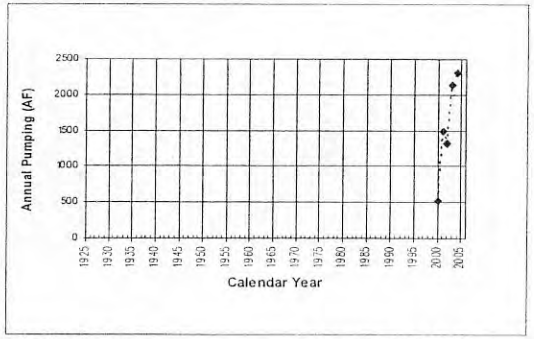
Location: VWC-N3 County: LOS ANGELES CO



Location: VWC-N4 County: LOS ANGELES CO

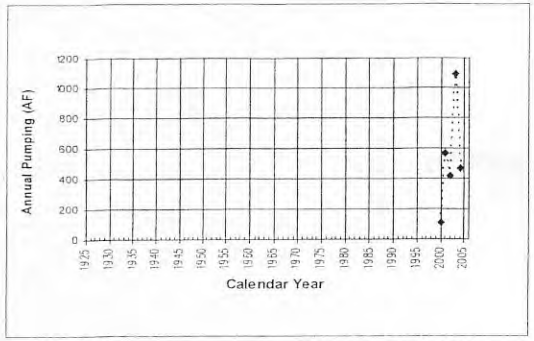


Location: VWC-Q2 County: LOS ANGELES CO

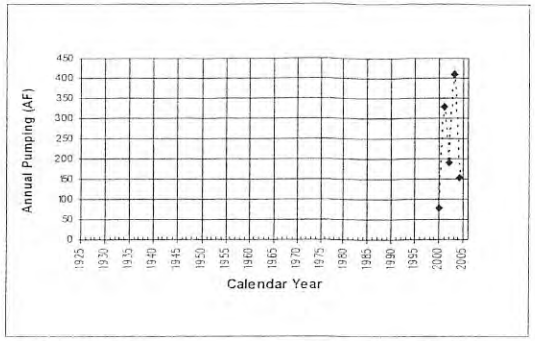


Location: VWC-S6 County: LOS ANGELES CO

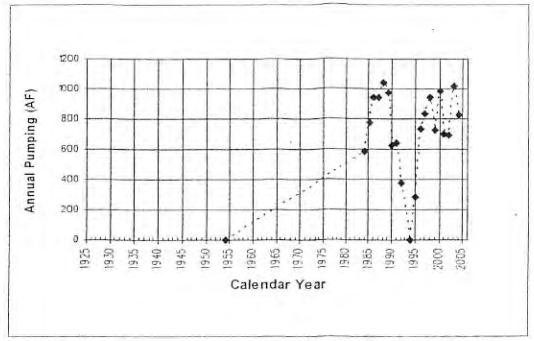
5-1292



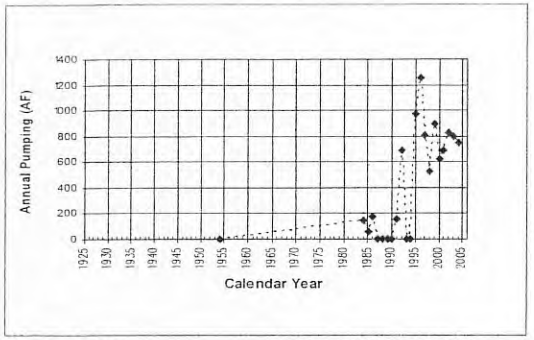
Location: VWC-S7 County: LOS ANGELES CO



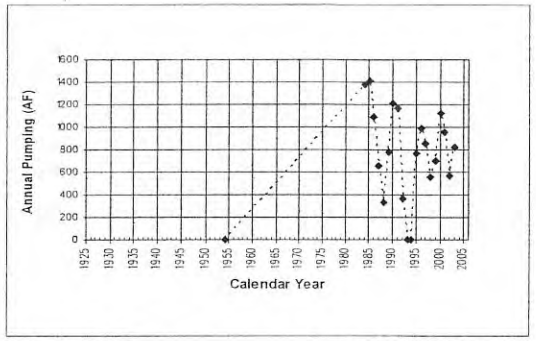
Location: VWC-S8 County: LOS ANGELES CO



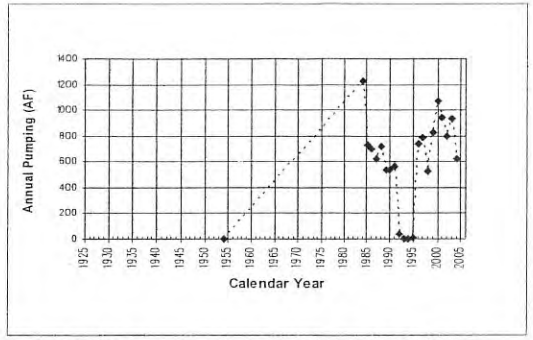
Location: VWC-T2 County: LOS ANGELES CO



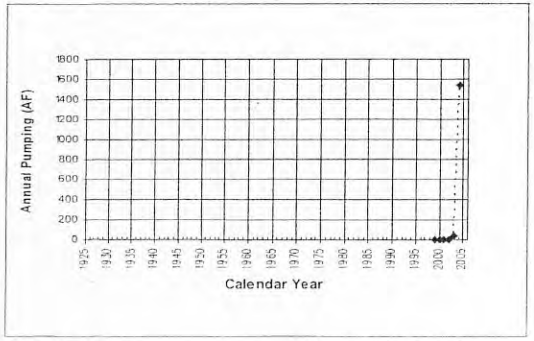
Location: VWC-T4 County: LOS ANGELES CO



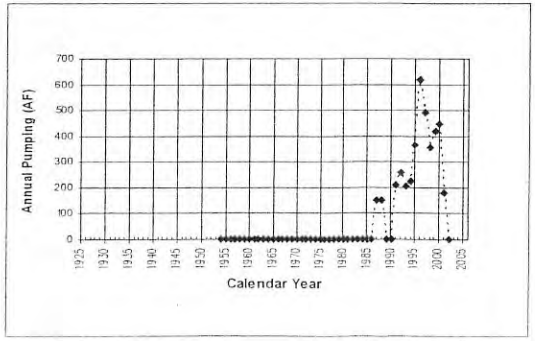
Location: VWC-U3 County: LOS ANGELES CO



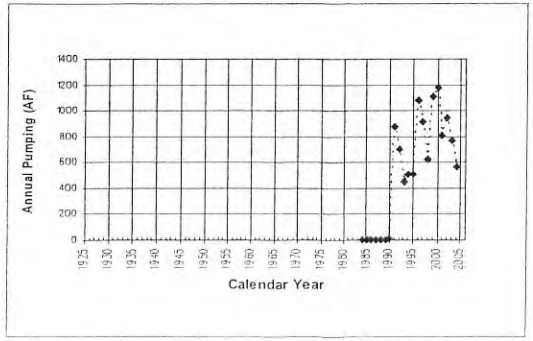
Location: VWC-U4 County: LOS ANGELES CO



Location: VWC-W10 County: LOS ANGELES CO



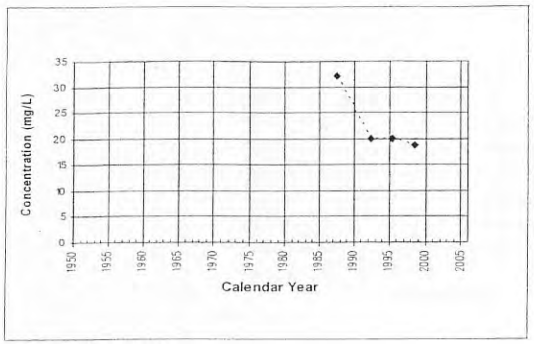
Location: VWC-W6 County: LOS ANGELES CO



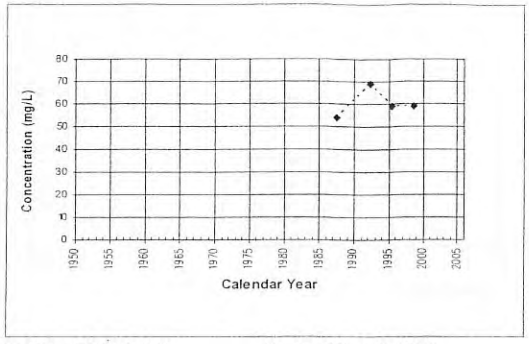
Location: VWC-W9 County: LOS ANGELES CO

5-1293

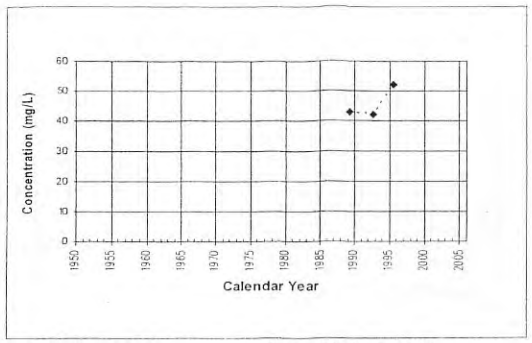
This Page Intentionally
Left Blank



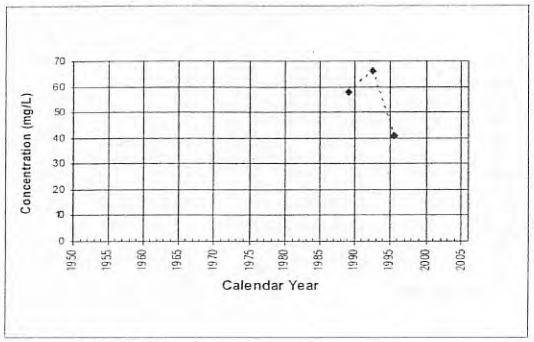
Location: 03N16W02J03S



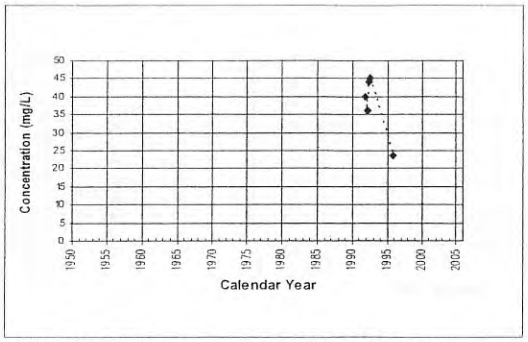
Location: 03N16W02R01S County: LOS ANGELES CO



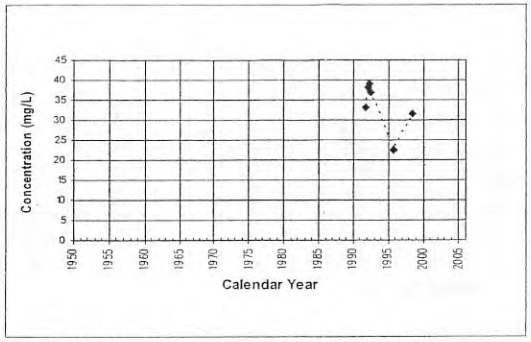
Location: 04N15W06P01S County: LOS ANGELES CO



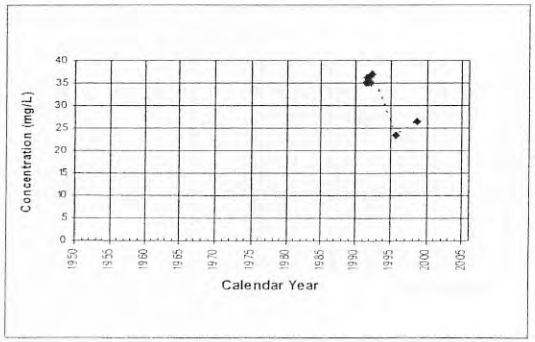
Location: 04N15W18N03S



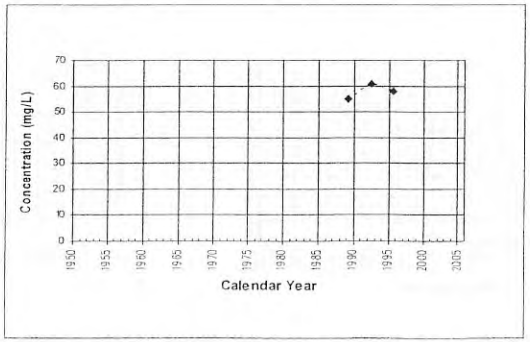
Location: 04N16W04H01S County: LOS ANGELES CO



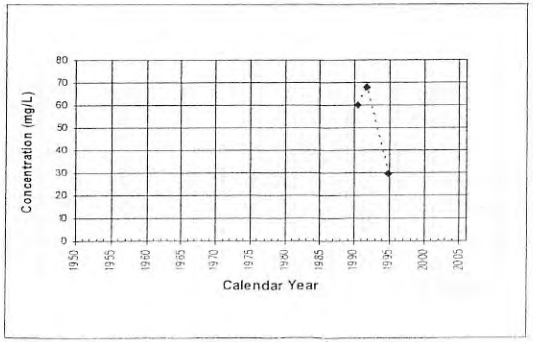
Location: 04N16W09H02S County: LOS ANGELES CO



Location: 04N16W09Q03S

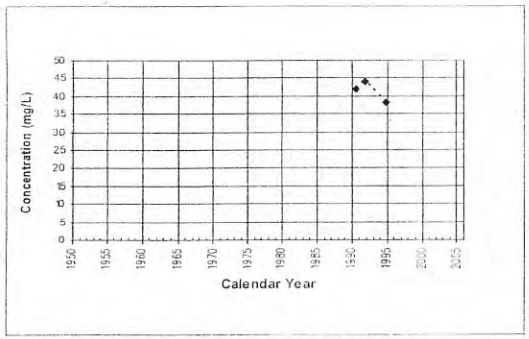


Location: 04N16W12N02S County: LOS ANGELES CO

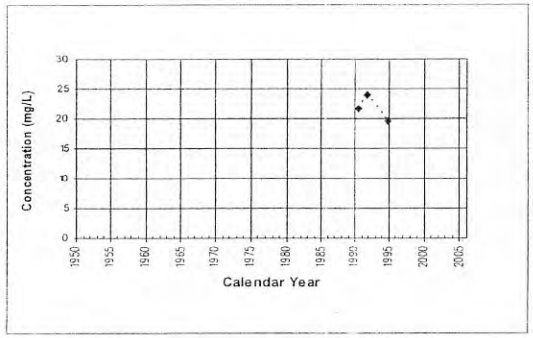


Location: 04N16W15R02S

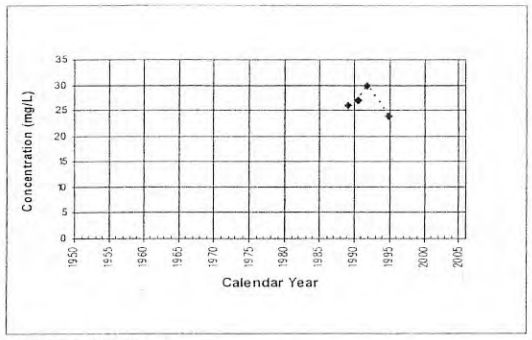
5-1235



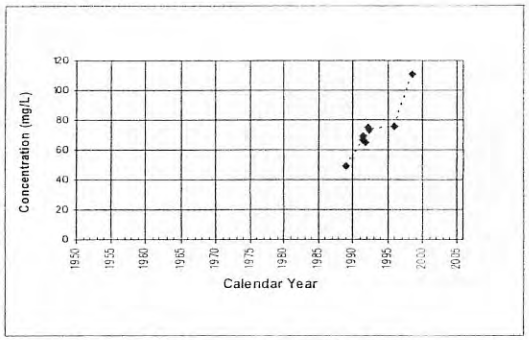
Location: 04N16W17A05S County: LOS ANGELES CO



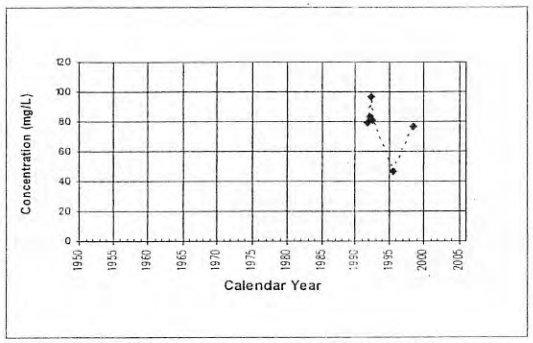
Location: 04N16W21D01S County: LOS ANGELES CO



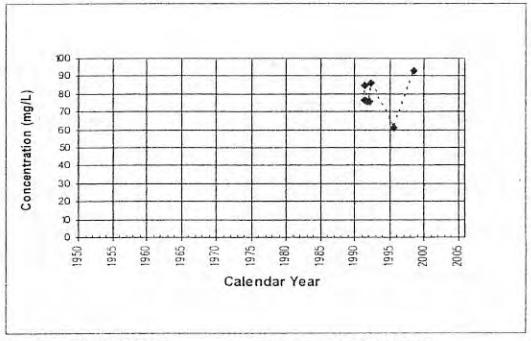
Location: 04N16W21J01S



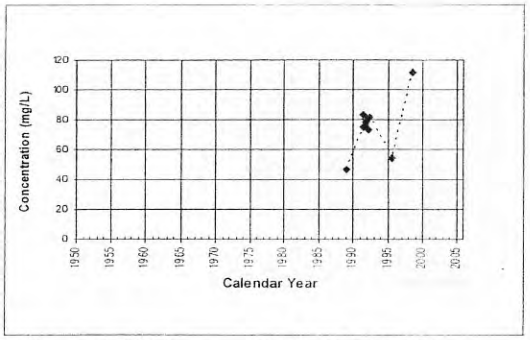
Location: 04N16W22C01S County: LOS ANGELES CO



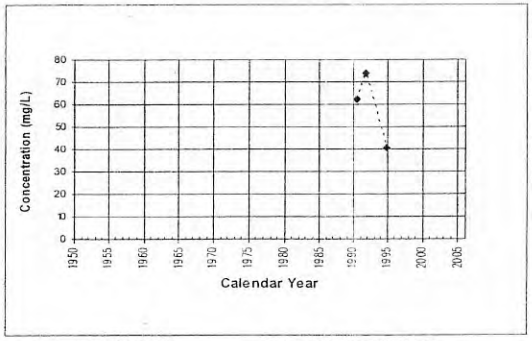
Location: 04N16W22C03S County: LOS ANGELES CO



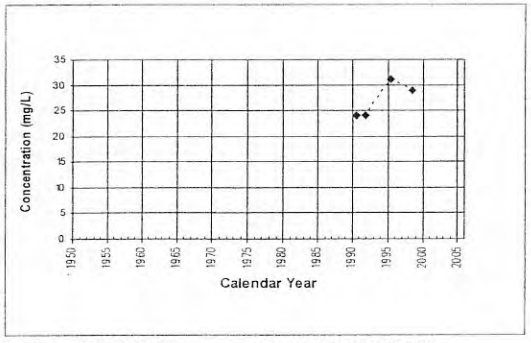
Location: 04N16W22C04S County: LOS ANGELES CO



Location: 04N16W22C07S County: LOS ANGELES CO

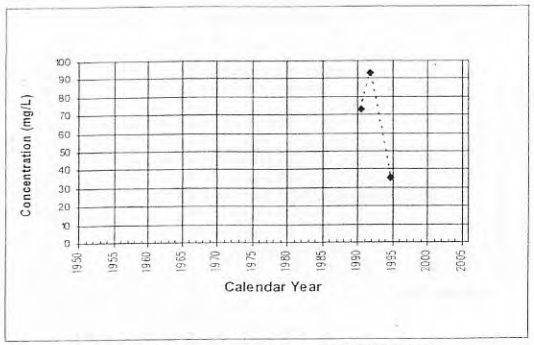


Location: 04N16W22D02S County: LOS ANGELES CO

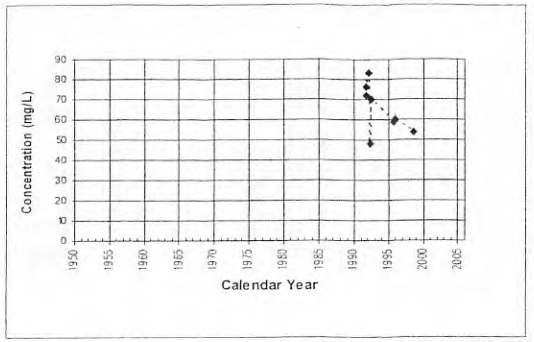


Location: 04N16W22M01S County: LOS ANGELES CO

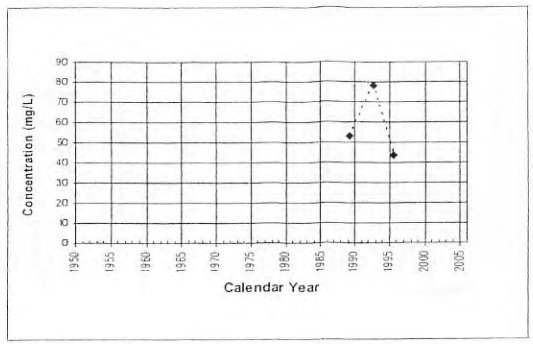
5-1298



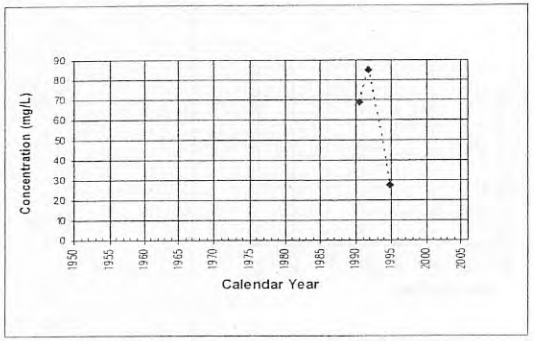
Location: 04N16W23A01S County: LOS ANGELES CO



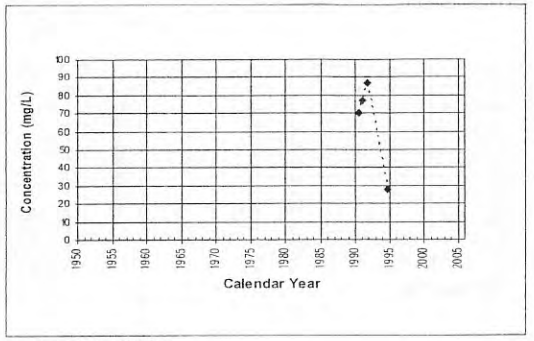
Location: 04N16W23A02S County: LOS ANGELES CO



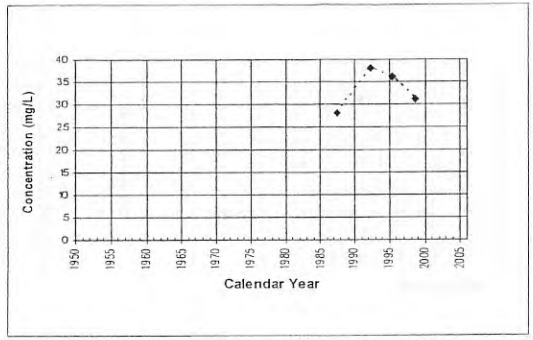
Location: 04N16W23F01S



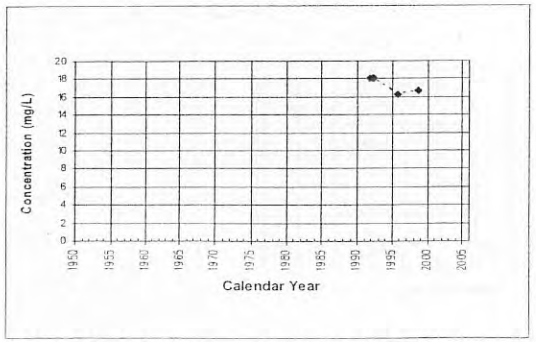
Location: 04N16W24A06S



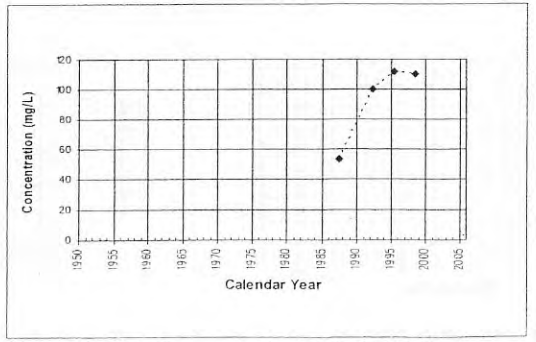
Location: 04N16W24B02S



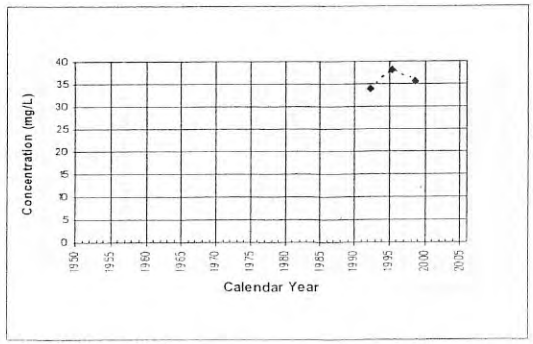
Location: 04N16W27J03S County: LOS ANGELES CO



Location: 04N16W33L01S County: LOS ANGELES CO

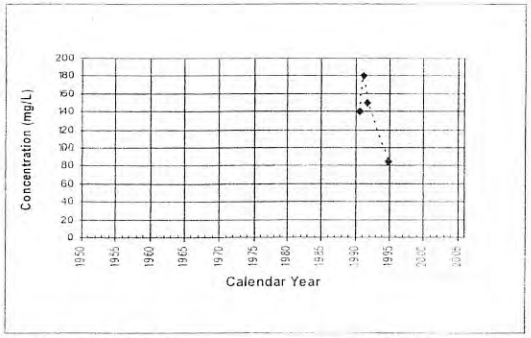


Location: 04N16W34A03S County: LOS ANGELES CO

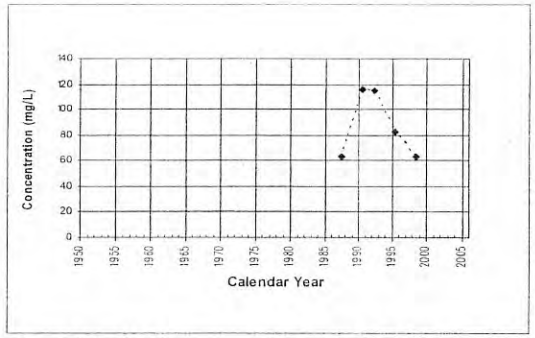


Location: 04N16W35A01S

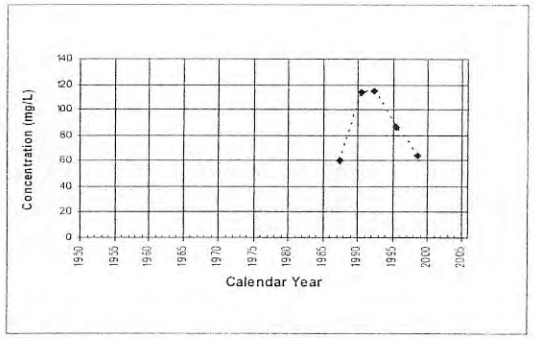
E-1287



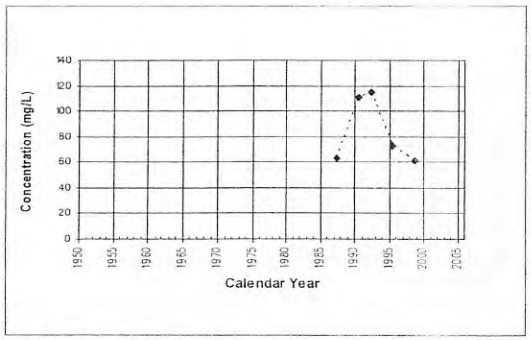
Location: 04N17W12C01S County: LOS ANGELES CO



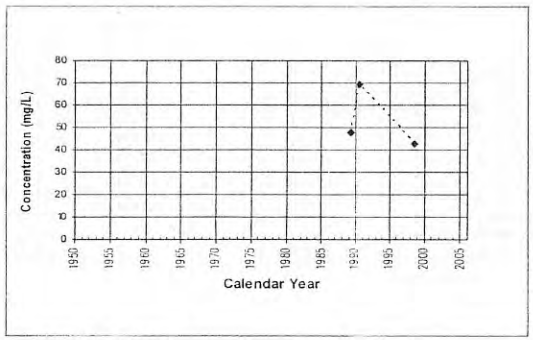
Location: 05N17W25B02S County: LOS ANGELES CO



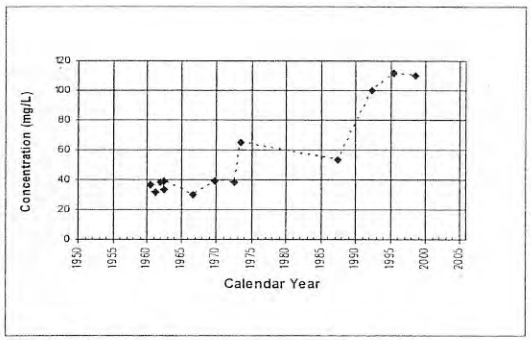
Location: 05N17W25B04S County: LOS ANGELES CO



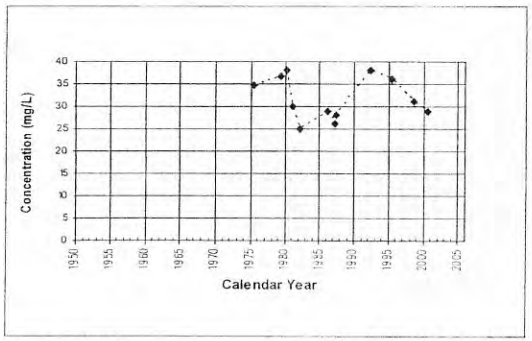
Location: 05N17W25G06S County: LOS ANGELES CO



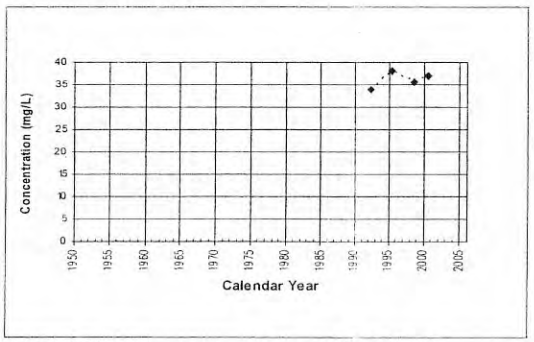
Location: 05N17W25G07S



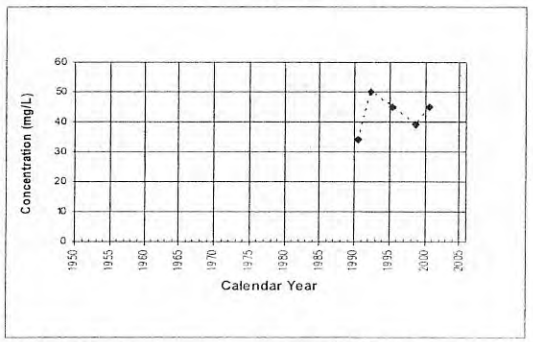
Location: NCWD-10 County: LOS ANGELES CO



Location: NCWD-11 County: LOS ANGELES CO

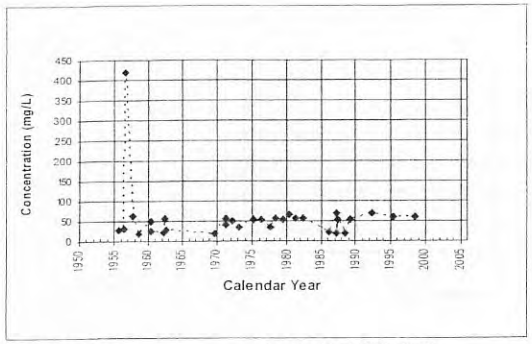


Location: NCWD-12 County: LOS ANGELES CO

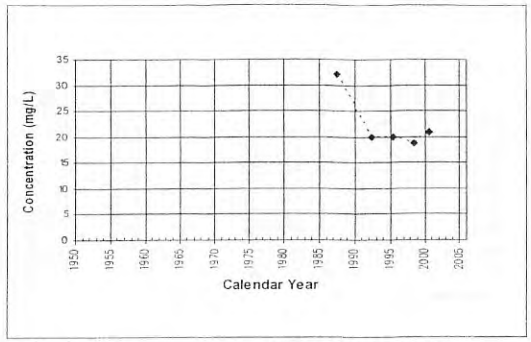


Location: NCWD-13 County: LOS ANGELES CO

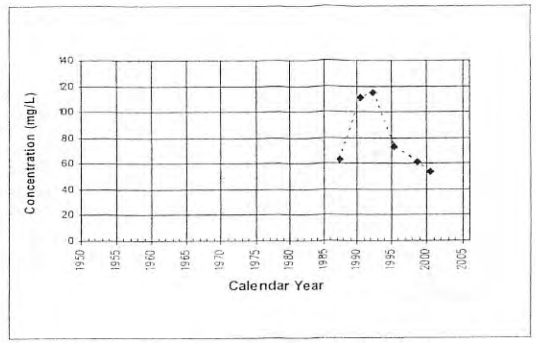
5-1298



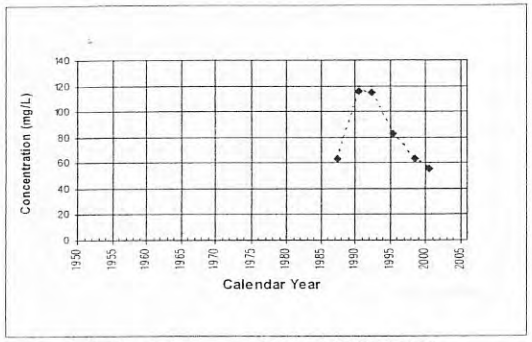
Location: NCWD-7 County: LOS ANGELES CO



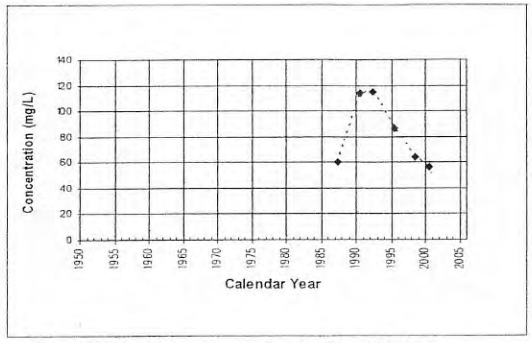
Location: NCWD-9 County: LOS ANGELES CO



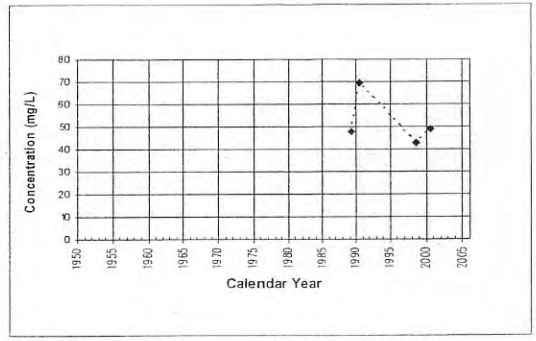
Location: NCWD-Castaic 1 County: LOS ANGELES CO



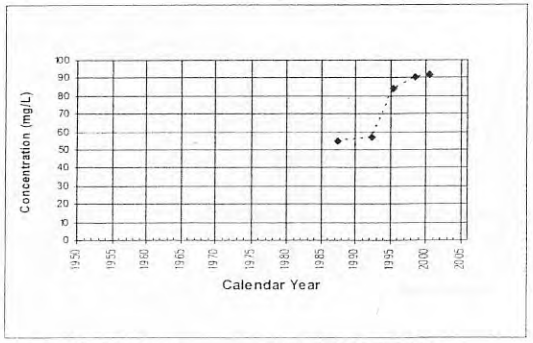
Location: NCWD-Castaic 2 County: LOS ANGELES CO



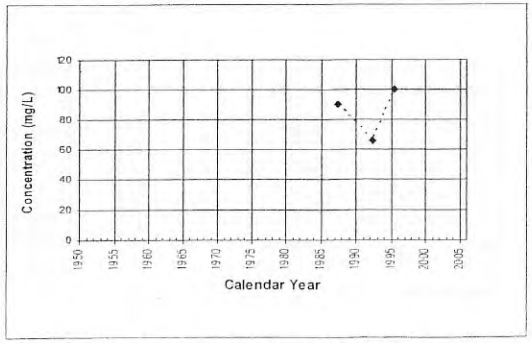
Location: NCWD-Castaic 3 County: LOS ANGELES CO



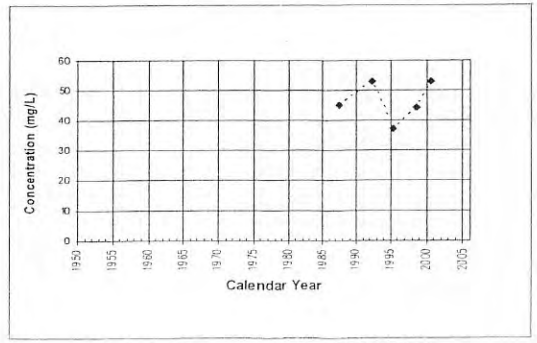
Location: NCWD-Castaic 4 County: LOS ANGELES CO



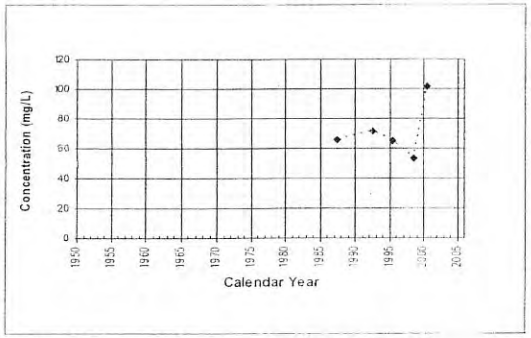
Location: NCWD-Pinetree 1 County: LOS ANGELES CO



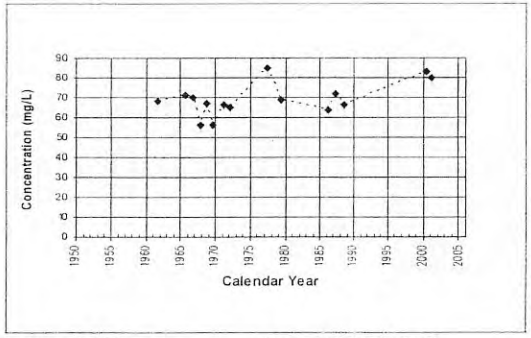
Location: NCWD-Pinetree 2 County: LOS ANGELES CO



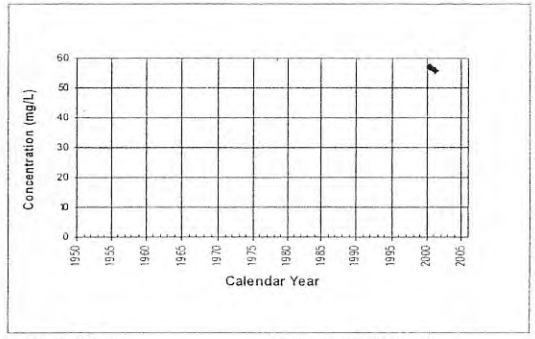
Location: NCWD-Pinetree 3 County: LOS ANGELES CO



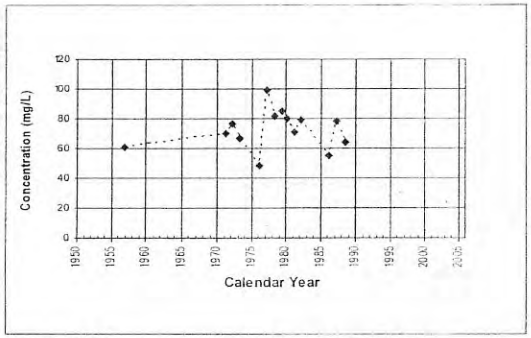
Location: NCWD-Pinetree 4 County: LOS ANGELES CO



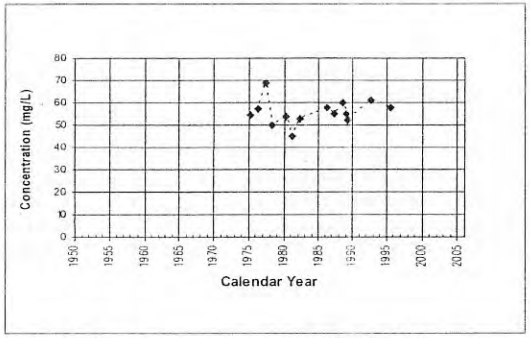
Location: NLF-B6 County: LOS ANGELES CO



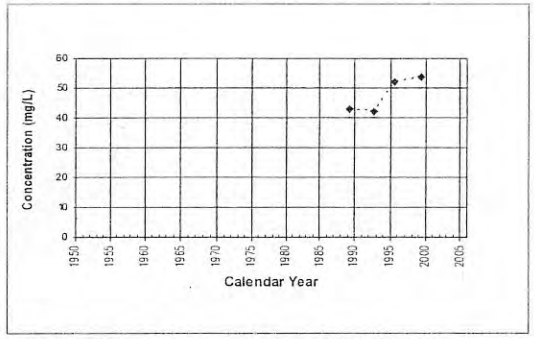
Location: NLF-C County: LOS ANGELES CO



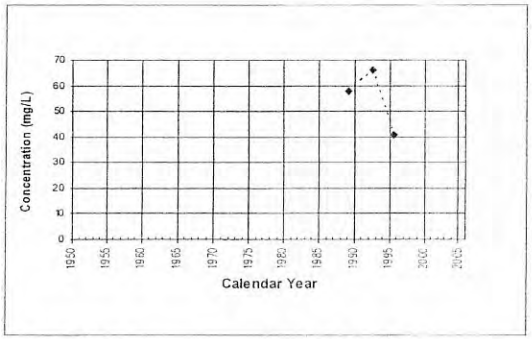
Location: NLF-C6 County: LOS ANGELES CO



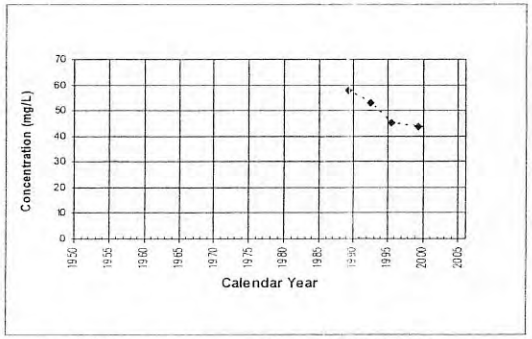
Location: SCWC-Clark County: LOS ANGELES CO



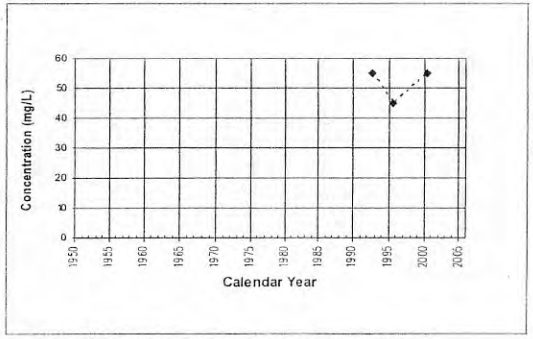
Location: SCWC-Guida County: LOS ANGELES CO



Location: SCWC-Honby County: LOS ANGELES CO

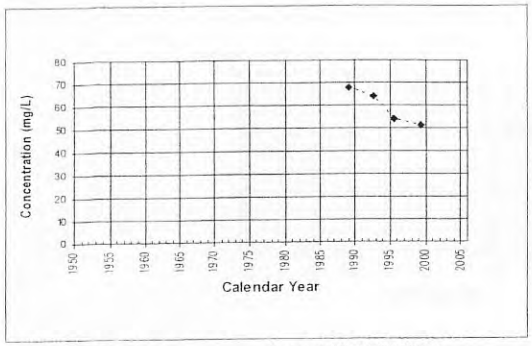


Location: SCWC-Lost Canyon 2 County: LOS ANGELES CO

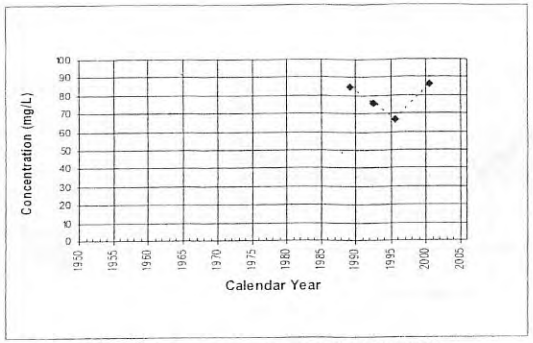


Location: SCWC-Lost Canyon 2A County: LOS ANGELES CO

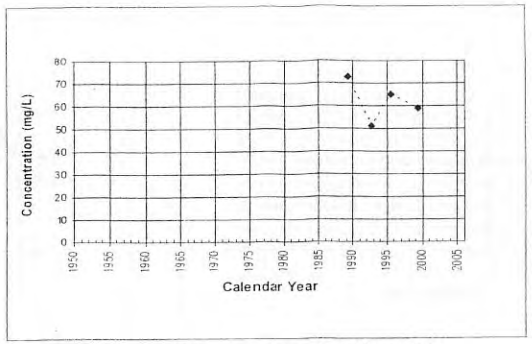
5-1309



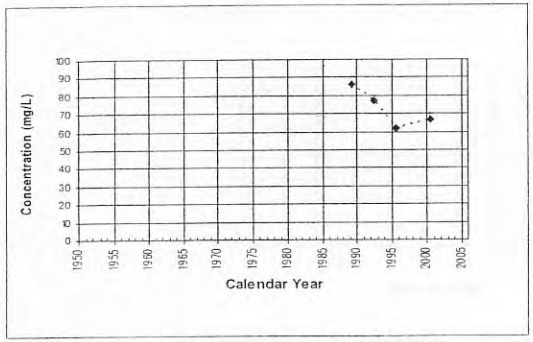
Location: SCWC-Mitchell County: LOS ANGELES CO



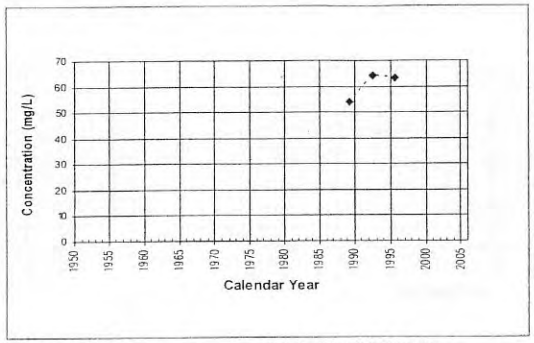
Location: SCWC-N. Oaks Central County: LOS ANGELES CO



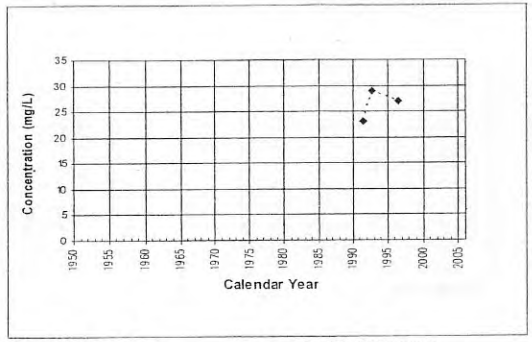
Location: SCWC-N. Oaks East County: LOS ANGELES CO



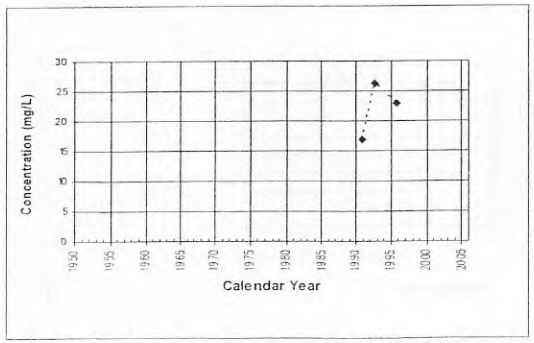
Location: SCWC-N. Oaks West County: LOS ANGELES CO



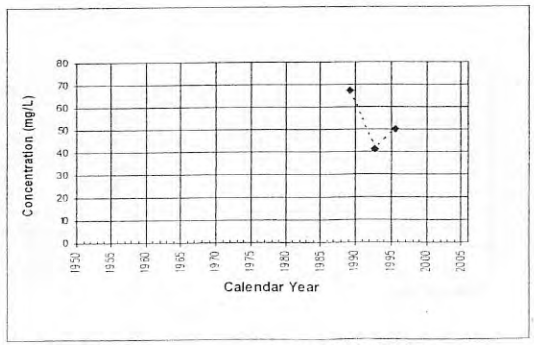
Location: SCWC-Sand Canyon County: LOS ANGELES CO



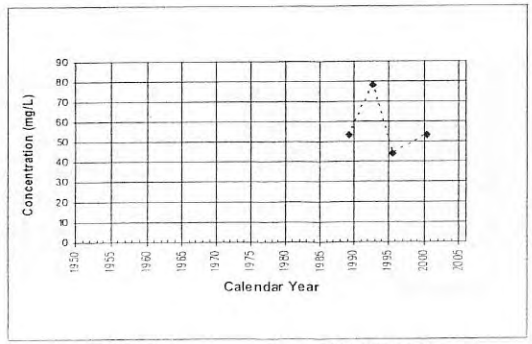
Location: SCWC-Saugus 1 County: LOS ANGELES CO



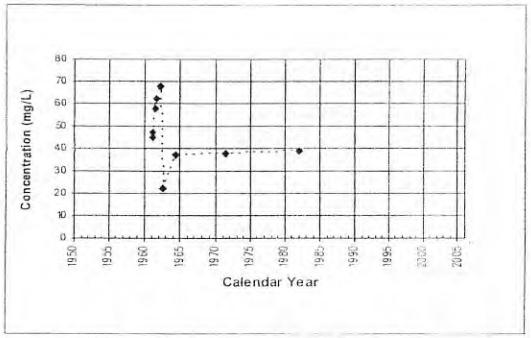
Location: SCWC-Saugus 2 County: LOS ANGELES CO



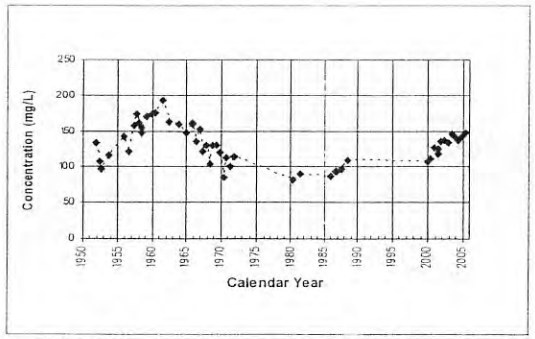
Location: SCWC-Sierra County: LOS ANGELES CO



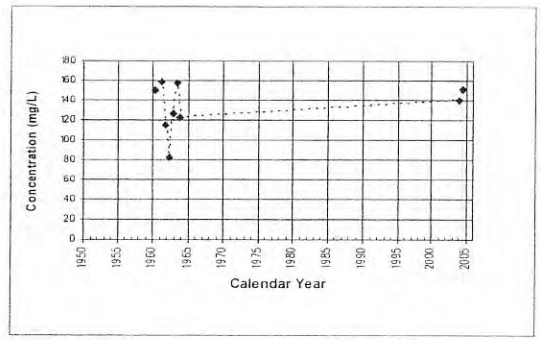
Location: SCWC-Stadium County: LOS ANGELES CO



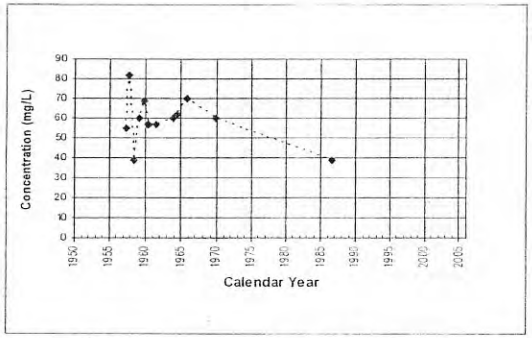
Location: V-0009 County: VENTURA CO



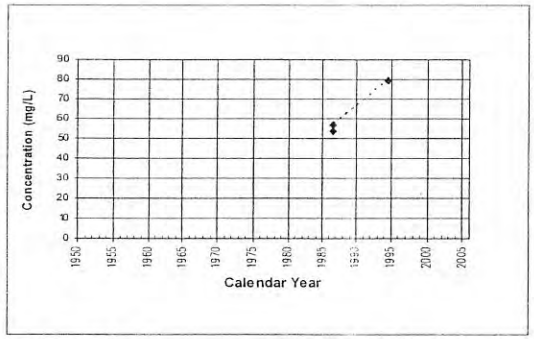
Location: V-0012 County: VENTURA CO



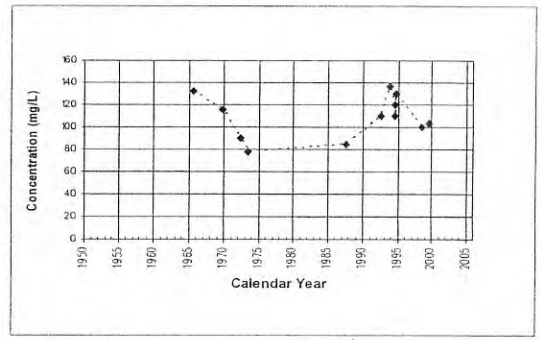
Location: V-0013 County: VENTURA CO



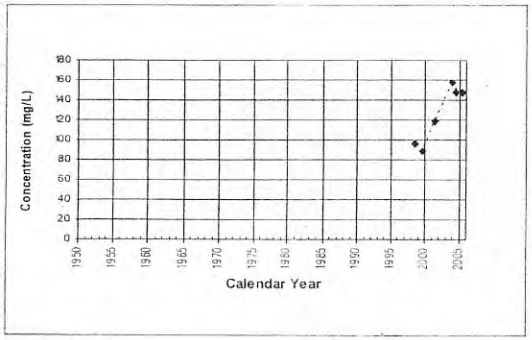
Location: V-0015 County: VENTURA CO



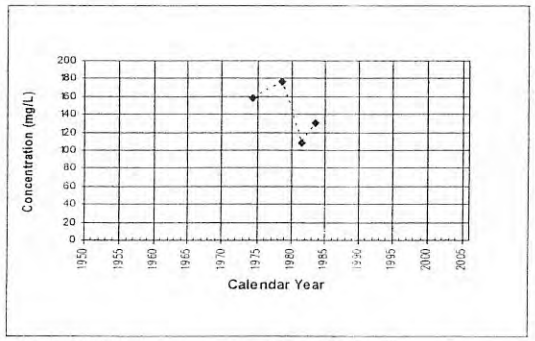
Location: V-0026 County: VENTURA CO



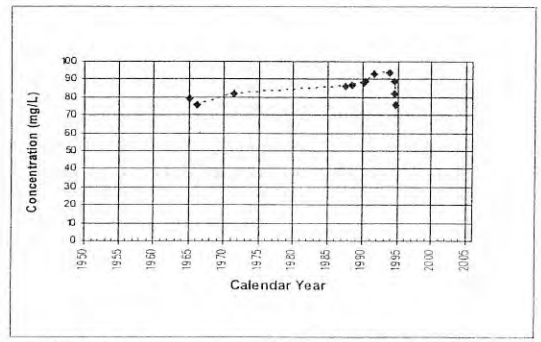
Location: V-0031 County: VENTURA CO



Location: V-0036 County: VENTURA CO

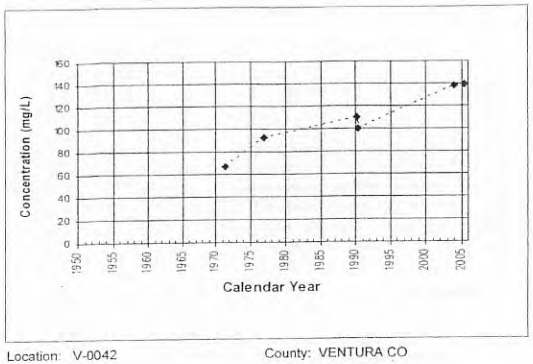


Location: V-0037 County: VENTURA CO

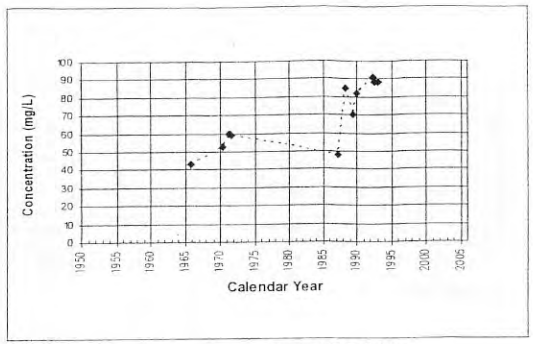


Location: V-0039 County: VENTURA CO

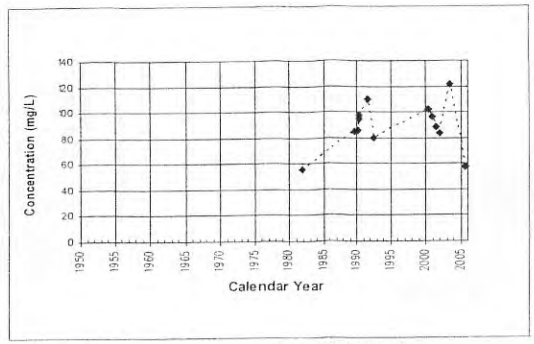
S-1302



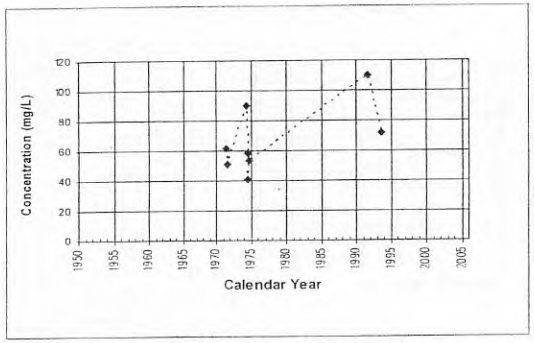
Location: V-0042 County: VENTURA CO



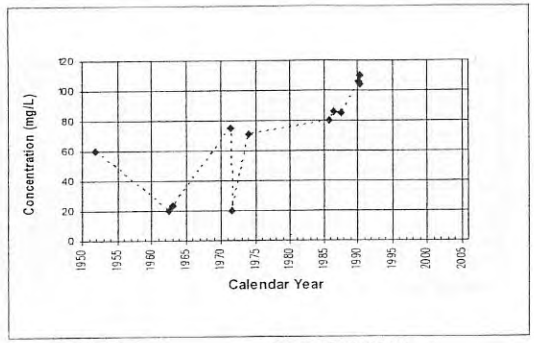
Location: V-0051 County: VENTURA CO



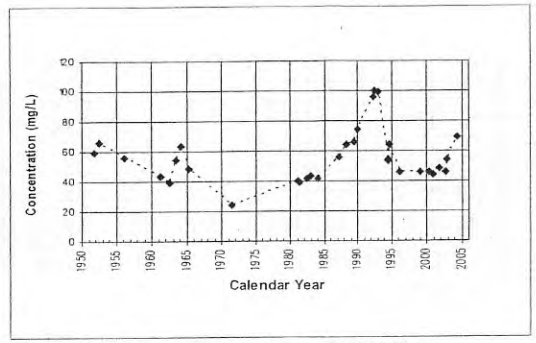
Location: V-0053 County: VENTURA CO



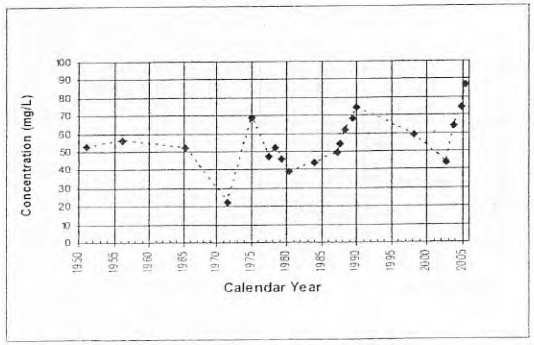
Location: V-0055 County: VENTURA CO



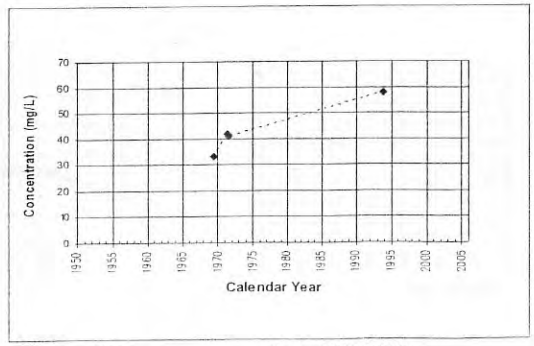
Location: V-0059 County: VENTURA CO



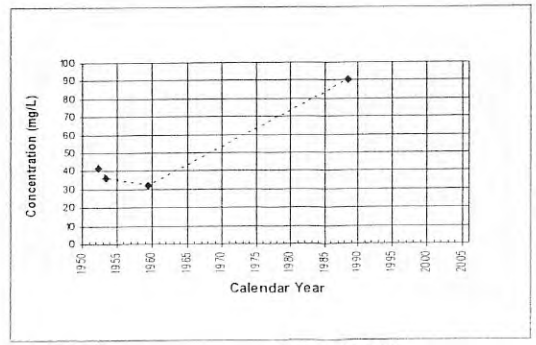
Location: V-0060 County: VENTURA CO



Location: V-0061 County: VENTURA CO

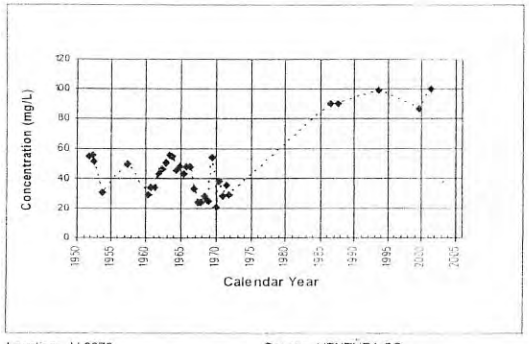


Location: V-0064 County: VENTURA CO

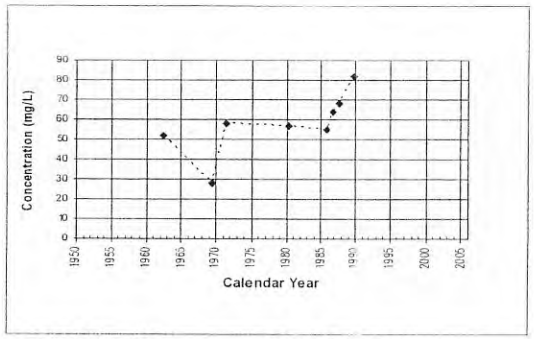


Location: V-0067 County: VENTURA CO

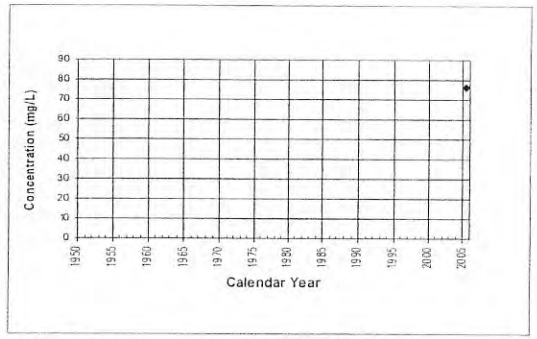
5-1353



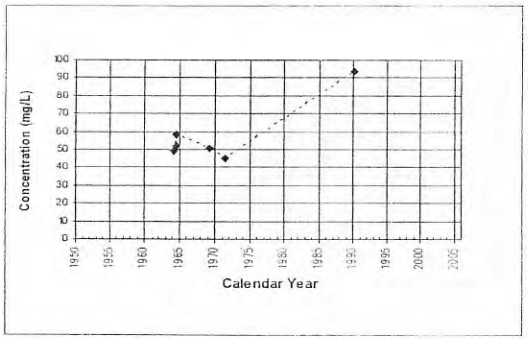
Location: V-0070 County: VENTURA CO



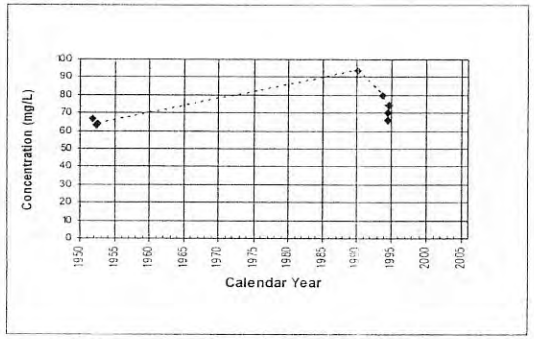
Location: V-0071 County: VENTURA CO



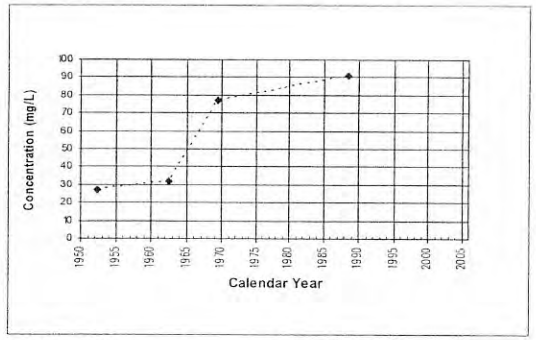
Location: V-0077 County: VENTURA CO



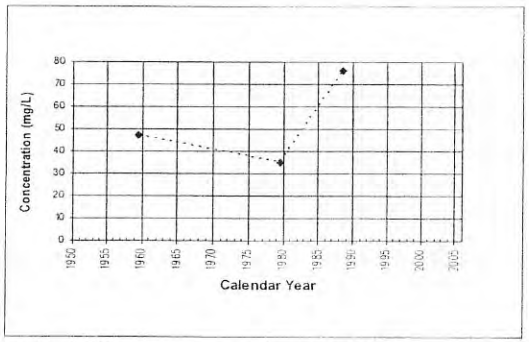
Location: V-0079 County: VENTURA CO



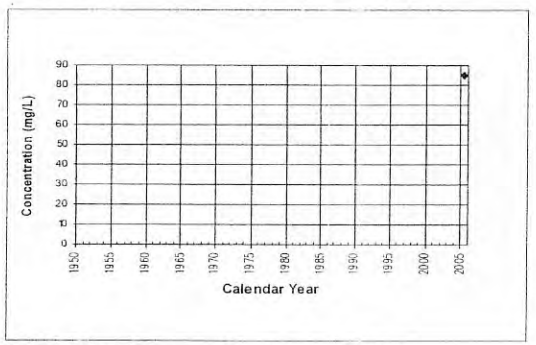
Location: V-0082 County: VENTURA CO



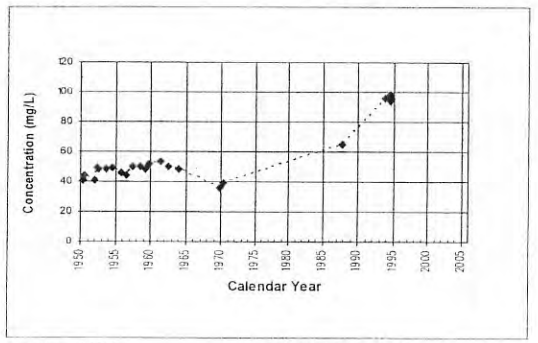
Location: V-0090 County: VENTURA CO



Location: V-0093 County: VENTURA CO

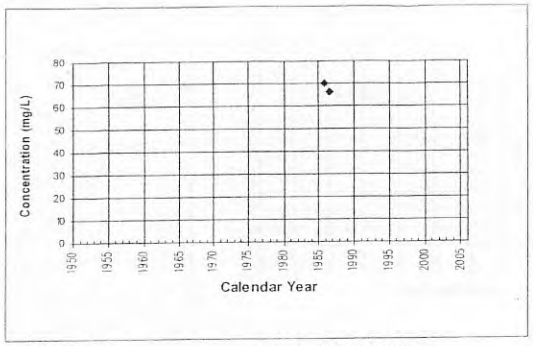


Location: V-0094 County: VENTURA CO

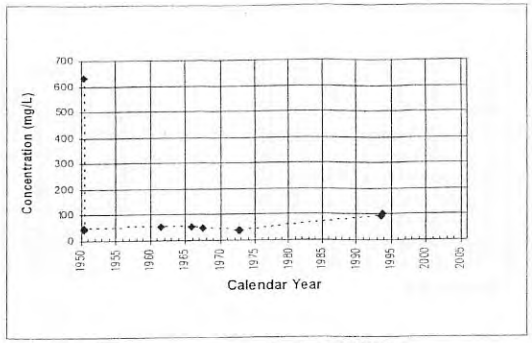


Location: V-0095 County: VENTURA CO

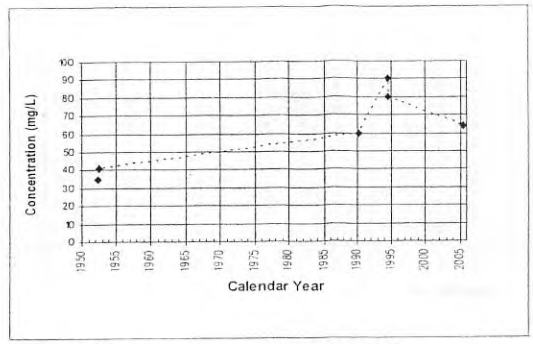
5-1384



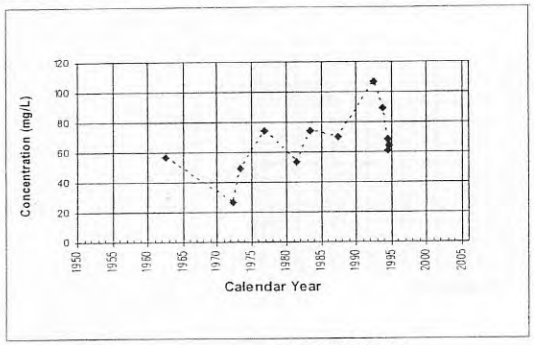
Location: V-0096 County: VENTURA CO



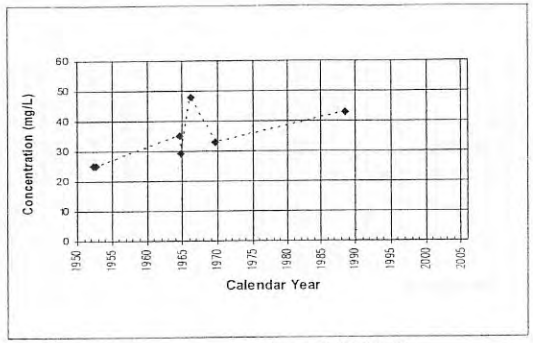
Location: V-0097 County: VENTURA CO



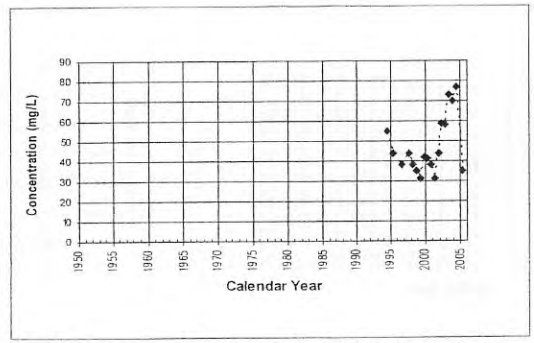
Location: V-0102 County: VENTURA CO



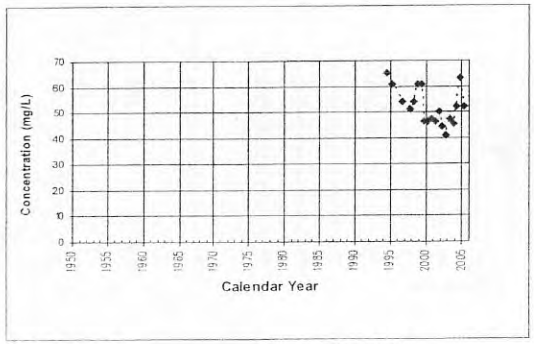
Location: V-0103 County: VENTURA CO



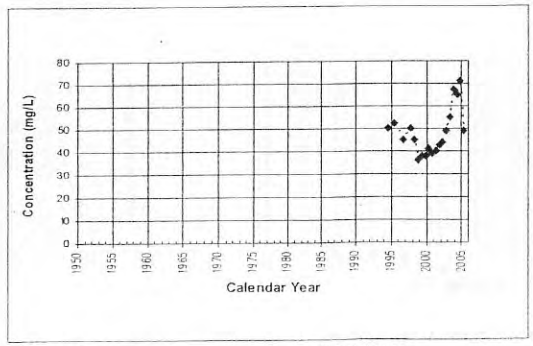
Location: V-0104 County: VENTURA CO



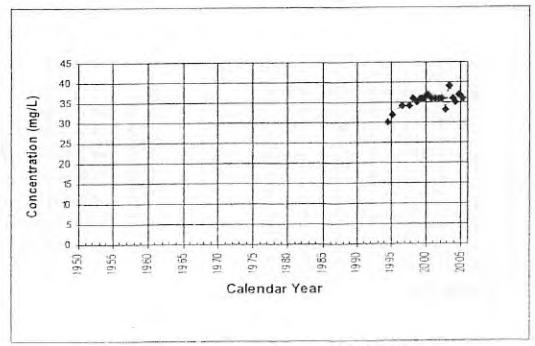
Location: V-0105 County: VENTURA CO



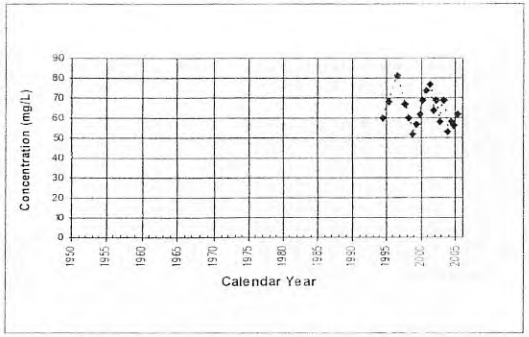
Location: V-0106 County: VENTURA CO



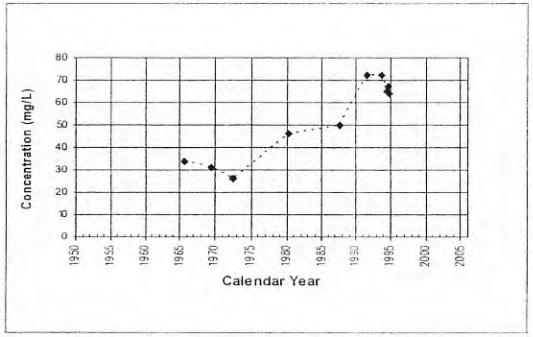
Location: V-0107 County: VENTURA CO



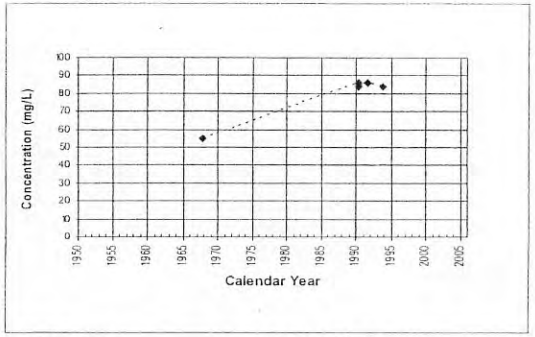
Location: V-0108 County: VENTURA CO



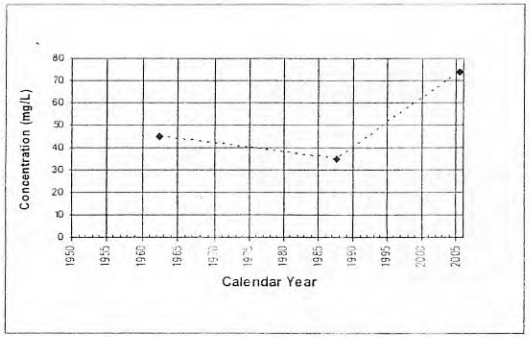
Location: V-0109 County: VENTURA CO



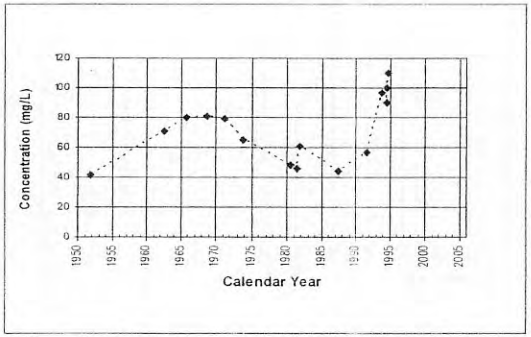
Location: V-0110 County: VENTURA CO



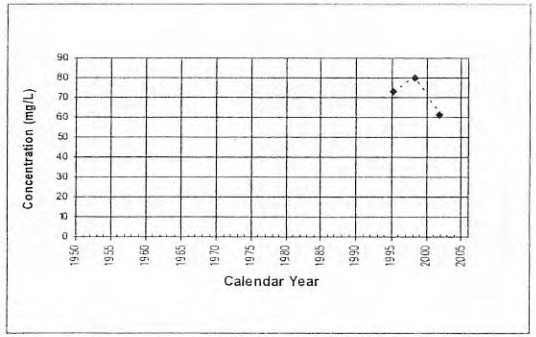
Location: V-0111 County: VENTURA CO



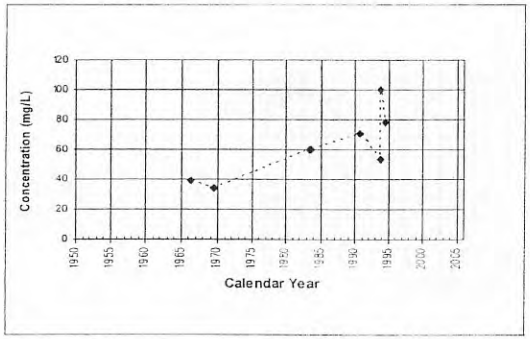
Location: V-0117 County: VENTURA CO



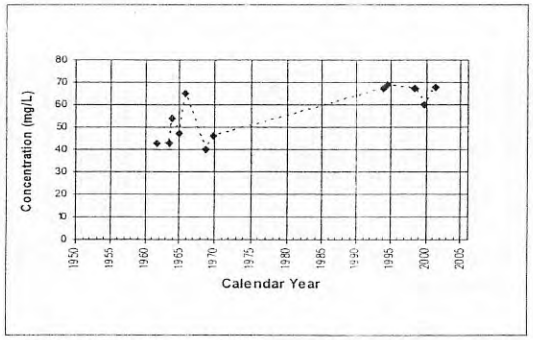
Location: V-0123 County: VENTURA CO



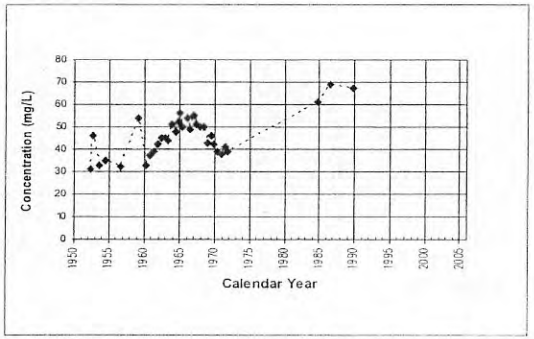
Location: V-0126 County: VENTURA CO



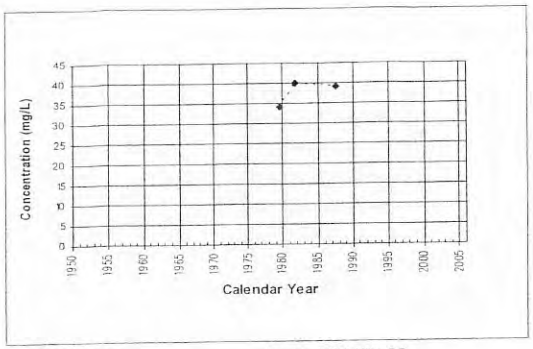
Location: V-0127 County: VENTURA CO



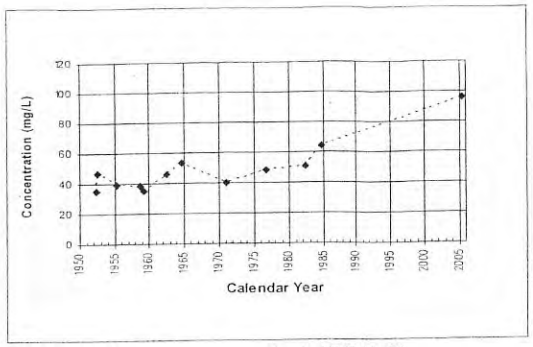
Location: V-0134 County: VENTURA CO



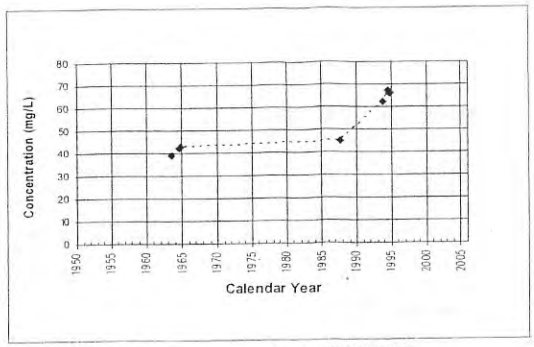
Location: V-0139 County: VENTURA CO



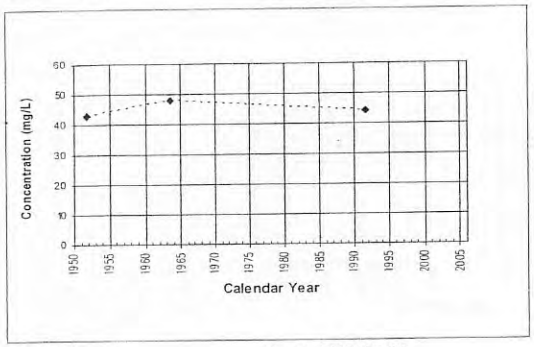
Location: V-0141 County: VENTURA CO



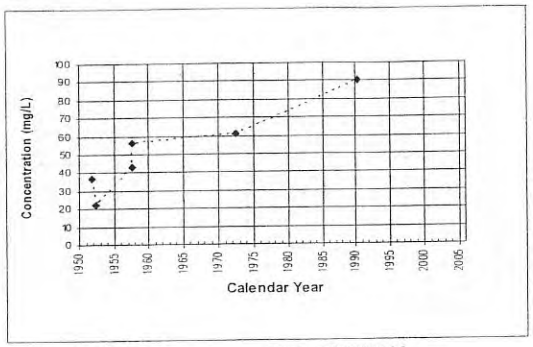
Location: V-0143 County: VENTURA CO



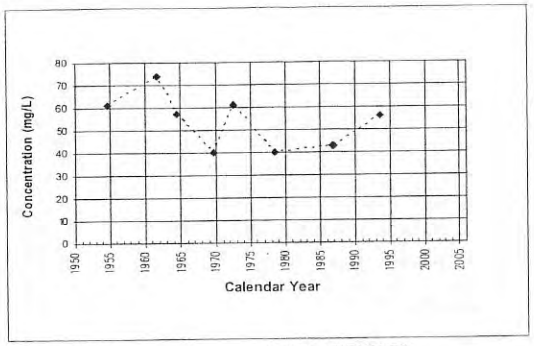
Location: V-0152 County: VENTURA CO



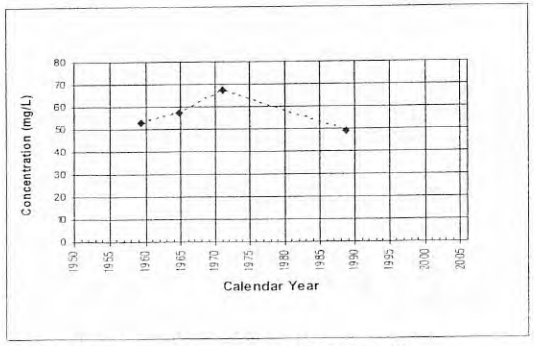
Location: V-0154 County: VENTURA CO



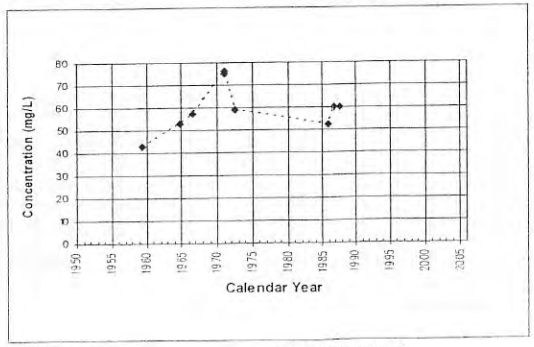
Location: V-0158 County: VENTURA CO



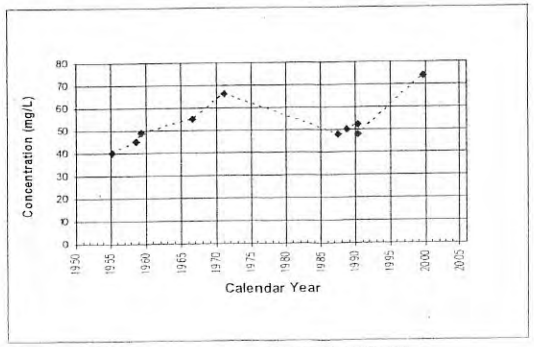
Location: V-0159 County: VENTURA CO



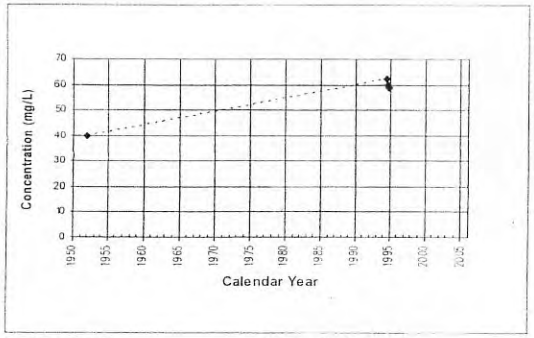
Location: V-0160 County: VENTURA CO



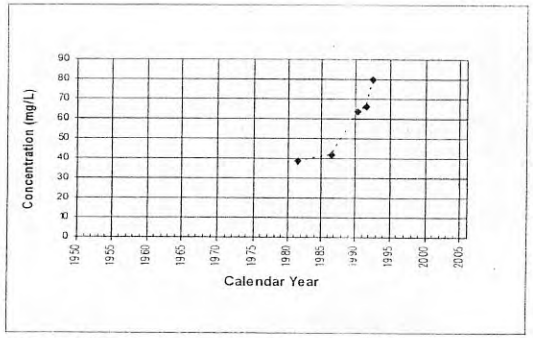
Location: V-0161 County: VENTURA CO



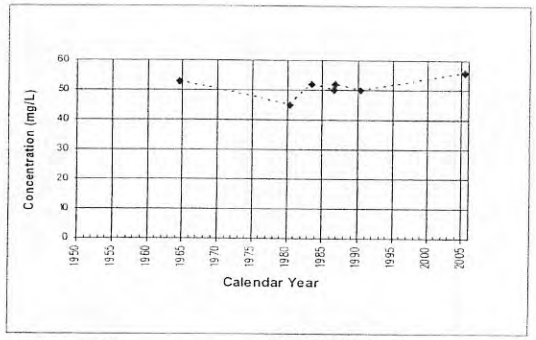
Location: V-0162 County: VENTURA CO



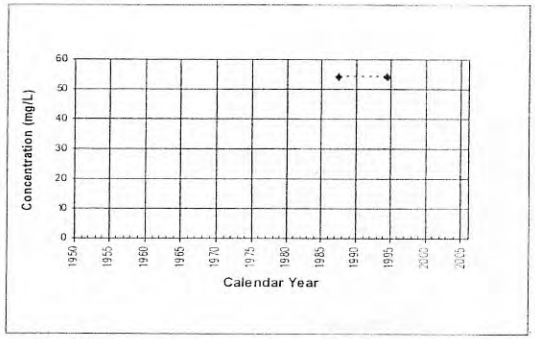
Location: V-0164 County: VENTURA CO



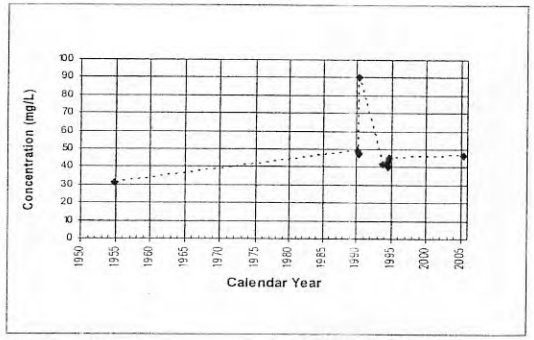
Location: V-0165 County: VENTURA CO



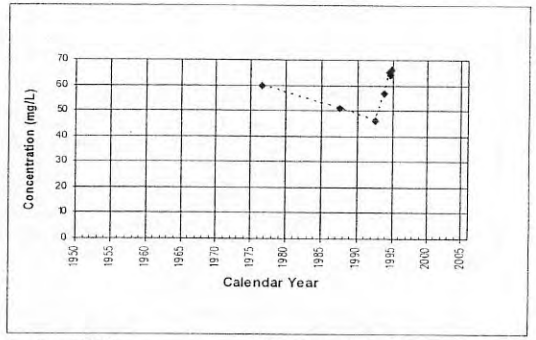
Location: V-0168 County: VENTURA CO



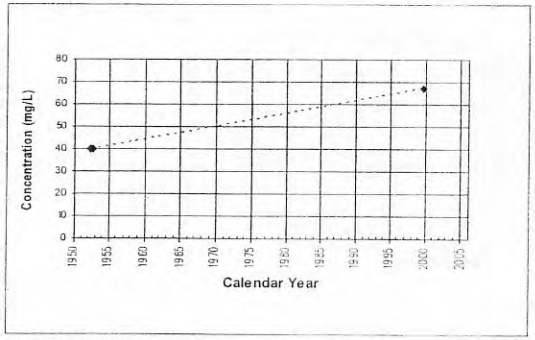
Location: V-0175 County: VENTURA CO



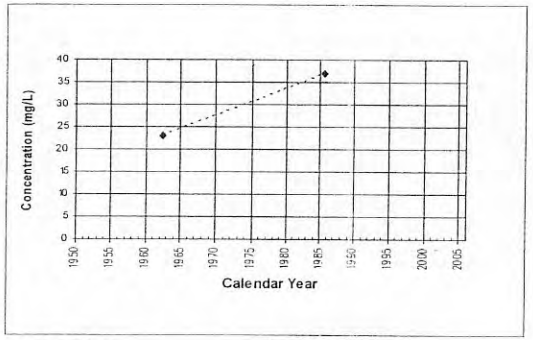
Location: V-0176 County: VENTURA CO



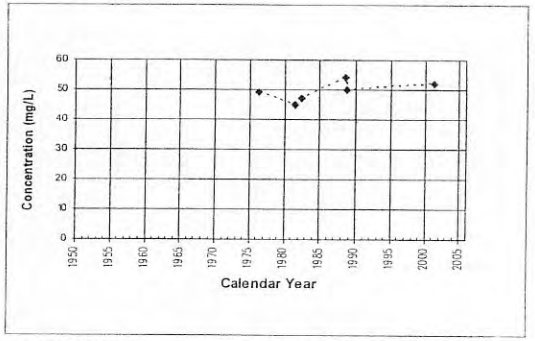
Location: V-0178 County: VENTURA CO



Location: V-0181 County: VENTURA CO

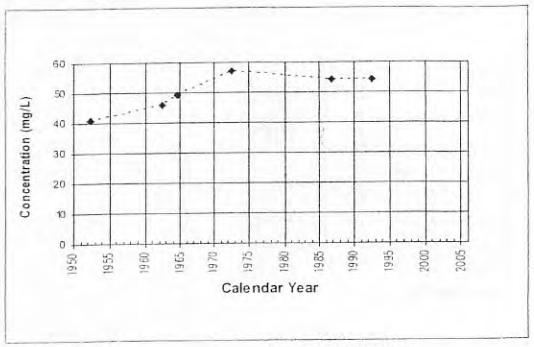


Location: V-0182 County: VENTURA CO

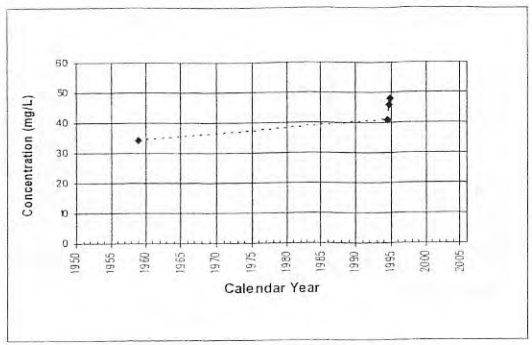


Location: V-0184 County: VENTURA CO

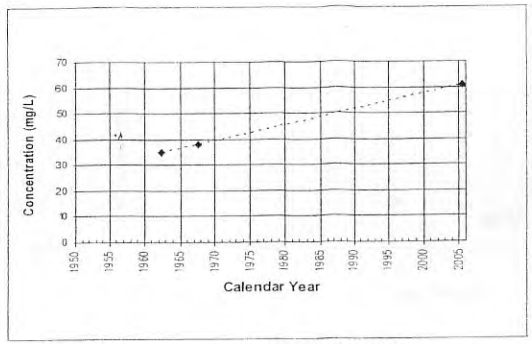
5-1388



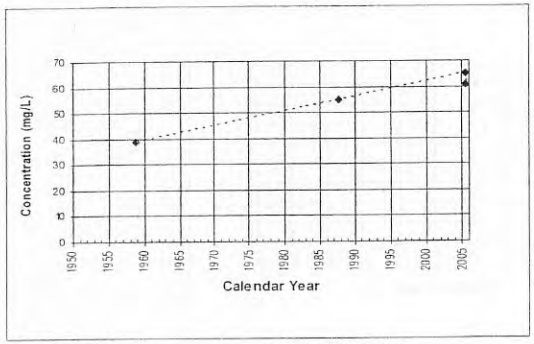
Location: V-0185 County: VENTURA CO



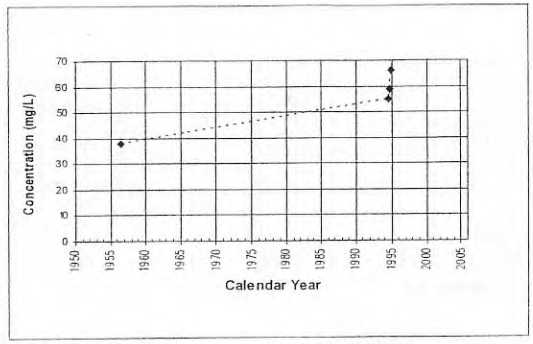
Location: V-0186 County: VENTURA CO



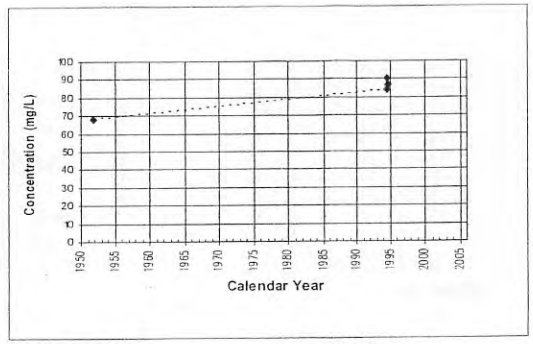
Location: V-0193 County: VENTURA CO



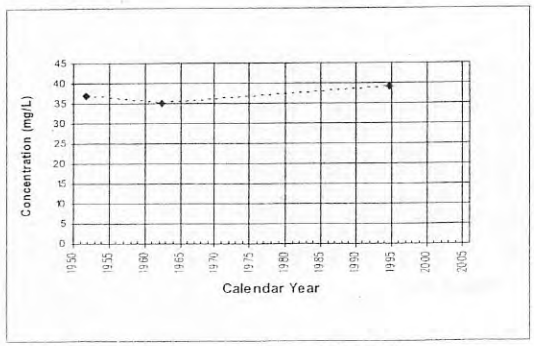
Location: V-0199 County: VENTURA CO



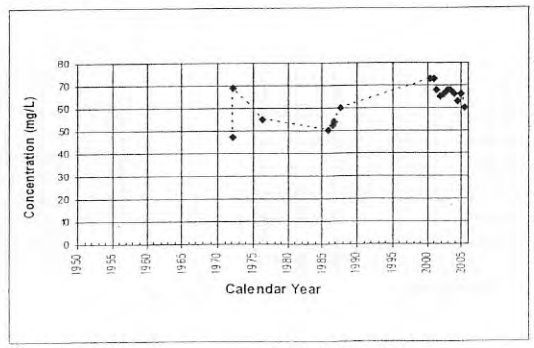
Location: V-0200 County: VENTURA CO



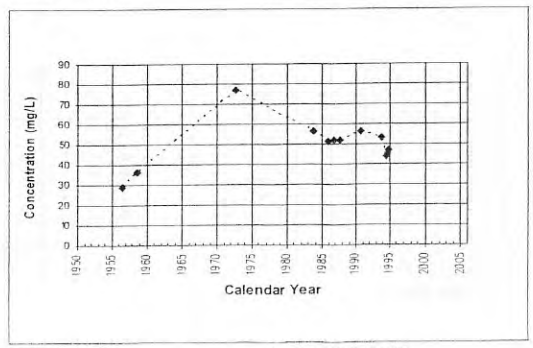
Location: V-0206 County: VENTURA CO



Location: V-0214 County: VENTURA CO

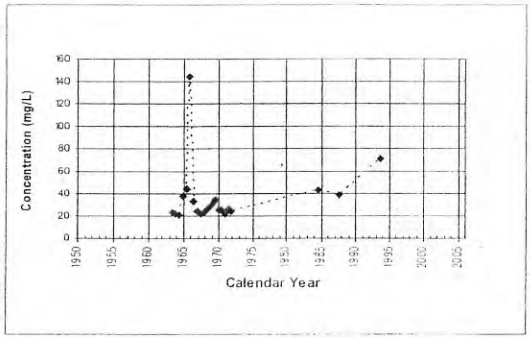


Location: V-0216 County: VENTURA CO

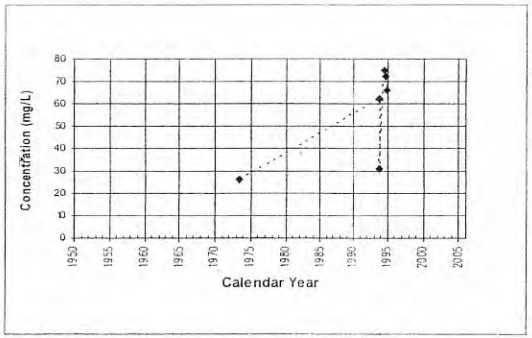


Location: V-0219 County: VENTURA CO

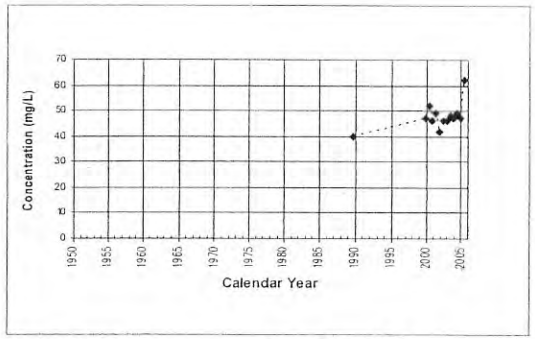
5-1303



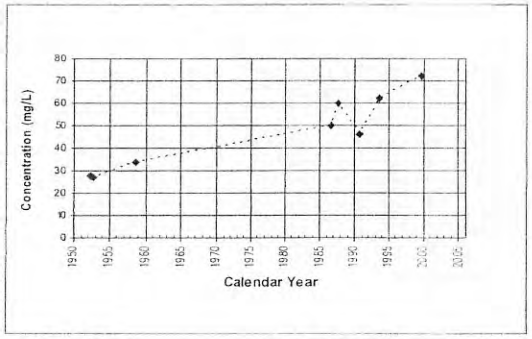
Location: V-0229 County: VENTURA CO



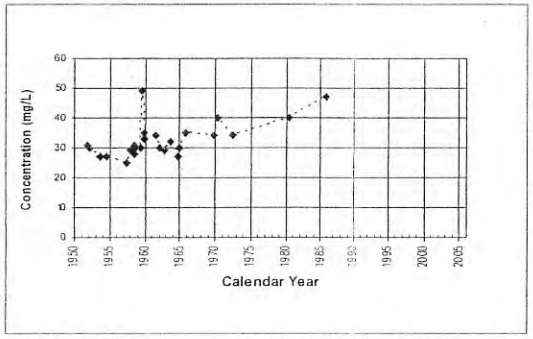
Location: V-0231 County: VENTURA CO



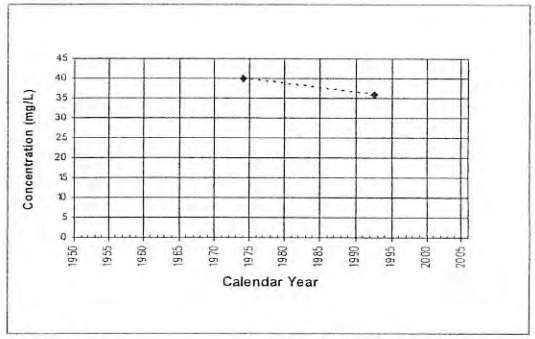
Location: V-0233 County: VENTURA CO



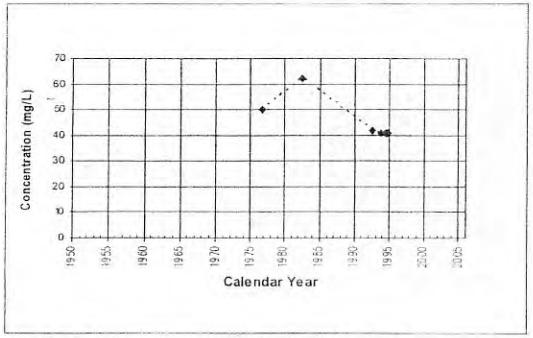
Location: V-0237 County: VENTURA CO



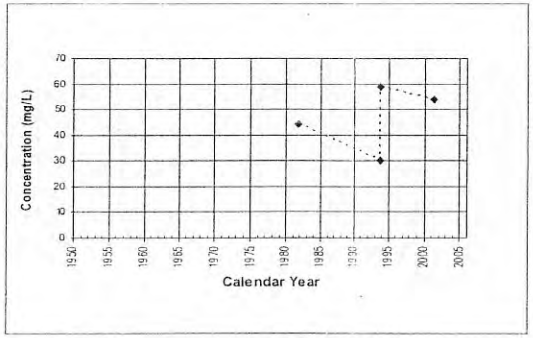
Location: V-0238 County: VENTURA CO



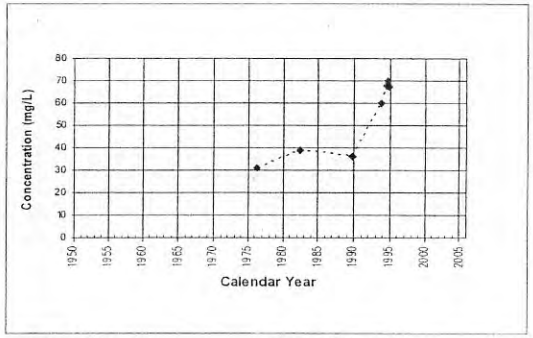
Location: V-0242 County: VENTURA CO



Location: V-0243 County: VENTURA CO

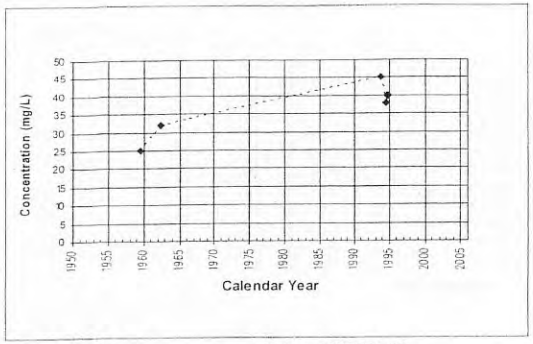


Location: V-0244 County: VENTURA CO

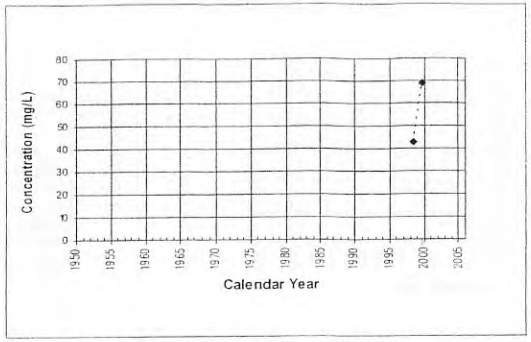


Location: V-0248 County: VENTURA CO

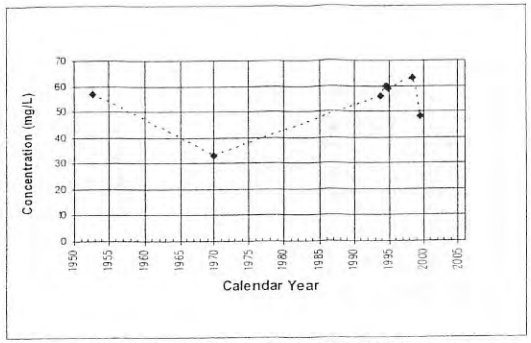
5-1314



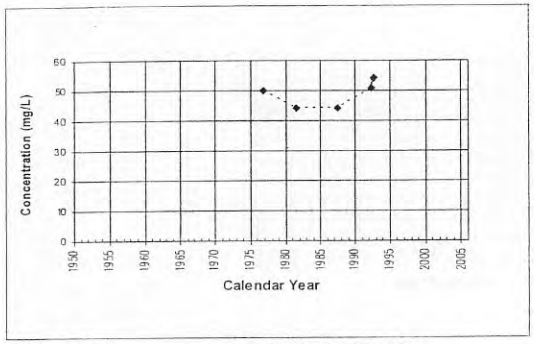
Location: V-0281 County: VENTURA CO



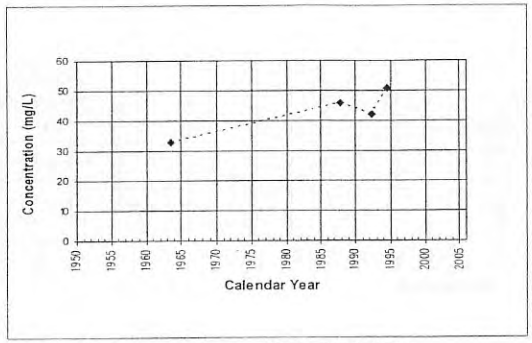
Location: V-0284 County: VENTURA CO



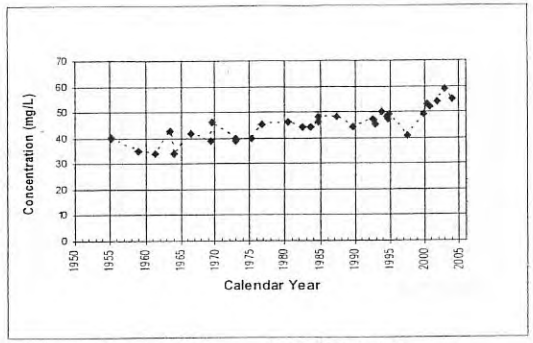
Location: V-0296 County: VENTURA CO



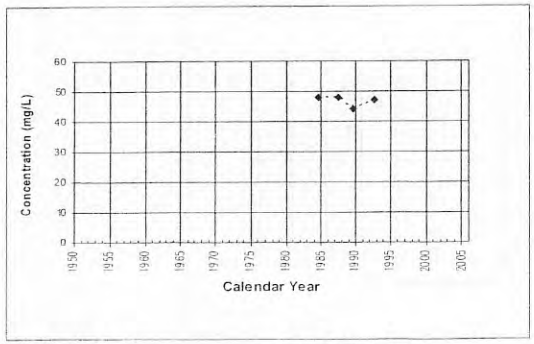
Location: V-0302 County: VENTURA CO



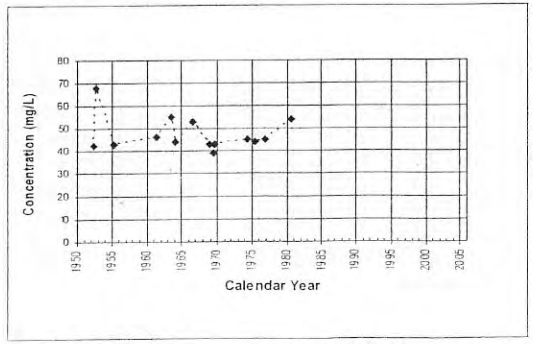
Location: V-0308 County: VENTURA CO



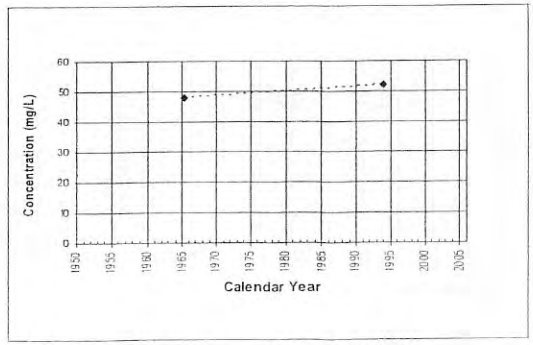
Location: V-0309 County: VENTURA CO



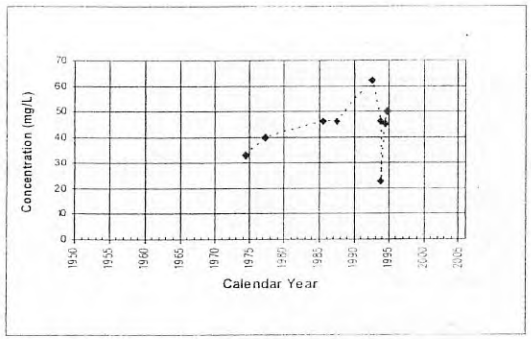
Location: V-0310 County: VENTURA CO



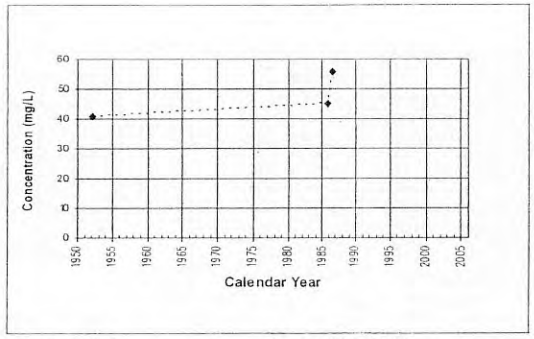
Location: V-0314 County: VENTURA CO



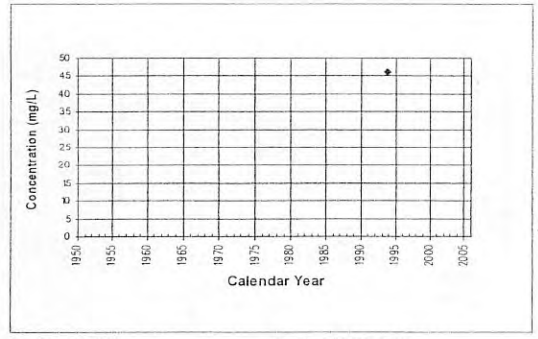
Location: V-0317 County: VENTURA CO



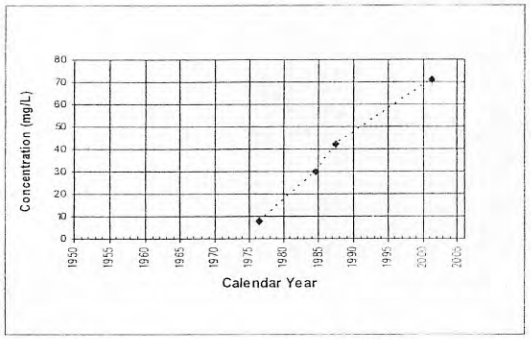
Location: V-0322 County: VENTURA CO



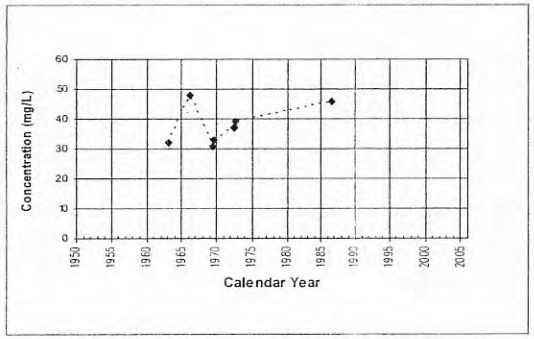
Location: V-0327 County: VENTURA CO



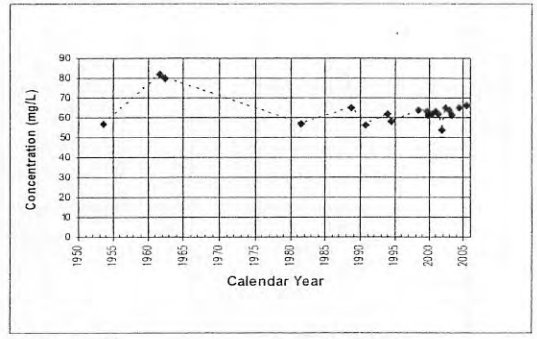
Location: V-0329 County: VENTURA CO



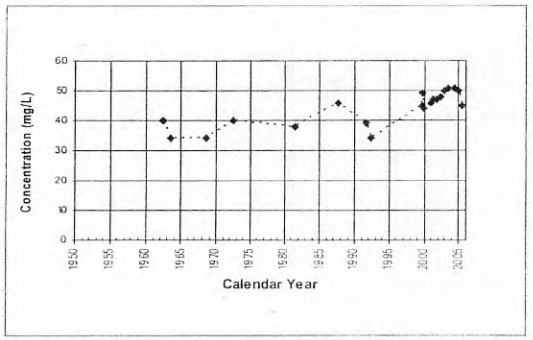
Location: V-0332 County: VENTURA CO



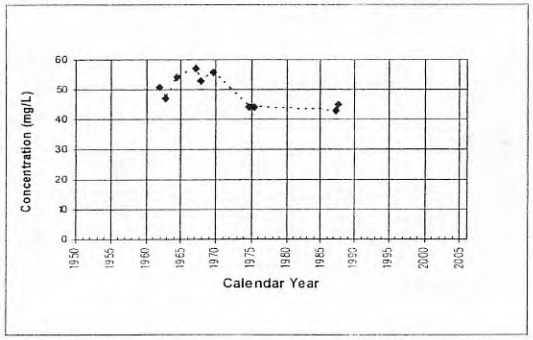
Location: V-0333 County: VENTURA CO



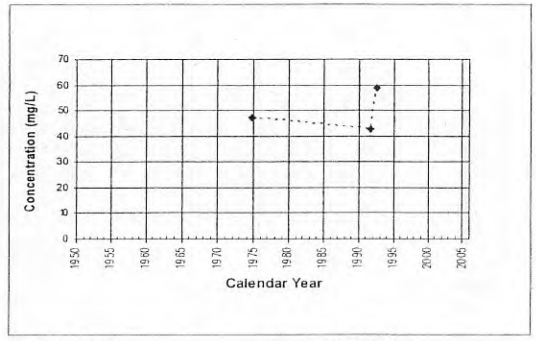
Location: V-0340 County: VENTURA CO



Location: V-0342 County: VENTURA CO

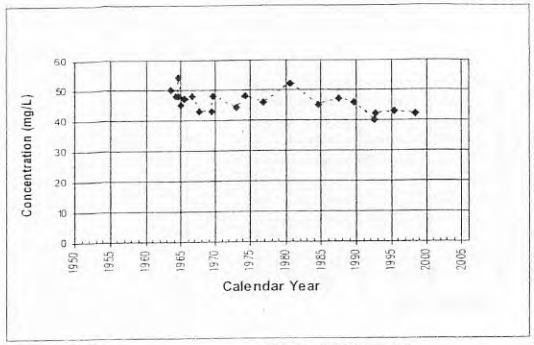


Location: V-0350 County: VENTURA CO

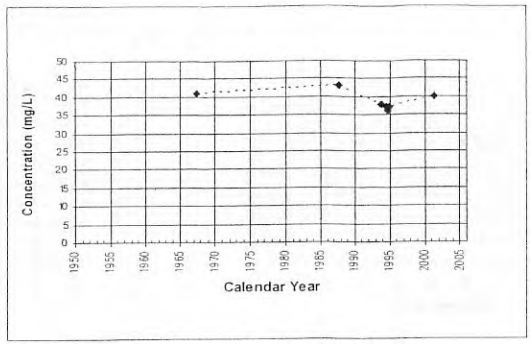


Location: V-0352 County: VENTURA CO

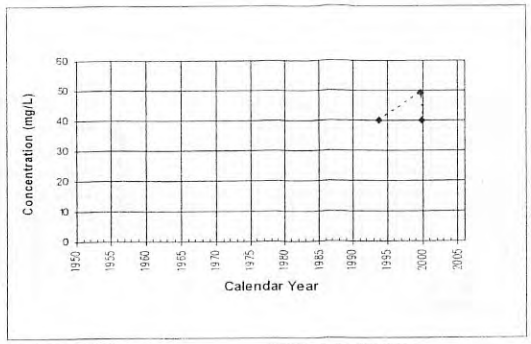
5-1812



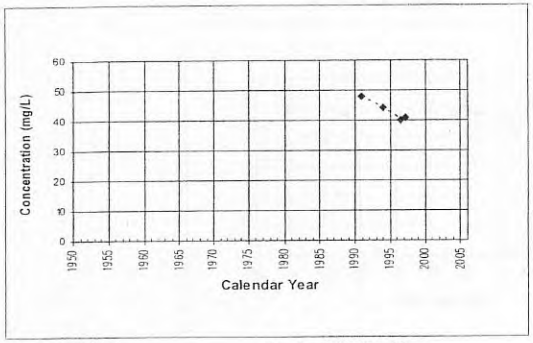
Location: V-0360 County: VENTURA CO



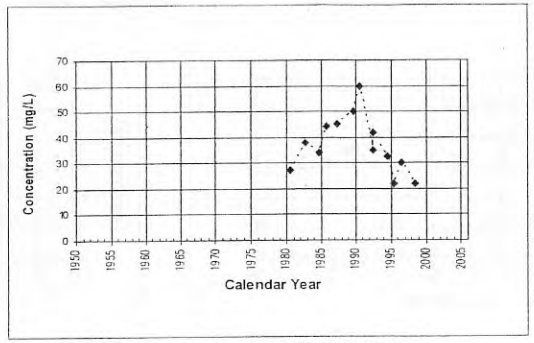
Location: V-0362 County: VENTURA CO



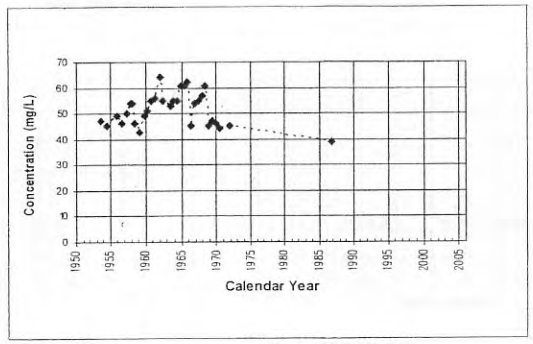
Location: V-0372 County: VENTURA CO



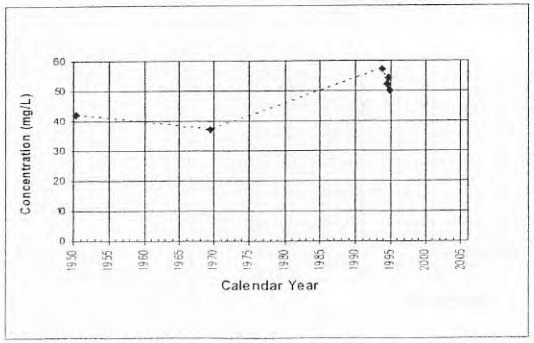
Location: V-0392 County: VENTURA CO



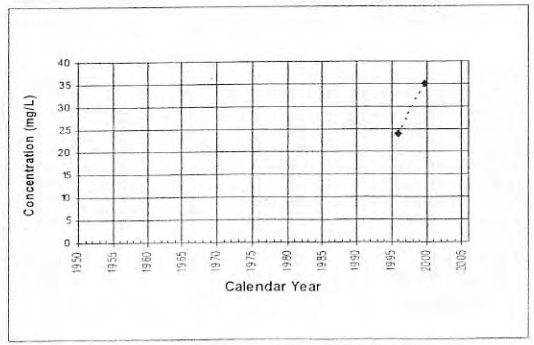
Location: V-0393 County: VENTURA CO



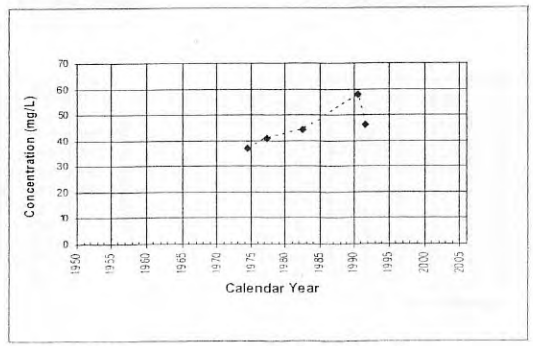
Location: V-0406 County: VENTURA CO



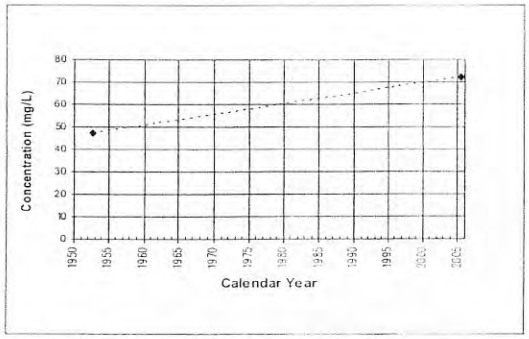
Location: V-0421 County: VENTURA CO



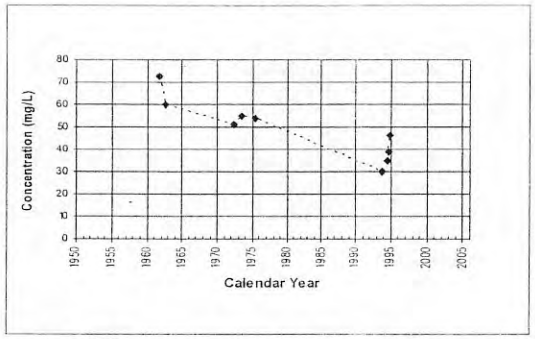
Location: V-0438 County: VENTURA CO



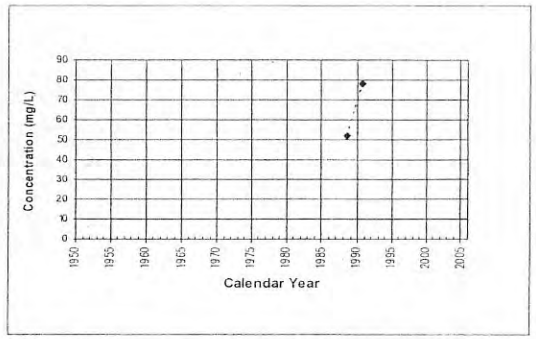
Location: V-0446 County: VENTURA CO



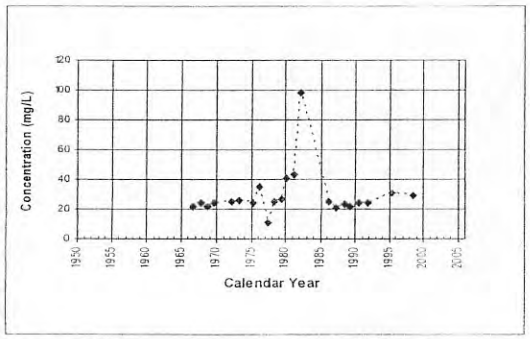
Location: V-0447 County: VENTURA CO



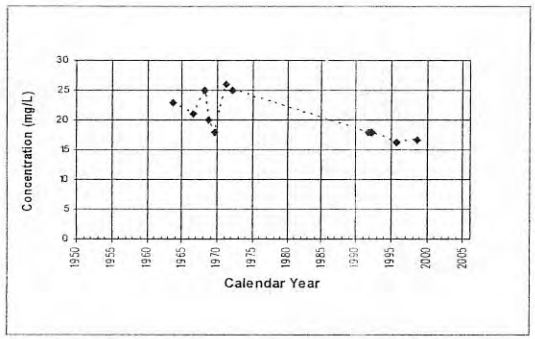
Location: V-0473 County: VENTURA CO



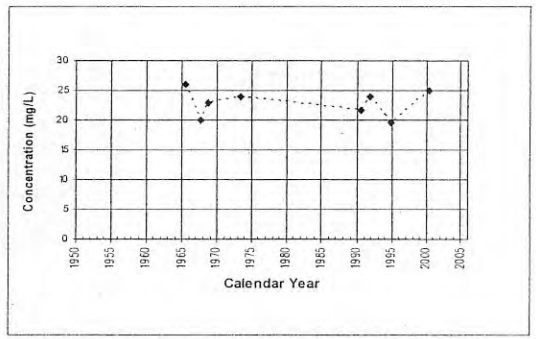
Location: V-0499 County: VENTURA CO



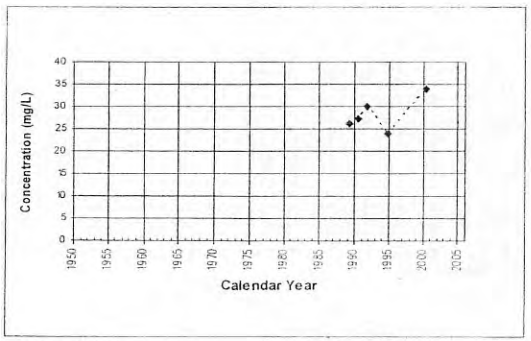
Location: VWC-157 County: LOS ANGELES CO



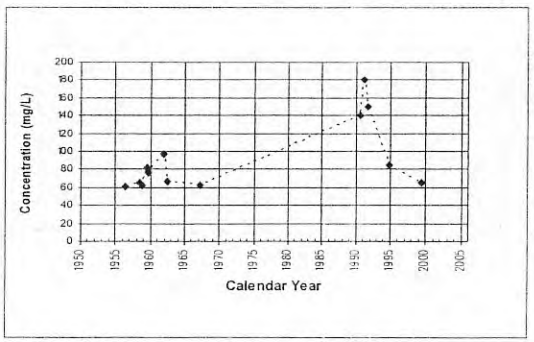
Location: VWC-159 County: LOS ANGELES CO



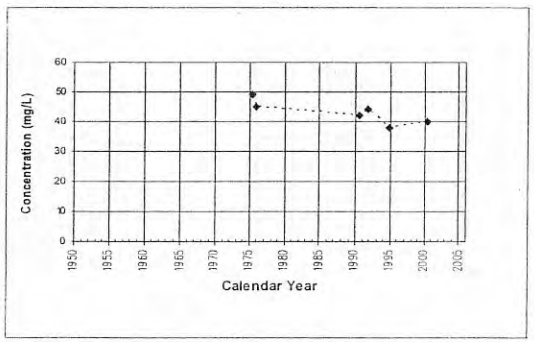
Location: VWC-160 County: LOS ANGELES CO



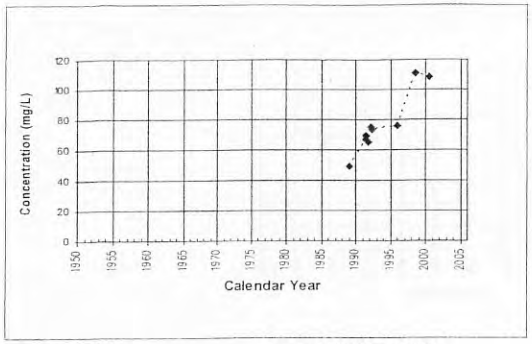
Location: VWC-201 County: LOS ANGELES CO



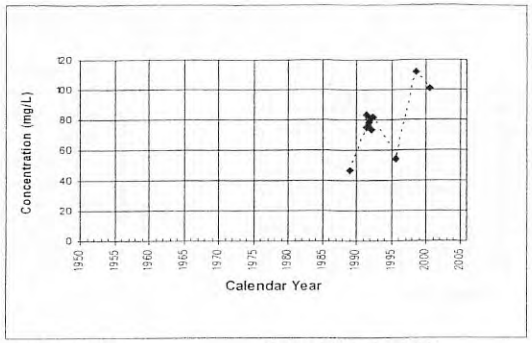
Location: VWC-D County: LOS ANGELES CO



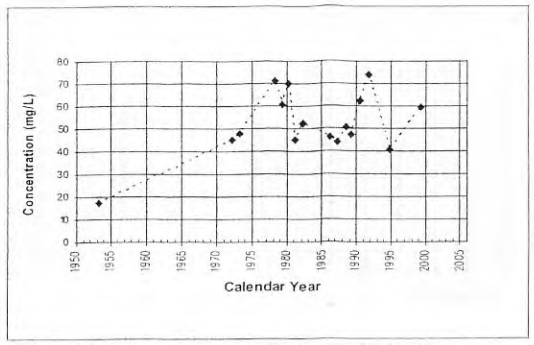
Location: VWC-I County: LOS ANGELES CO



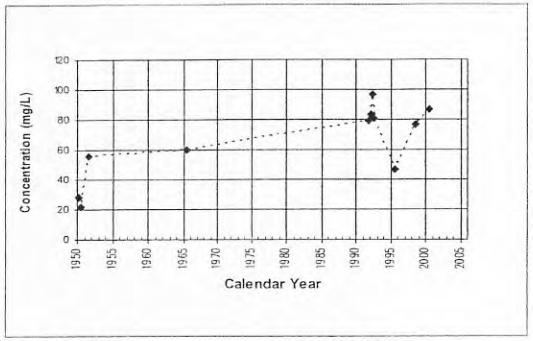
Location: VWC-K2 County: LOS ANGELES CO



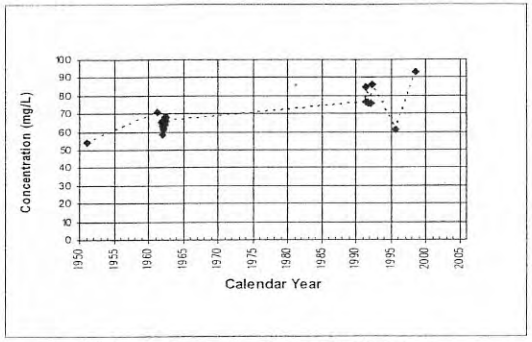
Location: VWC-L2 County: LOS ANGELES CO



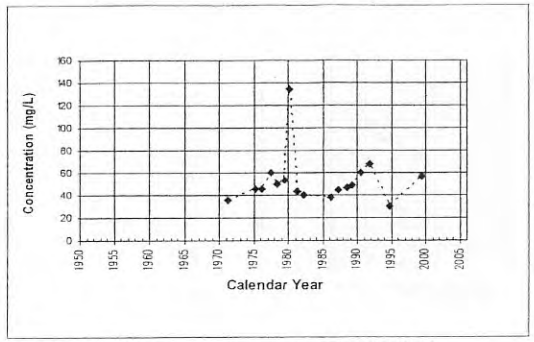
Location: VWC-N County: LOS ANGELES CO



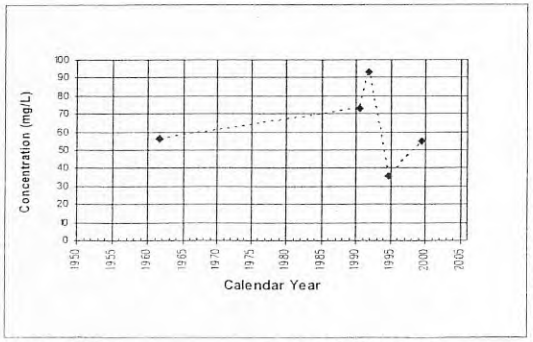
Location: VWC-N3 County: LOS ANGELES CO



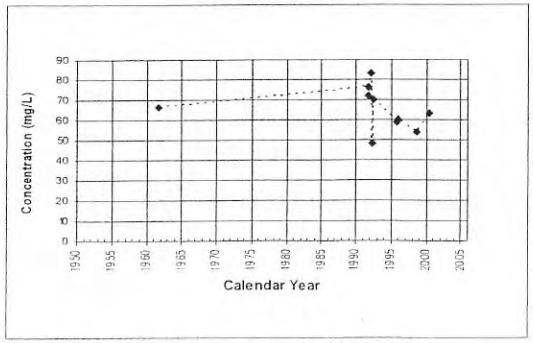
Location: VWC-N4 County: LOS ANGELES CO



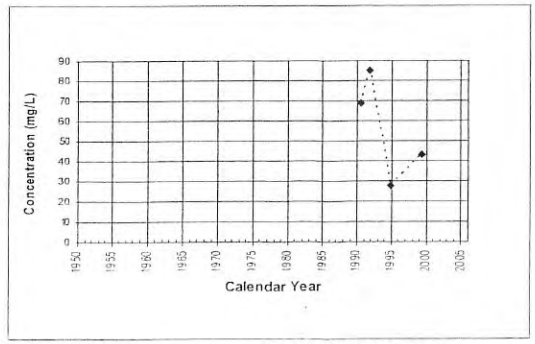
Location: VWC-Q2 County: LOS ANGELES CO



Location: VWC-T2 County: LOS ANGELES CO

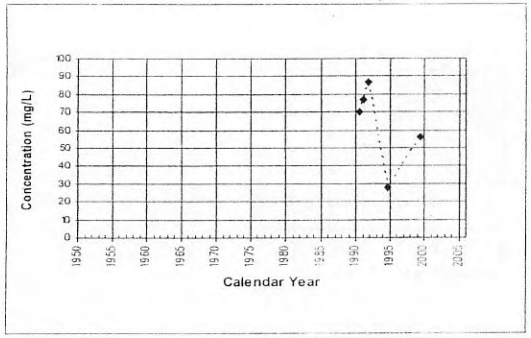


Location: VWC-T4 County: LOS ANGELES CO

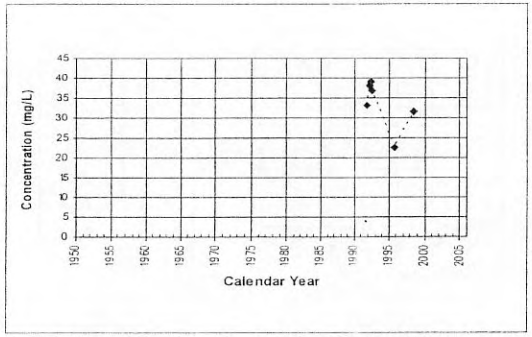


Location: VWC-U3 County: LOS ANGELES CO

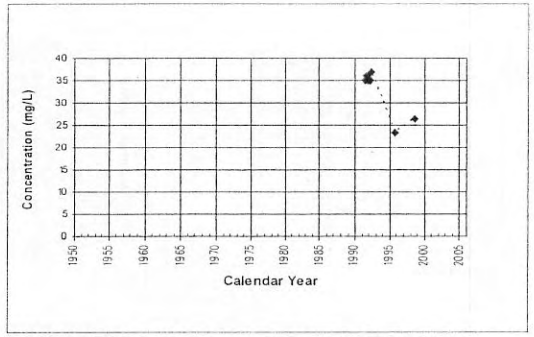
5-10-15



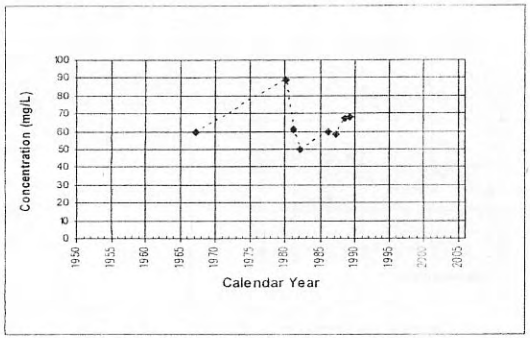
Location: VWC-U4 County: LOS ANGELES CO



Location: VWC-W6 County: LOS ANGELES CO

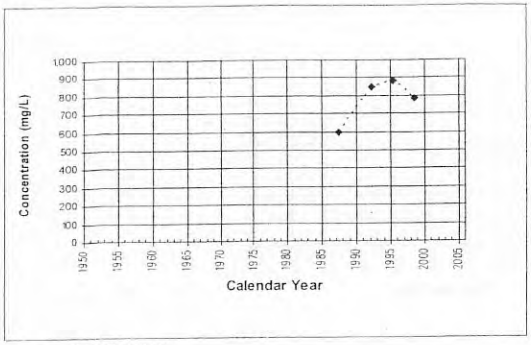


Location: VWC-W9 County: LOS ANGELES CO

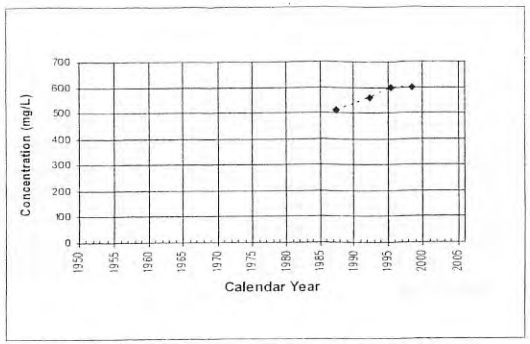


Location: WHR-18 - Old County: LOS ANGELES CO

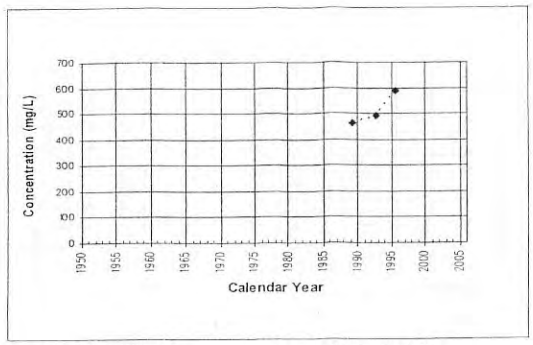
S-1916



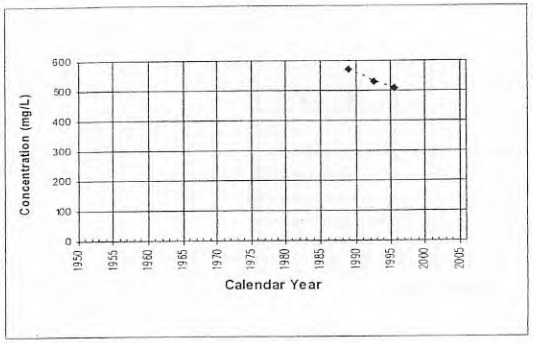
Location: 03N16W02J03S



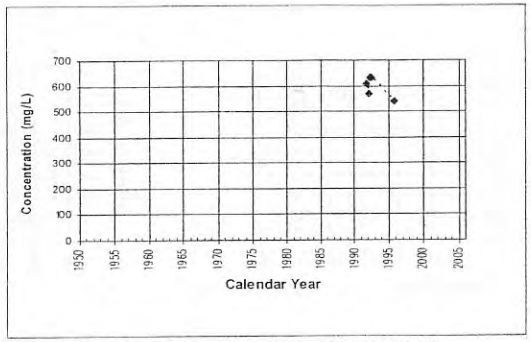
Location: 03N16W02R01S County: LOS ANGELES CO



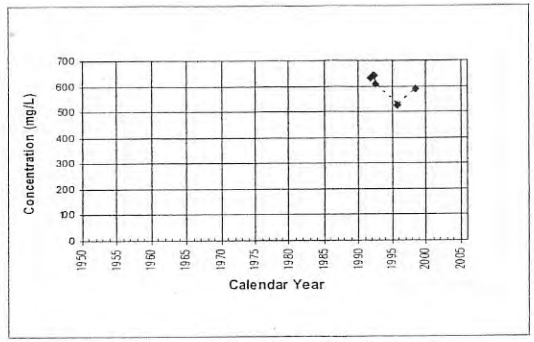
Location: 04N15W06P01S County: LOS ANGELES CO



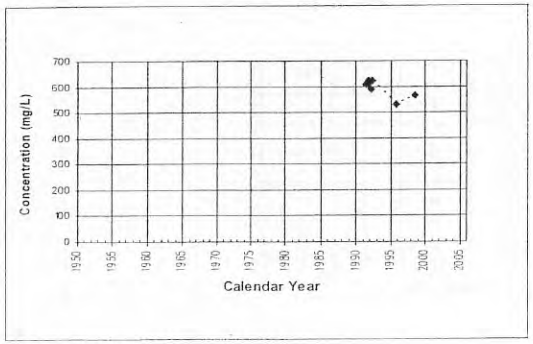
Location: 04N15W18N03S



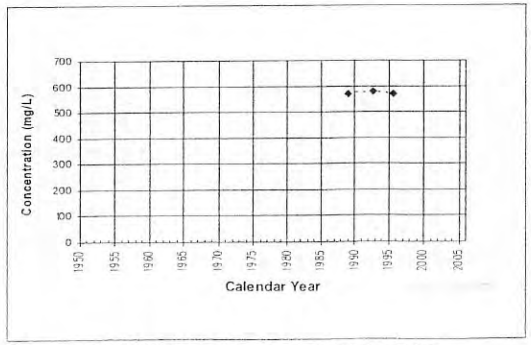
Location: 04N16W04H01S County: LOS ANGELES CO



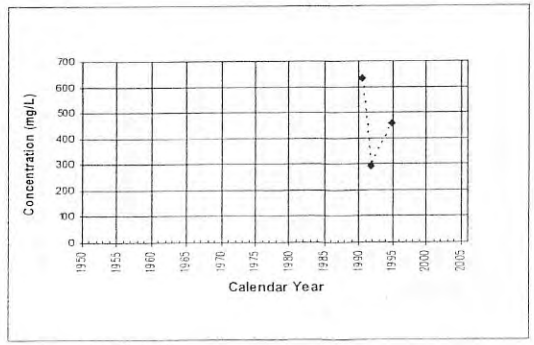
Location: 04N16W09H02S County: LOS ANGELES CO



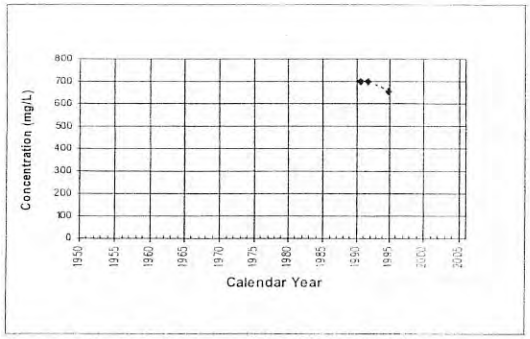
Location: 04N16W09Q03S



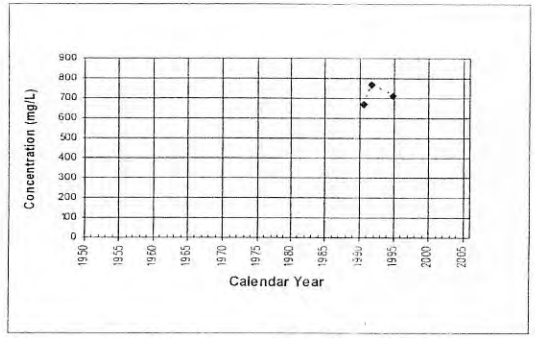
Location: 04N16W12N02S County: LOS ANGELES CO



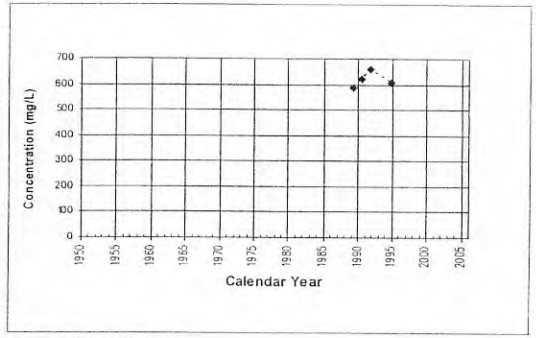
Location: 04N16W15R02S



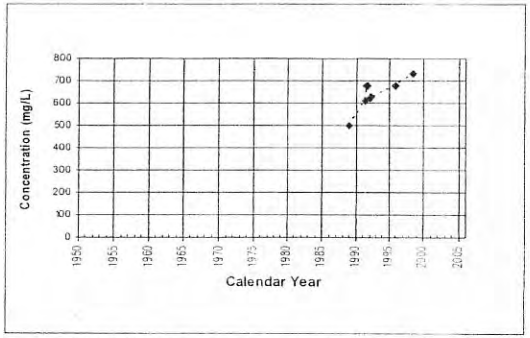
Location: 04N16W17A05S County: LOS ANGELES CO



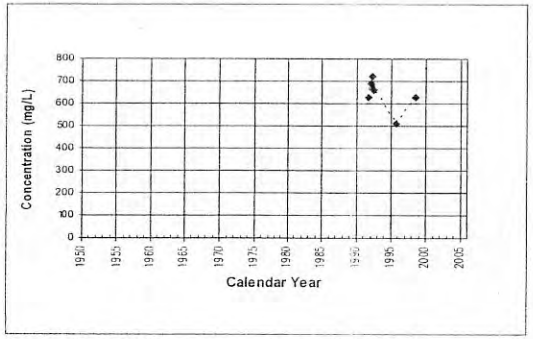
Location: 04N16W21D01S County: LOS ANGELES CO



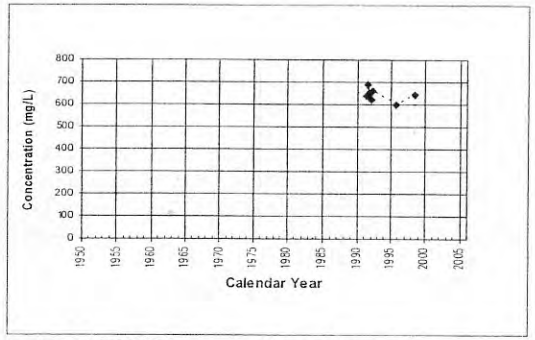
Location: 04N16W21J01S



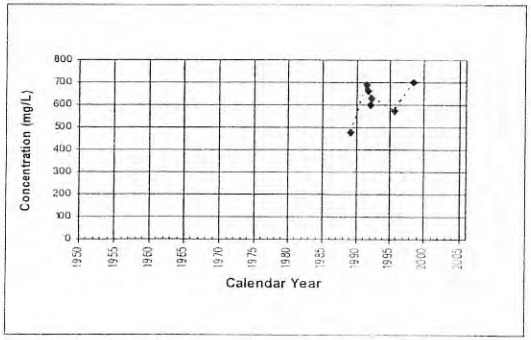
Location: 04N16W22C01S County: LOS ANGELES CO



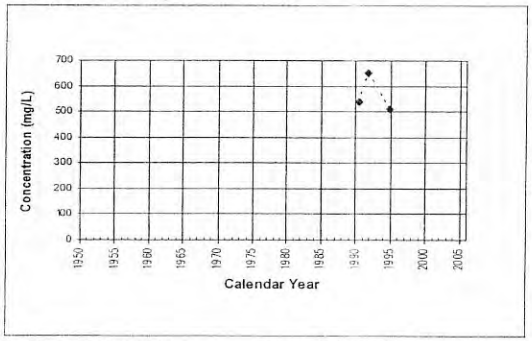
Location: 04N16W22C03S County: LOS ANGELES CO



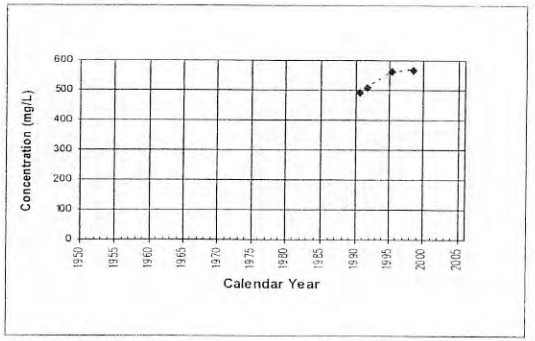
Location: 04N16W22C04S County: LOS ANGELES CO



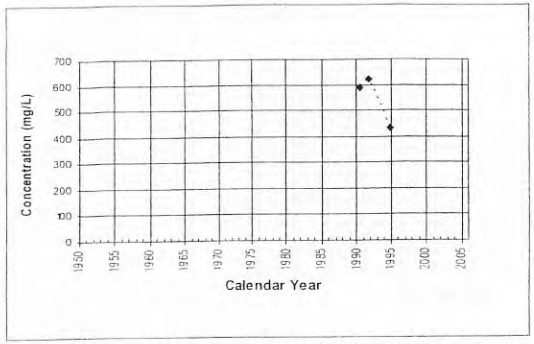
Location: 04N16W22C07S County: LOS ANGELES CO



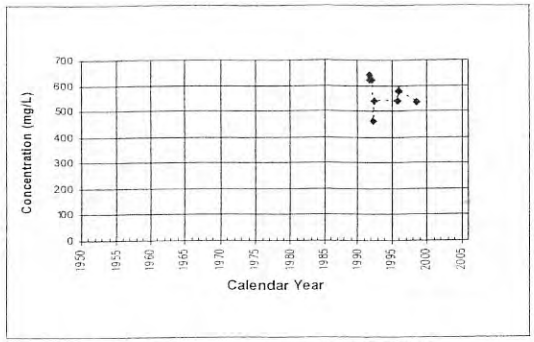
Location: 04N16W22D02S County: LOS ANGELES CO



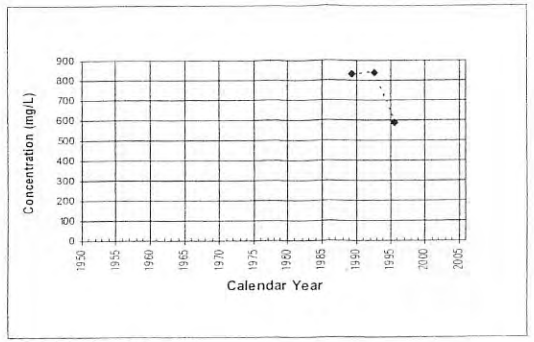
Location: 04N16W22M01S County: LOS ANGELES CO



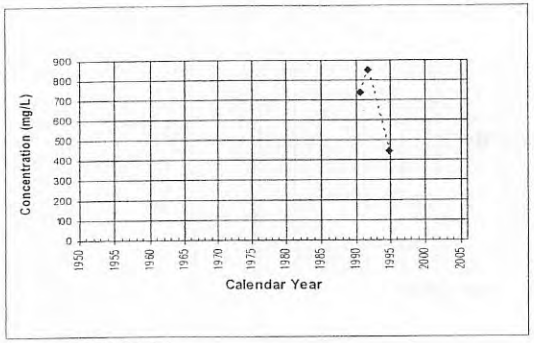
Location: 04N16W23A01S County: LOS ANGELES CO



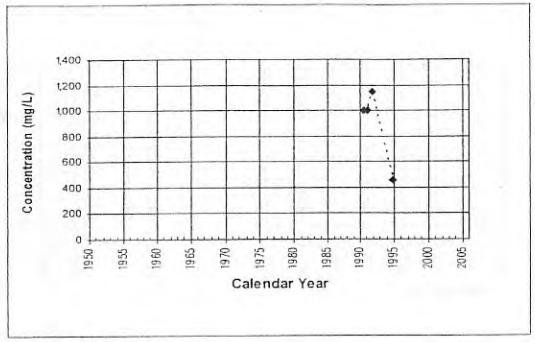
Location: 04N16W23A02S County: LOS ANGELES CO



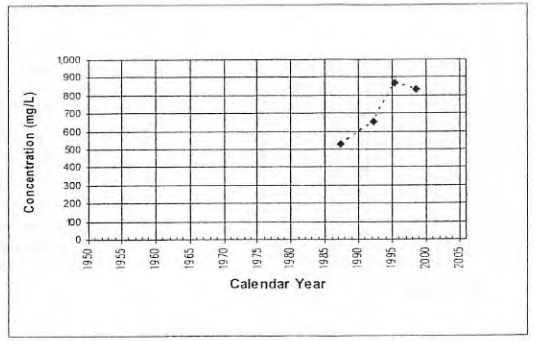
Location: 04N16W23F01S



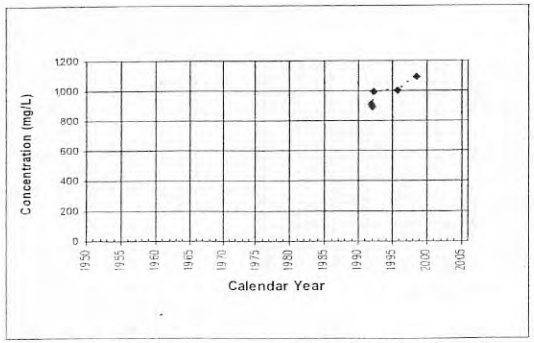
Location: 04N16W24A06S



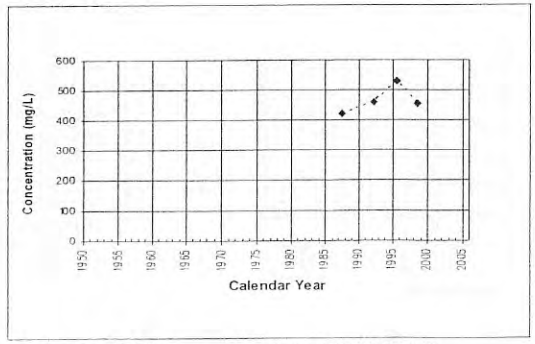
Location: 04N16W24B02S



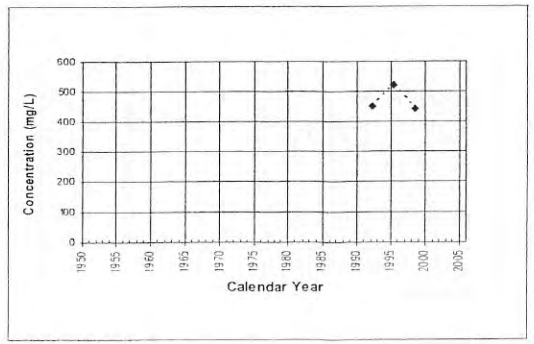
Location: 04N16W27J03S County: LOS ANGELES CO



Location: 04N16W33L01S County: LOS ANGELES CO

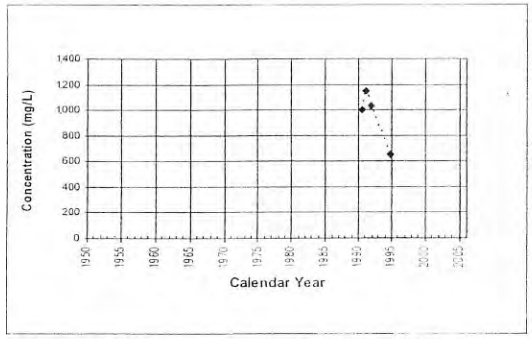


Location: 04N16W34A03S County: LOS ANGELES CO

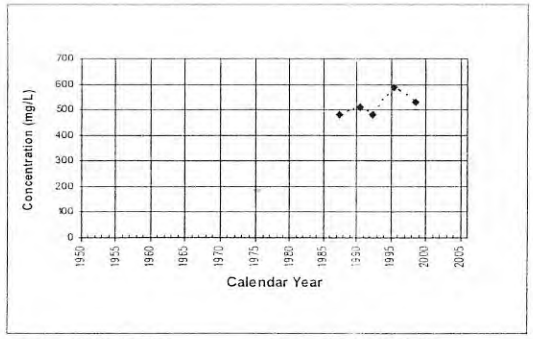


Location: 04N16W35A01S

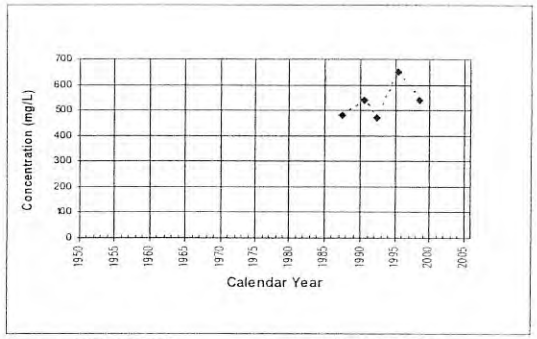
5-1319



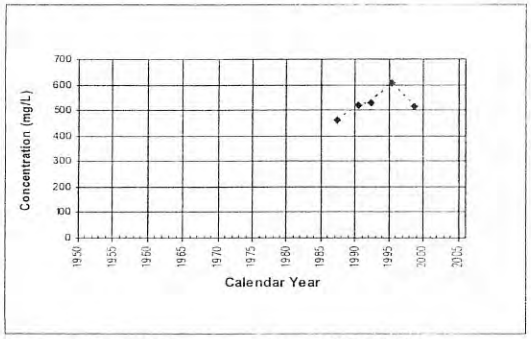
Location: 04N17W12C01S County: LOS ANGELES CO



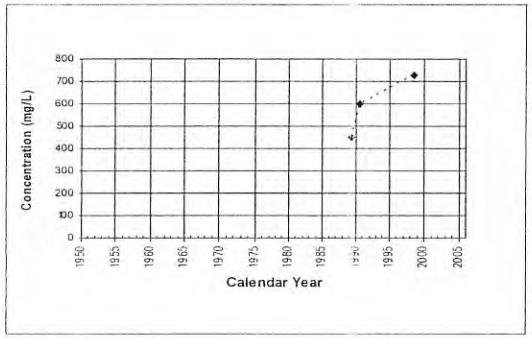
Location: 05N17W25B02S County: LOS ANGELES CO



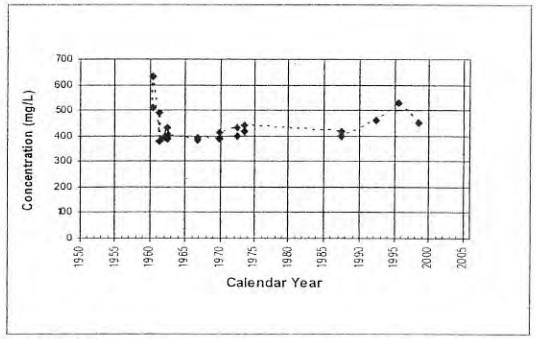
Location: 05N17W25B04S County: LOS ANGELES CO



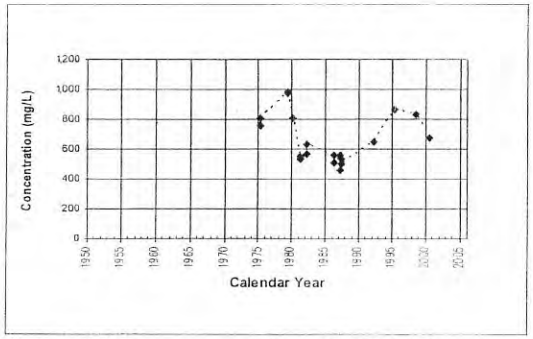
Location: 05N17W25G06S County: LOS ANGELES CO



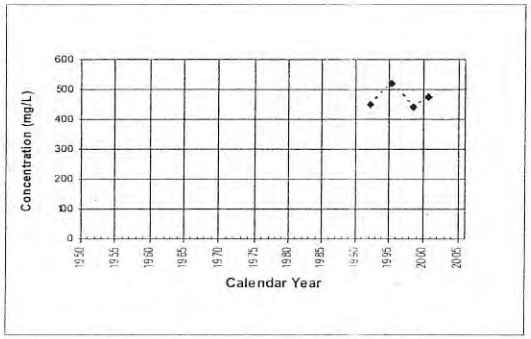
Location: 05N17W25G07S



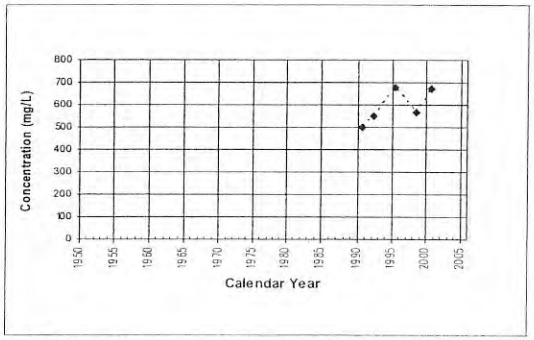
Location: NCWD-10 County: LOS ANGELES CO



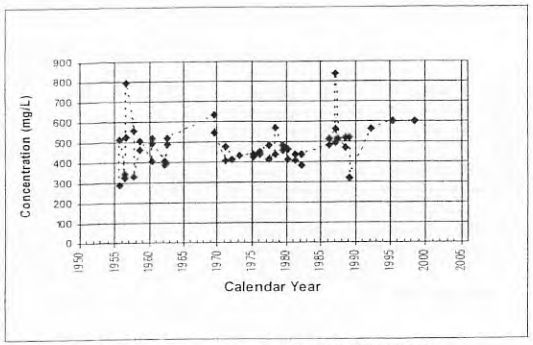
Location: NCWD-11 County: LOS ANGELES CO



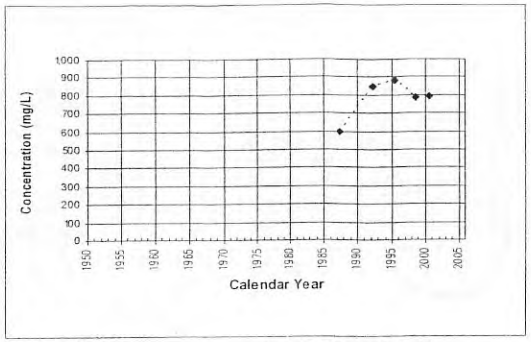
Location: NCWD-12 County: LOS ANGELES CO



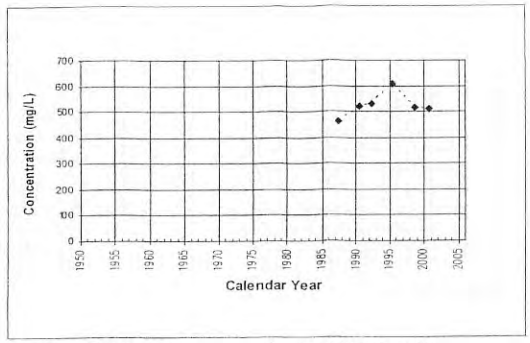
Location: NCWD-13 County: LOS ANGELES CO



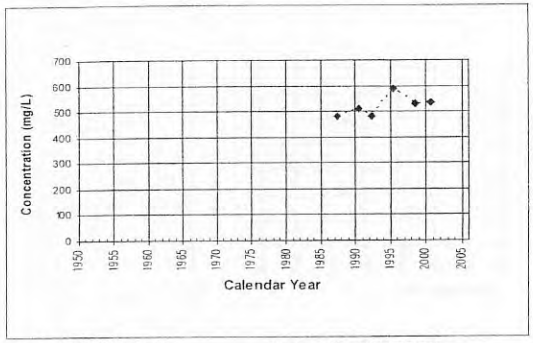
Location: NCWD-7 County: LOS ANGELES CO



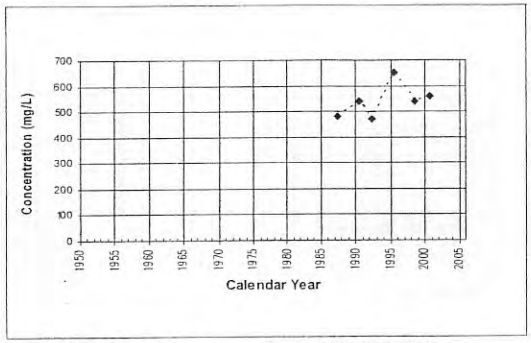
Location: NCWD-9 County: LOS ANGELES CO



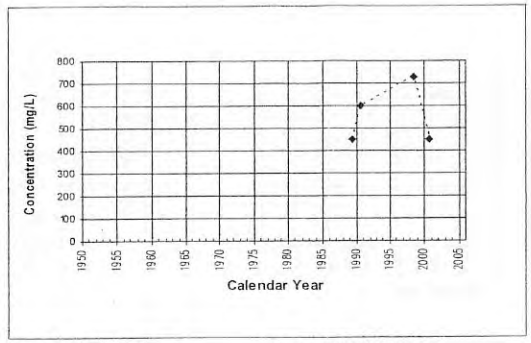
Location: NCWD-Castaic 1 County: LOS ANGELES CO



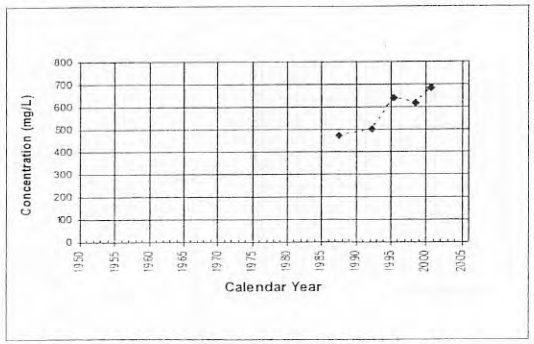
Location: NCWD-Castaic 2 County: LOS ANGELES CO



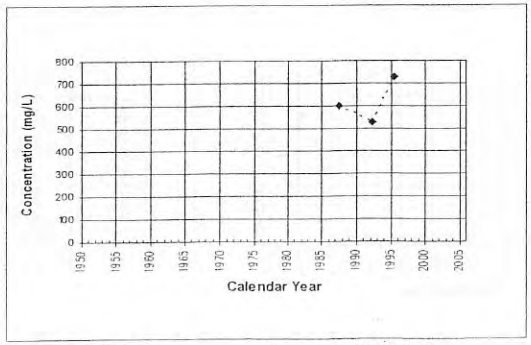
Location: NCWD-Castaic 3 County: LOS ANGELES CO



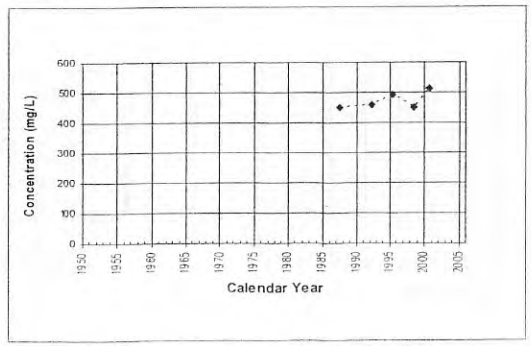
Location: NCWD-Castaic 4 County: LOS ANGELES CO



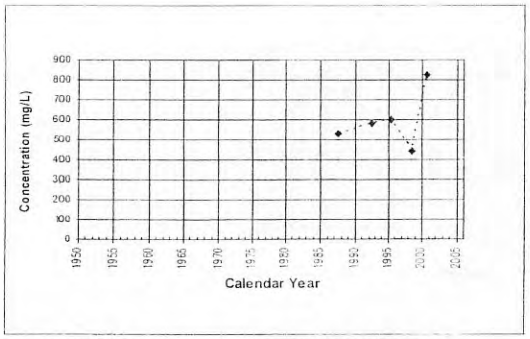
Location: NCWD-Pinetree 1 County: LOS ANGELES CO



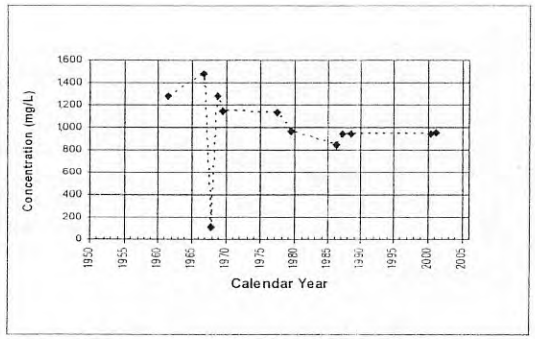
Location: NCWD-Pinetree 2 County: LOS ANGELES CO



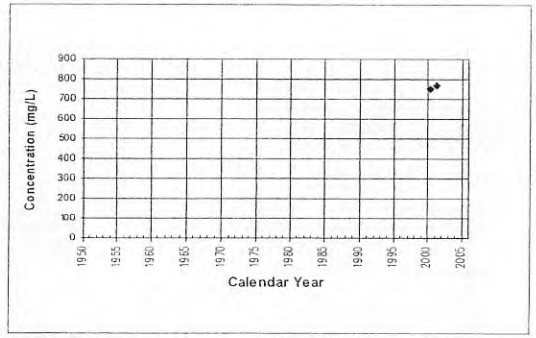
Location: NCWD-Pinetree 3 County: LOS ANGELES CO



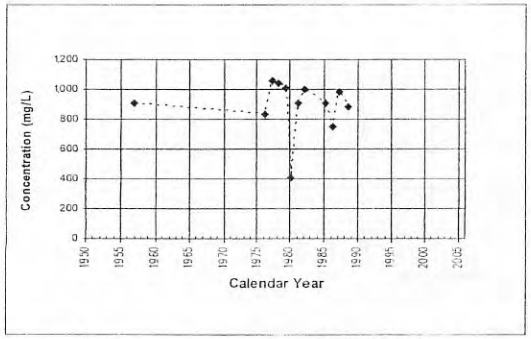
Location: NCWD-Pinetree 4 County: LOS ANGELES CO



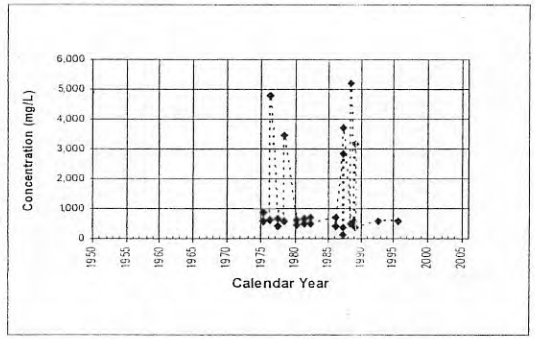
Location: NLF-B6 County: LOS ANGELES CO



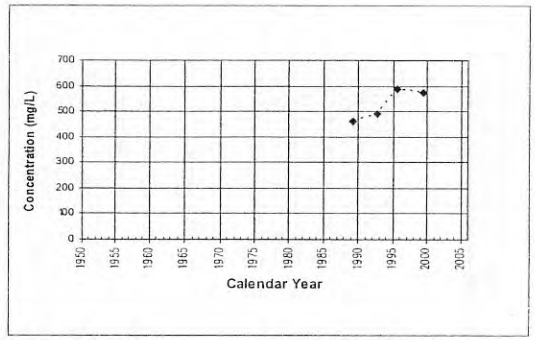
Location: NLF-C County: LOS ANGELES CO



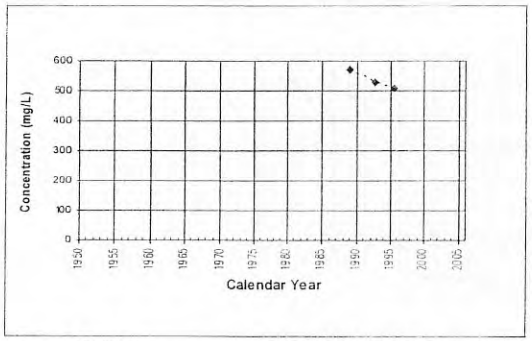
Location: NLF-C6 County: LOS ANGELES CO



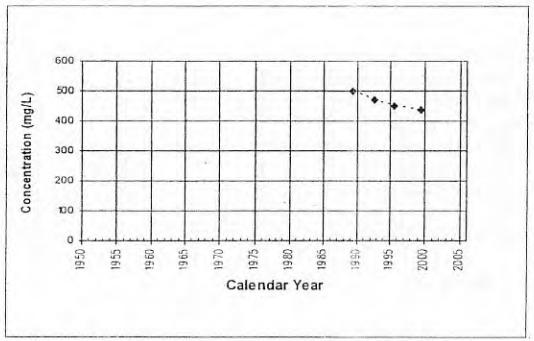
Location: SCWC-Clark County: LOS ANGELES CO



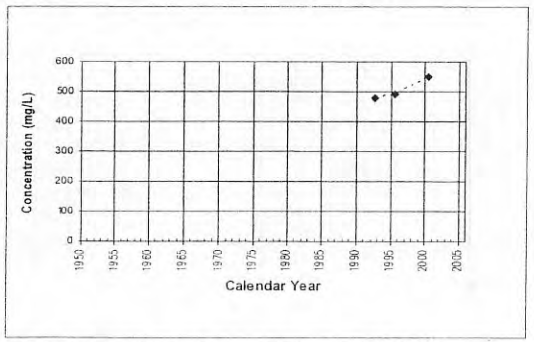
Location: SCWC-Guida County: LOS ANGELES CO



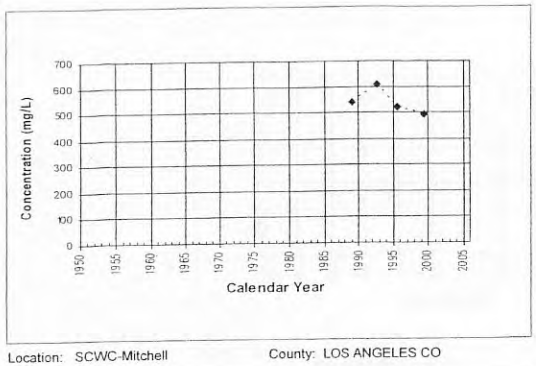
Location: SCWC-Honby County: LOS ANGELES CO



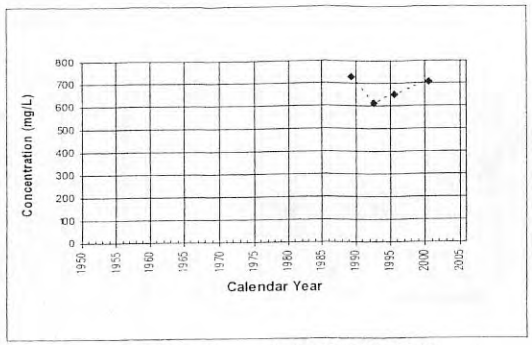
Location: SCWC-Lost Canyon 2 County: LOS ANGELES CO



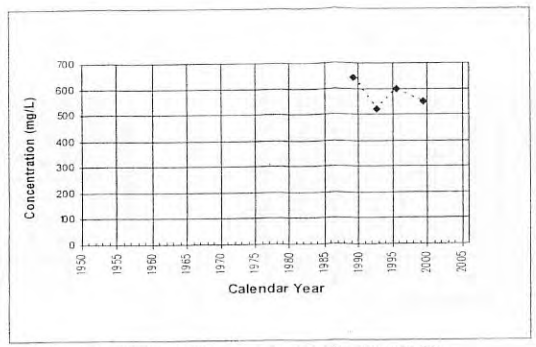
Location: SCWC-Lost Canyon 2A County: LOS ANGELES CO



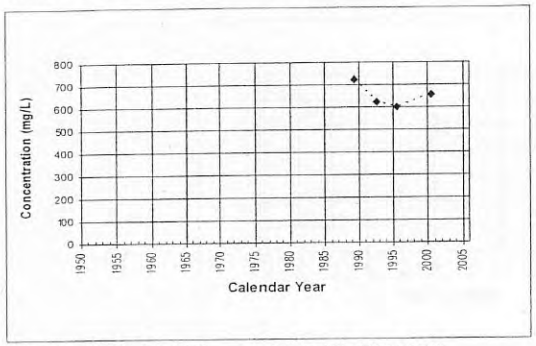
Location: SCWC-Mitchell County: LOS ANGELES CO



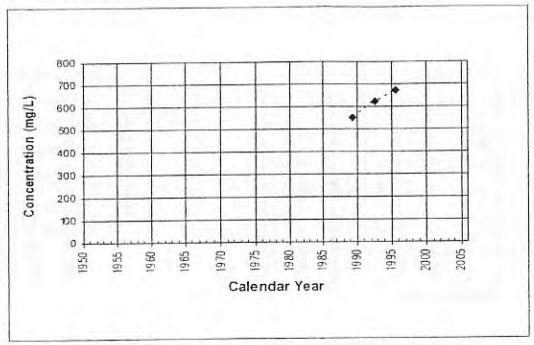
Location: SCWC-N. Oaks Central County: LOS ANGELES CO



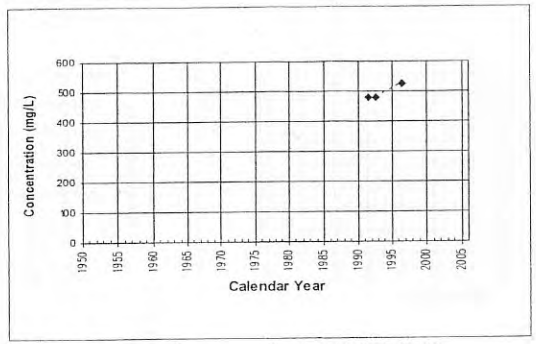
Location: SCWC-N. Oaks East County: LOS ANGELES CO



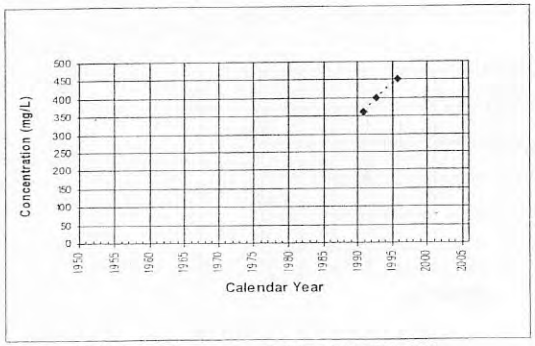
Location: SCWC-N. Oaks West County: LOS ANGELES CO



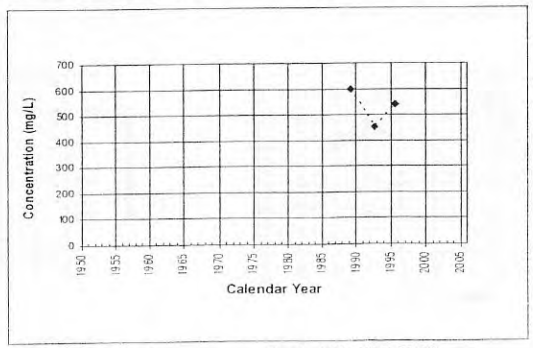
Location: SCWC-Sand Canyon County: LOS ANGELES CO



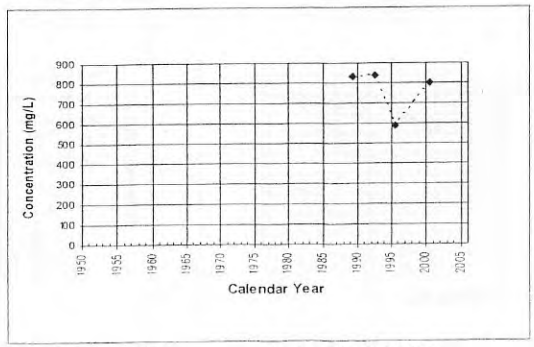
Location: SCWC-Saugus 1 County: LOS ANGELES CO



Location: SCWC-Saugus 2 County: LOS ANGELES CO

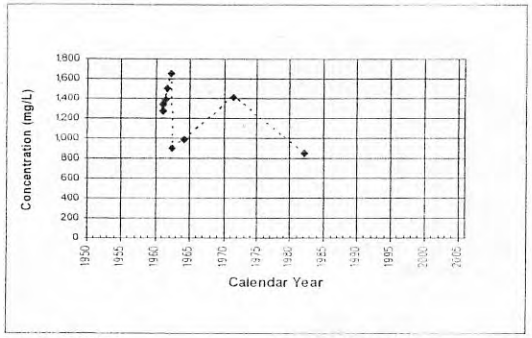


Location: SCWC-Sierra County: LOS ANGELES CO

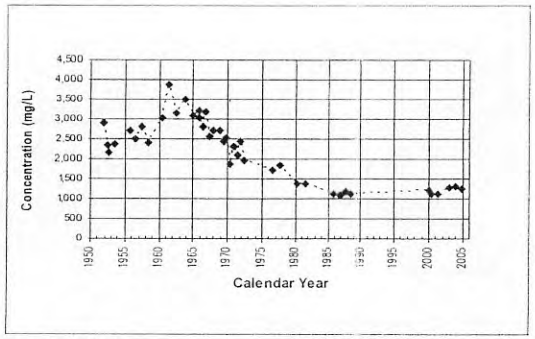


Location: SCWC-Stadium County: LOS ANGELES CO

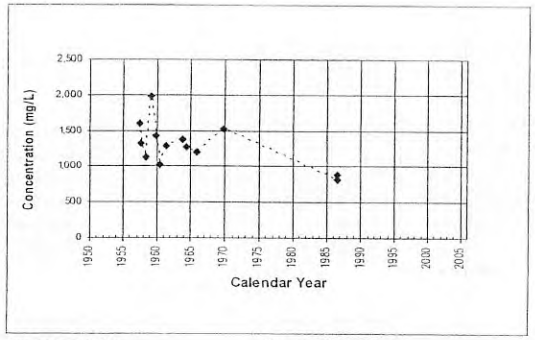
S-1323



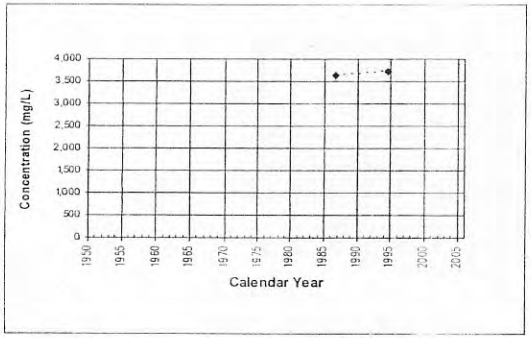
Location: V-0009 County: VENTURA CO



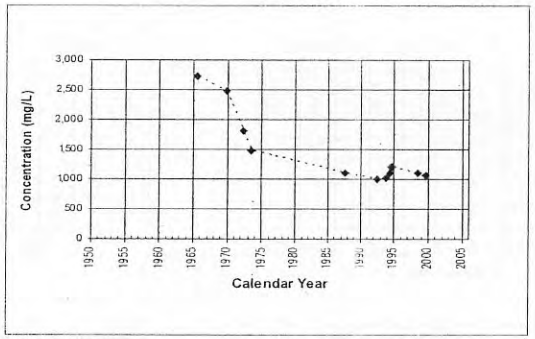
Location: V-0012 County: VENTURA CO



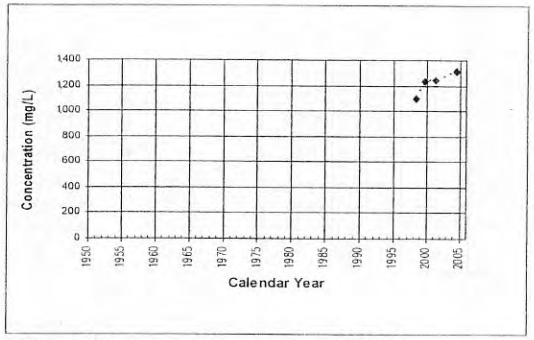
Location: V-0015 County: VENTURA CO



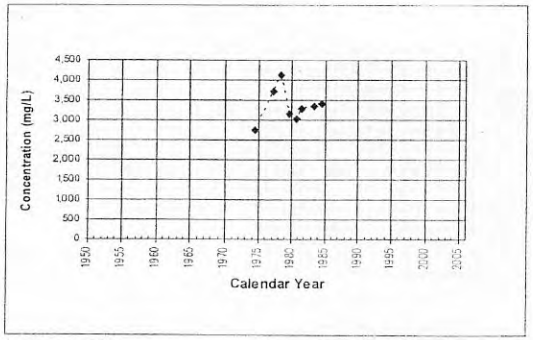
Location: V-0026 County: VENTURA CO



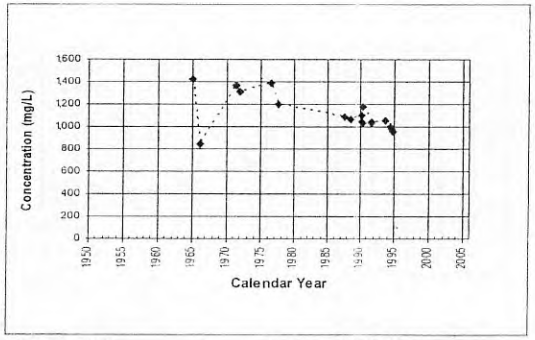
Location: V-0031 County: VENTURA CO



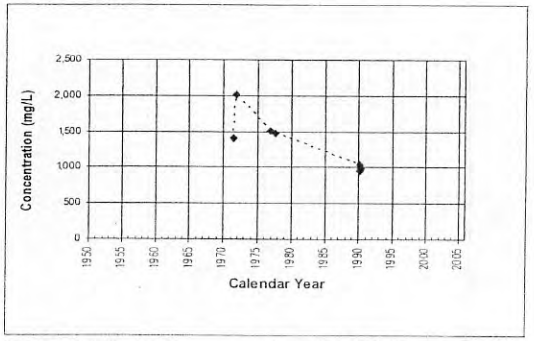
Location: V-0036 County: VENTURA CO



Location: V-0037 County: VENTURA CO

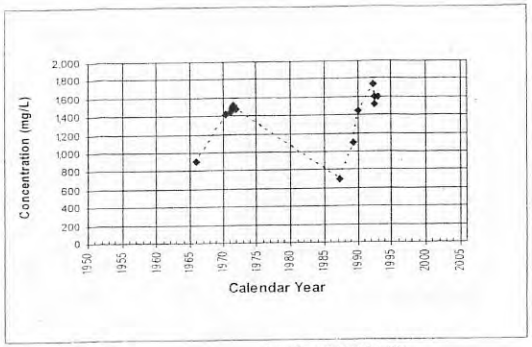


Location: V-0039 County: VENTURA CO

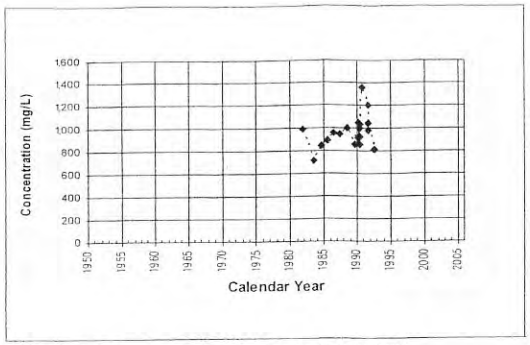


Location: V-0042 County: VENTURA CO

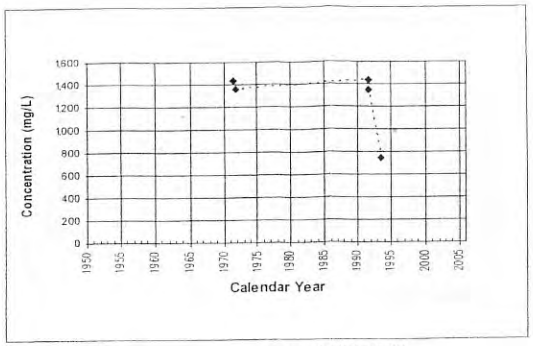
5-1324



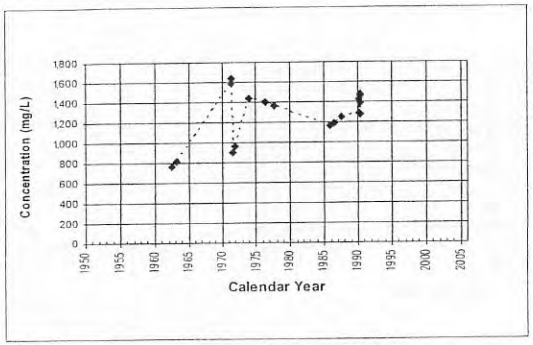
Location: V-0051 County: VENTURA CO



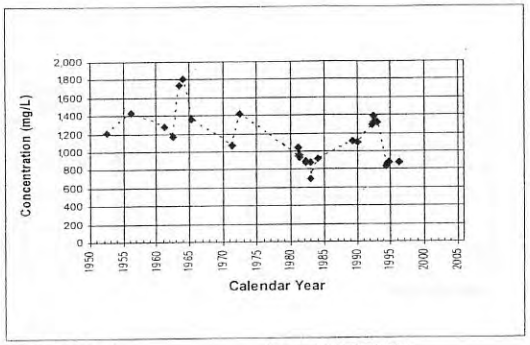
Location: V-0053 County: VENTURA CO



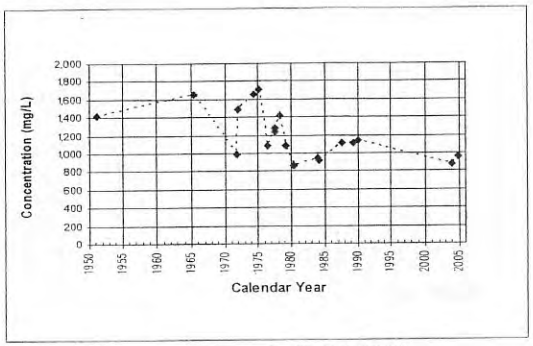
Location: V-0055 County: VENTURA CO



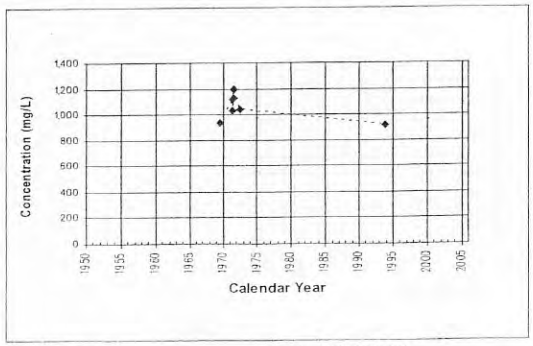
Location: V-0059 County: VENTURA CO



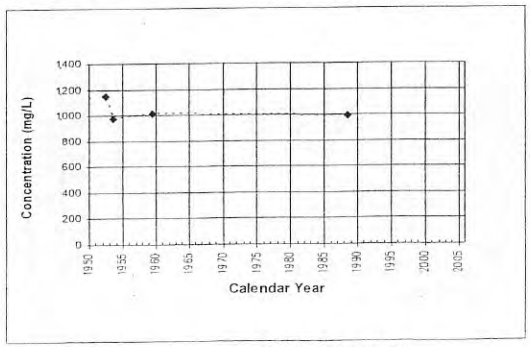
Location: V-0060 County: VENTURA CO



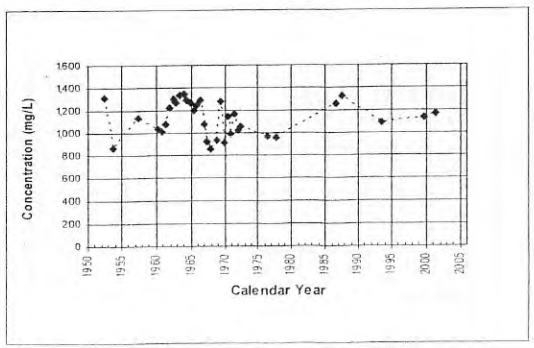
Location: V-0061 County: VENTURA CO



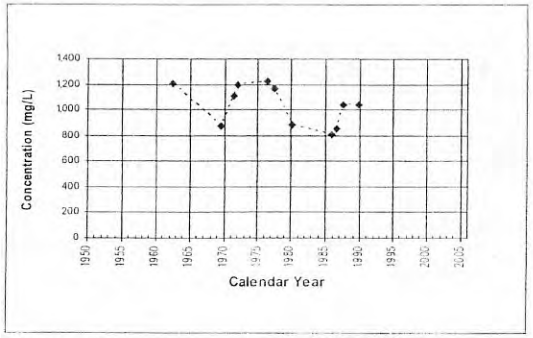
Location: V-0064 County: VENTURA CO



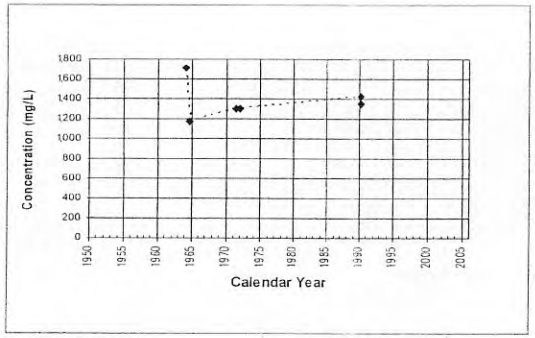
Location: V-0067 County: VENTURA CO



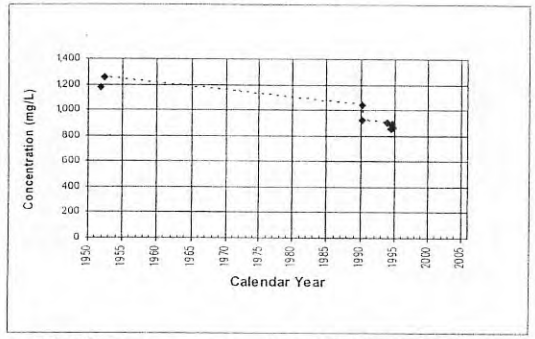
Location: V-0070 County: VENTURA CO



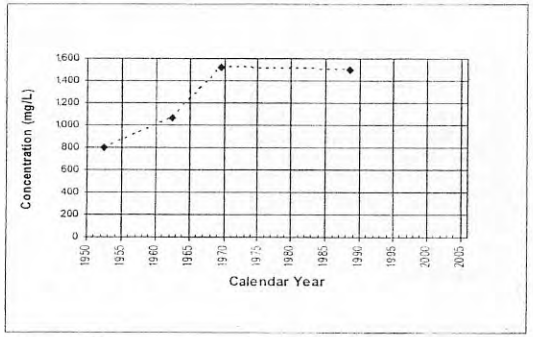
Location: V-0071 County: VENTURA CO



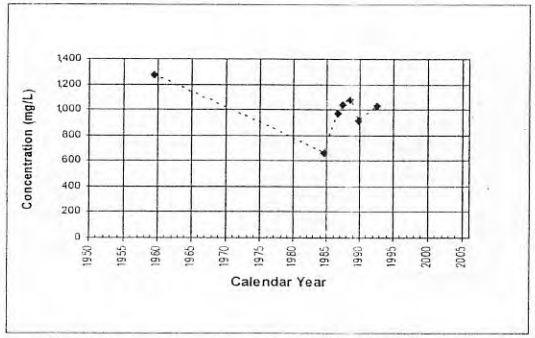
Location: V-0079 County: VENTURA CO



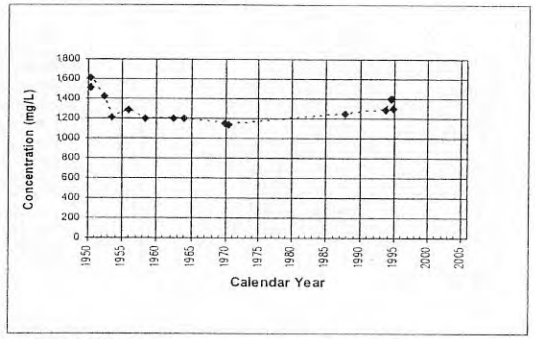
Location: V-0082 County: VENTURA CO



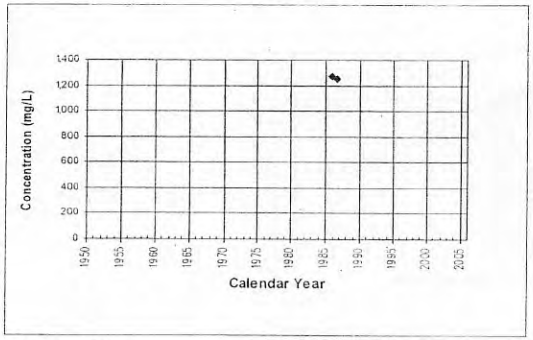
Location: V-0090 County: VENTURA CO



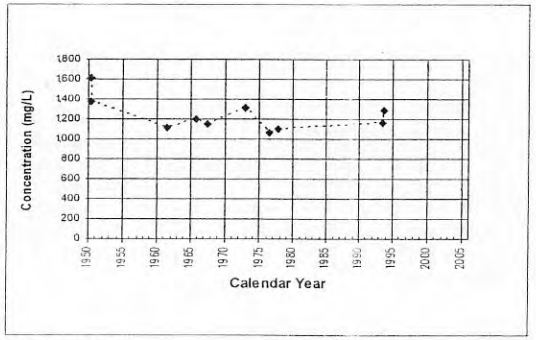
Location: V-0093 County: VENTURA CO



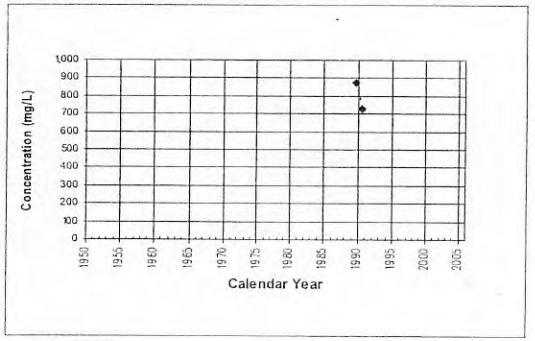
Location: V-0095 County: VENTURA CO



Location: V-0096 County: VENTURA CO

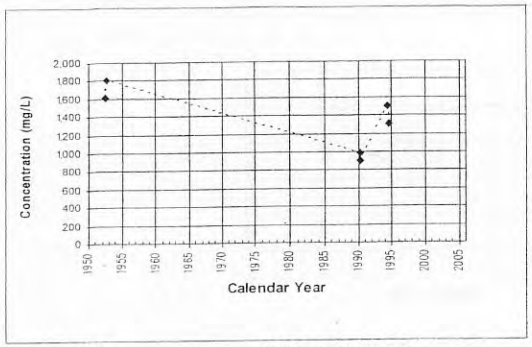


Location: V-0097 County: VENTURA CO

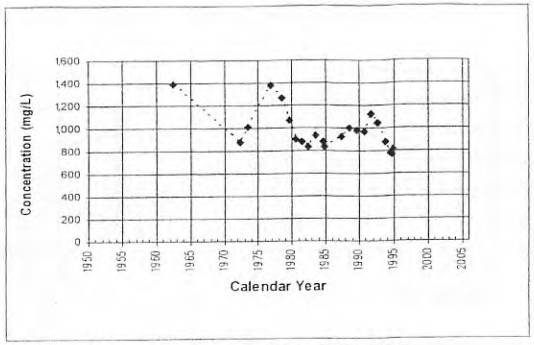


Location: V-0100 County: VENTURA CO

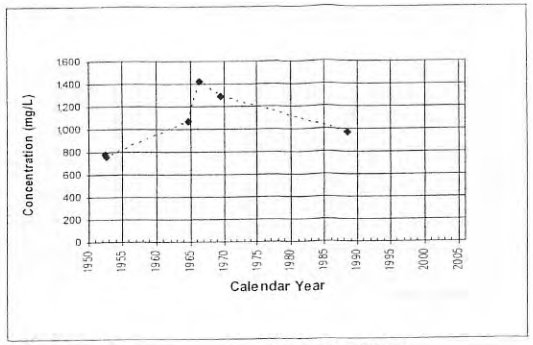
5-13225



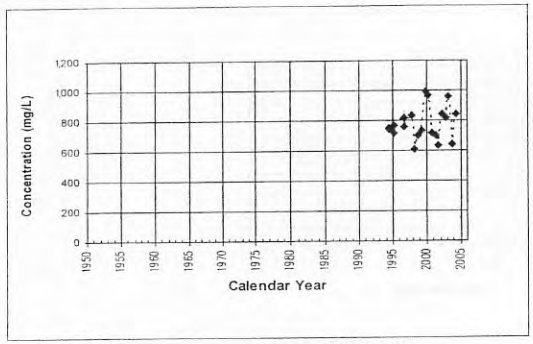
Location: V-0102 County: VENTURA CO



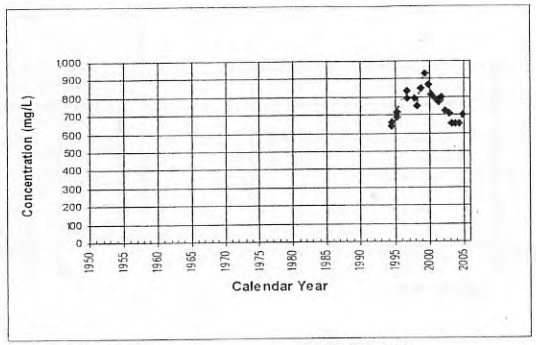
Location: V-0103 County: VENTURA CO



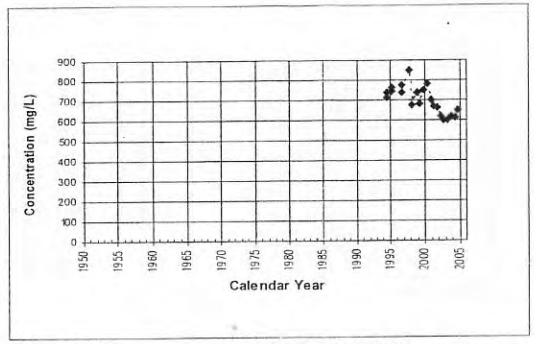
Location: V-0104 County: VENTURA CO



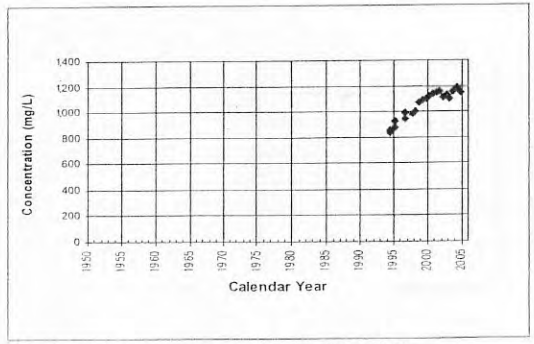
Location: V-0105 County: VENTURA CO



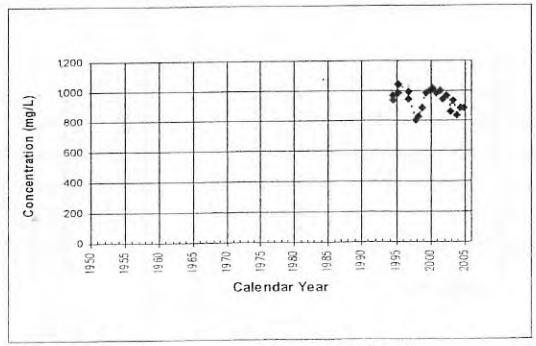
Location: V-0106 County: VENTURA CO



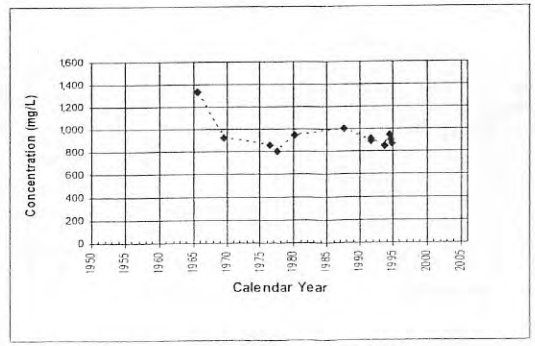
Location: V-0107 County: VENTURA CO



Location: V-0108 County: VENTURA CO

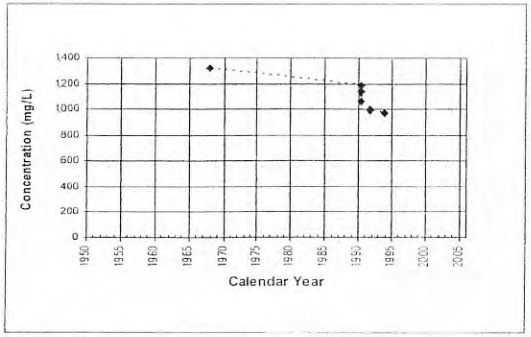


Location: V-0109 County: VENTURA CO

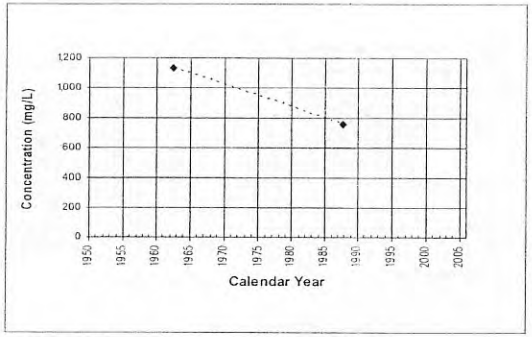


Location: V-0110 County: VENTURA CO

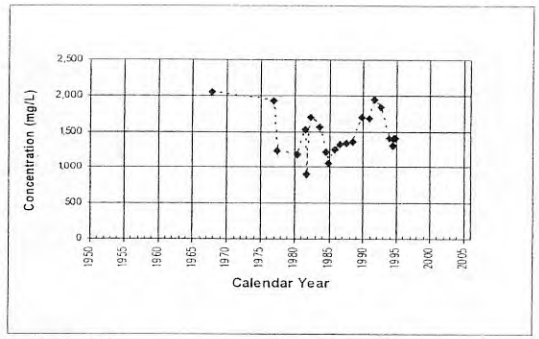
5-1327



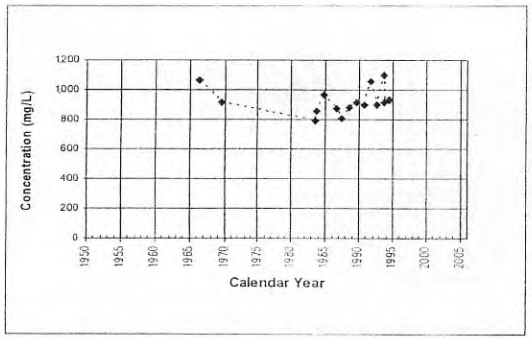
Location: V-0111 County: VENTURA CO



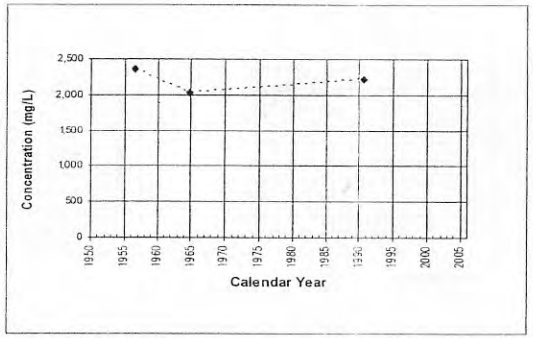
Location: V-0117 County: VENTURA CO



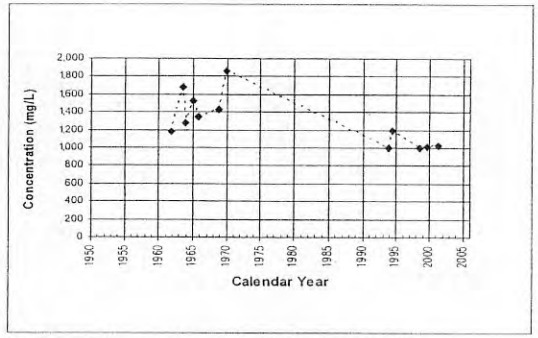
Location: V-0123 County: VENTURA CO



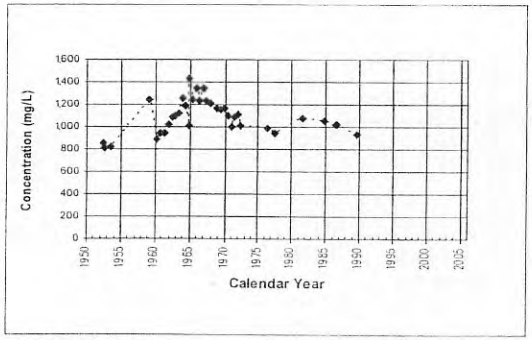
Location: V-0127 County: VENTURA CO



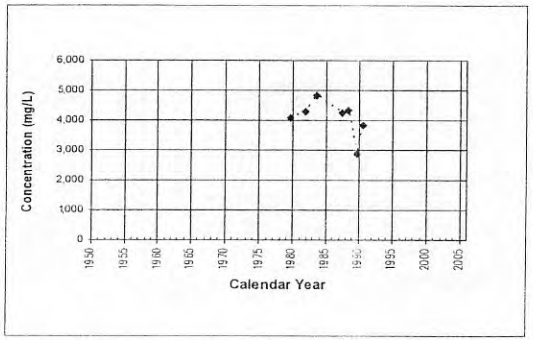
Location: V-0129 County: VENTURA CO



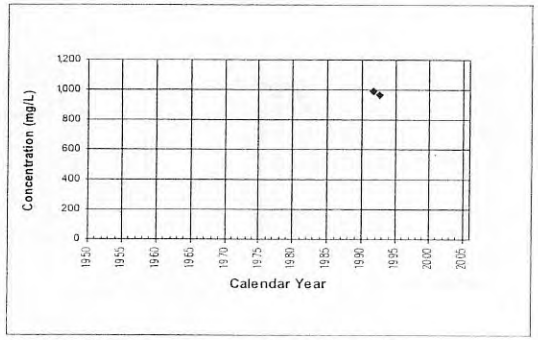
Location: V-0134 County: VENTURA CO



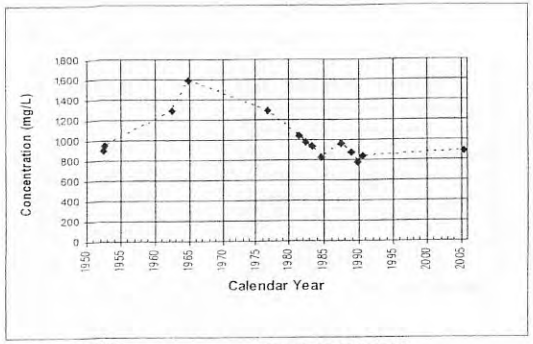
Location: V-0139 County: VENTURA CO



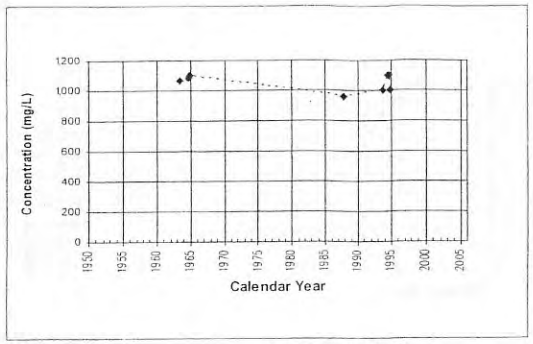
Location: V-0141 County: VENTURA CO



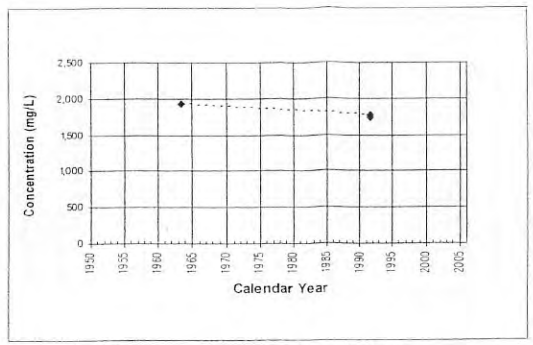
Location: V-0142 County: VENTURA CO



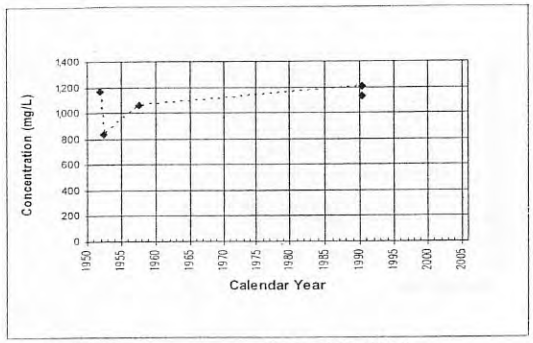
Location: V-0143 County: VENTURA CO



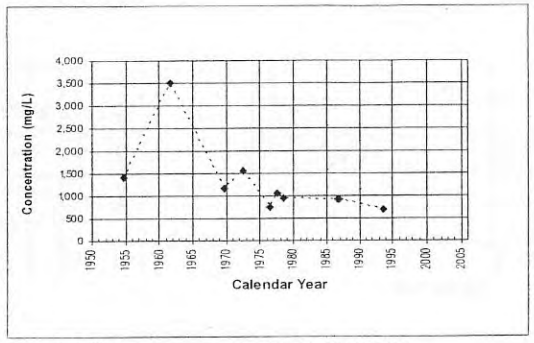
Location: V-0152 County: VENTURA CO



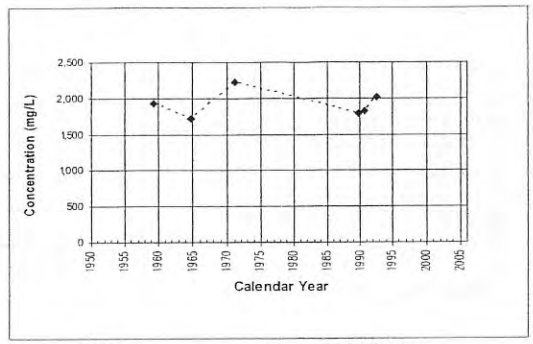
Location: V-0154 County: VENTURA CO



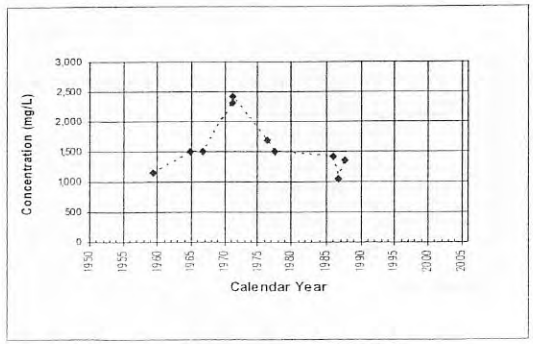
Location: V-0158 County: VENTURA CO



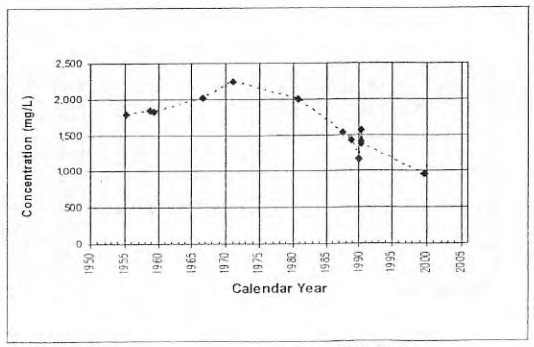
Location: V-0159 County: VENTURA CO



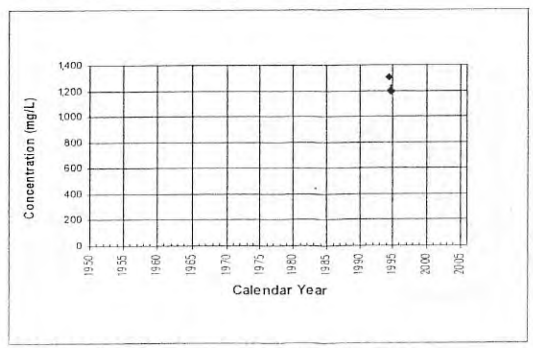
Location: V-0160 County: VENTURA CO



Location: V-0161 County: VENTURA CO

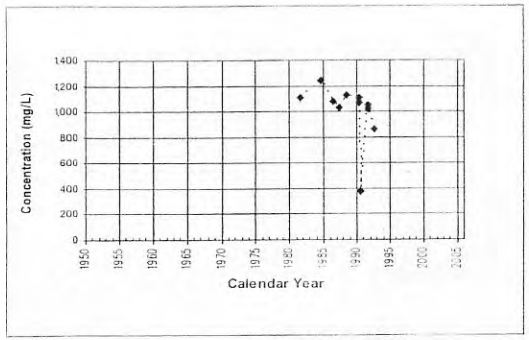


Location: V-0162 County: VENTURA CO

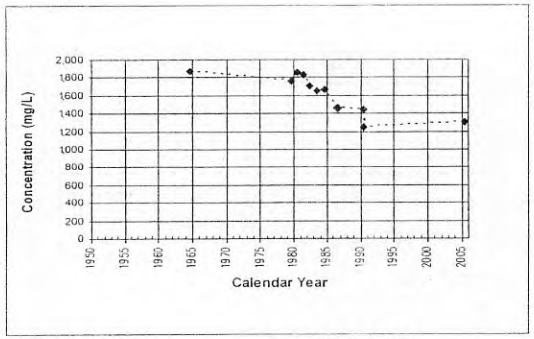


Location: V-0164 County: VENTURA CO

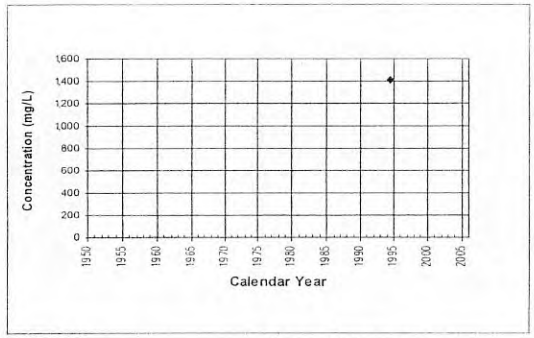
5-1329



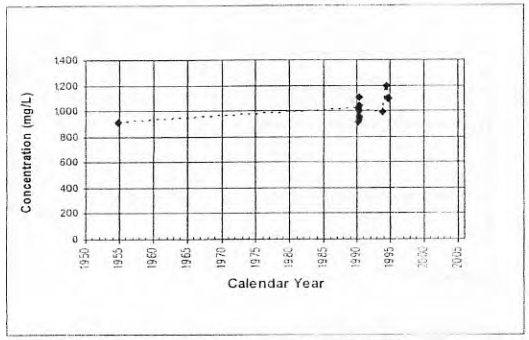
Location: V-0165 County: VENTURA CO



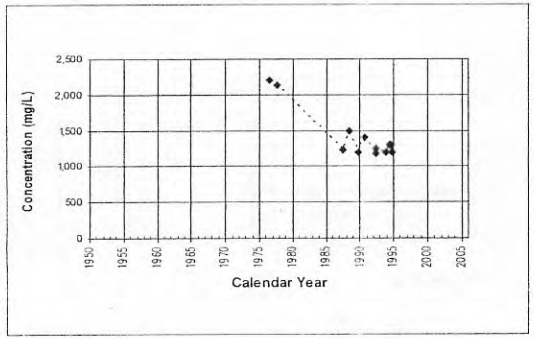
Location: V-0168 County: VENTURA CO



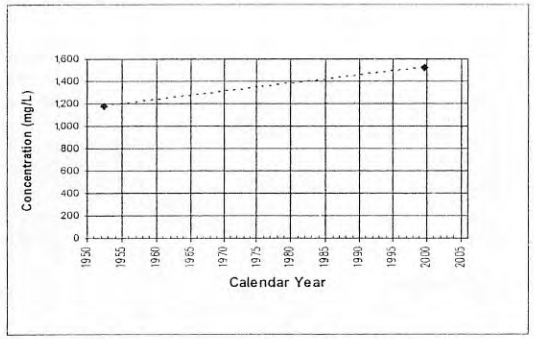
Location: V-0175 County: VENTURA CO



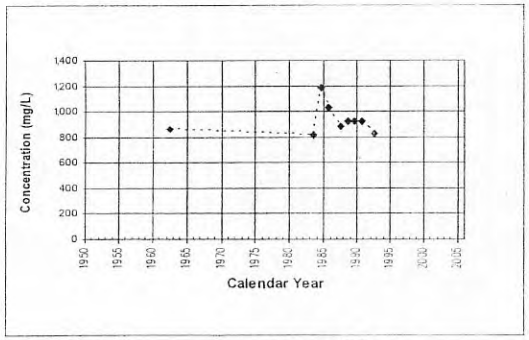
Location: V-0176 County: VENTURA CO



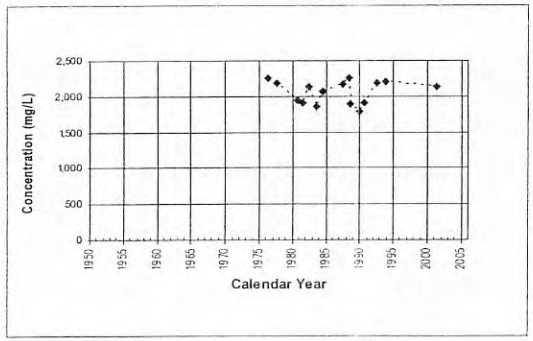
Location: V-0178 County: VENTURA CO



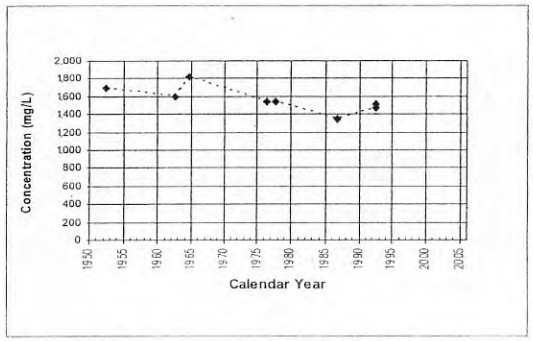
Location: V-0181 County: VENTURA CO



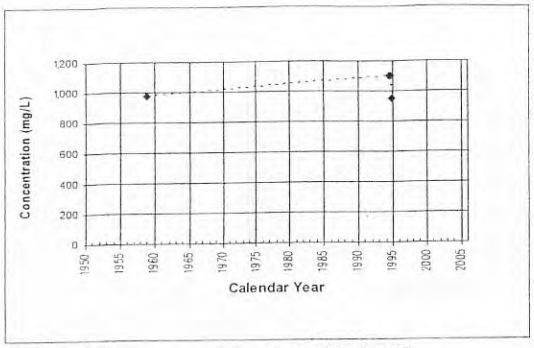
Location: V-0182 County: VENTURA CO



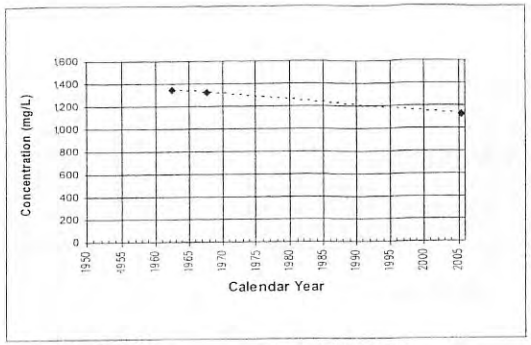
Location: V-0184 County: VENTURA CO



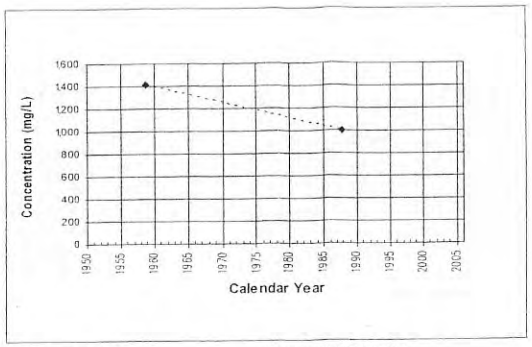
Location: V-0185 County: VENTURA CO



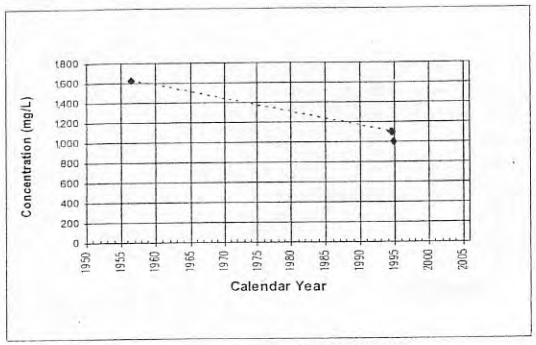
Location: V-0186 County: VENTURA CO



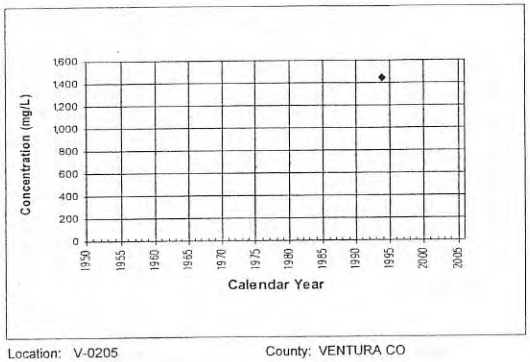
Location: V-0193 County: VENTURA CO



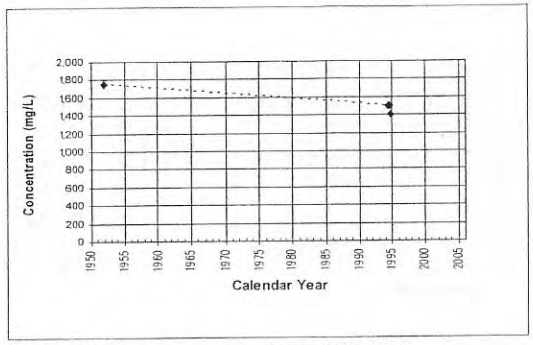
Location: V-0199 County: VENTURA CO



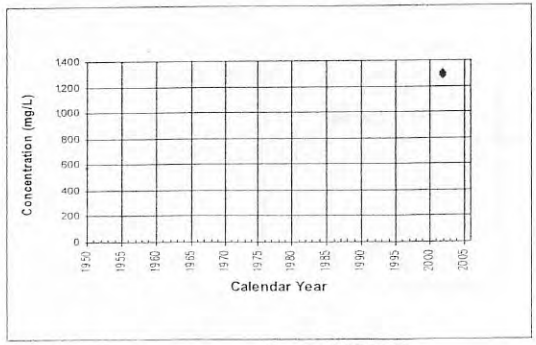
Location: V-0200 County: VENTURA CO



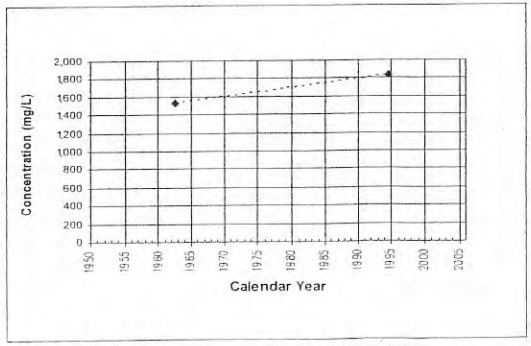
Location: V-0205 County: VENTURA CO



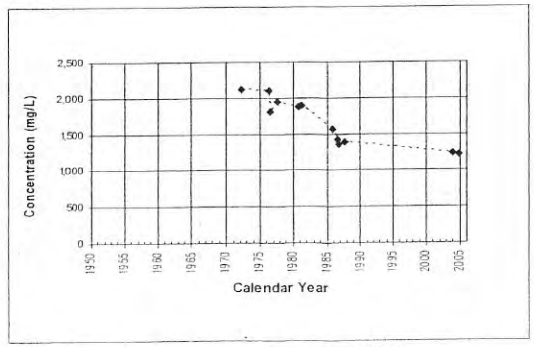
Location: V-0206 County: VENTURA CO



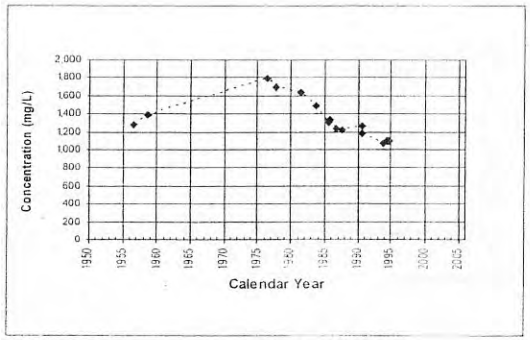
Location: V-0212 County: VENTURA CO



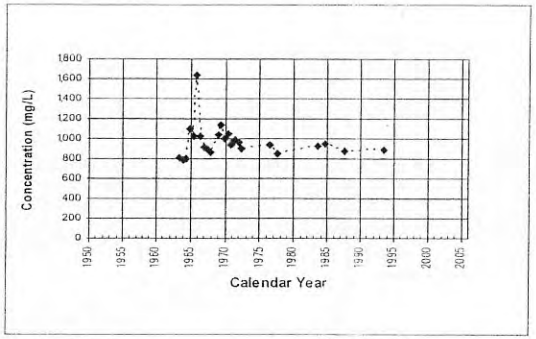
Location: V-0214 County: VENTURA CO



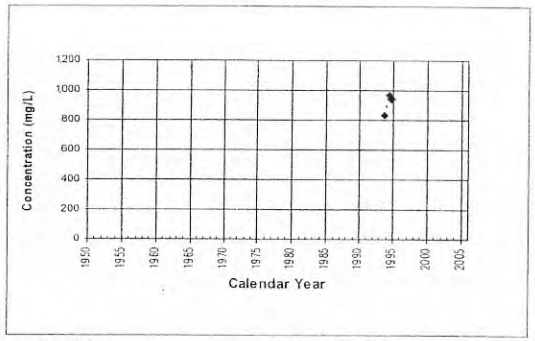
Location: V-0216 County: VENTURA CO



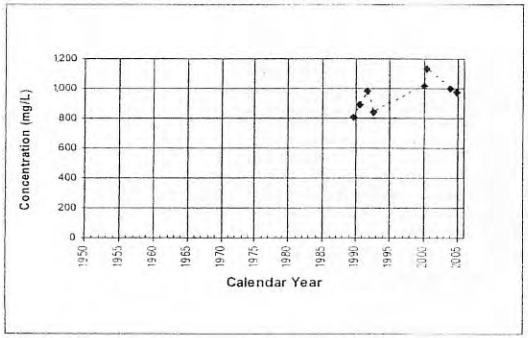
Location: V-0219 County: VENTURA CO



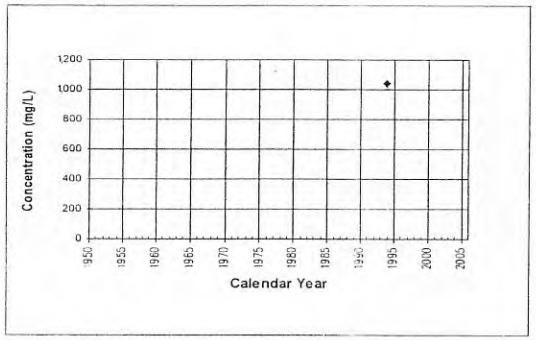
Location: V-0229 County: VENTURA CO



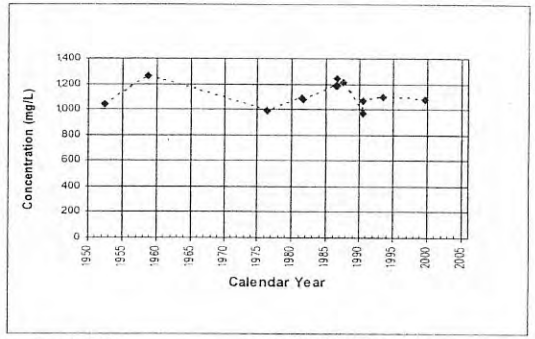
Location: V-0231 County: VENTURA CO



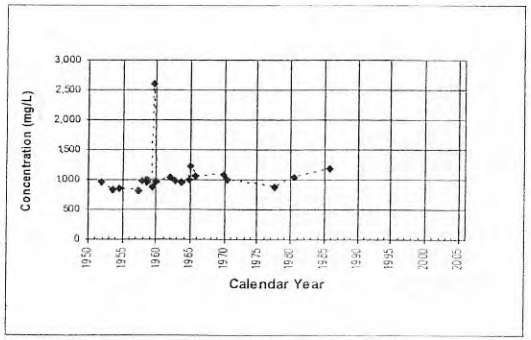
Location: V-0233 County: VENTURA CO



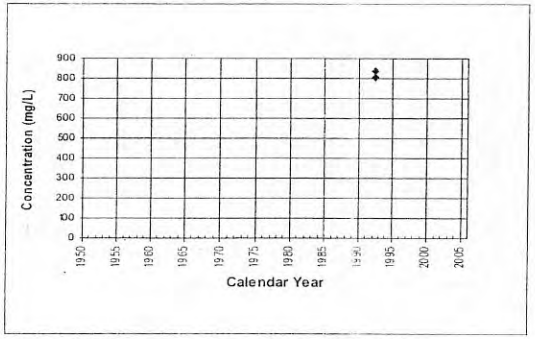
Location: V-0234 County: VENTURA CO



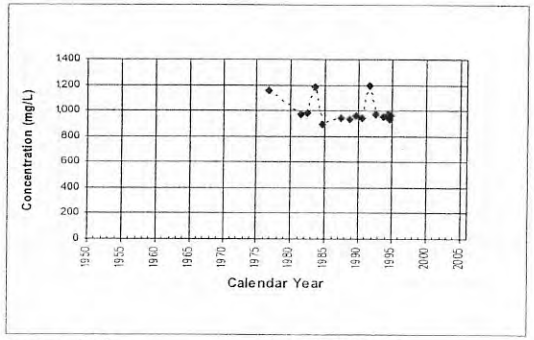
Location: V-0237 County: VENTURA CO



Location: V-0238 County: VENTURA CO

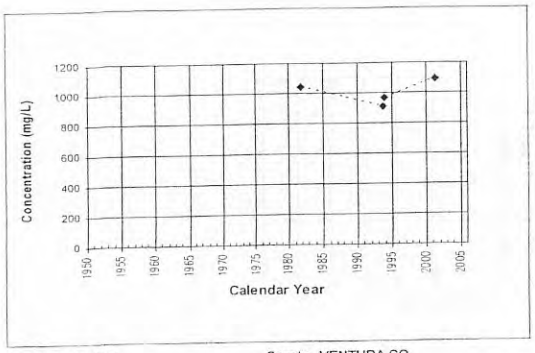


Location: V-0242 County: VENTURA CO

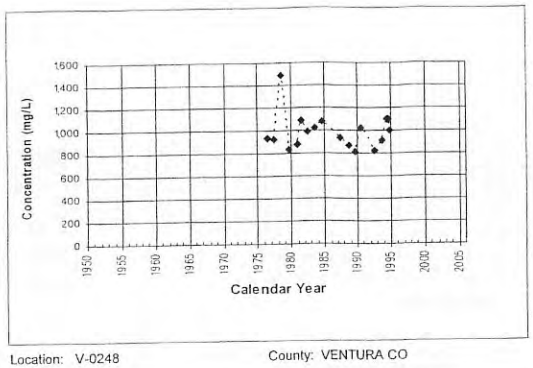


Location: V-0243 County: VENTURA CO

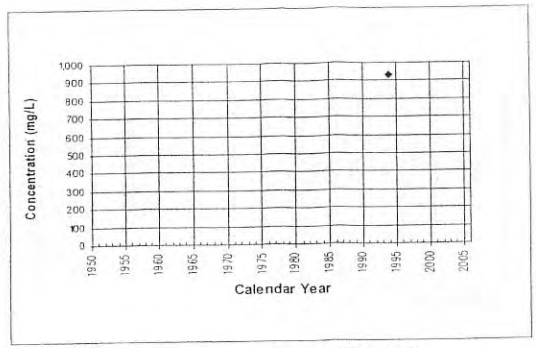
5-13802



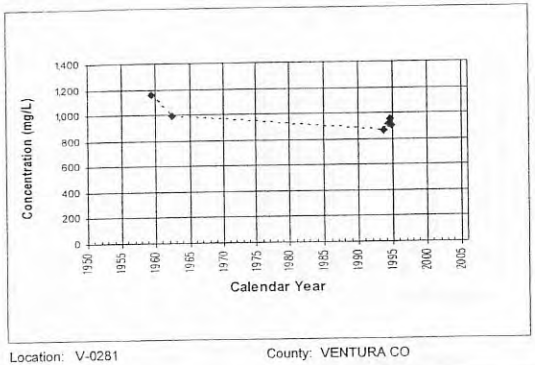
Location: V-0244 County: VENTURA CO



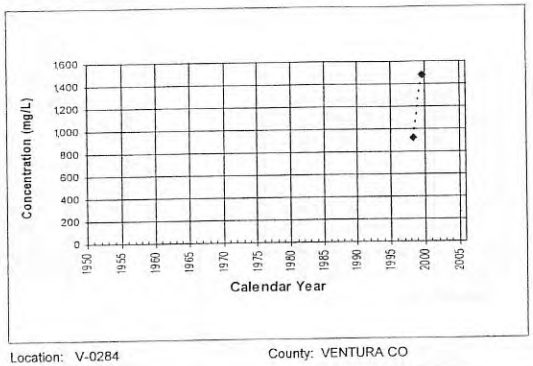
Location: V-0248 County: VENTURA CO



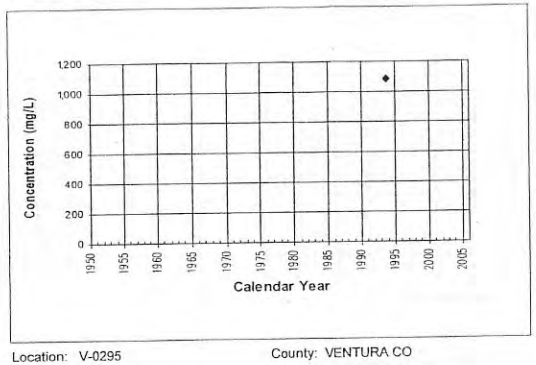
Location: V-0250 County: VENTURA CO



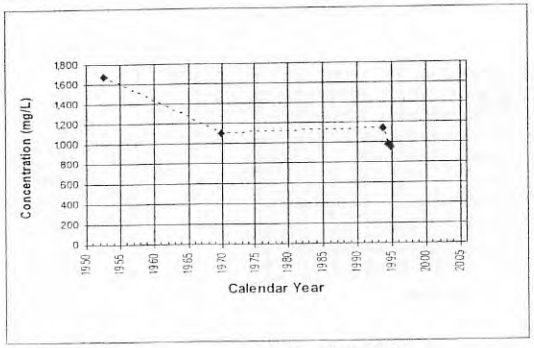
Location: V-0281 County: VENTURA CO



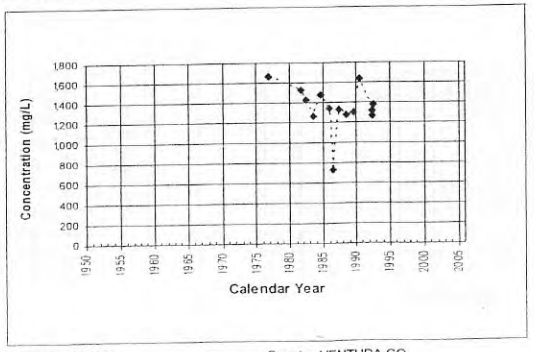
Location: V-0284 County: VENTURA CO



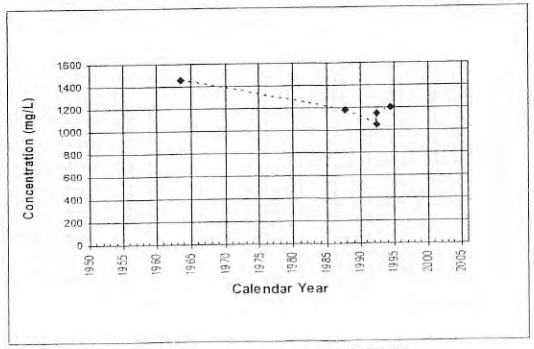
Location: V-0295 County: VENTURA CO



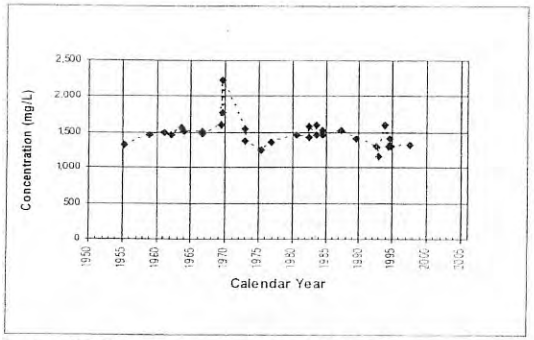
Location: V-0296 County: VENTURA CO



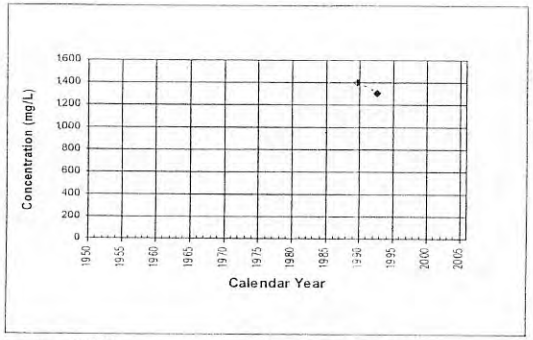
Location: V-0302 County: VENTURA CO



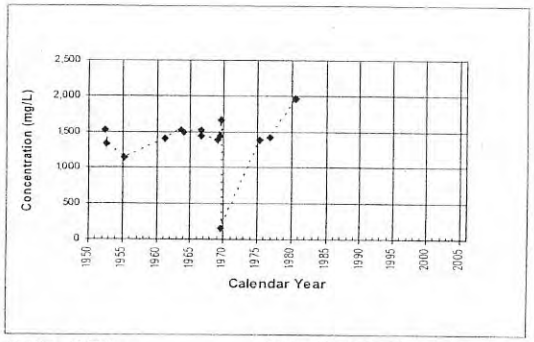
Location: V-0308 County: VENTURA CO



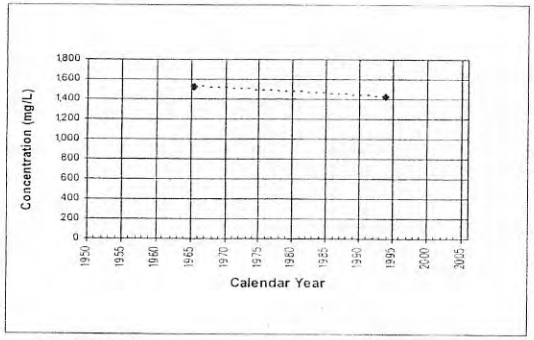
Location: V-0309 County: VENTURA CO



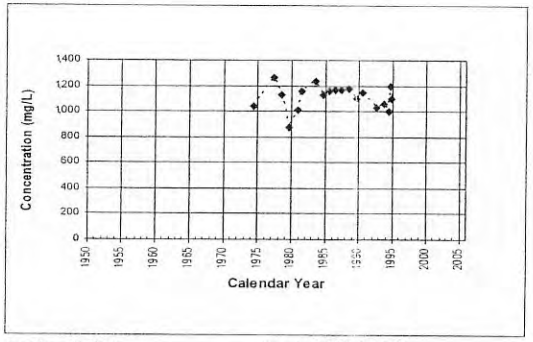
Location: V-0310 County: VENTURA CO



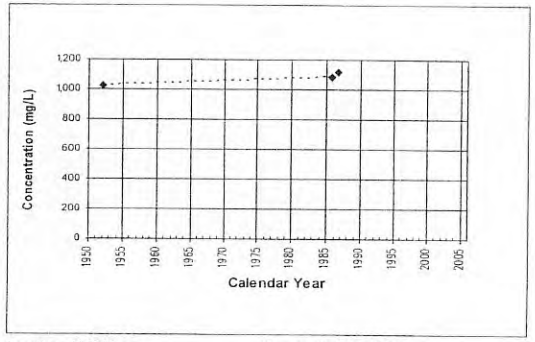
Location: V-0314 County: VENTURA CO



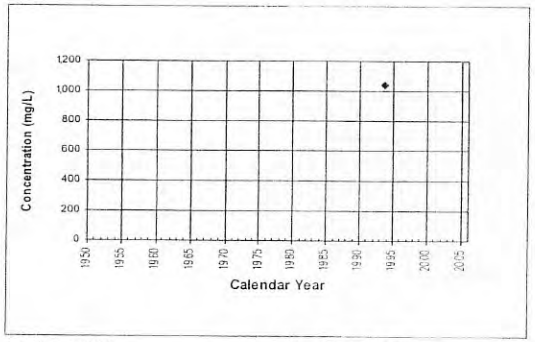
Location: V-0317 County: VENTURA CO



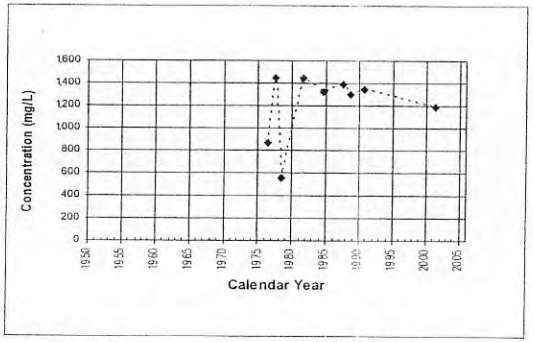
Location: V-0322 County: VENTURA CO



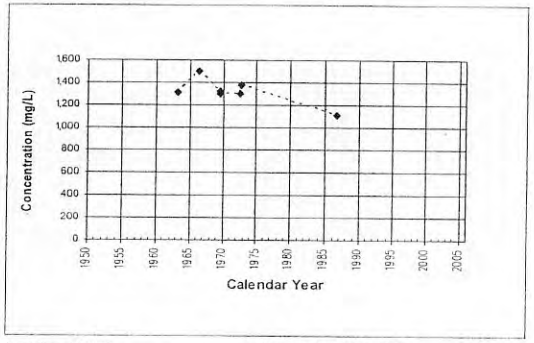
Location: V-0327 County: VENTURA CO



Location: V-0329 County: VENTURA CO

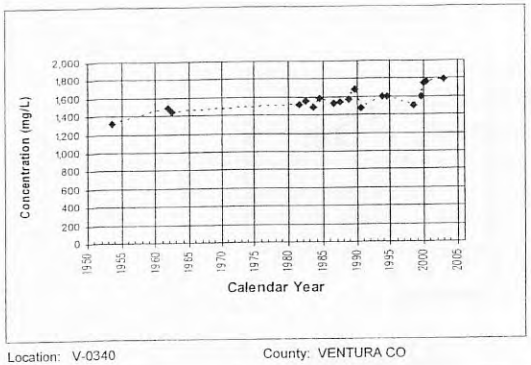


Location: V-0332 County: VENTURA CO

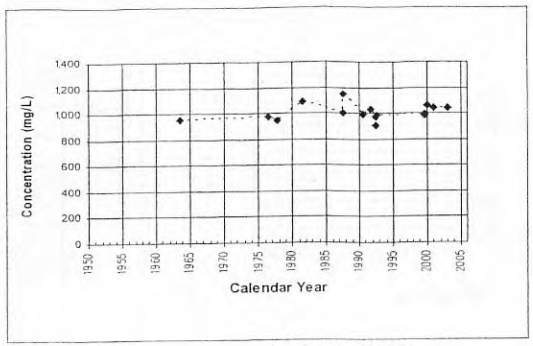


Location: V-0333 County: VENTURA CO

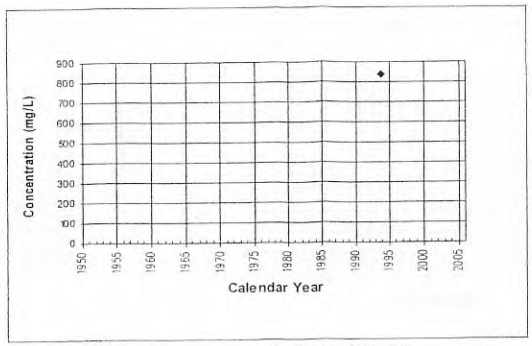
5-13311



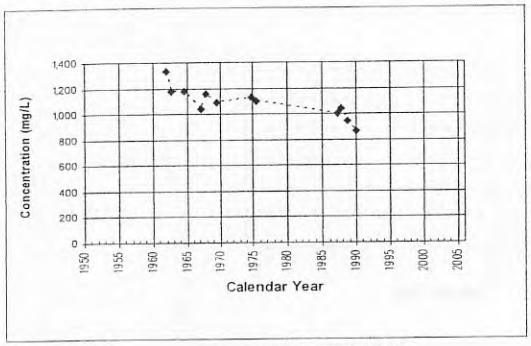
Location: V-0340 County: VENTURA CO



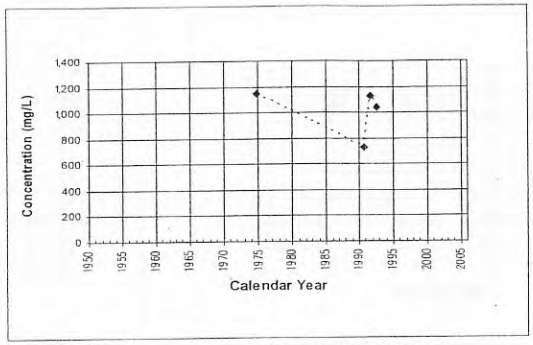
Location: V-0342 County: VENTURA CO



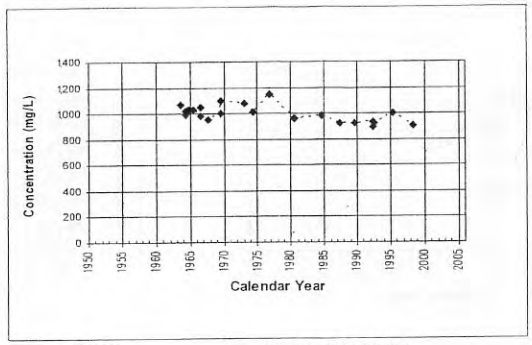
Location: V-0349 County: VENTURA CO



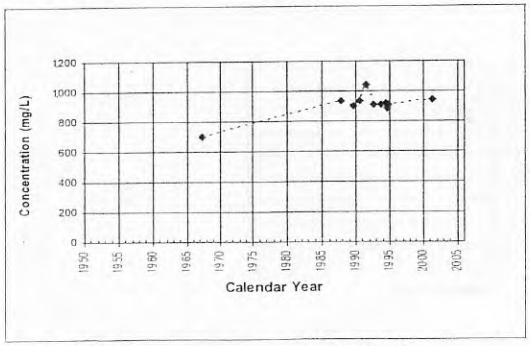
Location: V-0350 County: VENTURA CO



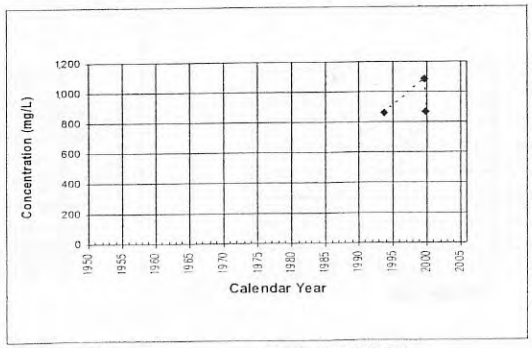
Location: V-0352 County: VENTURA CO



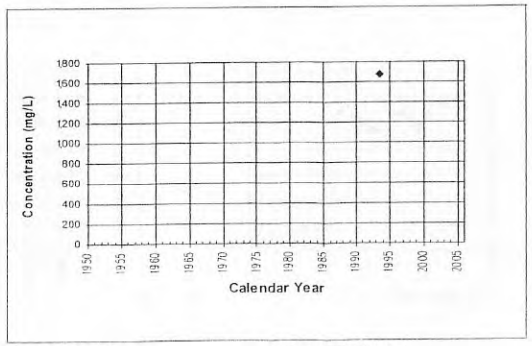
Location: V-0360 County: VENTURA CO



Location: V-0362 County: VENTURA CO

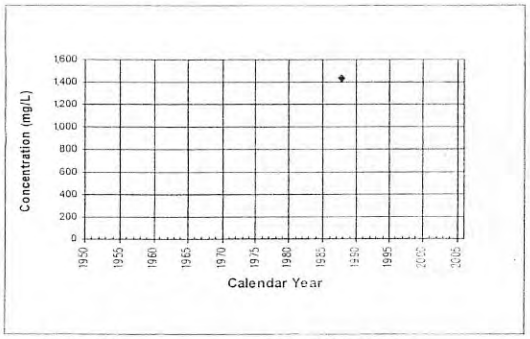


Location: V-0372 County: VENTURA CO

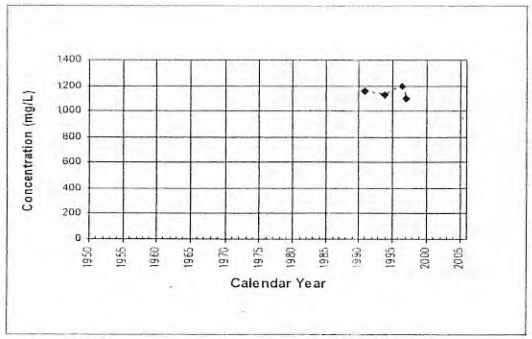


Location: V-0373 County: VENTURA CO

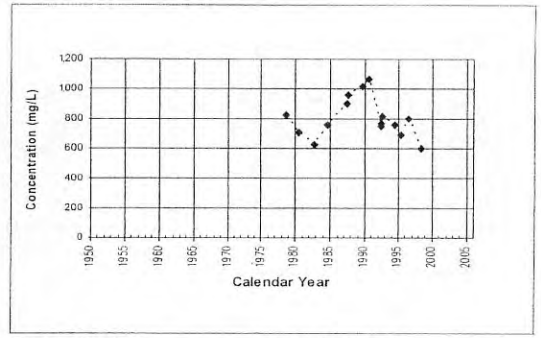
5-1325



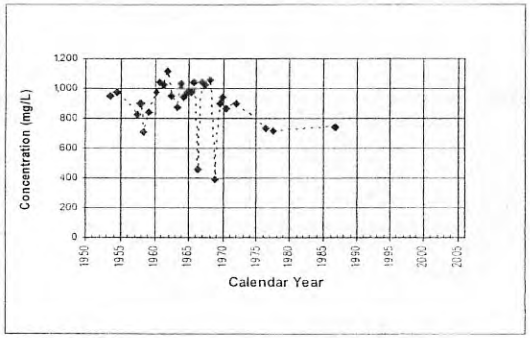
Location: V-0389 County: VENTURA CO



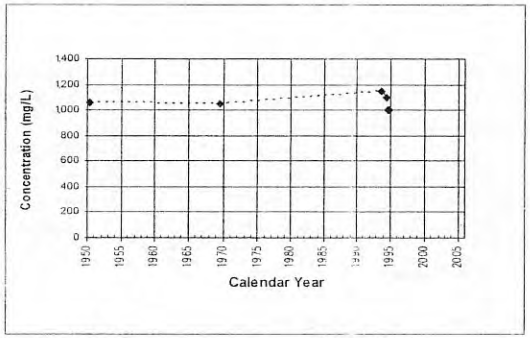
Location: V-0392 County: VENTURA CO



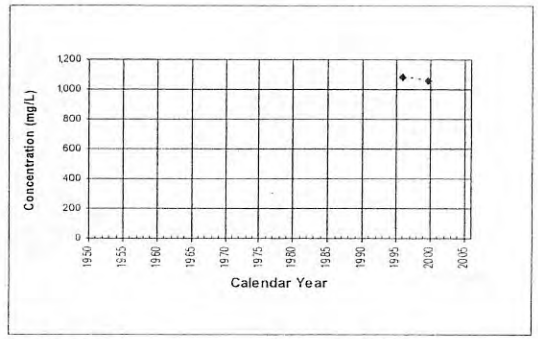
Location: V-0393 County: VENTURA CO



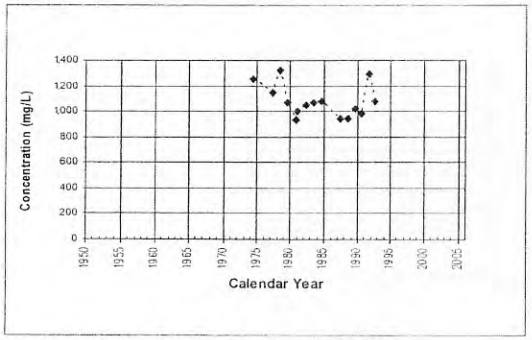
Location: V-0406 County: VENTURA CO



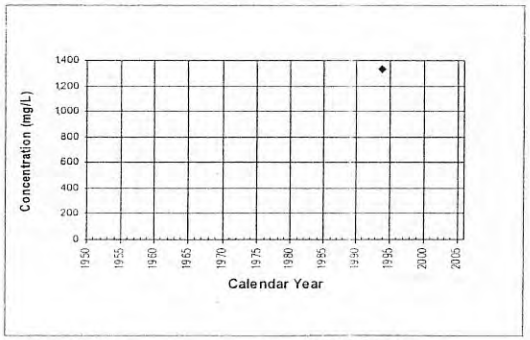
Location: V-0421 County: VENTURA CO



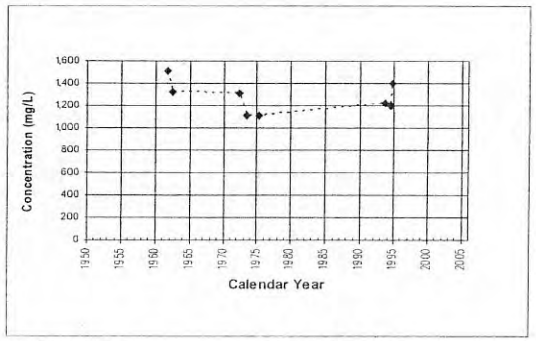
Location: V-0438 County: VENTURA CO



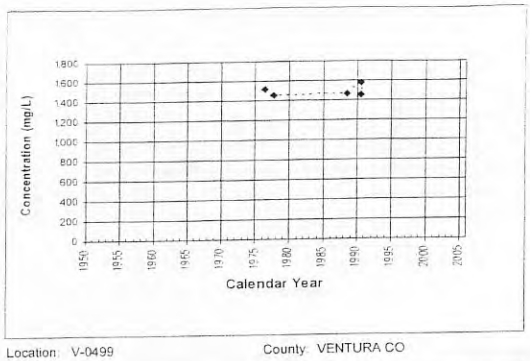
Location: V-0446 County: VENTURA CO



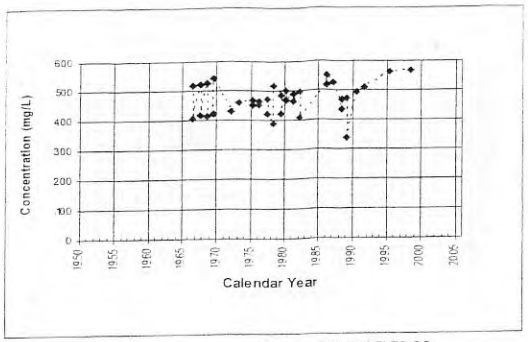
Location: V-0468 County: VENTURA CO



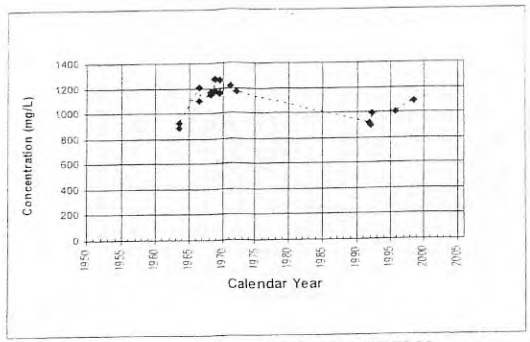
Location: V-0473 County: VENTURA CO



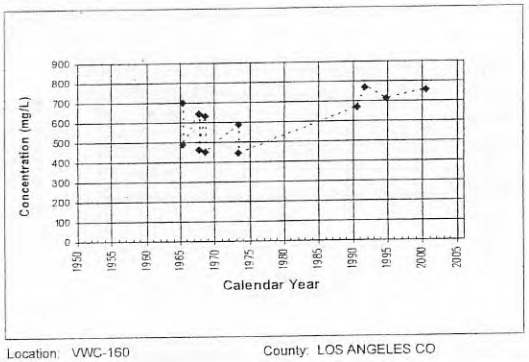
Location: V-0499 County: VENTURA CO



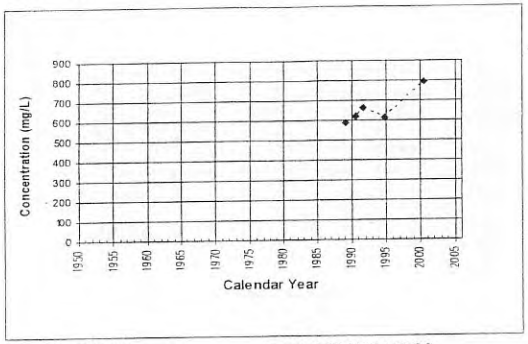
Location: VWC-157 County: LOS ANGELES CO



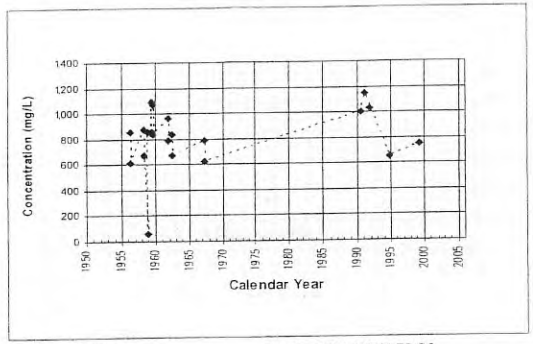
Location: VWC-159 County: LOS ANGELES CO



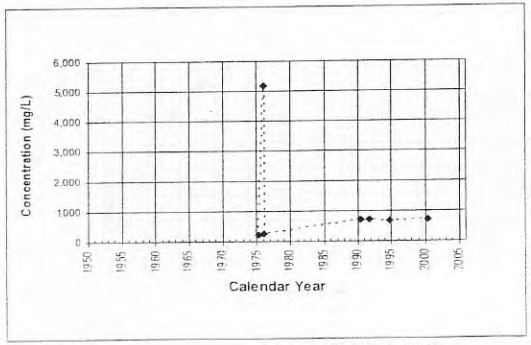
Location: VWC-160 County: LOS ANGELES CO



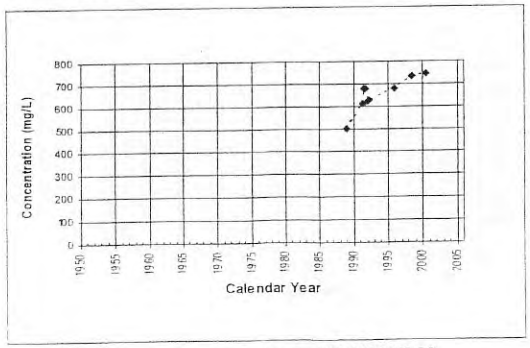
Location: VWC-201 County: LOS ANGELES CO



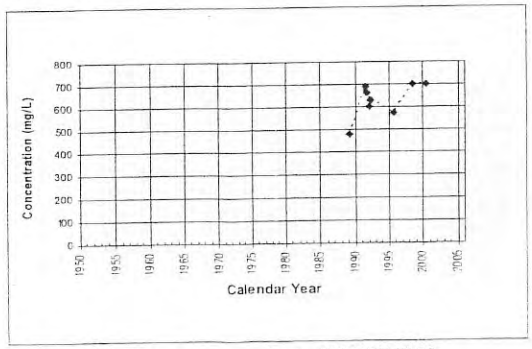
Location: VWC-D County: LOS ANGELES CO



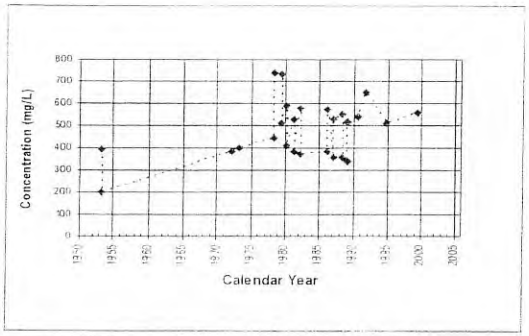
Location: VWC-I County: LOS ANGELES CO



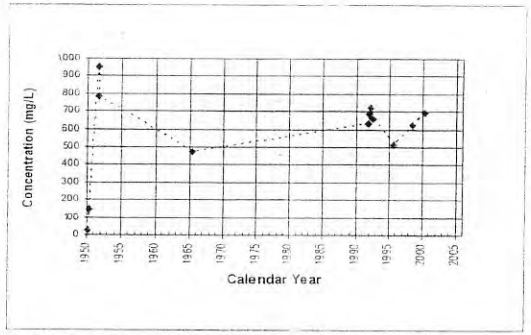
Location: VWC-K2 County: LOS ANGELES CO



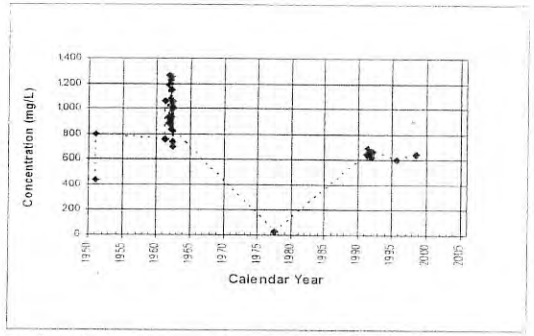
Location: VWC-L2 County: LOS ANGELES CO



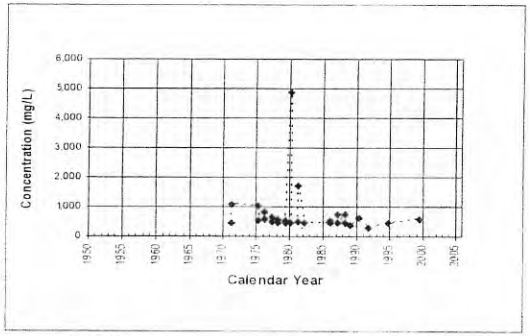
Location: VWC-N County: LOS ANGELES CO



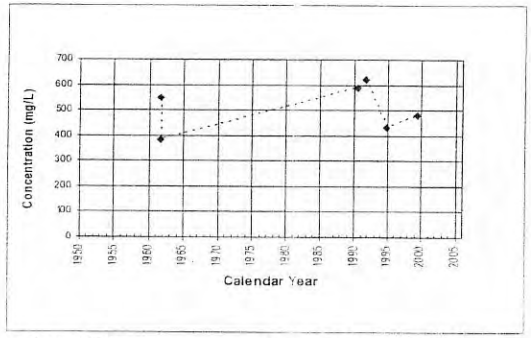
Location: VWC-N3 County: LOS ANGELES CO



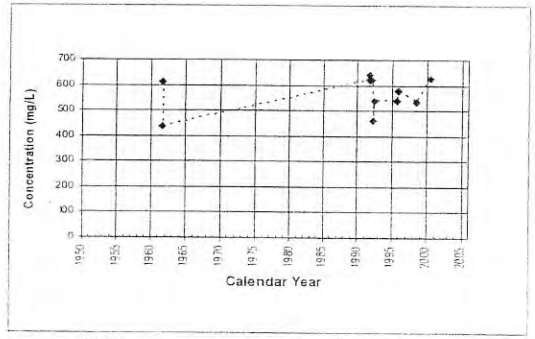
Location: VWC-N4 County: LOS ANGELES CO



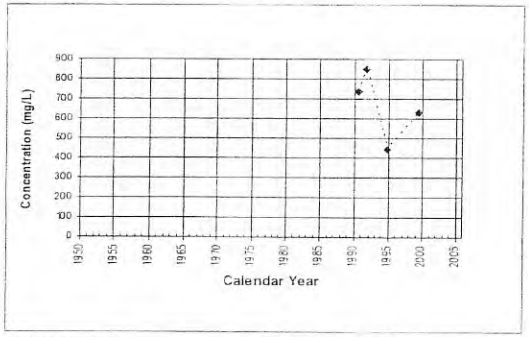
Location: VWC-Q2 County: LOS ANGELES CO



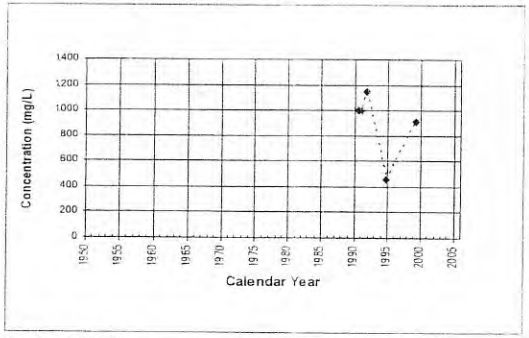
Location: VWC-T2 County: LOS ANGELES CO



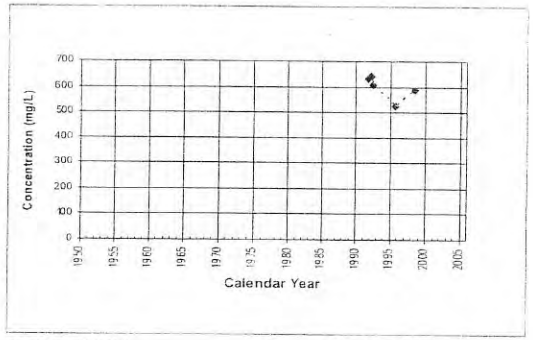
Location: VWC-T4 County: LOS ANGELES CO



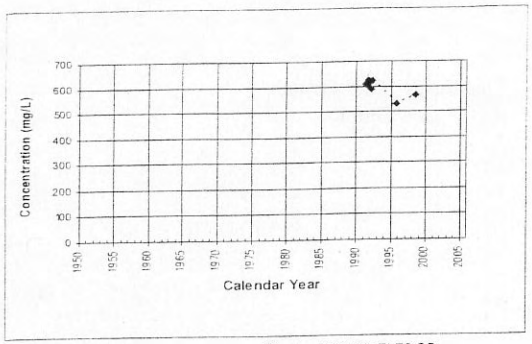
Location: VWC-U3 County: LOS ANGELES CO



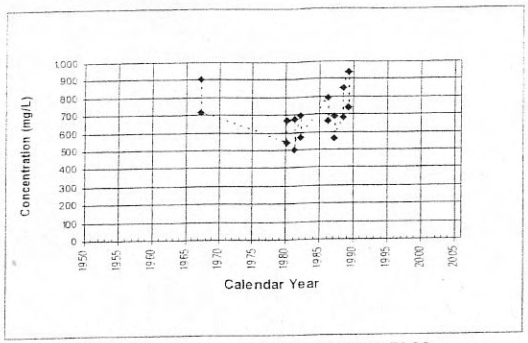
Location: VWC-U4 County: LOS ANGELES CO



Location: VWC-W6 County: LOS ANGELES CO



Location: VWC-W9 County: LOS ANGELES CO



Location: WHR-18 - Old County: LOS ANGELES CO

This Page Intentionally
Left Blank