Water Resources Data Report

Water Year 1994-1995

Monterey County Water Resources Agency
893 Blanco Circle, Salinas, California 93901
Phone (408) 755-4860, e-mail address- *hydrology@mcwra.gov*

Water Resources Data Report
Water Year 1994-1995

October 1997

Monterey County Water Resources Agency
Michael D. Armstrong, General Manager

Report Prepared by the Water Resources Management Division with assistance provided by the Technical Support Group of the Administrative Services Division

Hydrology Section

Gene Taylor, Senior Hydrologist
Howard Franklin, Hydrologist
John Stremel, Hydrologist
Dennis Lebow, Hydrology Technician
Justine Gerbrandt, Engineering Aide III

Water Quality Section

Kathleen Thomasberg, Water Quality Supervisor
Manuel Saavedra, Water Conservation Technician
Veronica Ramirez, Engineering Aide I

Technical Support Section

Robert Johnson, Senior Hydrologist
Darryl Tyler, Hydrology Technician

Editing

Lauran Howard, Assistant General Manager, Chief Engineer
Kimberley Wall, Water Conservation Technician

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Monterey County Water Resources Agency Strategic Plan

Mission / Purpose Statement

Monterey County Water Resources Agency provides flood control services and manages, protects, and enhances the quantity and quality of water for present and future generations of Monterey County.

Vision Statement

Monterey County Water Resources Agency's vision is to be recognized as a leader in efficient, innovative, and equitable water resources management.

Three-Year Goals (1997-2000)

Complete the Salinas River Basin Management Plan document and Environmental Impact Report, and begin implementation

Complete construction, begin startup, and implement operations and maintenance of the Castroville Seawater Intrusion Project and the Salinas Valley Reclamation Project

Establish budget and program priorities to improve Agency capability and efficiency

Maintain a positive relationshp among the public, Board of Supervisors, Board of Directors, Agency management, and employees

Exercise leadership, build consensus, and take action on water resources issues involving agricultural, urban, recreational, and environmental interests

Evaluate and prioritize agency services and develop a course of action to meet the requirements of Proposition 218 in Zones 2 & 2A, working through the Proposition 218 Ad Hoc Committee and the Board of Supervisors

Monterey County Board of Supervisors

Simon Salinas,Chair	District #1
Judy Pennycook	District #2
Tom Perkins	District #3
Edith Johnsen	District #4
Dave Potter	District #5

Monterey County Water Resources Agency Board of Directors

Stephen Collins, Chair	District #1
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Tim M. Handley	District #3
Paul Martin	District #4
Robert Hunsicker	District #5
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Lawrence Porter	Farm Bureau
Norman Martella	Grower-Shipper Vegetable Association
Roy Morris	Mayor Select Committee

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Section 1
Introduction

The Monterey County Water Resources Agency (MCWRA) is defined by Chapter 52 of the California Water Code. State legislation outlines the objectives and purposes of the MCWRA and states that the MCWRA is to "carry on technical and other necessary investigations, make measurements, collect data, make analyses, studies and inspections pertaining to water supply, water rights, control of flood and storm waters and use of water both within and outside of the agency ..." The MCWRA is responsible for the managing, planning and engineering of the water resources of the Salinas Valley (Valley). This report is prepared in part to fulfill that responsibility.

Data is collected in order to describe the quality, quantity, temporal trends and location of the water resources in the Valley. All of the MCWRA functions require analysis of a large amount of data. As shown in Figure 1.1, there are many types of data collected by the MCWRA, including rainfall, climate, streamflow, reservoir, ground and surface water quality, ground water levels, geology and pumping. Raw data is processed and analyzed to produce information. The funnel in Figure 1.1 illustrates how the volumes of raw data are reduced to usable information that will support the decision-making process. The information is used to identify problems and to evaluate alternative courses of action. Information products result from the MCWRA's data collection and analysis efforts which answer questions and form the basis for decisions on water management strategies for Monterey County (County). In general, data is needed to ***describe*** the history and current status of the water resources, to ***predict*** what might happen to the water resources and to ***evaluate*** management alternatives.

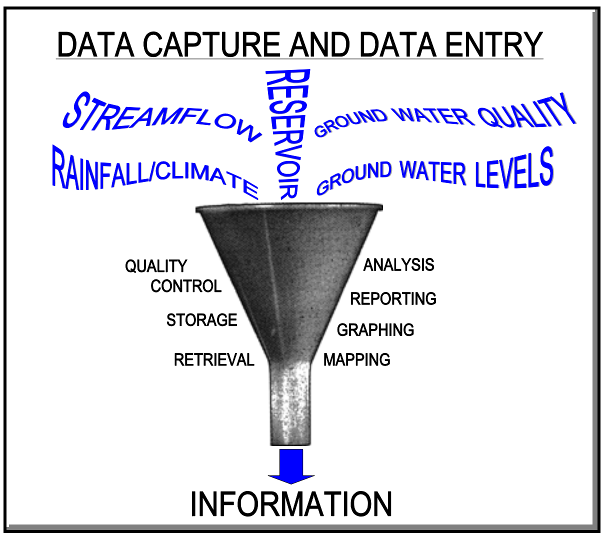

Figure 1.1 Making useable information from raw data

MCWRA Automation Effort

The MCWRA has made a significant investment in automating many of its information processing functions. The role of the computer system is to assist the MCWRA in data acquisition, storage, management, retrieval, analysis, reporting, modeling and forecasting.

The MCWRA information systems include all hardware, software, data, people, and procedures used to manage the data and produce useable information products. The computer system is used by MCWRA staff to assist in all the verification, display, transmission, dissemination, interpretation and storage of data and information needed to carry out the water management mission of the MCWRA.

The MCWRA has developed a number of applications using relational database management systems technology, and is conducting mapping and spatial analysis using a Geographic Information System (GIS). All water resources problems and related solutions have a geographic component. The use of GIS technology assists the technical staff, Board of Directors and the public in better understanding the characteristics of the water supply and the variables that need to be considered in making critical water resources decisions. The automation effort is needed to improve the responsiveness in acquisition and dissemination of information, to increase the capability and efficiency of the MCWRA staff and to ultimately reduce costs while increasing the performance of the MCWRA in meeting its strategic goals and objectives. The maps presented in this report were prepared using the GIS.

Purpose, Intended Audience and Geographic Area

The purpose of this report is to present the information produced as a result of the data collection and analysis efforts for the 1995 water year[1]. This report serves as a concise information source for the Board of Directors, the Board of Supervisors and the public. The MCWRA intends to produce an annual data report each fall following the close of the previous water year.

Figure 1.2 shows the general location map for Monterey County and depicts the areas of the Salinas Valley Basin. Due to the sources of available funding, the geographic area covered in this report is limited to the Salinas Valley. MCWRA revenues, to support this work, are derived from Zones 2 and 2A, which cover the irrigated area of the Salinas Valley in Monterey County.

[1] October 1, 1994, to September 30, 1995

Report Contents

This report essentially follows the hydrologic cycle. Beginning with precipitation, Section 2 presents the results of the MCWRA's climatic data collection program. Continuing from rainfall to streamflow, Section 3 documents the results of the stream gaging program that is cooperatively conducted by the MCWRA and the U.S. Geological Survey. Proceeding from streamflow to reservoir storage, Section 4 presents information on the two dams owned and operated by MCWRA at Nacimiento and San Antonio Reservoirs, which store a large amount of the Salinas Valley's winter streamflow. In addition to providing flood control benefits, the dams are operated to slowly release the winter's water storage to the Salinas River during the summer period of peak demand. These conserved reservoir releases recharge the ground water basin during the summer months in order to augment the existing ground water supply. Progressing from reservoir storage to ground water storage, Section 5 presents ground water data and the results of the ground water level monitoring program. Finally, Section 6 of this report presents the ground water quality monitoring program and the evaluation of the water quality data. The seawater intrusion front and the status of nitrate in the Salinas Basin are also discussed.

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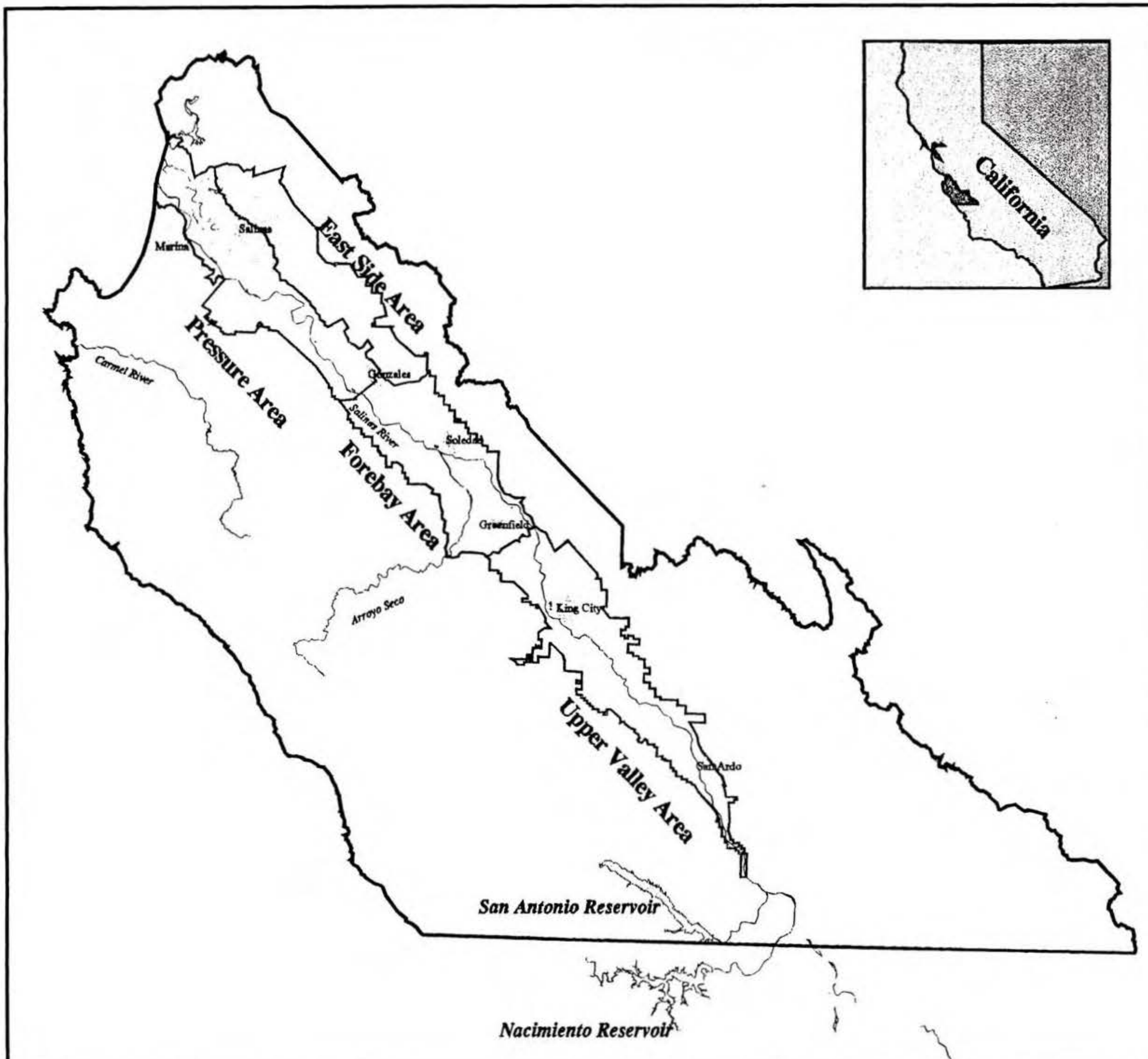

Figure 1.2

Location Map
County of Monterey

Legend:

- Salinas Valley Basin
- Incorporated Areas
- Monterey County
- Water Bodies
- Subarea Boundaries

5 0 5 10

MILES

Monterey County Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

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Section 2
Rainfall and Climatic Data

Introduction and General Program Description

Monterey County agribusiness, residential water users, the tourist industry, and all other businesses depend on rainfall as the original source of water. An area's climate is a description of its general, long-term conditions. The Central Coast and Salinas Valley enjoy what is termed a *Mediterranean* climate, with dry summers and cool, wet winters. Weather is a short-term description of the climate at any given time. The Salinas Valley can experience some years with major floods and abundant water, followed by drought conditions that can extend over a number of years. The variations in weather patterns associated with the Mediterranean climate pose significant water management challenges. The MCWRA has both a flood control and a water conservation mission.

Measurement of rainfall occurring within the County is essential to the management of water resources. The use and purpose of rainfall and climatic data is shown in Table 2.1. Rain falling in County watersheds may be stored in the soil, become streamflow, be used by plants, or percolate to ground water. Rainfall measurements are an indicator of the water supply conditions that will occur in any given year. Knowledge of long-term rainfall and climatic trends are critical to water management decisions related to flood control, water supply and water conservation.

Table 2.1 Use and Purpose of Rainfall and Climatic Data

1. Flood warning
2. Cloud seeding verification, evaluation
3. Climatic analysis, identification of regions
4. Engineering design data
5. Storm frequency analysis
6. Public information
7. Forecast verification
8. Ground water model inputs
9. Reservoir inflow calculation
10. Reservoir release management
11. Water supply studies
12. Water condition reports

The MCWRA precipitation data program consists of five independent sources and collection methods described in the following paragraphs. Locations of the rain gages in Monterey County are shown on the map, Figure 2.1.

CIMIS

The California Irrigation Management Information System (CIMIS) is an integrated network of computerized weather stations located throughout California. CIMIS is a program of the California Department of Water Resources (DWR) that provides information to improve water management through efficient irrigation management practices. Weather data including solar radiation, air temperature, relative humidity, wind speed and direction, soil temperature and rainfall, are collected from each station in the network on an hourly basis and transferred daily to a central computer in Sacramento. After being analyzed for accuracy, the data are used to estimate reference evapotranspiration (ET_o). ET_o is a standard measure of the evaporating power of the atmosphere and must be factored with a “crop coefficient” (Kc) to estimate crop evapotranspiration (ET). Table 2.2 summarizes the Salinas Valley ET_o data.

In 1993, in cooperation with DWR, the MCWRA expanded coverage of the CIMIS system in the Salinas Valley to provide improved data coverage for the various micro-climatic regions in the Valley. There are presently six CIMIS stations located in the Salinas Valley (Figure 2.1). There are several methods which can be used to access the data:

1. Direct access to the DWR computer by modem. This method provides access to all the data available from every station in the state on an hourly, daily, or monthly basis. A password is needed for access and can be obtained from the MCWRA.

2. Internet access provides daily data for the past week, and monthly data for the last eleven months. Stations are grouped by county. The universal resource locator (URL) is:
http://www.water.ca.gov/cgi-bin/dla/programs/cimis/main.pl

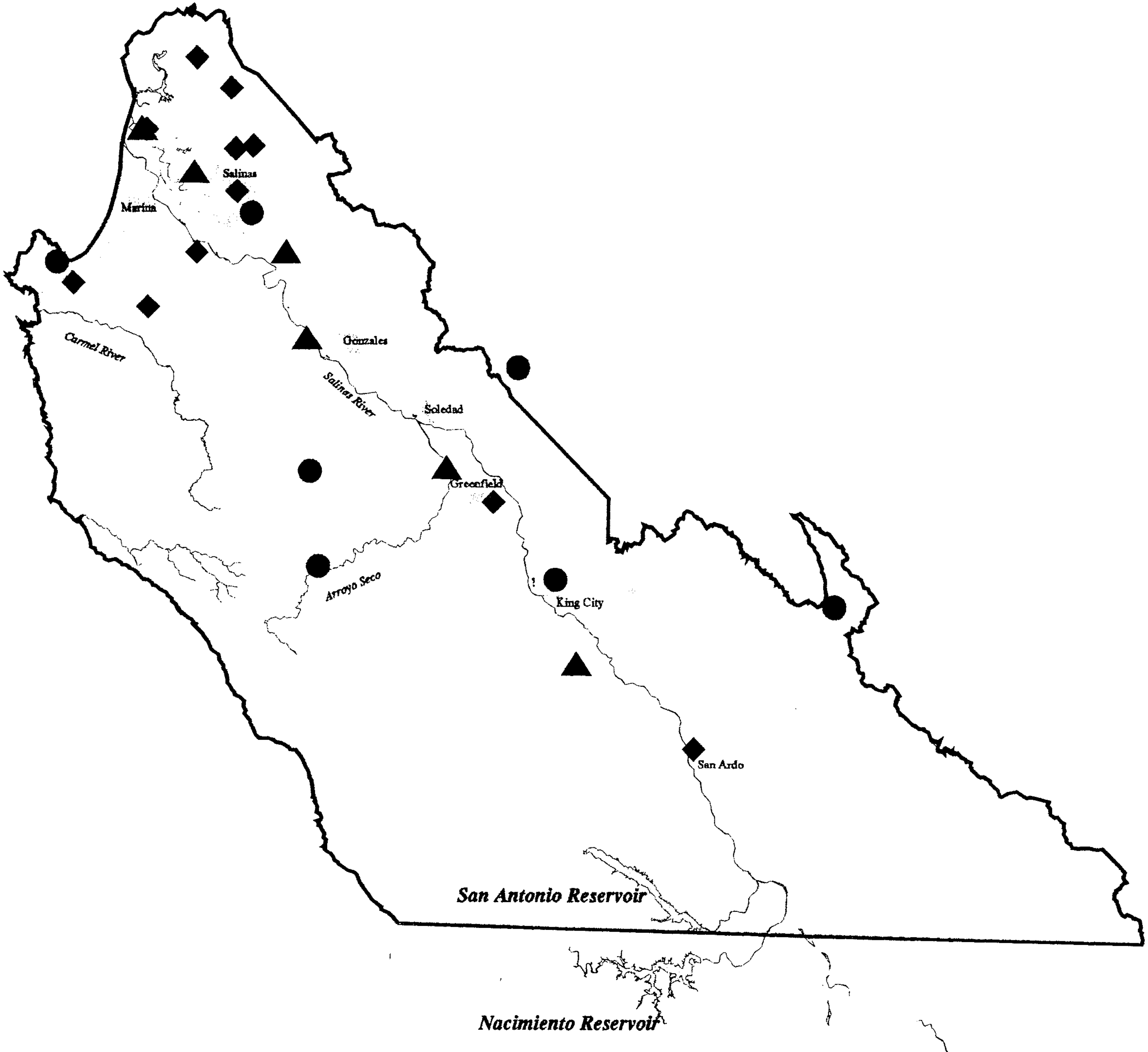
3. The Agency provides a telephone voice recording (1-800-4-U-CIMIS) which provides ET_o and rainfall data for the past week for the Salinas Valley stations.

Analysis of data from the six CIMIS stations reveals that there are three distinctly different regions of climatic water demand within the Salinas Valley.

The marine region, extending from the coast to the City of Salinas, is characterized by cool summer weather, often influenced by fog for extended periods during the day. Typical peak ET_o values in the summer are in the range of 0.15 inch per day.

Figure 2.1

Location Map
Rainfall Data Sources



Legend:

- ● NOAA Gage
- ▲ CIMIS Gage
- ◆ MCWRA & Cooperators

5 0 5 10

MILES

Monterey County Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

In the semi-marine region around the City of Salinas, especially at the southern edge near the airport, the fog often clears by mid-day during the summer, resulting in significantly higher ET_o and producing the greatest local changes in ET_o in the Valley. Typical peak daily ET_o values are in the range of 0.20 inch per day.

The interior region around Arroyo Seco and King City is characterized by hot summer days with early clearing of morning fog. Typical peak daily ET_o values are in the range of 0.25 inch per day.

Water Year 1994-95 was a cooler period than Water Year 1993-94 throughout the Salinas Valley. The annual ET_o averaged 15 percent lower than the previous year.

Table 2.2 ET_o Data Summary from Salinas Valley CIMIS Stations Rain Year 1994-1995

Month	Castroville	Salinas-North	Salinas-South	Gonzales	Arroyo Seco	King City
	ET_o (in)	ET_o (in)	ET_o (in)	ET_o (in)	ET_o (in)	ET_o (in)
July	3.09	3.62	6.29	6.12	7.09	7.34
August	3.82	4.15	6.08	6.27	6.79	7.45
Sept.	2.88	3.10	4.42	4.48	4.76	5.09
Oct.	2.83	2.98	3.70	3.62	3.70	4.06
Nov.	1.58	1.43	1.80	1.83	1.84	1.97
Dec.	1.18	1.08	1.25	1.28	1.28	1.30
Jan.	1.04	0.98	1.27	1.01	0.95	0.98
Feb.	1.49	1.26	1.60	1.50	1.66	1.68
March	2.49	2.65	2.70	2.64	3.07	3.14
April	3.67	3.70	4.31	4.22	4.92	4.72
May	3.40	3.07	4.27	4.54	5.61	5.48
June	4.59	4.60	5.84	5.98	7.27	7.11
Total (in)	**32.06**	**32.62**	**43.53**	**43.49**	**48.94**	**50.32**
(ft)	**2.67**	**2.72**	**3.63**	**3.62**	**4.08**	**4.19**

NOAA Stations

The National Oceanic and Atmospheric Administration (NOAA) maintains a network of rainfall gages throughout the county and state. The locations of the Monterey County gages are shown in Figure 2.1. Rainfall totals for each 24-hour period are collected daily, along with the maximum and minimum temperatures. The rainfall is manually measured at 0.01 inch intervals in the rain gage. The majority of these sites are located near federal or state agencies, and associated personnel record the observation. Occasionally, the site is in a remote location and "cooperators" are called upon to observe and record the data. Of the seven sites in Monterey County, two are remote. These gage locations have been in operation for many years, resulting in lengthy historical records which allow for more accurate determination of averages/trends for the location and region. This data is inspected, then certified as "official" by NOAA and used in on-going climatic definition programs.

MCWRA Recording Gages

MCWRA recording gages are located at various sites throughout the County as seen in Figure 2.1. They measure rainfall at 0.10 inch increments by weighing a catchment bucket at 15 minute intervals. The data is recorded on paper punch-tapes that are manually retrieved. This data is used for hydrologic investigations and as input for drainage culvert design engineering calculations. There are four recording gages of this type currently in use by MCWRA. During the 1994-95 Rain Year, the MCWRA is experimenting with a tipping bucket gage that may ultimately replace the older, weighing-type gages currently in use. The tipping bucket gage electronically stores rainfall at 0.01 inch increments, increasing accuracy of measurement.

Cooperators

Precipitation data from this source is provided by private businesses and local government entities that routinely collect the data and by citizen observers who volunteer to measure and record rainfall data at various locations, usually their own homes. Figure 2.1 shows the location of key cooperator gages. The rainfall is manually measured at 0.01 inch increments in a collection device and is used to supplement other official sources of data. There are currently eight cooperators in Monterey County.

ALERT

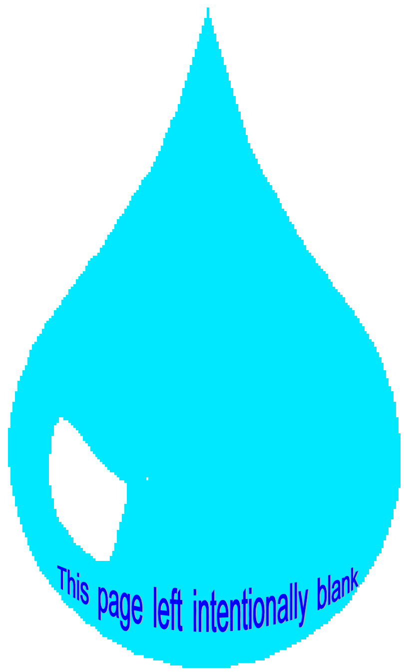
This Automated Local Evaluation in Real Time (ALERT) gaging network is owned and operated by the MCWRA. The ALERT system is used to monitor both rainfall and streamflow. The locations of the gages are shown in Figure 2.2. The ALERT network was created following the catastrophic Marble Cone fire of 1977, when the burning of 178,000 acres of coast range watershed created the possibility of massive winter flooding. The Monterey County system was the first one of its kind to be installed in the United States.

The ALERT gages transmit data by radio frequency to the MCWRA, NOAA and DWR computer systems where the data is received in real time. The rainfall is measured by a tipping bucket at one millimeter (approximately 0.04 inch) increments. The precipitation network consists of 25 rain gages and four weather stations that also provide temperature, humidity and wind velocity. County streams are monitored at seven locations; three reservoir-level sites complete the system. These data are used for flood forecasting and monitoring, estimating inflow to the reservoirs, managing the cloud seeding aerial flights and supplementing other climatic data.

General Climate and Precipitation

Monterey County's semi-arid Mediterranean climate is characterized by year-round moderate temperatures and seasonal rainfall. Moderate temperatures are largely a function of the Pacific Ocean's cooling effect on the land during the summer and warming effect during the winter. During the summer, the cool ocean currents are responsible for low clouds and fog which are prevalent along the coastal areas. The Santa Lucia coastal mountain range prevents the ocean influence from spreading to the interior regions where temperatures are more typical for the latitude.

Figure 2.3 is the mean annual precipitation map for Monterey County. Each line on the map represents the annual rainfall in inches for the areas delineated. Rainfall varies over the County and is strongly influenced by topography. The heaviest rainfall occurs in the Santa Lucia mountains along the coast, where an average of up to 70 inches of rain falls each year. In the Salinas Valley, the mean annual rainfall averages from 10 to 11 inches in the interior region and from 13 to 16 inches over northern areas. The central California rain season normally extends from late October to the end of April, and measurable rainfall occurs on an average of 51 days per year. Very little rainfall occurs during the summer in Monterey County.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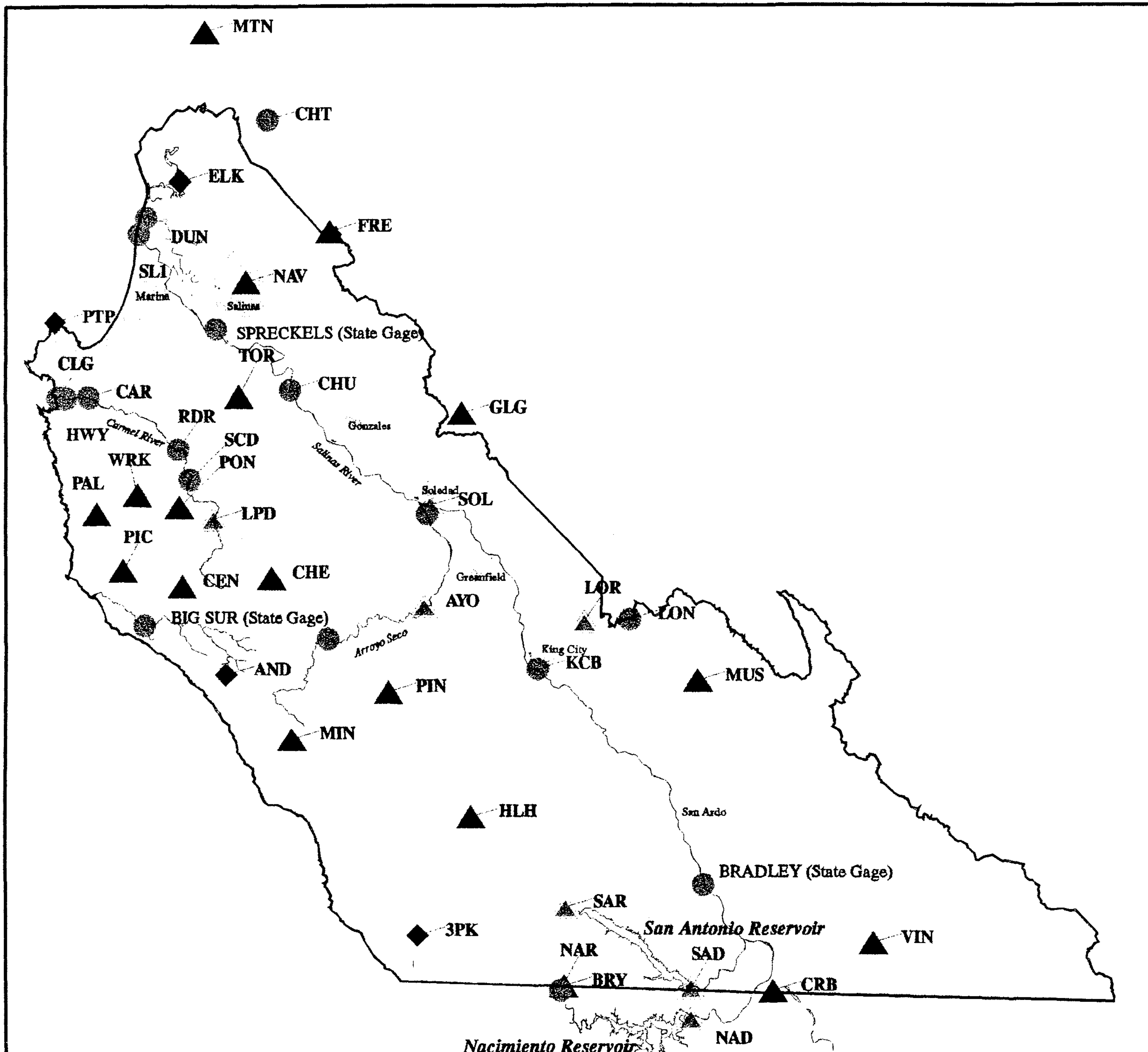

Figure 2.2

ALERT Gages
County of Monterey

Legend:

- **Precipitation Gage**
- **Stream Level Gage**
- **Precip/Level Gage**
- **Weather Station**

Monterey County
Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

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Figure 2.3

Monterey County
Mean Annual Precipitation Map

Legend:

- **Rain Contours (Inches)**
- **Incorporated Areas**
- **Monterey County**
- **Water Bodies / Channels**

5 0 5 10 15 20

MILES

Note: Non-Uniform Contour Intervals
Portion of data for the map contributed by Santa Clara Valley Water District.

Monterey County
Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

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The Salinas Valley has a number of well-defined climatic zones, ranging from cool and moist at the northern end to warm and dry at the southern end. The ocean's influence spreads into the Valley approximately 20 miles from the coast. Unlike the San Joaquin Valley to the east, the Salinas Valley has air moving freely through its length. This movement of air helps the agricultural industry, since ventilation reduces concentrations of dust, ash and smoke, which allows more beneficial solar radiation to reach the crops. Other benefits are the reduction of long-term winter fog and low cloud conditions that are prevalent in the San Joaquin Valley.

Evaluation of Long-Term Salinas and King City Rainfall

The official monthly rainfall records for Salinas and King City extend back to 1872 and 1910, respectively. These long-term records provide averages and maximum and minimum extremes, define past drought and extended wet periods and establish what should be considered "normal" throughout the Salinas Valley.

Annual rainfall is most often reported for the rain year period beginning July 1 and ending June 30. The long-term average annual precipitation for the Salinas station, using the rain year records from 1873 to 1995, is 13.44 inches. In order to assess the historic rainfall for the area, the annual data for the period of record were compiled and sorted from the lowest to the highest as seen in Figure 2.4. The sorting and ranking process was performed for both Salinas and King City. Only the ranking for Salinas Airport is presented in graphic form as an example. The sorting process labels the driest 20 percent of the rain years as "dry." The next driest 20 percent of the data is sorted and labeled "below normal." The same process is then applied to the remaining 60 percent, categorizing data into "normal," "above normal" and "wet" years. A total of five categories are defined, ranking the data based on the amount of annual rainfall. Table 2.3 lists the individual categories and corresponding percentages of normal rain year totals. The method of classifying the data into five categories of wetness is termed "creating quintiles."

After classifying each year, the data is then re-sorted to show the years chronologically, as shown in Figures 2.5 and 2.6 for Salinas and King City, respectively. The color and shading on the bars indicate whether the year was "dry," "below normal," "normal," "above normal" or "wet."

Table 2.3 Quintile Categories for Salinas Airport Station and Representative Percentage of Normal

Category	Percentage of Normal
Dry	Less than 70
Below Normal	70 to 90
Normal	91 to 109
Above Normal	110 to 130
Wet	Above 130

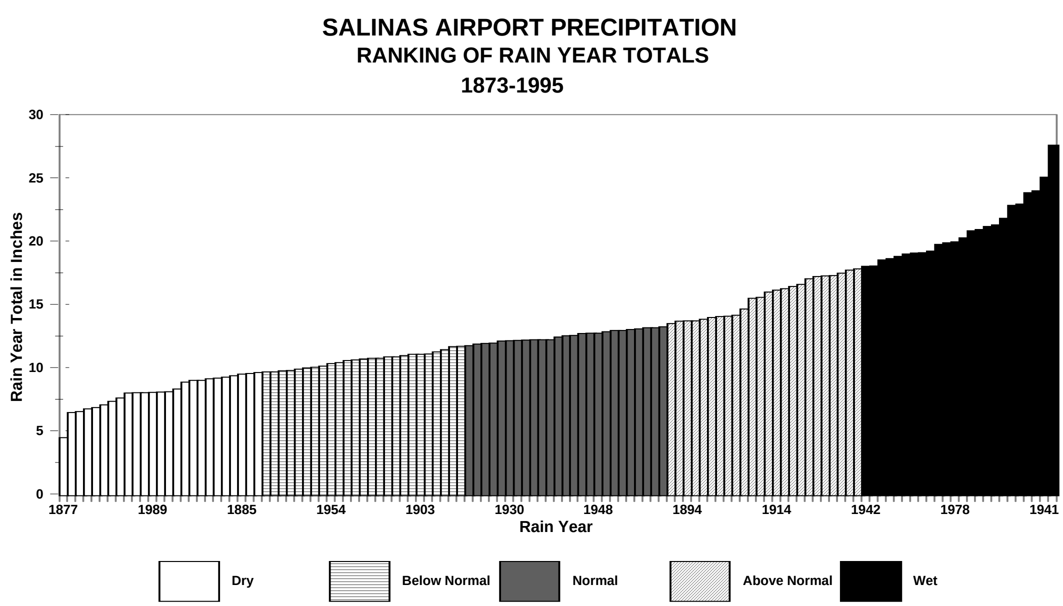


Figure 2.4

Salinas Historic Precipitation

Figure 2.5 shows the annual Salinas precipitation in inches and the classification of each year's total rainfall relative to the wetness or dryness of the year. The lowest annual rainfall occurred in 1877 when only 4.4 inches were recorded. Although a number of high rainfall years are apparent in the graph, the highest rainfall of record occurred in 1890 when 27.6 inches fell. The graph does not readily lend itself to identification of long-term trends, but a few patterns can be detected. The first 23 years of record, 1873 to 1895, formed a wet cycle when six high rainfall years occurred. An extended dry period can be observed in the graph from 1924 through

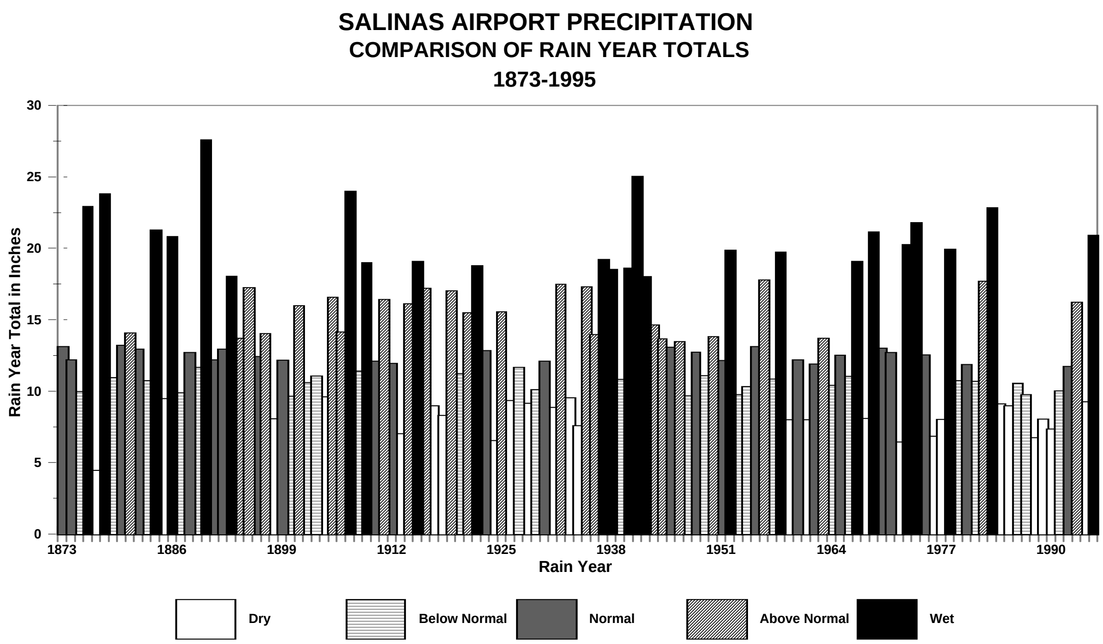


Figure 2.5

1934. The wettest consecutive period extended from 1935 through 1943 when most years were above average to wet, including slightly over 25 inches recorded in 1941. A similar 18-year wet cycle occurred from 1966 to 1983, during which seven high precipitation years occurred. Following the wet period ending in 1983, a drought occurred from 1984 through 1991. The drought is depicted on the graph as a series of dry and below normal years.

King City Historic Rainfall

King City average annual rainfall for the period 1910 through 1995 is 10.80 inches. The official rainfall record began in 1910 during a wet period as seen in Figure 2.6. By 1915, three rain years in excess of 15.75 inches had occurred as well as the minimum of record in 1913, 4.97 inches. A below normal to dry cycle beginning in 1915 prevailed until 1934 when several above normal to wet years occurred, including the 25.9 inch maximum year of 1941. This was followed by a dry to below normal period lasting from 1945 to 1951. Beginning in 1967, a greater number of above normal to wet years occurred, interspersed with exceptionally dry years of 1972, 1976 and 1990. The dry period in Monterey County following 1986 was less noticeable in the southern Salinas Valley. Rain Year 1995 was recorded as a wet year, with 18.51

inches or 173 percent of normal.

1995 Rain Data and Salinas Valley Weather Systems

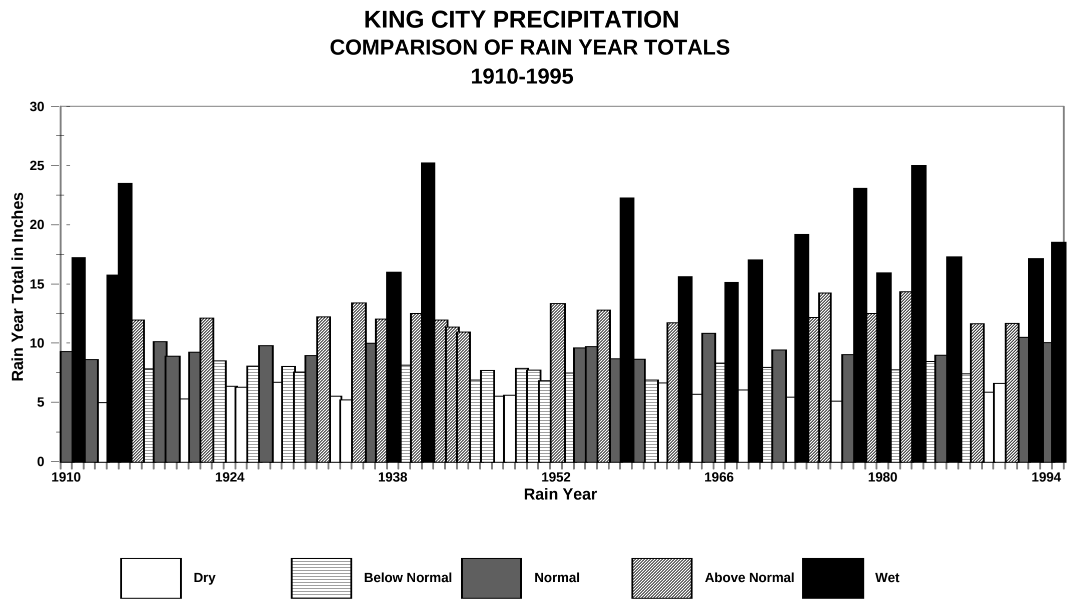


Figure 2.6

1995 Salinas Rainfall

Perhaps the most newsworthy and widely noted weather-related events of this period were the two nearly back-to-back flood events of January and March, both occurring on the 10th day of the month. These high water events were caused by unusually moist Pacific weather systems. The infamous “Pineapple Connection” occurred, the situation where moisture-laden tropical air originating near the Hawaiian Islands is drawn into West Coast storm systems roughly 3,000 miles to the north. This situation can cause very heavy rainfall in a relatively short time and is usually fully developed during very wet California rain events, as it was during both January and March. Rainfall amounts referred to were recorded at the near sea-level Salinas Airport. Rainfall measured over mountainous areas and higher terrain are roughly four to five times those recorded at sea-level.

The Salinas Airport 1994-95 Rain Year began normally, with a dry July and August and light rain during September. October rain was below normal, but storm activity increased significantly in November. By the end of November, four weather systems had passed through the area leaving 2.58 inches or 193 percent of the 1.34 inch normal. During December, nine generally weak weather systems, originating within the Gulf of Alaska region, passed over the area leaving only 1.72 inches or 88 percent of the normal 2.39 inches.

The rain year total at the end of December was 4.68 inches, which was very close to the normal 4.57 inches. It now appeared that the Central Coast area would experience a near-normal winter. During the first several days of January, light rainfall totaled less than half an inch. By January 4, however, tropical moisture had moved northward and, after entering the storm system, had begun to influence rainfall intensities as nearly one inch fell on that day. Showers continued January 5 through January 7. Figure 2.7 is a satellite photo showing the bright white cloudiness of the first in a series of storms being propelled toward the west coast by strong winds aloft. The greyish tail seen extending from the storm to the Hawaiian Islands is visible cloud and tropical moisture being drawn into the storm system. The next storm in the series can been seen to the west, extending to the horizon. The resultant two-day rainfall totaled 2.11 inches. At higher elevations, in the rainfall-enhancing Santa Lucia mountains, precipitation in varying intensities had been continuing through most of early January. From January 1 to January 8, over 13 inches had fallen. During the 48 hours of January 9 and 10, over 11 inches fell in the watershed, totaling over 24 inches for the first 10 days of January. During the remainder of January, there were 14 days with measurable rainfall, totaling 3.76 inches. January ended with 7.81

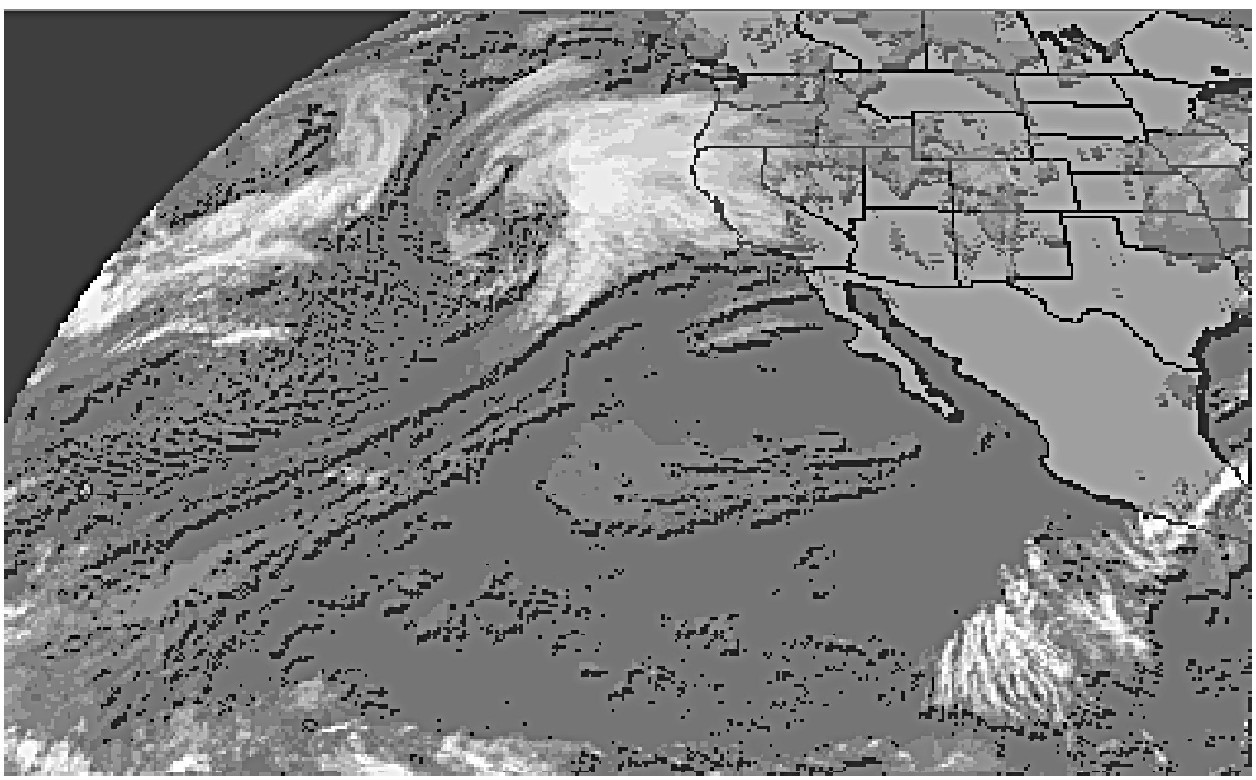


Figure 2.7 January 1995 Storms Approaching California

inches, the third wettest January in the 123-year Salinas rainfall record.

During February, a broad, high pressure area over Central California caused most approaching storms to veer northward, producing heavy rainfall in the Pacific Northwest. The rainfall total for the month was only 0.69 inch.

March began very much like January with rain occurring nearly every day during the first week, totaling roughly 0.75 inch. On March 9, as seen in Figure 2.8, the first of three powerful storm systems was already spreading rain over most of California. As in January, the area of clouds extending from the storm to near Hawaii is actually moist, tropical air moving northeastward to become converted to rainfall by the storm. The next developing storm is seen as a curl-shaped area of clouds to the west, and further west, on the horizon, is the third and last storm of the system. The combined result of the two-day rain period was 2.69 inches. At higher elevations in the Santa Lucia mountains, rainfall early in the month, from March 3 to 8, had totaled 7.5 inches. During the 48 hours of March 9 and 10, nearly 15 inches of rainfall was recorded. During the remainder of the month, five consecutive days of very light rain totaled 1.68 inches, bringing the March total to 5.31 inches. Historically, this was the fourth

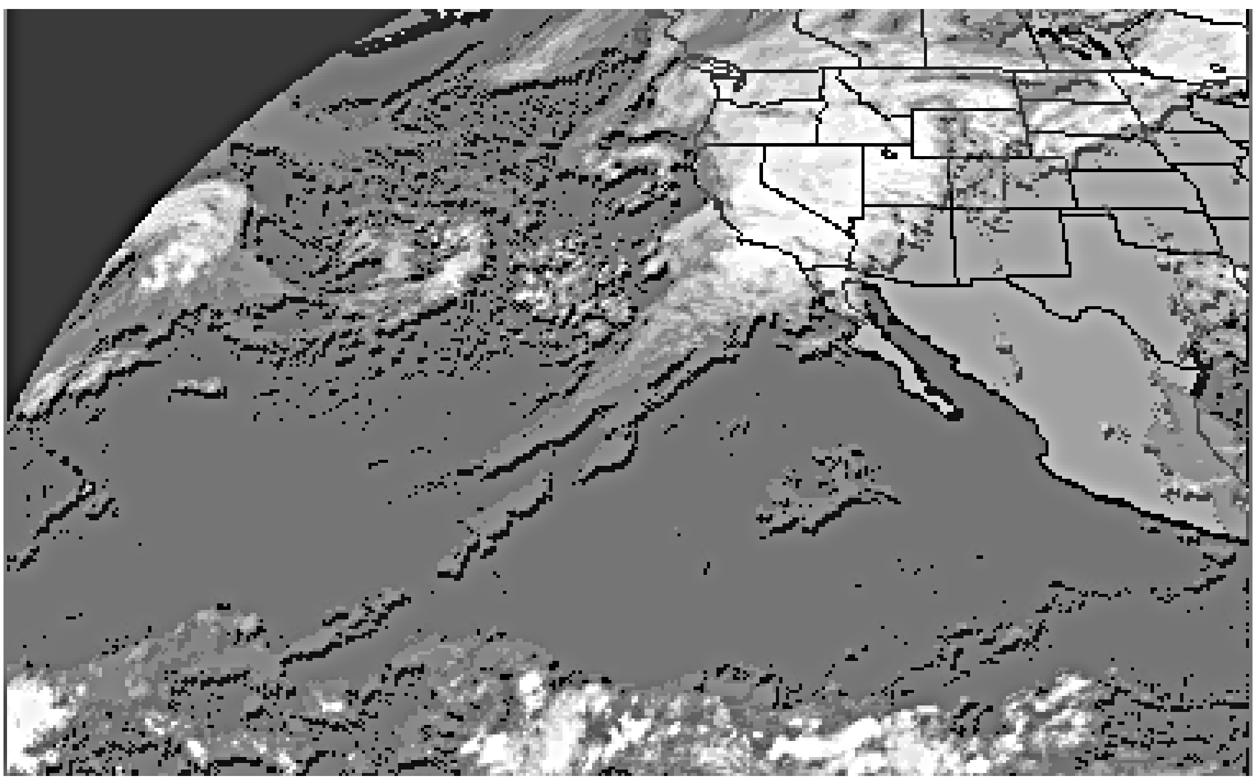


Figure 2.8 March 1995 as New Storms Develop Over California and the Pacific Ocean

wettest March at the Salinas Airport, at 241 percent of normal.

April was dry for nearly the first two weeks. On April 13 and 15, cold fronts moving through the Central Coast region left 0.77 inch of rain, and isolated showers on April 17 and 20 recorded an additional 0.14 inch. Beginning on April 27, four consecutive days of very light rain associated with a slow-moving cold front recorded 0.71 inch. April came to a close with a rainfall total of 1.62 inches or 149 percent of normal.

May is typically associated with the beginning of the rain-free summer months on the Central Coast. During the first half of the month, occasional shower periods produced 0.26 inch; the second half was dry. The May rainfall normal is 0.38 inch.

The first half of June passed without any measurable rainfall occurring. On June 15 and 16, an unusually strong weather system brushed the Central Coast resulting in a two-day rain total of 0.55 inch. Normal rainfall for June is just 0.11 inch.

Rain Year 1994-95 ended with a total of 20.92 inches or 156 percent of normal, ranking the year as the eighth wettest in Salinas history. The monthly and cumulative monthly precipitation for both 1995 and the long-term average are shown in Figure 2.9. The bars show the rainfall for the month. The line shows how the monthly and average monthly rainfall accumulate over the course of the year. The “cumulative monthly rainfall“ line represents the actual collective rainfall occurring through the rain year.

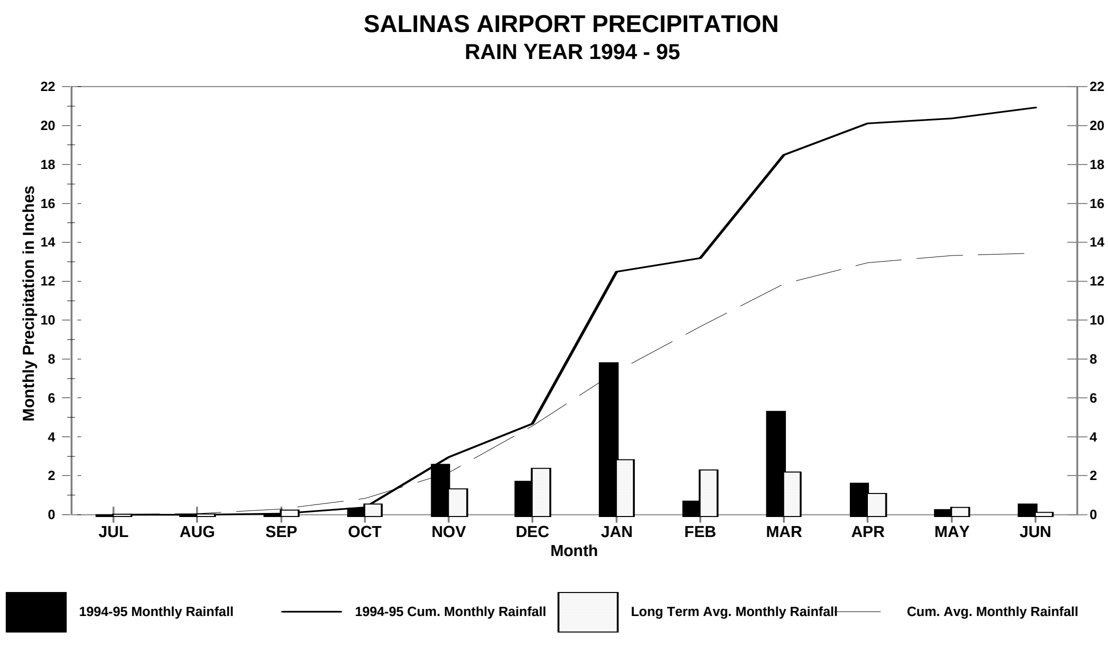


Figure 2.9

1995 King City Precipitation

Figure 2.10 shows the cumulative average monthly rainfall and 1995 cumulative monthly rainfall for King City as lines. The figure also shows the rainfall for each month for both the long-term average and for each of the months in 1995 as bars. As seen by the lines on Figure 2.10, the 1995 rainfall total through the end of December was 2.93 inches or 86 percent of normal. The rainfall during January totaled 6.12 inches or 266 percent of normal. February provided a drying period with a rainfall total of only 0.72 inch for the month. March resumed where January had ended by producing a total of 7.65 inches or 386 percent of normal. The remainder of the spring produced only 1.09 inches or 51 percent of normal. The year concluded with a rainfall total of 18.51 inches or 173 percent of normal. March 1995 was the third wettest March in King City history.

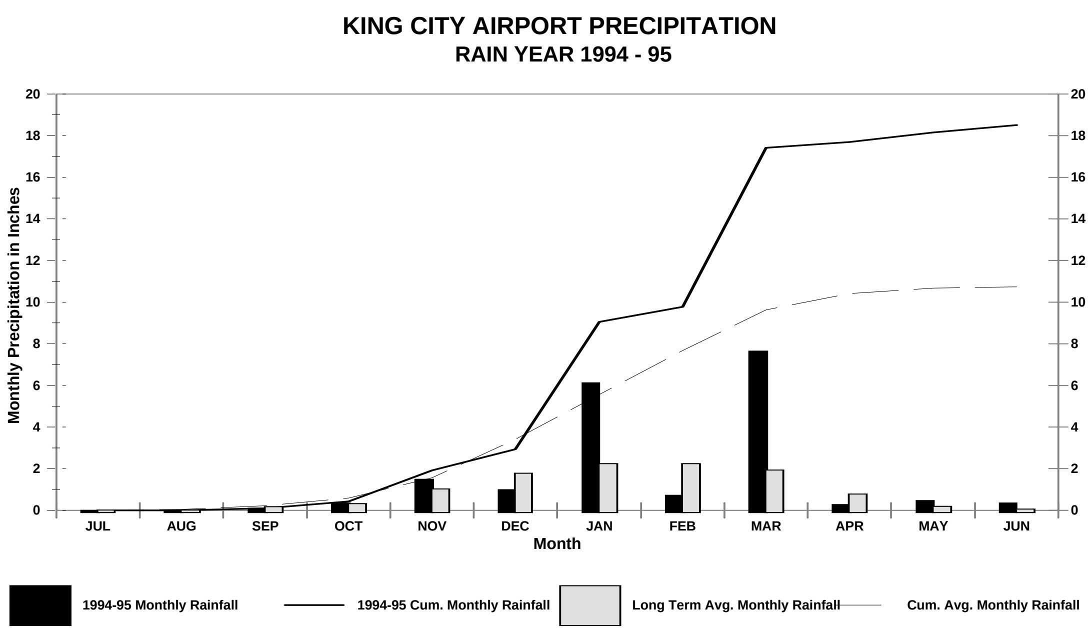


Figure 2.10

Section 3
Streamflow

Introduction and General Program Description

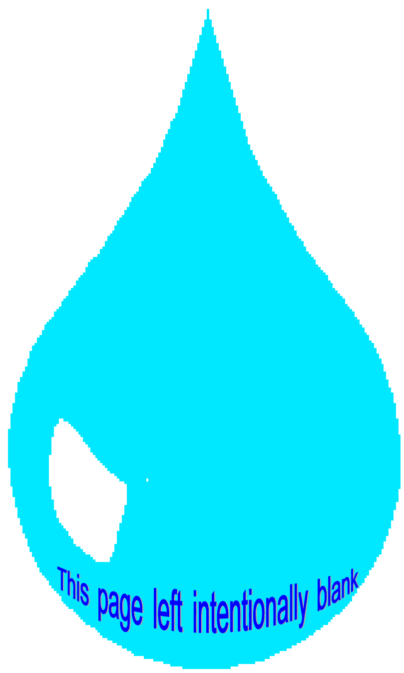
The MCWRA conducts an annual stream gaging program in cooperation with the U.S. Geological Survey (USGS). The data has multiple purposes and uses as described in Table 3.1. The locations for the Salinas River Basin stream gages are shown in Figure 3.1. Appendix C is a summary table of stream gages in Monterey County. The table lists each gage by name, period of record, average annual flow for the period of record, the 1995 water year total flow and the percentage of average annual flow observed during 1995.

Table 3.1 Use and Purpose of Streamflow Data

1. Public information
2. Water supply studies
3. Flood frequency analysis and forecasting
4. Capital project evaluation
5. Flood warning and public safety
6. Sedimentation studies
7. Ground water model inputs
8. Water rights
9. Reservoir inflow/outflow calculation
10. Calculation of streamflow losses
11. Water quality analyses

The Salinas River extends south from the mouth at Monterey Bay 135 miles to the headwaters in San Luis Obispo County. It is important to note that approximately 35 percent of the watershed lies in San Luis Obispo County. Santa Margarita Lake is the only reservoir of significance located in San Luis Obispo County. It provides a minimal amount of flow regulation and is located in the uppermost portion of the watershed. Stream gages located in the upper watershed are positioned to quantify flow originating in San Luis Obispo County. These gages are located on Estrella Creek, a tributary, and on the Salinas River at Paso Robles, though they are not shown in Figure 3.1. When the flows at these gages are added together, the total indicates the volume of streamflow which crosses the Monterey County line.

The next gage north on the Salinas River is located at Bradley and measures both the uncontrolled runoff from the upper watershed and the controlled flows from major tributaries to the Salinas River, the Nacimiento and San Antonio Rivers. Nacimiento and San Antonio Dams are the most important water management features located on the Salinas River. These dams are owned and operated by the MCWRA to provide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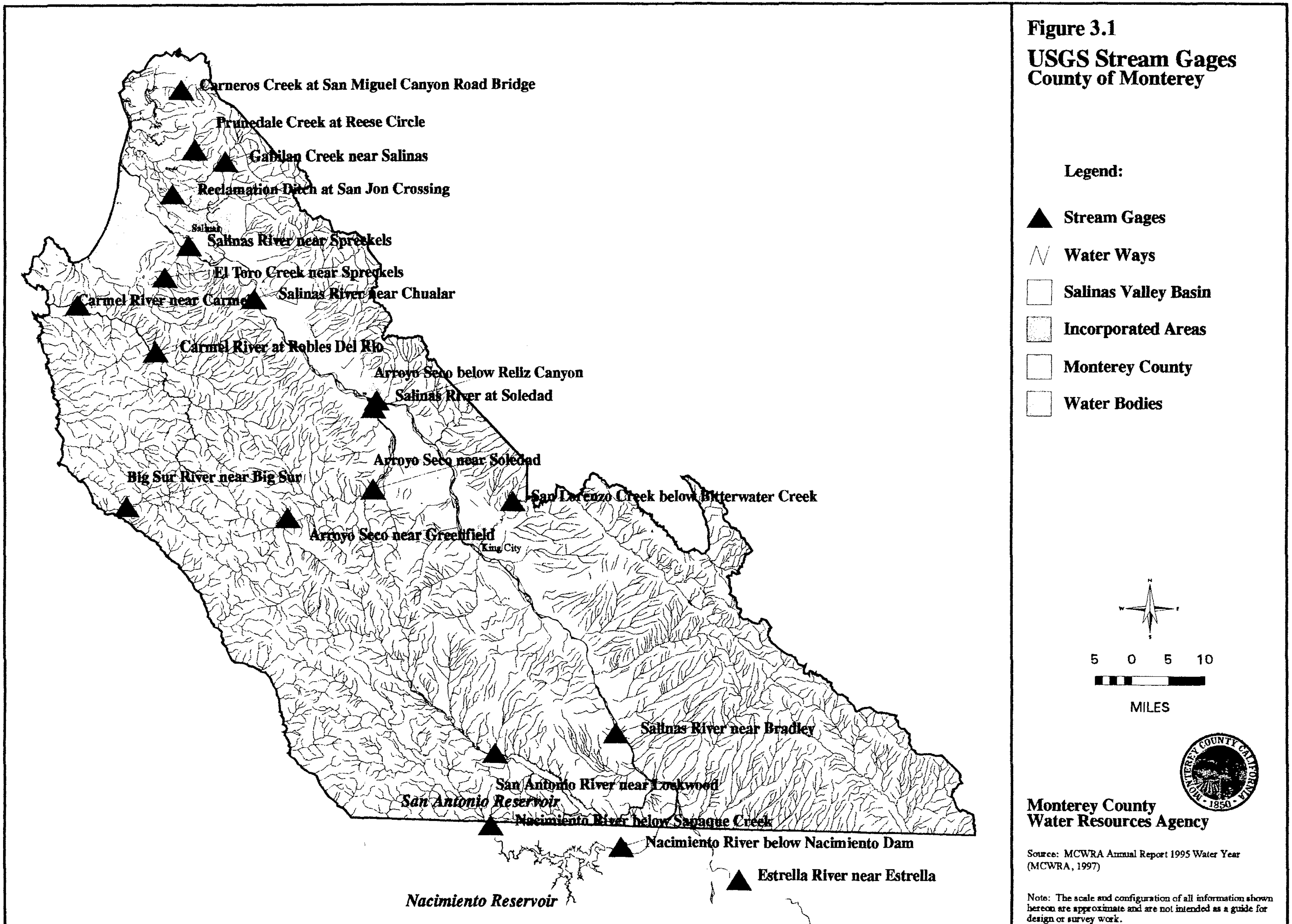


Figure 3.1
USGS Stream Gages
County of Monterey

Monterey County
Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Page after Figure 3.1

flood control, water supply, and recreation benefits. There are a number of gages located on the Nacimiento and San Antonio Rivers that assist in reservoir operations and management. Salinas River streamflows observed on the lower reaches of the Salinas River in Monterey County are the result of both uncontrolled runoff and runoff controlled by the MCWRA dams.

The water stored behind Nacimiento and San Antonio Dams helps control winter runoff and minimize flooding. Flood waters are stored behind the dams to be released down the Salinas River during the summer months to augment ground water recharge in the Salinas Valley. The operation of the two reservoirs as a single flood control system significantly influences the flow regime in the lower reaches of the Salinas River and has protected the Salinas Valley by lessening the severity of devastating flood flows.

Moving downstream from Bradley, a gage is located near Soledad above the confluence with the Arroyo Seco. The gage at Soledad measures the Salinas River streamflow before it combines with the waters flowing from the Arroyo Seco watershed. The amount of flow recorded at the Soledad gage can then be subtracted from the amount of flow recorded at the Bradley gage to determine the volume of water that percolates to the ground water basin between Bradley and Soledad.

The Arroyo Seco is an unregulated, naturally flowing stream. The watershed is undeveloped and in pristine condition. Gages along the Arroyo Seco are located to define the characteristics and amount of streamflow originating from this 244 square-mile watershed. The Arroyo Seco near Soledad gage has been in operation since 1902, which makes this gage of primary importance to any long-term streamflow analysis in Monterey County. In 1994, a new station was added on the Arroyo Seco at the lower bridge just upstream of the confluence with the Salinas River. The gage was added in response to popular demand that more information be provided on the recharge in the lower reaches of the Arroyo Seco.

Further down the Salinas River channel, gages are located at Chualar and Spreckels. The Chualar gage serves two functions; it allows the monitoring of summer reservoir releases, and it also permits calculation of the volume of water that percolates to the ground water basin between the Salinas River-Arroyo Seco confluence and Chualar. The Chualar gage is the only site in Monterey County at which the U. S. Geological Survey performs surface water quality sampling as part of its nation-wide program.

All of the gages on the Salinas River and its tributaries assist in flood warning during the winter months, and many of the gages are instrumented to be part of the ALERT system. The instrumentation allows the MCWRA to monitor storms and related river flows in real time to determine when river levels are rising and thus warn others of potentially dangerous situations. The Rainfall and Climatic Data section of the report provides greater detail on the ALERT network.

Evaluation of the 1995 Streamflow

Water Year 1994-95 will be remembered as one of the wettest in the last decade. With the precipitation total for the Salinas Airport rain gage reaching 156 percent of normal, annual runoff was increased substantially.

There was tremendous flooding in most areas of Monterey County, including the Carmel River and Pajaro River regions. However, the focus of this report is the Salinas Valley, so conditions in other areas of the County are not discussed.

As previously stated, the Arroyo Seco is an uncontrolled stream. The gaging stations on the Arroyo Seco represent natural flow conditions. Figure 3.2 shows the comparison of annual streamflow for the period of record at the Arroyo Seco near Soledad gage. As was done with rainfall for the stations at Salinas and King City, the total annual streamflow for each year has been categorized as “dry,” “below normal,” “normal,” “above normal” and “wet.” For 1995, streamflow from the Arroyo Seco indicated “wet” conditions. Note that even though the magnitude of the Arroyo Seco 1995 streamflow is in the wet range, the record indicates that there were nine years with greater annual flows.

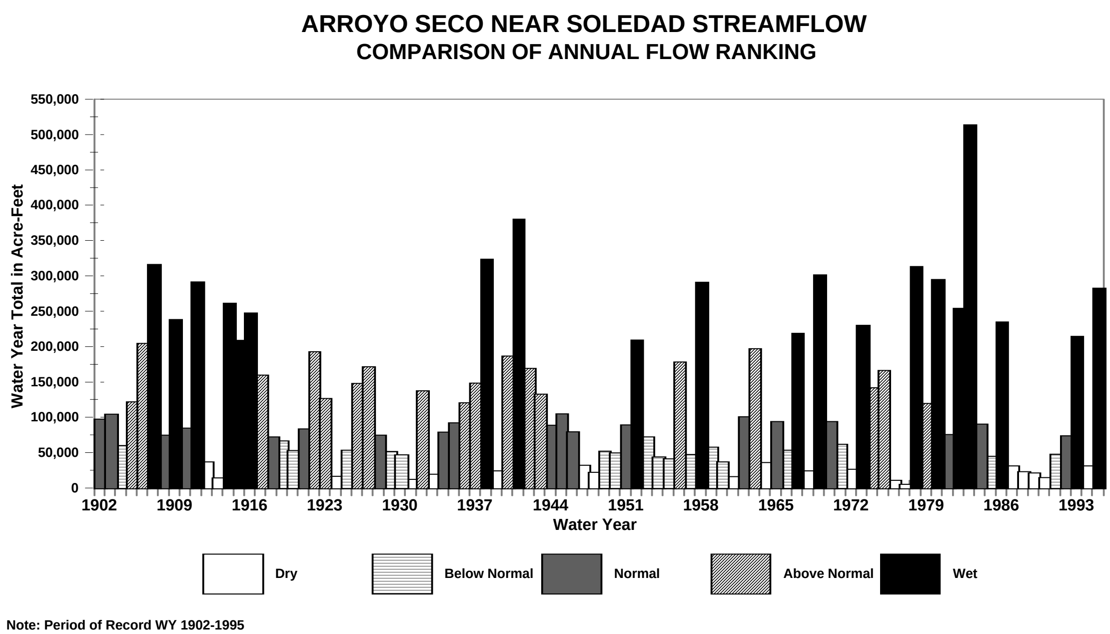


Figure 3.2

Figure 3.3 shows the monthly streamflow and cumulative monthly streamflow totals for the gage on the Arroyo Seco near Soledad for 1995 and compares these to the long-term monthly average and cumulative monthly average. The two sets of bars in Figure 3.3 show the streamflow for each month in the 1994-1995 water year and the long-term average streamflow for each month. Most apparent in the graph are the high flows for January and March. Each of these months was 410 percent of its respective monthly average.

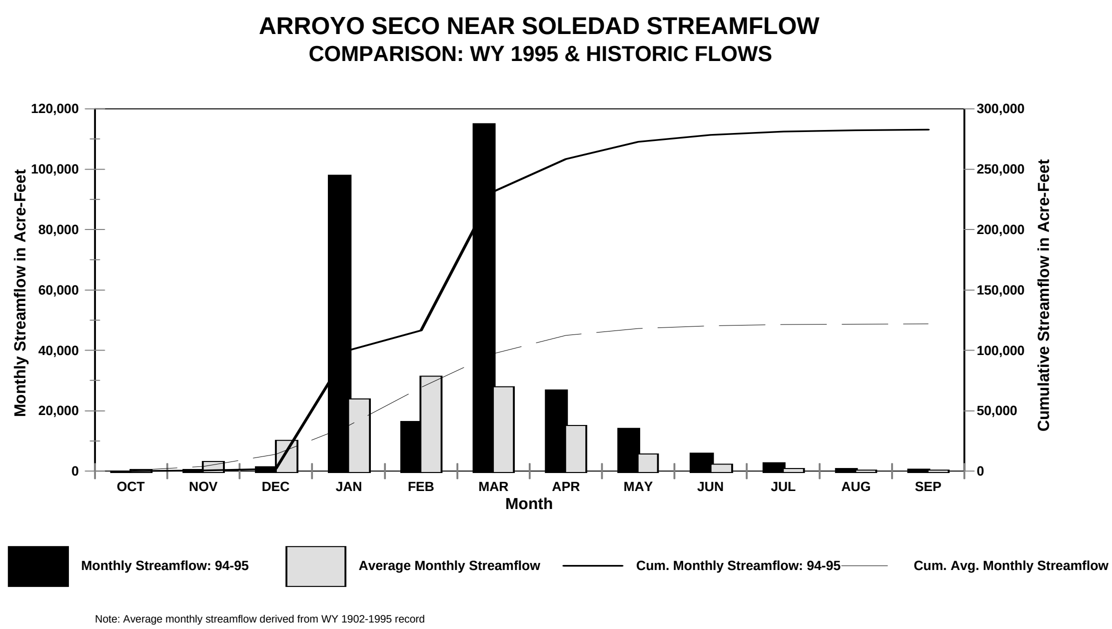


Figure 3.3

The March flow was particularly remarkable, totaling 115,100 acre-feet, or 95 percent of the average annual flow. The lines in Figure 3.3 show the cumulative monthly streamflow for this water year and the long-term average. The long-term average annual flow for the Arroyo Seco is 122,000 acre-feet. The 1995 annual flow totaled 282,700 acre-feet, which is 232 percent of normal for the year.

Figure 3.4 shows the streamflow measured for the Salinas River at Soledad gage. The streamflow observed at this location includes the water that flowed from San Luis Obispo County and the water released from the reservoirs. The combined flow from San Luis Obispo County, as measured by the Estrella Creek gage and the Salinas River Paso Robles gage, was 337,120 acre-feet for the 1995 water year.

The monthly and cumulative monthly totals for the Salinas River at Soledad gage are also presented in Figure 3.4. The long-term average streamflow measured at this gage is 285,300 acre-feet per year. For the 1995 water year, the annual flow totaled 802,400 acre-feet, which represents 281 percent of normal streamflow. The higher streamflow is attributed to the extremely high January and March monthly totals, as in the case of the Arroyo Seco near Soledad gage.

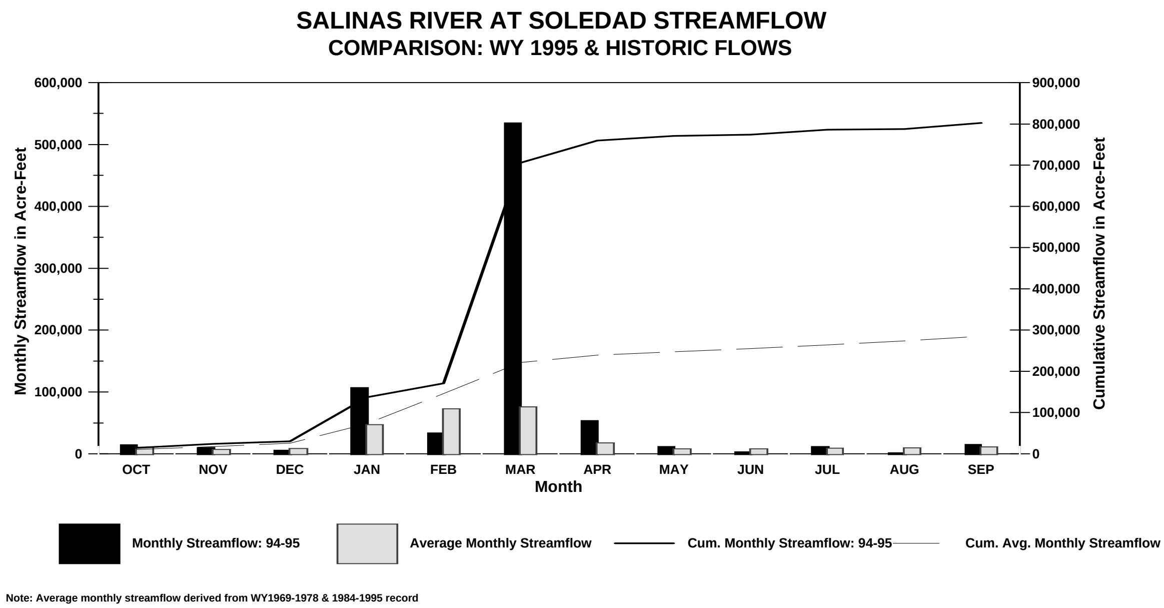


Figure 3.4

Reservoir releases tend to minimize the impact of dry cycles since the water released may be carry-over storage from previous water years. Arroyo Seco streamflow records reflect the responsiveness of the basin to rainfall amounts and intensity. As the rainfall increases or intensifies, the flow increases, whereas streamflow observed at the Salinas River Soledad gage is usually more uniformly distributed throughout the year. The traditionally even distribution of streamflow at the Soledad gage results from controlled reservoir releases, which in turn provide ground water recharge benefits. This year, however, some of the releases were made to evacuate the flood pool to allow for more storage during the months of higher rainfall. The reservoir release criteria, along with the effects of the reservoir releases and streamflow percolation to the ground water basin, will be discussed further in the Reservoir Operations section of this report.

The 1995 streamflow for the Spreckels gage is shown in Figure 3.5. The total annual flow observed at this site in 1995 was 837,000 acre-feet, which represents 317 percent of average. The average annual flow for the 1942 to 1995 water-year period is 265,500 acre-feet. Extremes for this station include flooding during extremely wet months, and months to years of no flow during extremely dry periods.

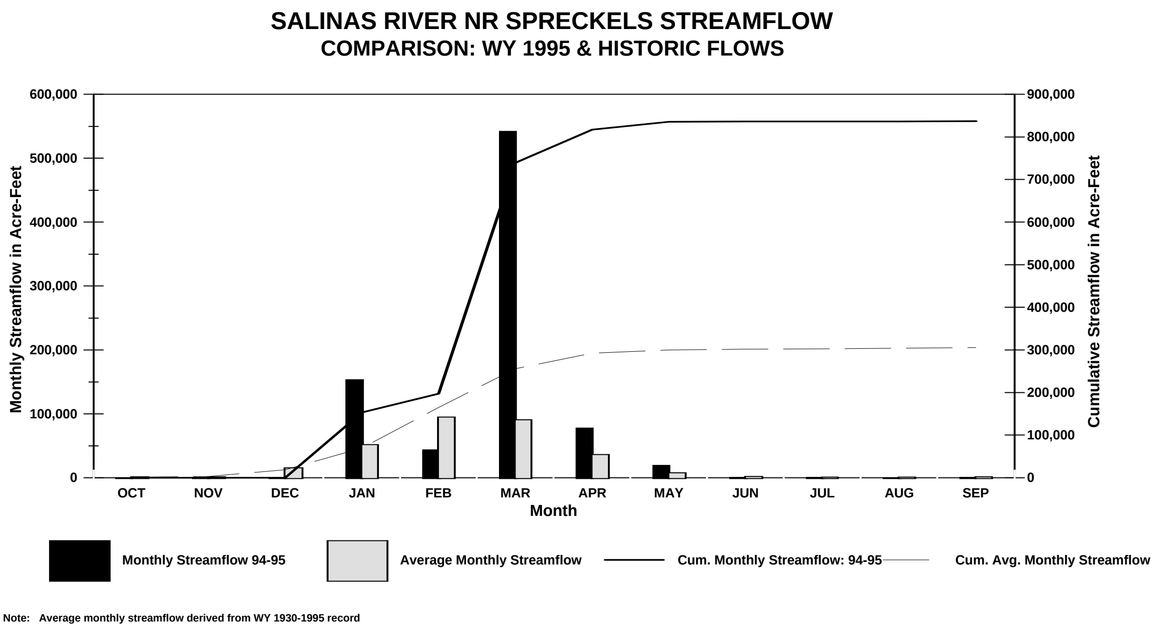
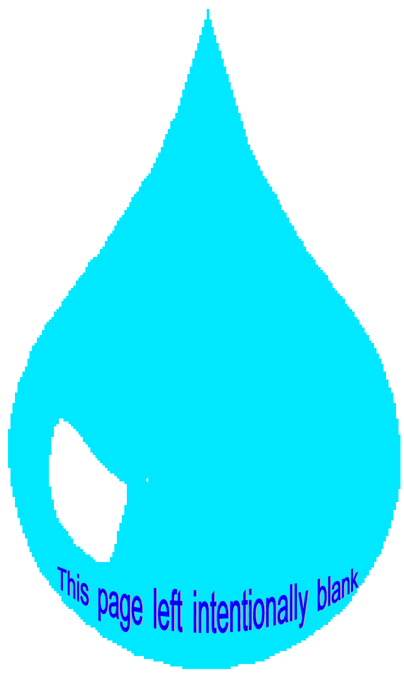


Figure 3.5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Section 4
Reservoir Operations

Introduction and General Program Description

The use of ground water for the irrigation of crops became common practice in the Salinas Valley Basin in the early 1900s. Later, with the advent of the deep well turbine pump, the depth to ground water was eliminated as a major problem and irrigation spread throughout the Valley. Farming was no longer totally dependent on rainfall and many new crops were grown. The benefits from increased ground water pumping were not without consequence. As pumping lowered the water table, seawater began to move inland into the aquifers and was observed at the coast in the mid-1930s.

Winter flooding along the Salinas River was also a significant problem and damage to farmland was extensive when the river overflowed its banks. Flooding, declining water tables, seawater intrusion and increased development all led to public recognition of the need to better manage surface and ground water.

The operation of large water resource facilities, such as the two reservoirs, carries with it significant responsibilities and challenges. Public safety and the soundness of the structures are the primary concerns. The MCWRA is also accountable for wise and efficient use of the available water. Table 4.1 shows the use and purpose of reservoir data. Accountability for the water requires accurate measurement of both inflow and outflow at the reservoirs, as well as rainfall and evaporation. Daily measurements of this data are taken and recorded. The data also provide a historic record of the natural flow of water into the reservoirs and are evaluated to improve efficiency in the operation and management of the stored water. Modeling of data also provides a useful tool for evaluating the effectiveness of various alternatives for managing the resource.

Table 4.1 Use and Purpose of Reservoir Data

1. Public information
2. Operations analysis
3. Maintain MCWRA water rights
4. Flood control
5. Water conservation
6. Reservoir inflow/outflow calculation
7. Capital improvements planning
8. Decision support
9. Drought response

Reservoir Construction

In the 1940s, after extensive study of local water problems by the community, the county and the state, the cause of seawater intrusion was determined to be over pumping of underground water supplies. Monterey County has historically been favored with strong community leadership and far-sighted government. The first steps in a solution to the problems were taken in 1947. At the request of the Monterey County Board of Supervisors, the state legislature passed an act creating the Monterey County Flood Control and Water Conservation District, subsequently renamed the Monterey County Water Resources Agency (MCWRA). The newly formed entity encompassed all of Monterey County and was given the authority to create local zones to finance and construct water resource facilities to solve the water supply and quality problems. These facilities would be financed by zones which would receive benefit from the project.

In 1956, a $7 million general obligation bond for construction of a dam on the Nacimiento River was placed on the ballot. The measure passed easily with an 11 to one margin. The Nacimiento Dam was completed in February 1957.

The Nacimiento Dam was expected to only partially solve the problems of the Basin, and in the early 1960s it was determined that the Salinas Valley was in need of additional water supplies. The district engineer recommended that a dam be constructed on the San Antonio River. The county board set a general obligation bond election for September 1963. A $12.9 million bond issue was carried by a large margin and the San Antonio Dam was constructed. The new dam began impounding water in December 1965. In addition to the funds provided by the local bond issues, the district received a grant from the state for $3.82 million because of state-wide recreational benefits created by the San Antonio Reservoir.

The bond for Nacimiento was fully paid in 1996. The bond for San Antonio is scheduled to be retired in the year 2004.

Reservoir Storage Allocation

Each reservoir was designed to provide a total capacity of 350,000 acre-feet of water storage. After construction, the initial engineering surveys used U.S. Geological Survey topographic mapping to confirm the capacities. In 1989, improvements in mapping technologies using aerial photography led the MCWRA to review the reservoir storage figures. The result of engineering surveys prompted revisions to the total storage figures for Nacimiento and San Antonio reservoirs. The total storage and storage allocations for each reservoir are shown in Figures 4.1 and 4.2 for San Antonio Reservoir and Nacimiento Reservoir, respectively.

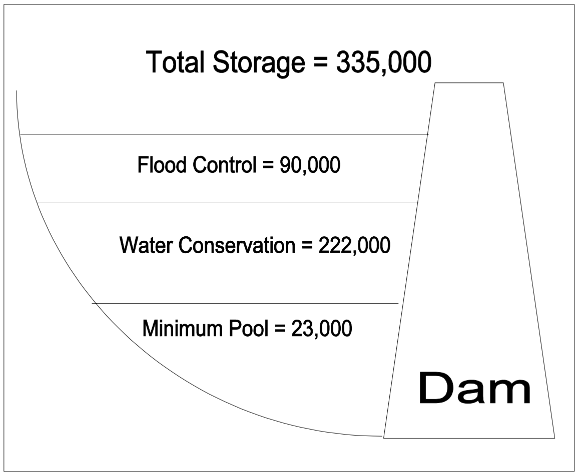


Figure 4.1 San Antonio Reservoir Storage Allocation (Acre-Feet)

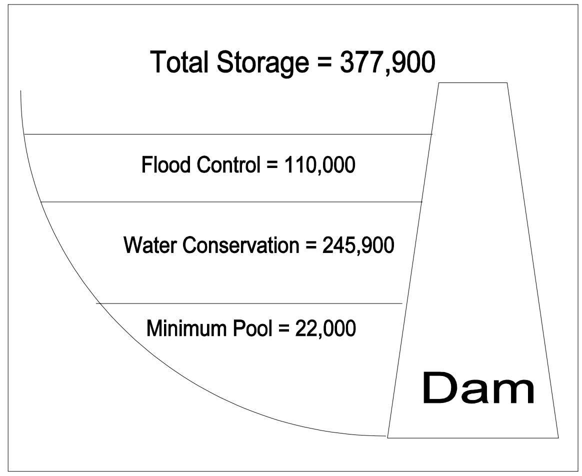


Figure 4.2 Nacimiento Reservoir Storage Allocation (Acre-Feet)

From the inception of both projects, the storage at the reservoirs has been designated to serve multiple objectives related to flood control and water conservation. Recreational benefits also accrue from water stored. Minimum pools provide recreation and protect environmental quality through the preservation of fisheries and wildlife. The multi-purpose allocations of storage were specified in the voter-approved bond measures and incorporated in MCWRA water rights and operations plans. Water conservation pools and associated storage rights allow the capture of winter storm runoff that would have flowed to the ocean.

The capacities of the flood control pools are presently determined from criteria established by the State Division of Safety of Dams (DSOD). The Federal Energy Regulatory Commission (FERC) also establishes requirements for flood storage space at Nacimiento since there is a hydropower generation plant located on the outlet works of the dam. In the late 1980s, new flood control pools for each reservoir were established by the DSOD and FERC based upon engineering studies of the storage needed to manage high flows during the winter season. Nacimiento Reservoir receives nearly three times as much runoff as does San Antonio, so the need for flood control storage differs. Operational criteria called “rule curves” are used to manage reservoir storage and are shown in Figures 4.3 and 4.4 for Nacimiento and San Antonio, respectively.

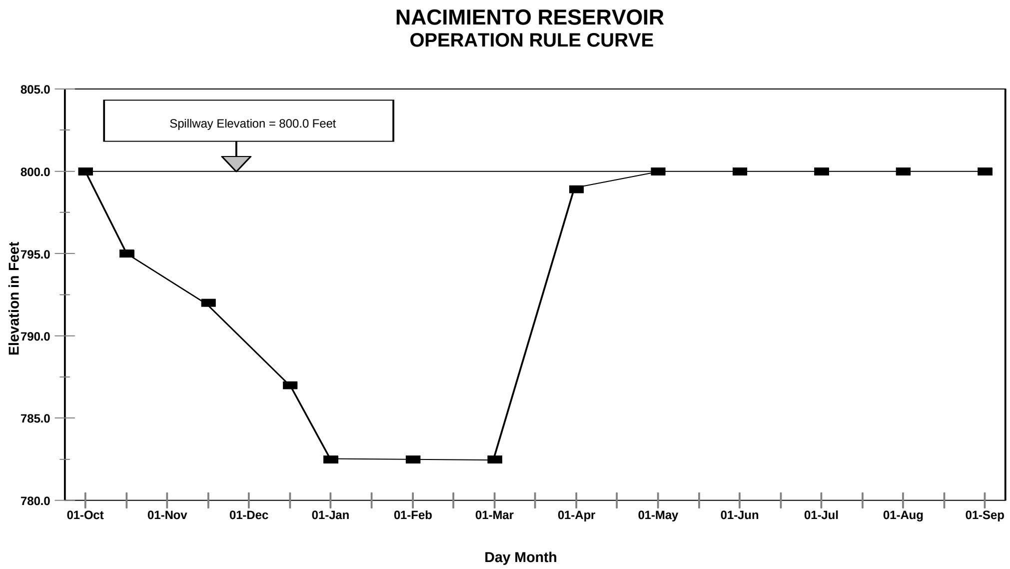


Figure 4.3

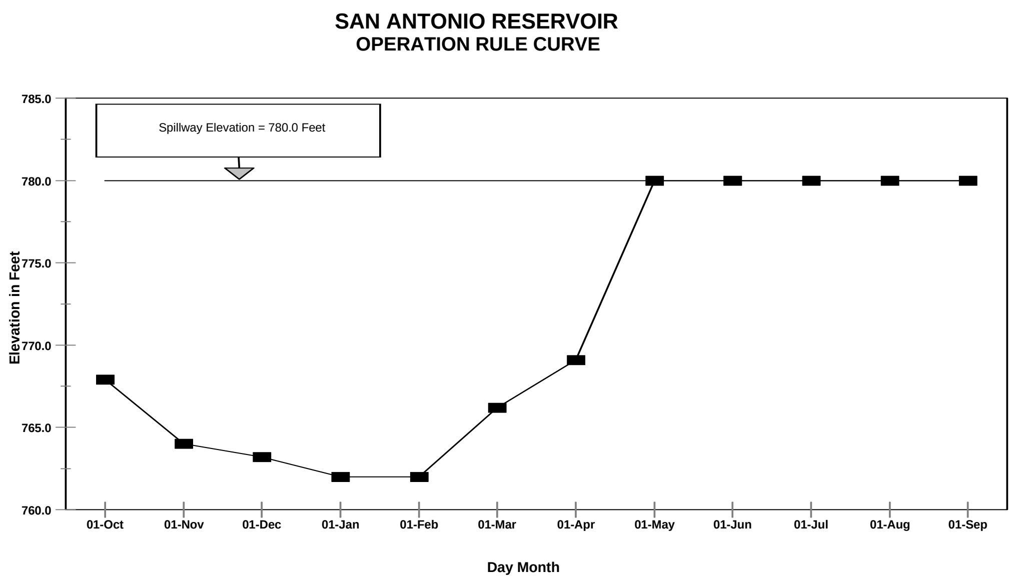


Figure 4.4

The rule curves specify the reservoir storage space which must be available to assure containment of the maximum runoff that could enter the reservoirs, known as Probable Maximum Floods (PMF). The size of the flood control pool changes from month to month throughout the winter. Flood control releases are made to maintain adequate flood control storage space in the winter and to stay within the operating rule curve. Nacimiento Reservoir is actually operated at a level approximately five feet lower than shown in Figure 4.3 to provide greater flood protection to the Salinas River Basin. The rule curves establish the elevation that cannot be exceeded to assure that water does not flow over the dams. Overtopping a dam could cause failure of the structure and severe flooding downstream. The rule curves may change in the future as more recent meteorologic and hydrologic data allow the update of engineering studies.

Although much of the watershed for Nacimiento Reservoir lies within Monterey County, the reservoir and dam are situated within San Luis Obispo County. As a result of agreements reached during the negotiations on the water rights permits for the construction of San Antonio Dam, an entitlement of 17,500 acre-feet per year from Nacimiento was granted to San Luis Obispo County. To date, a portion of the allotment has been used to supply drinking water to developments surrounding Nacimiento Reservoir and to increase flow in the river below the dam. The balance of the annual allotment has remained in Nacimiento while San Luis Obispo County evaluates the feasibility of projects that would use their entitlement to deliver water to other parts of San Luis Obispo County.

Historic Reservoir Storage

Water stored in the reservoirs for conservation purposes is released into the Salinas River each year when natural runoff diminishes. As ground water pumping for irrigation of crops resumes each year, reservoir releases provide replacement water to recharge the ground water basin and meet the various water demands.

Water that is stored in the reservoirs varies greatly with yearly weather patterns and the demand for recharge in the Salinas River channel. Generally, enough rainfall occurs during the winter season to replenish water that was released from the reservoirs for conservation purposes during the prior summer. Figure 4.5 shows the monthly storage in Nacimiento Reservoir for the past 11 years, ending in 1995. Figure 4.6 shows the storage-elevation curve and the area-elevation curve for Nacimiento. Using the curves in Figure 4.6, the volume of storage or the surface area of the reservoir can be determined for any water surface elevation.

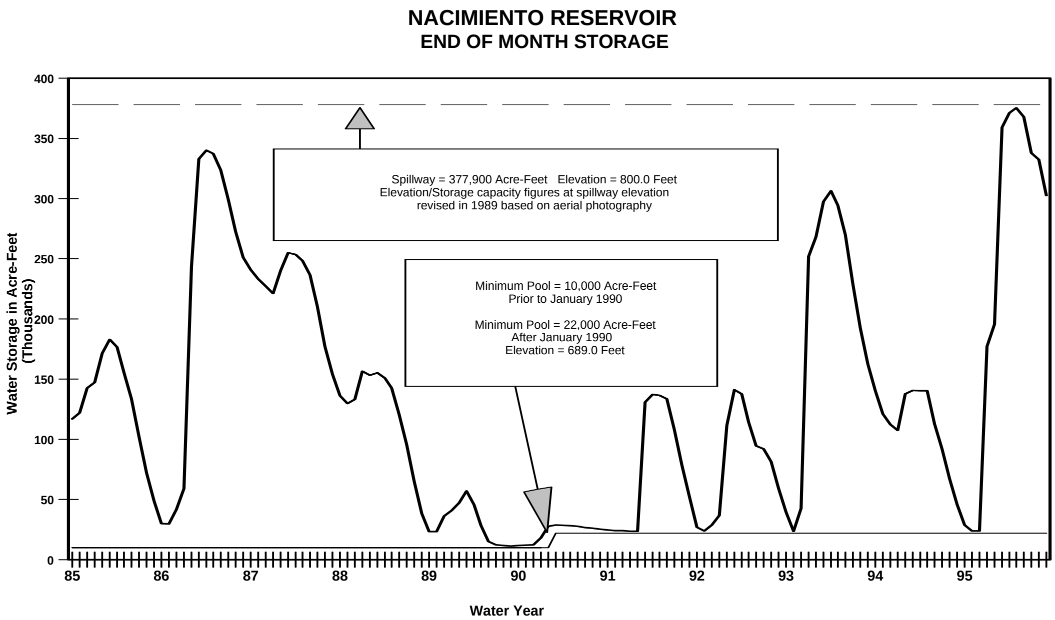


Figure 4.5

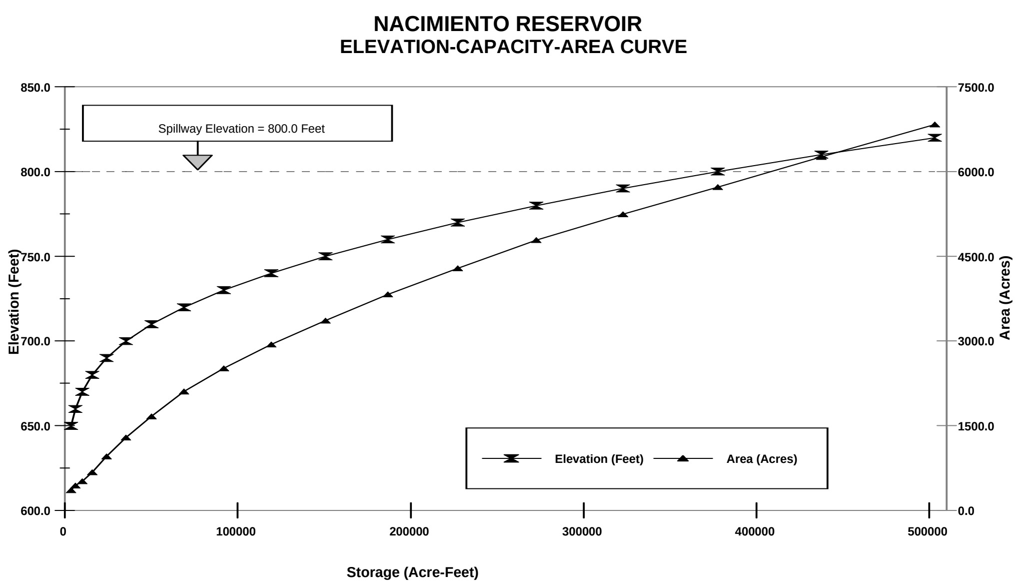


Figure 4.6

Figure 4.5 shows that Nacimiento Reservoir had a number of years with limited storage. The low levels at the end of 1985 were due to dry climatic conditions. In 1985, releases for percolation caused the reservoir storage to decline almost to minimum pool.

Fortunately, a greater than normal rainfall year occurred in 1986 and abundant inflow refilled the reservoir. In 1989, the entrance to the low-level intake structure was raised 11 feet. This allows the MCWRA to inspect the structure and its three 42-inch butterfly valves without lowering the lake elevation below the new minimum pool. A new minimum pool was agreed upon with San Luis Obispo County and noted in the MCWRA state water rights license. Following the very wet year in 1986, the area experienced a general decline in surface water supplies due to effects of the drought which began in 1987. Inflow diminished and reservoir levels declined to historic lows. In July 1989, storage reached minimum pool and remained near that level for more than one and one-half years. Except for minimal releases required to sustain fish, no water was available for percolation releases.

In 1990, the MCWRA began a five year cloud seeding pilot program with the goal of increasing rainfall in the two reservoir watersheds. An independent evaluation of the program's effectiveness indicated an average increase in reservoir inflow of 23 percent during the five year period. By 1992, storage had increased sufficiently to allow conservation releases to resume. Reservoir storage rose significantly during 1993 when inflow to the reservoir reached 186 percent of normal. Reservoir storage declined again during 1994 with inflow amounting to less than 30 percent of normal.

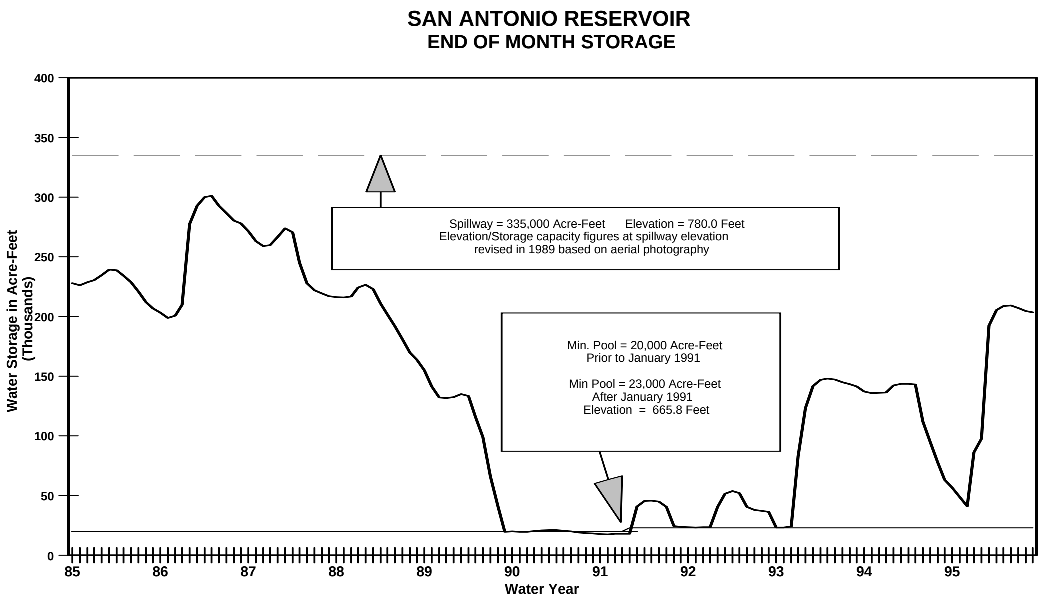


Figure 4.7

Figure 4.7 shows the historic storage for San Antonio Reservoir for the same period as Nacimiento. San Antonio Reservoir maintained more water in storage and had fewer, less severe fluctuations. However, following the high runoff period of 1986, storage diminished steadily due to effects of the drought beginning in 1987. Minimum pool was reached in September 1989. The following three years saw only minimal inflows, leaving lake levels at historic lows. No water was available for percolation releases in 1990, and only minimal amounts were released in 1991 and 1992. Recreational use of San Antonio fell off dramatically. San Antonio storage recovered only moderately in 1993 when inflow reached 172 percent of normal. Levels diminished significantly during 1994 as inflow amounted to only 16 percent of normal. Figure 4.8 presents the storage-elevation curve and the area-elevation curve for San Antonio Reservoir.

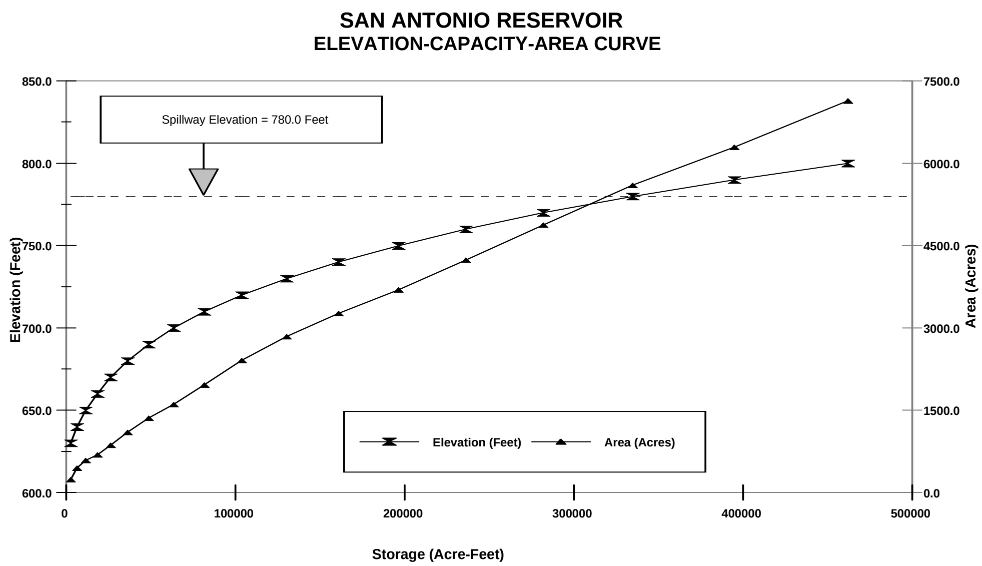


Figure 4.8

1995 Reservoir Data

During January and March 1995, the Central Coast experienced some of the heaviest rain events to occur during the century. The Nacimiento and San Antonio Reservoirs, as they were designed to do, trapped and stored the massive runoff and then released the extra water into the Salinas River between maximum flow peaks when the channel capacity was the greatest. During March, following torrential rains at the

Salinas River headwaters in San Luis Obispo County, an extremely large flow peak moved down the channel. The river stage measured at Spreckels exceeded “flood stage” by over seven feet, becoming the highest peak ever measured at Spreckels. It has been suggested that if the reservoirs had not been in place, the massive runoff from the Nacimiento and San Antonio watersheds would have entered the Salinas River channel at the same time as the large peak from the Salinas River head waters and the flow would have inundated additional areas as the peak moved down the river. Under this scenario, the loss of life and property would have been tremendous.

Inflow

Inflow into Nacimiento Reservoir has averaged approximately 211,000 acre-feet for the period 1958 to 1995. At San Antonio, inflow for the period from 1967 to 1995 averaged only 79,000 acre-feet per year. The obvious difference in these values is indicative of the different size and drainage characteristics of the two watersheds.

The 1995 Nacimiento inflow started unusually late due to only 3.77 inches of rain falling by the end of December 1994. With storage at near minimum pool of 22,500 acre-feet, no significant inflow took place until the first week in January when the climatic conditions changed from little, or no rainfall to well above normal. By the end of January, nearly 12 inches of rain had fallen, which translated to an inflow of 136,700 acre-feet of new water. During February, 23,000 acre-feet flowed into Nacimiento even though there was no additional rainfall during the month. Above normal rainfall resumed in early March with almost 11 inches falling during the month. The resultant runoff provided continuing inflow through April and May. During the actual inflow period from December 28 to June 4, over 413,700 acre-feet, or approximately 200 percent of normal, flowed into Nacimiento. During this time, combined flood and conservation releases totaled approximately 88,600 acre-feet, leaving 347,600 acre-feet, or 99 percent, of reservoir capacity by June 4.

Significant inflow at San Antonio began on January 4, following a three month rain total of 4.80 inches. By the end of January, an additional 12.76 inches of rain had resulted in a net inflow of 46,100 acre-feet of new water, bringing the storage to 86,300 acre-feet. Unlike Nacimiento’s dry February, 1.26 inches of rainfall was measured at San Antonio. By the end of the month, the storage had increased to 97,400 acre-feet. Over 11 inches of March rain brought the water year total to 27.75 inches and reservoir storage to 192,300 acre-feet. Even though the end of March signaled the end of significant rainfall, inflow continued until June 26, when storage reached 209,500 acre-feet or 63 percent of capacity.

Because there is no practical method for directly measuring all runoff occurring within the drainage area of a large body of water, the total inflow is estimated using a reservoir water budget. This method is expressed by the following equation:

Inflow - Outflow = Change in Storage

or

Inflow = Change in Storage + Outflow

Where:

Inflow	=	Estimated total inflow to the reservoir from sources other than precipitation, which is independently measured.
Change In Storage	=	The change in reservoir storage for the period.
Outflow	=	The net outflux from the reservoir including releases, spills and evaporation minus precipitation.

Monthly tabulations of the various components of the reservoir water budget are included in Appendix D, Reservoir Operations Summaries.

Evaporation and Rainfall

Evaporation and rainfall are important in quantifying components of the reservoir water budget. Unlike inflow, precipitation and evaporation can be directly measured at the site and used to quantify the amount of water lost to evaporation or added to the reservoir from rainfall. Evaporation and rainfall at both reservoirs are measured with standard National Weather Service instruments. Weather stations, including Class A evaporation pan, are located near the north abutment of Nacimiento Dam and near the Lynch Ramp parking lot at San Antonio Reservoir. In accordance with standard practices, a factor of 0.7 is used to adjust pan evaporation to lake evaporation.

Monthly rainfall and evaporation amounts are tabulated in the Nacimiento and San Antonio Reservoir Operation Summaries in Appendix D.

Releases

The daily releases from Nacimiento Reservoir are computed using valve discharge rating curves and a sonic flowmeter. The computed daily releases are checked with the flow records of the U.S. Geological Survey at the gaging station downstream of the dam to verify the computed values. Releases from San Antonio are measured using a sonic flowmeter located in the outlet conduit of the dam.

Outflow from both dams can be categorized as flood control, water conservation and spillway releases. Table 4.2 shows the breakdown of releases from the two reservoirs for each category during 1995.

Table 4.2 Categories of Reservoir Releases in Acre-Feet

Reservoir Name	Flood Control	Water Conservation	Spill	Total
Nacimiento	78,226	112,550	0	190,776
San Antonio	0	25,858	0	25,858
Total:	78,226	138,408	0	216,634

During 1995, as can be seen from Table 4.2, releases were made for flood control at Nacimiento and for water conservation purposes at both reservoirs. Combined conservation releases from Nacimiento and San Antonio during the year totaled 138,408 acre-feet.

Monthly releases are tabulated for each reservoir in the Reservoir Operation Summaries in Appendix D.

Water Conservation and Streambed Absorption

The major source of recharge to the Salinas Valley Ground Water Basin is streamflow, consisting of Salinas River flow entering South County, releases from Nacimiento and San Antonio Reservoirs and natural flow from the Arroyo Seco and other non-measured tributaries. Rainfall and return flow from irrigation also contribute significant recharge.

Prior to construction of the dams, recharge from streamflow averaged 172,800 acre-feet per year. Stream gaging records compiled by the U.S. Geological Survey indicate that total streamflow absorption for 1995 amounted to approximately 362,000 acre- feet. Of that, approximately 131,000 was contributed by releases from the reservoirs, with 231,000 contributed by natural runoff. The total absorption can be broken into two categories: reservoir releases and natural flow. The reservoir release portion of the total absorption figure is 36 percent. The natural flow portion of the total absorption figure is 64 percent. The very wet conditions of the year are evident from the amount of natural runoff that occurred.

The conservation releases from the reservoirs were quantified based on the assumption that flow beyond the Spreckels gaging station goes to the ocean, since no appreciable recharge to aquifers is gained between the Spreckels gage and the ocean. If the flow at Spreckels equals or exceeds the amount being released from the reservoirs, and flow is observed in the entire length of the Salinas River channel, then all reservoir releases for that period are assumed to go to the ocean. Conversely, if reservoir releases are being made and there is no flow at Spreckels, then it is assumed that all releases are conserved.

Table 4.3 Summary of Releases from Nacimiento Reservoir and San Antonio Reservoir (Acre-Feet)

Water Year 1994-1995	Combined Reservoir Releases (Acre-Feet)	Releases Flowing to the Ocean* (Acre-Feet)	Releases Conserved (Acre-Feet)
October	26,438	0	26,438
November	13,630	0	13,630
December	8,796	0	8,796
January	2,182	1,081	1,101
February	1,568	1,568	0
March	78,865	78,865	0
April	1,680	1,680	0
May	1,736	1,736	0
June	8,004	227	7,777
July	26,781	333	26,448
August	2,325	0	2,325
September	44,718	547	44,171
Total:	216,723	86,037	130,686

* Note: Flow to the ocean was determined from U.S. Geological Survey records at Spreckels.

Table 4.3 shows the combined monthly releases from the reservoirs and the corresponding flow at Spreckels. It is apparent from the table that following the very heavy rains and flows of January, no subsequent river bed absorption took place during the months of February through May.

In addition to the U.S. Geological Survey measurement of streams, MCWRA conducts annual surveys of stream bed absorption. Flow is measured at a series of locations along the stream during the summer. The releases from the reservoirs are held constant when the river series measurements occur. Figure 4.9 is a graph showing two measurement series that were completed during Water Year 1994-95.

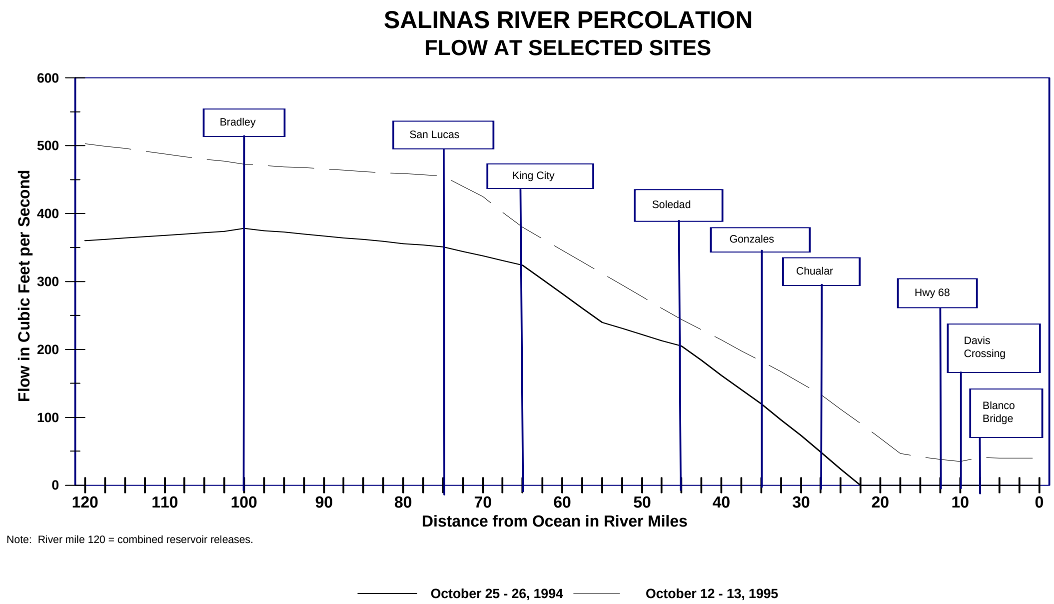


Figure 4.9

As can be seen from Figure 4.9, releases of from approximately 380 cubic feet per second during October 1994 to 500 cubic feet per second in October 1995 were required to meet the percolation demand of the channel, to recharge the ground water basin and to reach the target area for the end of flow. This equates to roughly 760 to 1,000 acre-feet of recharge to the ground water basin per day. The target area for the end of flow is approximately seven miles north of Chualar Bridge and is selected to optimize recharge to the aquifers.

No allowance has been made for evaporation and evapotranspiration losses of water released to the Salinas River system. The amount of water evaporating and consumptively used by phreatophytes in the stream channel has been estimated at 16,000 to 20,000 acre-feet per year. These water loses vary with climatic conditions and the density of vegetation in the channel.

Reservoir Water Quality

Both Nacimiento and San Antonio Lakes are sampled at the dams three times a year during the months of January, May and October. Two water samples are taken at each dam, one at the surface and one 10 feet from the bottom. Chemical analyses for these samples include nutrients and conductivity. Physical field measurements include temperature, dissolved oxygen and clarity. The resulting data from this sampling provide background information about the water quality trends to benefit both the MCWRA and the recreational operations of the lakes.

Section 5
Ground Water Levels

Introduction and General Program Description

An estimated 95 percent of all water used in Monterey County is derived from ground water wells. As mentioned in Section 4, Reservoir Operations, ground water pumping in the Salinas Valley Basin was not significant until irrigation was introduced for agriculture in the early 1900s. Irrigation became wide-spread when it was learned the fertile valley and climate were ideal for growing vegetable crops. From that early beginning, irrigation demand for ground water grew steadily in proportion to the increase in agricultural land brought into production. The increase in agricultural cropland stabilized in the mid 1980s. With nearly 200,000 acres of land under cultivation today, agricultural pumping exceeds 495,000 acre-feet per year. Combined with urban and other uses, total water pumped in the Salinas Valley is approximately 520,000 acre-feet per year. Assuring that there are sufficient quantities of good quality ground water is the most important aspect of managing water resources in Monterey County today.

Table 5.1 Use and Purpose of Ground Water Data

1. Public information
2. Evaluate changes in ground water storage
3. Evaluate potential for seawater intrusion
4. Track seasonal pumping
5. Evaluate effects of reservoir operation and quantify stream recharge to Basin.
6. Capital projects evaluation
7. Quarterly status reports to BOD on ground water conditions
8. MCWRA / other water rights evaluation
9. Hydrogeologic evaluation
10. Ground water model inputs
11. Define direction of ground water flow and ground water gradient.
12. Drought response trigger

The ability of ground water supplies to meet pumping needs can be determined through monitoring fluctuations in ground water levels and the corresponding changes in ground water storage. Programs of consistent well measurement have been ongoing since the 1940s when Monterey County and the State of California began investigations to determine the cause of seawater intrusion along the coast. They found that intrusion was caused by pumping the basin beyond rates that it could recharge through the natural ground water system. The aquifers near the coast are covered by heavy clays and receive little direct recharge from the overlying land surface or the Salinas River. Therefore, replenishment to these aquifers must travel from inland sources through the aquifer which acts as a conduit confined by the overlying clays. If water is pumped at a rate faster than it can be replenished by the conduit, then water pressure in the pressurized aquifer is lowered and seawater is allowed to move into the aquifer. The first steps in dealing with the intrusion problem was to increase water supplies through the construction of the dams. Along with the construction of the dams came the need to monitor replenishment to the basin and also to account for water being added to the basin for water rights purposes. Continuation of the water level measurement program was a natural course of action to provide the needed information.

Changes in ground water storage occur annually in the unconfined aquifers throughout the County. No significant change in storage occurs in areas where ground water aquifers are overlain or confined by continuous beds of impermeable clay. In these strata, the seasonal fluctuation of subsurface water levels is determined by the hydrostatic pressure distribution within the aquifer rather than a change in the storage volume. These pressurized ground water strata are termed “pressure aquifers.”

Surveys to determine the fluctuations in ground water levels are strategically conducted by the MCWRA. Existing production wells are used, with the owner’s permission, to facilitate these investigations. A number of dedicated monitoring wells have been constructed to augment this effort, but because of the additional cost of these wells, it is more cost effective to utilize existing wells. High production agriculture wells are used most often because they extract a substantial amount of water and provide better representation of current aquifer conditions. When practical, these designated study wells are used for the collection of both water level and water quality data.

The ground water survey program consists of measurements of key wells to monitor monthly fluctuations, and annual measurements of an established network of wells to determine relative changes in storage. A survey is also conducted each August to monitor changes in coastal ground water zones that will affect the inland movement of seawater. Each of the seasonal water level surveys are discussed in more detail in the following paragraphs.

A map identifying the Salinas Valley Ground Water Basin is shown in Figure 1.2 in the Introduction. Because of its size and variation of characteristics, the Salinas Valley Basin is separated into different hydrologic areas – Pressure, East Side, Forebay and Upper Valley – as shown on the map.

Monthly Measurements

A depth to ground water measurement is conducted monthly in approximately 50 study wells that are distributed among the various hydrologic areas throughout the basin. Consistent monthly measurements monitor the seasonal change in ground water levels which help in defining the magnitude and timing of peaks and recessions. These measurements also assist in determining the spatial relationship of seasonal pumping stress and aid in identifying trends or changes in pumping demand and the recovery of water levels.

The monthly measurements completed in 1995 were processed and a computed average of depth to water was determined for the individual areas. The 1995 water year data was plotted and a graphical comparison with measurements of the previous water year was completed. As a representative baseline, 1985 is plotted because it is a recent year that best exhibits the normal or average ground water conditions of recent years. The 1991 water year is plotted to illustrate one of the lowest historical water levels on record. These graphs are shown in Figure 5.1.

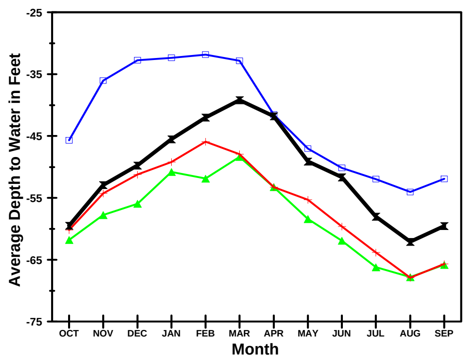
As illustrated in the graphs, ground water levels usually peak throughout the Valley in February or March. Occasionally, peaks will occur as early in the water year as December or as late as April. These peaks are the result of seasonal rainfall, changes in pumping, and the variation in local recharge regimes. With the onset of spring irrigation and reduced natural recharge comes the decline in ground water levels. The lowest point of seasonal ground water levels usually occurs in August or September.

The graphs also show that water levels in 1995 were generally below the 1985 historical normal level in the northern areas, the Pressure and East Side. For the first time in several years, the water levels in the Pressure 400-Foot Aquifer actually recovered above 1985 levels during the months of April and May. This was most likely caused by a reduction of normal pumping demands due to excessive rainfall, runoff and the resultant flooding of the Salinas Valley. In the Forebay and Upper Valley Areas, 1995 levels were near or above 1985 levels throughout most of the year.

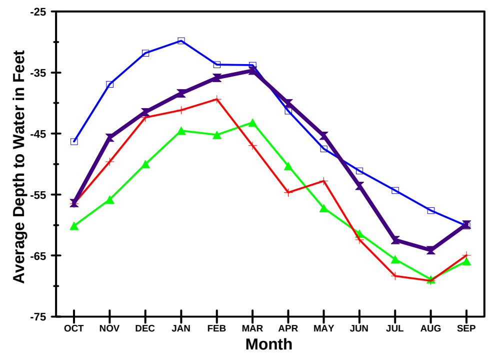
Because of the ongoing operation of wells for irrigation, it was not possible to obtain static level measurements for every well on the program each month. However, consistent data collection is necessary to derive comparable averages for the wells in each of the aquifers. If a well is found operating during measurements, a pumping water level measurement is obtained to assist in estimating a static water level. Estimates are based on known characteristics of the wells and comparisons with measurements of wells located in the same region or subarea. Knowledge of the extent of drawdown from normal static water levels to the pumping water level is useful in characterizing the behavior of wells. Data for individual wells is tabulated by hydrologic subarea under the Summary of Monthly Well Measurements in Appendix E.

MONTHLY GROUND WATER LEVELS
WATER YEAR 1994-95

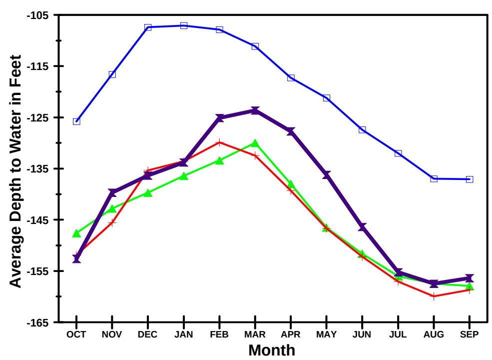
PRESSURE AREA
180-FOOT AQUIFER



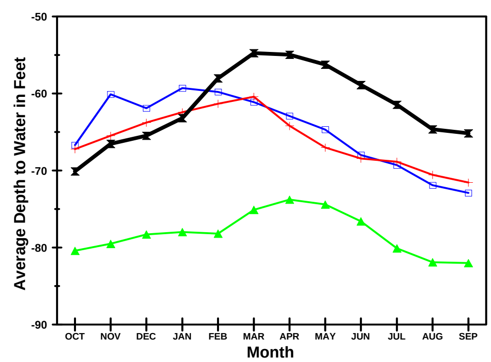
PRESSURE AREA
400-FOOT AQUIFER



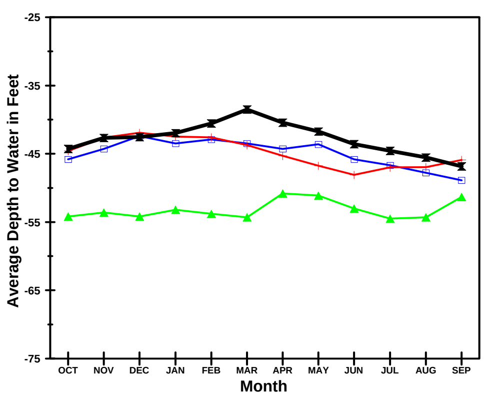
EAST SIDE AREA



FOREBAY AREA



UPPER VALLEY AREA



LEGEND
GROUND WATER LEVELS

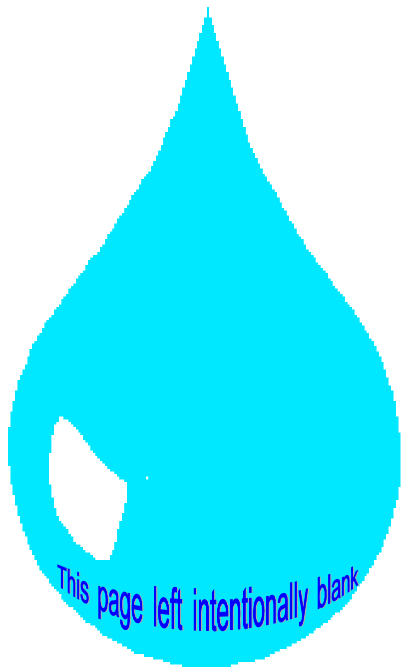
1985 WY

1991 WY

1994 WY

1995 WY

Figure 5.1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Fall Measurements

Surveys are conducted during the fall of each year to determine annual changes in ground water levels and the corresponding amount of ground water in storage. Static water level measurements are conducted in the fall of the year, which usually coincides with the end of the irrigation season. These measurements are used to indicate the changes that occurred during the preceding water year ending on September 30. The change in storage is the net result of annual recharge and withdrawals of ground water. The total number of wells included in the 1995 Fall Measuring Program is as follows:

Pressure 180-Foot Aquifer	65
Pressure 400-Foot Aquifer	75
Deep Zone (900-Foot Aquifer)	5
East Side Area	82
Forebay Area	87
Upper Valley Area	36
Total:	350

Water level data for each well is checked and compiled to determine the change from the previous year. Wells are required to have a valid measurement for the previous year and the current year before a comparison can be made. Next, the comparisons are averaged for various geographic areas within a subarea, and then a weighted average is calculated for the subarea as a whole. The results of these analyses are summarized in Table 5.2.

Table 5.2 Comparisons of 1994 and 1995 Fall Water Level Measurements

Aquifer / Subarea	Number of Wells Compared	Change 1994-95 in Feet
Pressure 180-Foot Aquifer	56	3.0
Pressure 400-Foot Aquifer	68	-0.6
Deep Zone	3	-5.0
East Side Area	66	1.2
Forebay Area	82	3.3
Upper Valley Area	32	-0.1
Total Valley	307	1.5

A table of wells designated by state well number titled ‘Fall Water Level Measurements’ is shown in Appendix E. The state well number using “Township” and “Range,” or “Government Land Survey,” is a standard method used by governmental agencies for defining geographic location or describing well locations.

As stated in the introductory remarks of this Section, the Fall Measurement Program has been ongoing since the 1940s. As each year’s fall survey is completed, the data is compiled and summarized for each subarea and the results plotted graphically. In Figure 5.2, an historic ground water level graph is presented for the period 1944 through 1995. Each area of the basin is represented with the Pressure Area plotted as a composite or weighted average of the 180-Foot and 400-Foot Aquifers. As illustrated in the graph, water levels rise and fall in each of the areas throughout the period. This is primarily a response to annual climatic conditions, available recharge, and changes in pumping. It can be noted that after beginning operation of the reservoirs, ground water levels were stabilized in the Forebay and Upper Valley Areas, and to a lesser degree, in the Pressure Area. In the East Side Area, change in levels is less apparent following the Reservoirs. Water levels have generally continued to drop, but the decline is not as steep after controlled releases from Nacimiento began. The Pressure Area is also experiencing a slight trend of continued decline.

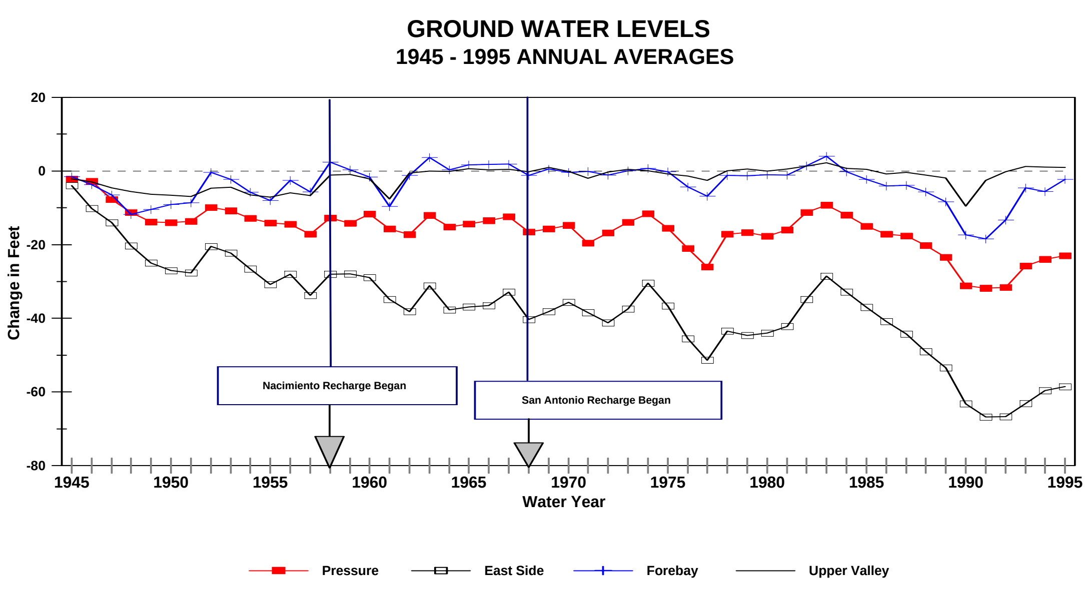

Figure 5.2

The East Side and Pressure Areas are the zones most impacted by overdraft, and areas which require an improvement in the distribution of water supplies. Both areas are located in the northern part of the basin where the Valley is wider and much of the farm land is further from the Salinas River, the primary recharge source. The water levels in the Forebay and Upper Valley areas ceased to decline after completion of the reservoirs and, despite significant increases in new farmland after 1965, have remained relatively stable.

A continuing decline in ground water levels does not always provide reliable evidence of overdraft within a basin. Water levels can follow a similar pattern if a basin is subjected to a drier than normal climatic cycle or a continuously increasing rate of extraction. Under these circumstances, water levels continue to drop as the basin attempts to reach a state of equilibrium where the amount of recharge will equal the rate of extraction. Declining ground water levels do, however, indicate the need for investigation of the total water balance of the basin. The Salinas River Basin Management Plan is currently being developed to identify and quantify various basin problems and recommend the most effective solutions to resolve the problems.

Other valuable information provided by the fall water level data is the determination of slope of the ground water gradient and the pattern of ground water flow. The depth to ground water within individual wells is converted to elevation of ground water using the mean sea level reference elevation for each well. This data is plotted on maps and lines of equal ground water elevation, or ground water contours, are drawn between the plotted data points. Contour maps of the fall 1995 data for the various aquifers are shown in Figures 5.3 and 5.4.

These contour maps are similar to topographic maps and can be used to interpret the slope of ground water and the direction of flow. The direction of flow can be determined by envisioning a perpendicular line between the contours, along which ground water will move, with the direction of flow occurring from the higher value contour to the lower. When multiple overlying aquifers are present, hydrologists must be careful to assure that the ground water level data plotted for contouring is compatible and does not attempt to represent different aquifers. This can be best accomplished by plotting the data and contouring for each aquifer on separate maps. Figure 5.3 presents the Pressure 180-Foot Aquifer and East Side Shallow Aquifer contoured with the Forebay and Upper Valley Areas. Figure 5.4 shows the Pressure 400-Foot Aquifer and the East Side Deep Aquifer contours. This portrayal is believed to be the best representation of ground water surfaces in the Salinas Valley Basin. A tabulation of fall 1995 measurements for each well, grouped by subarea, is contained in Appendix E. Data from these wells were used to prepare the contour maps.

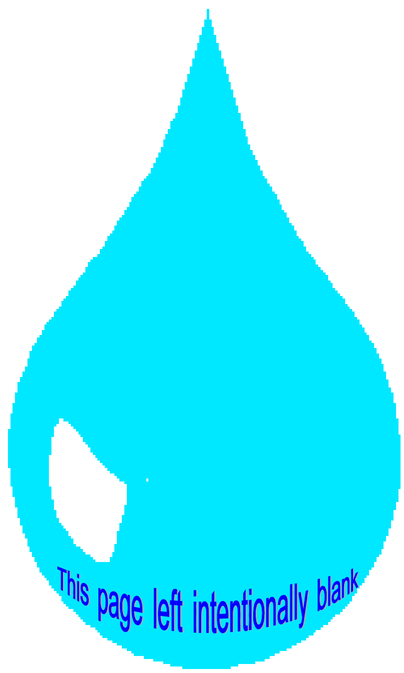
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Figure 5.3

Salinas Valley Basin

Lines of Equal Ground Water Elevation in Wells - Fall 1995

Legend:

- **Ground Water Contours**
- **Possible Fault**
- **Major Roads**
- **Pressure Area**
- **East Side Area**
- **Forebay Area**
- **Upper Valley Area**
- **Incorporated Areas**
- **Water Bodies / Channels**

NOTE - Datum is Mean Sea Level

1 0 1 2 3 4 5

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

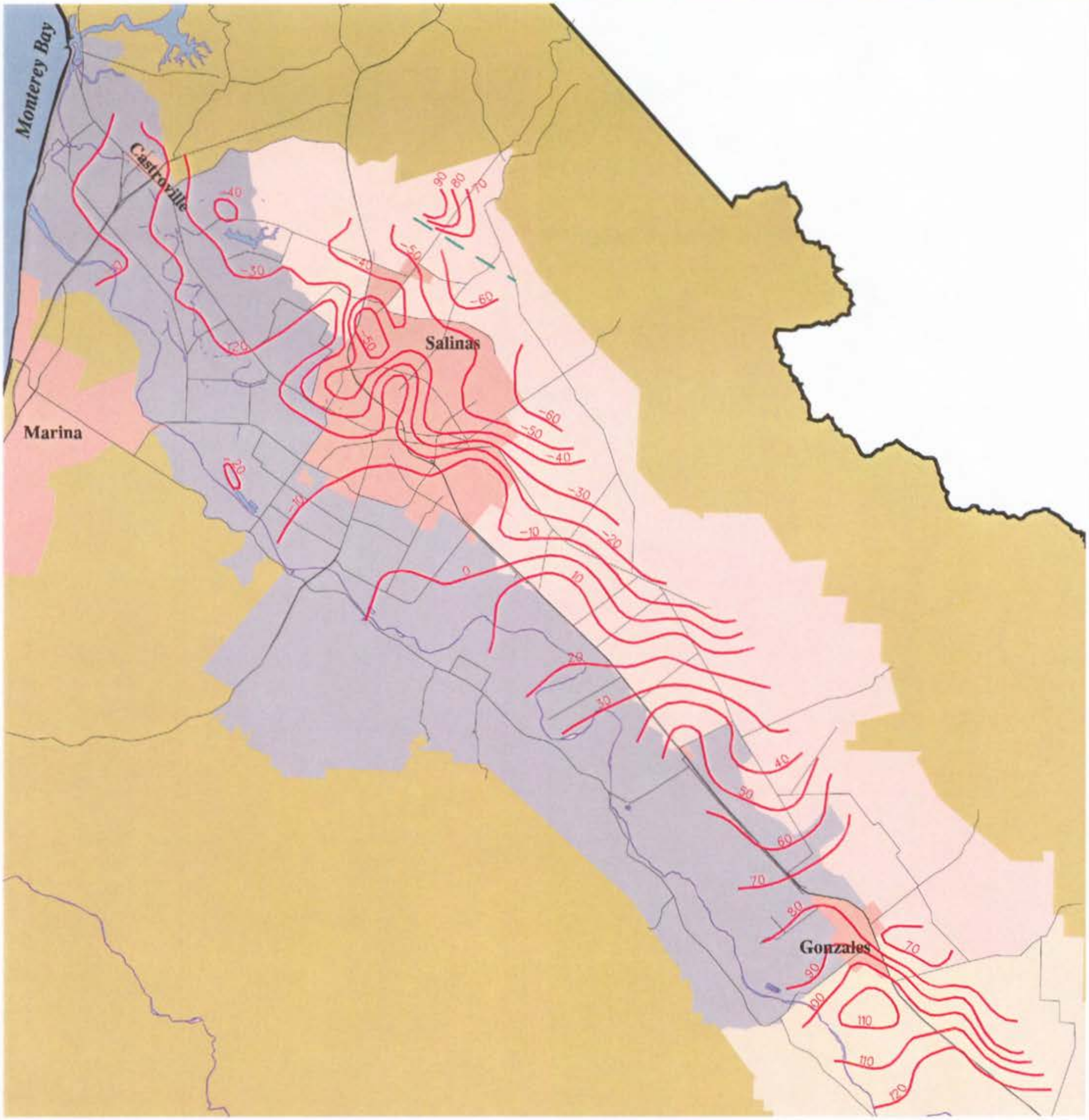


Figure 5.4

Salinas Valley Basin

Lines of Equal Ground Water Elevation in the Pressure 400-Foot and Deep East Side Aquifers

Fall 1995

Legend:

- Ground Water Contours
- Possible Fault
- Major Roads
- Pressure Area
- East Side Area
- Incorporated Areas
- Water Bodies / Channels

NOTE: Datum is Mean Sea Level

1 0 1 2 3 4 5

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

August Measurements

Depth-to-ground water measurements are performed in coastal wells each August to determine the location and extent of ground water pumping depressions or "troughs." These troughs occur in the Pressure 180-Foot and Pressure 400-Foot Aquifers between the City of Salinas and the coast, and in the East Side Area north and east of Salinas. They are caused by withdrawal of ground water at rates in excess of the rate of aquifer recharge as described earlier in this section. The "August Troughs" are formed when the water levels in wells decline steeply during summer pumping and are significantly below sea level. This occurrence is more serious near the coast where replenishment occurs both from the inland sources and from the ocean to fill the trough. The flow from the ocean is evidenced by seawater intrusion into the ground water aquifer, contaminating the aquifer and making it unusable for most purposes. For this reason, the location and depth of the troughs are an indication of the potential for the inland advance of seawater intrusion. Changes in pumping stress and recharge conditions cause the troughs to vary in location and depth from year to year. Seawater intrusion is discussed in greater detail in Section 6, Water Quality.

Ground water contour maps defining the August Troughs for the Pressure-180 Foot and East Side Shallow Aquifer during August 1995 are shown in Figure 5.5. The Pressure-400 Foot and the East Side Deep Aquifer Troughs are shown in Figure 5.6. The troughs are indicated by the lowest elevation contours, particularly the contours that close in a circular pattern. The contours are referenced to a mean sea level datum with the contours of negative value (minus) representing water surface elevations below sea level. The greater the negative value, the further below sea level the water surface lies. As stated previously, water surfaces within the Pressure Area aquifers are pressurized or piezometric surfaces. When the pressure head remains below sea level, seawater is able to encroach and contaminate the aquifer.

In the coastal region, the general availability of Pressure 180-Foot Aquifer data has been substantially reduced. Many wells on the water level program have been destroyed due to seawater contamination rendering them useless for irrigation purposes.

In August 1995, the Pressure 180-Foot Aquifer (Figure 5.5) pumping trough typically located along Highway 183 between Castroville and Salinas was not present. During the 1995 water year, it appears that this area's water surface was relatively consistent with the surrounding areas which are represented as 30 feet below sea level. More apparent are the troughs located in the East Side Area. These troughs have become more distinguishable in recent years as the August ground water monitoring programs have been extended beyond the City of Salinas. The California Water Service Company in Salinas has provided additional data from deep strata wells used to supply water to the city.

On both contouring figures, the dashed line located northeast of Salinas indicates a geologic fault or unique boundary condition. This feature has been determined to significantly affect water levels in the surrounding areas. Due to the influence of this feature, the recharge potential of Gabilan Creek, and a general lack of water level data for the shallow East Side Aquifer, the 1995 water year data for the area east of Salinas was contoured to indicate two significant troughs.

The area between the two troughs is uncertain, and mounding of ground water is assumed to occur. The trough, located near Highway 101, is generally in the same location as earlier years, but as indicated by the minus 100-foot contour, is approximately 10 feet deeper than it was in 1994. In addition, a second trough indicates a negative 90-foot contour line on Figure 5.5. This trough may appear to be a new development, however, August 1995 was the first time data was successfully collected for the area in several years. Water levels within the basin were assumed to have reached maximum depth during the 1991 water year, due to the drought and lack of recharge. The location and depth of the East Side troughs will likely continue to influence the inland migration of seawater intrusion in the Pressure 180-Foot Aquifer and East Side Shallow Aquifer zones. However, new information provided in the MCWRA 1993 Hydrogeologic Investigation prepared by Fugro West, indicates that aquifer characteristics in the East Side Area are less conducive to ground water movement in this eastward direction. Ground water can more easily migrate southeasterly along Highway 183 where the intrusion front in the Pressure 180-Foot Aquifer is a further distance from the city of Salinas.

The ground water troughs in the Pressure 400-Foot and the East Side Deep Aquifers are shown in Figure 5.6. These troughs are more easily defined than the shallower zone troughs as many wells are drilled into the deeper zones and data is more readily available. Three significant troughs are indicated in the August 1995 data. Data for individual wells used in preparing the August contours and ground water troughs is included in Appendix E.

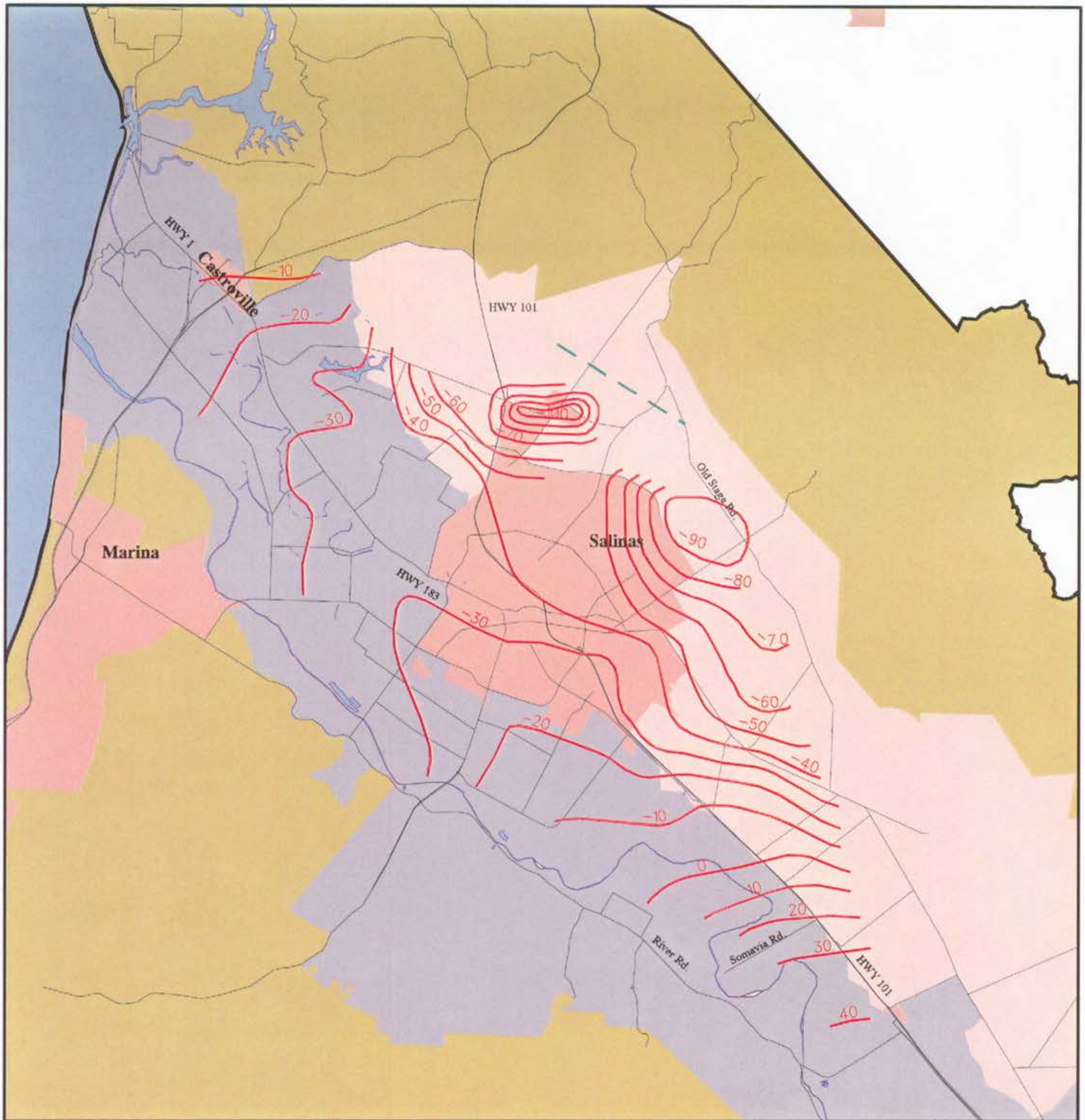


Figure 5.5

Coastal Ground Water Trough

Pressure 180-Foot & Shallow East Side Aquifers
August 1995

Legend:

- **Ground Water Contour**
- **Possible Fault**
- **Major Roads**
- **Pressure Area**
- **East Side Area**
- **Incorporated Areas**
- **Water Bodies / Channels**

Note: Datum is Mean Sea Level

1 0 1 2 3 4 5

MILES

Monterey County
Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

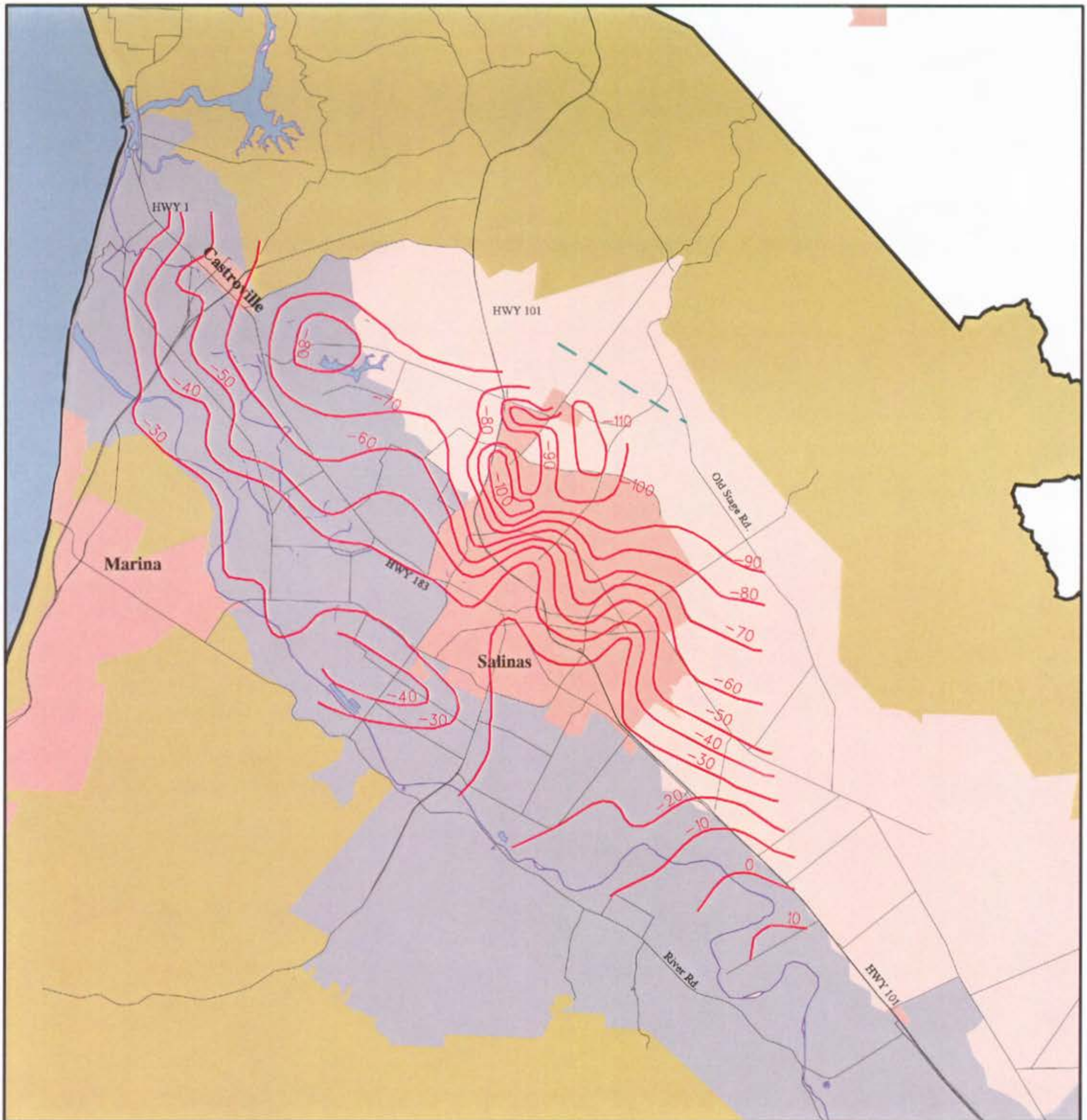


Figure 5.6

Coastal Ground Water Trough

Pressure 400-Foot & Deep East Side Aquifers
August 1995

Legend:

- Ground Water Contour
- Possible Fault
- Major Roads
- Pressure Area
- East Side Area
- Incorporated Areas
- Water Bodies / Channels

Note: Datum is Mean Sea Level

1 0 1 2 3 4 5

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Section 6
Water Quality

Introduction and General Program Description

Part of the MCWRA mission is to manage, protect and enhance the quantity and quality of water for present and future generations of Monterey County. In pursuit of this mission, the MCWRA collects and maintains water quality data as part of the ambient ground water monitoring program. Ambient monitoring, in this context, means data collected to measure constituent values for a large area, not just an area where known water problems may exist. The purpose of the ambient monitoring program is to provide long-term data to document and analyze water quality trends and conditions over time. Table 6.1 lists the use and purpose of the water quality data collection program. Water quality samples are collected annually for the ambient monitoring program, primarily from agricultural wells throughout the Salinas Valley Basin and from MCWRA-constructed dedicated monitoring wells. The same wells are sampled from year to year, unless abandoned or destroyed. In order for an existing well to become a monitoring well, the exact location must be known and the driller's log describing every aspect of the well must be on file with the MCWRA. This program has been in effect since 1947, when the Monterey County Flood Control and Water Conservation District (MCWRA) was formed.

Table 6.1 Use and Purpose of the Water Quality Data Collection Program

1. Assess impairments to beneficial uses of water: drinking, agricultural and other
2. Evaluate seawater intrusion front
3. Evaluate nitrate in ground water
4. Evaluate surface water quality
5. Support decision-making for watershed management
6. Provide information for public, private, and academic sectors

Agricultural Monitoring Wells

Large agricultural wells are owned and operated by the private sector and used for drawing large volumes of ground water for irrigation purposes. Presently, the MCWRA monitors more than 350 of these wells for water quality throughout the Salinas Valley Basin. Wells are sampled annually by MCWRA staff during the summer months, from late June through the middle of September.

The annual sampling begins in the northern Pressure Area and proceeds southward. This process takes one staff member three months. Samples are sent to the California state certified Monterey County Consolidated Chemistry Laboratory and are analyzed for general mineral content; constituents include conductivity, alkalinity, nitrate, chloride, sulfate, calcium, magnesium, sodium, potassium, and pH. The water quality data generated from this sampling program are then evaluated for determining ground water nitrate concentrations and the extent of seawater intrusion.

Dedicated Monitoring Wells

The MCWRA-constructed dedicated monitoring wells have a small diameter casing and no pump and motor; they must be pumped by MCWRA personnel using a portable submersible pump to draw water samples. There are a total of 27 dedicated monitoring wells in three different areas of the Salinas Valley. Eleven of these wells reside near the seawater intrusion front in the northern part of the Salinas Valley Basin and are referred to as “early warning wells.” These wells are sampled quarterly. These data are evaluated for chloride trends and constituent concentrations typical of seawater intrusion for the Pressure 180-Foot and Pressure 400-Foot Aquifers near the ocean. All wells are located in an area west of Highway 101, east of Highway 183, south of Espinosa Road and north of Boronda Road.

Another group of 17 wells resides in the area near the Salinas River close to Gonzales, Chualar, and the Arroyo Seco area. The purpose of these wells is to monitor water quality and water level trends near the recharge area of the Salinas River. These wells are also sampled quarterly. Water quality data will be examined as part of the alternatives analysis for the MCWRA Salinas River Basin Management Plan.

The last set of wells resides in the southern part of Monterey County south of San Ardo. These two wells are also monitored for general mineral trends in the water quality near the Salinas River and are sampled three times per year. These wells are also evaluated for general mineral trends.

Water Standards

General minerals are of concern to both the agricultural community and the consumer using rural and municipal drinking water. For agriculture, the California Department of Water Resources classifies three types of irrigation water as seen in Table 6.2.

Table 6.2 Agricultural Suitability for Irrigation Water

Constituents	Class I Excellent to	Class II Good to	Class III Injurious to
Total Dissolved Solids (TDS) ppm* (mg/L)**	Less than 700	700 to 2,000	Greater than 2,000
Electrical Conductivity (μΩ/cm)***	Less than 1,000	1,000 to 3,000	Greater than 3,000
Chloride Ion Concentration ppm* (mg/L)**	Less than 175	175 to 350	Greater than 350
Boron ppm* (mg/L)**	Less than 0.5	0.5 to 2.0	Greater than 2.0

*parts per million **milligrams per liter ***micromhos per centimeter

The California Safe Drinking Water Act contains Drinking Water Standards (DWS) that fall into two categories: Primary Standards and Secondary Standards. The only constituent under the Primary Standards category that the MCWRA examines is nitrate; the others are Secondary Standards for minerals, shown in Table 6.3, that include total dissolved solids, electrical conductivity, chloride ion concentration and sulfate. The first three constituents are the same as that of the irrigation water suitability. Both Primary and Secondary Standards are maintained to protect the public welfare and to ensure a supply of pure, wholesome and potable water.

Table 6.3 Secondary Drinking Water Standards for Minerals

Constituents	Recommended	Upper Limit	Short-Term
Total Dissolved Solids (TDS) ppm* (mg/L)**	500	1,000	1,500
Electrical Conductivity (μΩ/cm)***	900	1,600	2,200
Chloride Ion Concentration ppm* (mg/L)**	250	500	600
Sulfate ppm* (mg/L)**	250	500	600

*parts per million **milligrams per liter ***micromhos per centimeter

Table 6.4 shows the Primary Drinking Water Standard limits for nitrate. This constituent has no adverse effect on most crop production and can be used by plants receiving it from irrigation water. The ground water nitrate concentration could be counted as a portion of the fertilizer used for crops during production. When examining nitrate data, it is extremely important to note which form of nitrate is being reported. Equations for conversion of "N" values to "NO_3" are contained in Appendix A, Conversion Factors.

Table 6.4 Primary Drinking Water Standards for Nitrate

Constituents	Required	Unacceptable
Nitrate as NO_3 ppm* (mg/L)**	45 or Less	Greater than 45
Nitrate as N ppm* (mg/L)**	10 or Less	Greater than 10

* parts per million **milligrams per liter

The Monterey County Division of Environmental Health (MCDEH), Water Division, monitors compliance with the Drinking Water Standards for community water systems having less than 200 service connections, while the California Department of Health Services monitors the larger community water systems having 200 or more service connections. One of the MCWRA's purposes is to prevent contamination, pollution, or impairment to the beneficial uses of the surface water and ground water. Since the drinking water standard is set as a measure of impairment, the MCWRA uses the drinking water standards for certain mineral constituents, such as nitrate, in the ambient monitoring program.

The MCWRA makes recommendations, based on hydrology and water quality technical data, to assist the MCDEH in its decision-making process for well construction/ destruction permitting. This information enhances the MCDEH's ability to make sound decisions on well construction requirements for the protection of ground water and the health of the citizens of Monterey County.

Database

The MCWRA maintains a database of the information collected. The database is referred to as Water Resources Agency Geographic Information System (WRAGIS). This database holds all current and historical information pertaining to water quality, water level and well construction for agricultural monitoring wells in the Salinas Valley Basin. When examining the water quality of an area, well design and construction play a major role in understanding the water quality data obtained from a well. Water contributions from varying depths may have varying water quality; therefore, if the construction of a well is known (e.g. depth of perforations), more accurate water quality evaluations can be performed.

The remainder of this section examines the status of the two most relevant water quality concerns in the Salinas Valley Basin: seawater intrusion and nonpoint source nitrate contamination.

Overall Water Quality

In general, the quality of water in the aquifers of the Salinas Valley is Class I and Class II irrigation water (Table 6.2). However, there are some areas which have water of greater mineral content, possibly due to irrigation water that has leached through soils containing a high concentration of salts. Seawater-intruded aquifers near Castroville yield Class III water. In addition, along the East Side of the Salinas Valley near King City, water quality is poor where the ground water basin receives recharge from the naturally occurring, highly alkaline East Side hills. The focus of the water quality program in recent years has been the seawater intrusion front in the Pressure Area and the nitrate concentrations in the Salinas Valley Basin. Water quality standards are set by the state and federal Environmental Protection Agencies.

Seawater Intrusion

Seawater intrusion in the lower Salinas Valley, near Castroville, has been evident since the early 1930s and was one of the motivations for the 1946 Department of Water Resources (DWR) study (Bulletin 52). Seawater intrusion generally has been attributed to ground water over-pumping with insufficient recharge, causing inland migration of seawater into the aquifers from submarine outcroping in Monterey Bay. Figure F.1 in Appendix F represents the mechanism for seawater intrusion. Other potential pathways exist, such as leakage through wells and natural gaps in the aquitards between aquifers. Seawater intrusion initially began in the Pressure 180-Foot Aquifer, and later occurred in the Pressure 400-Foot Aquifer, when deeper wells were drilled to avoid the poor water quality associated with seawater intrusion in the Pressure 180-Foot Aquifer.

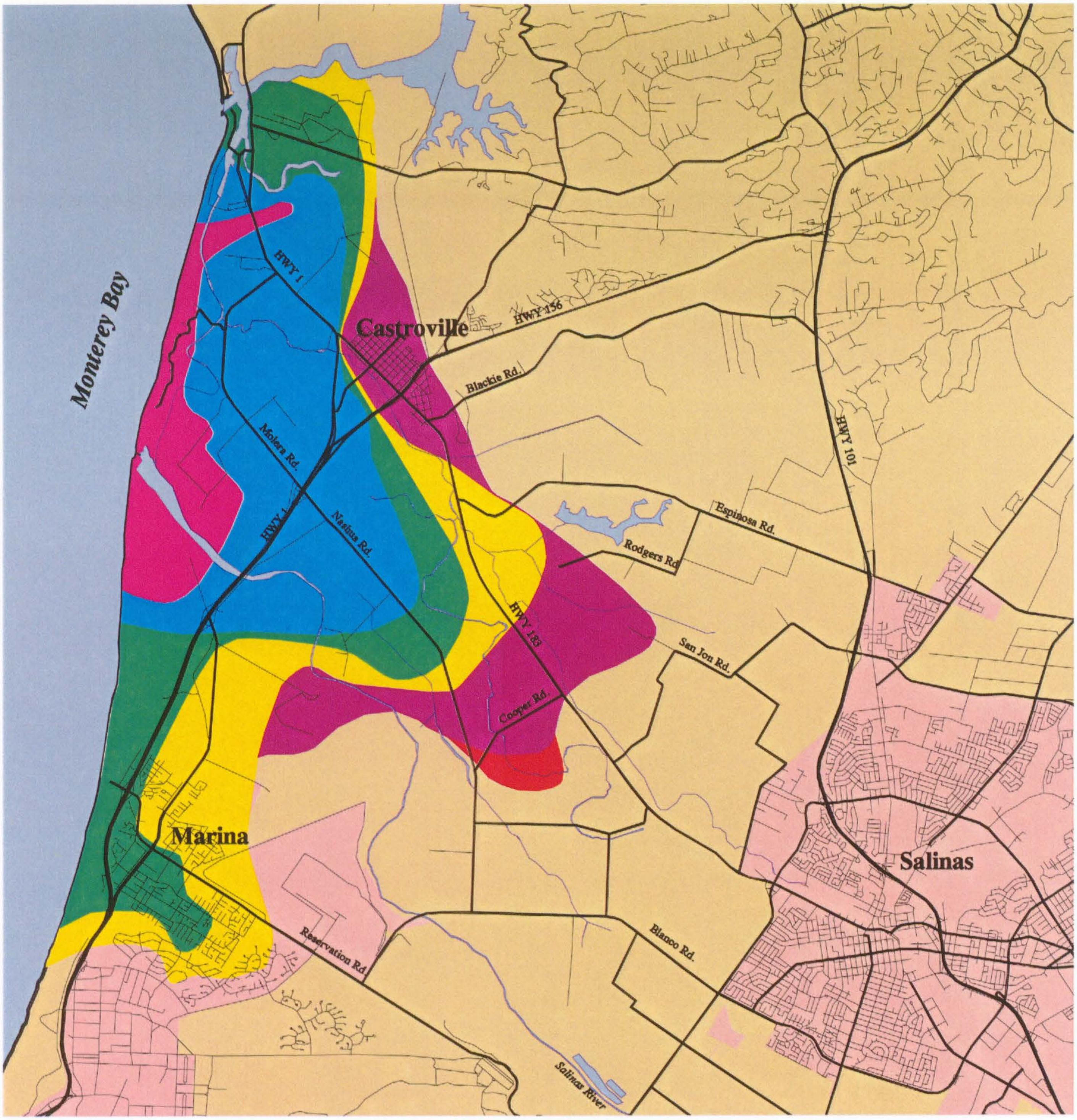
To date, many wells in both aquifers have had to be abandoned and destroyed due to seawater intrusion, as indicated by increased chloride concentrations and conductivity values. A chloride concentration of 500 milligrams per liter (mg/L) is the Secondary Drinking Water Standard upper limit for chloride and is used as a measure of impairment of water; it is therefore, used as the basis for determining the seawater intrusion front. Table 6.5 shows estimated overlying acreage for both the historical Pressure seawater intrusion fronts. In the Pressure 180-Foot Aquifer, an estimated 19,788 acres of land overlies ground water of 500 mg/L or greater chloride concentration. In the Pressure 400-Foot Aquifer, an estimated 9,792 acres of land overlies ground water of 500 mg/L or greater chloride concentration.

Table 6.5 Estimated Acreage Overlying Historic Seawater Intrusion in the Pressure Area

Water Year	Pressure 180-Foot Aquifer (acres advanced)	Total Acres	Pressure 400-Foot Aquifer (acres advanced)	Total Acres
1944	1,801	1,801	No Data	No Data
1959	No Data	1,801	20	20
1965	5,828	7,629	737	757
1975	3,993	11,622	3,020	3,777
1985	4,570	16,192	4,283	8,060
1990	No Data	16,192	1,018	9,078
1993	3,596	19,788	309	9,387
1994	No Observed Change	19,788	298	9,685
1995	No Observed Change	19,788	107	9,792

Figure 6.1 is a map showing the extent of historic seawater intrusion for the Pressure 180-Foot Aquifer. Figure 6.2 is a map showing the extent of historic seawater intrusion for the Pressure 400-Foot Aquifer.

The best estimation, using the data for 1995, is that the seawater intrusion front for the Pressure 180-Foot Aquifer shows no observable change since 1993. This does not necessarily mean the front has halted; it means that we are not able to detect



Historic Seawater Intrusion Map

Pressure 180-Foot Aquifer - 500 mg/L Chloride Areas

Figure 6.1

Legend:

- 1944 Intrusion Area
- 1965 Intrusion Area
- 1975 Intrusion Area
- 1985 Intrusion Area
- 1993 Intrusion Area
- 1997 Intrusion Area
- Major Roads
- Incorporated Areas
- Water Bodies

1 0 1 2 3

MILES

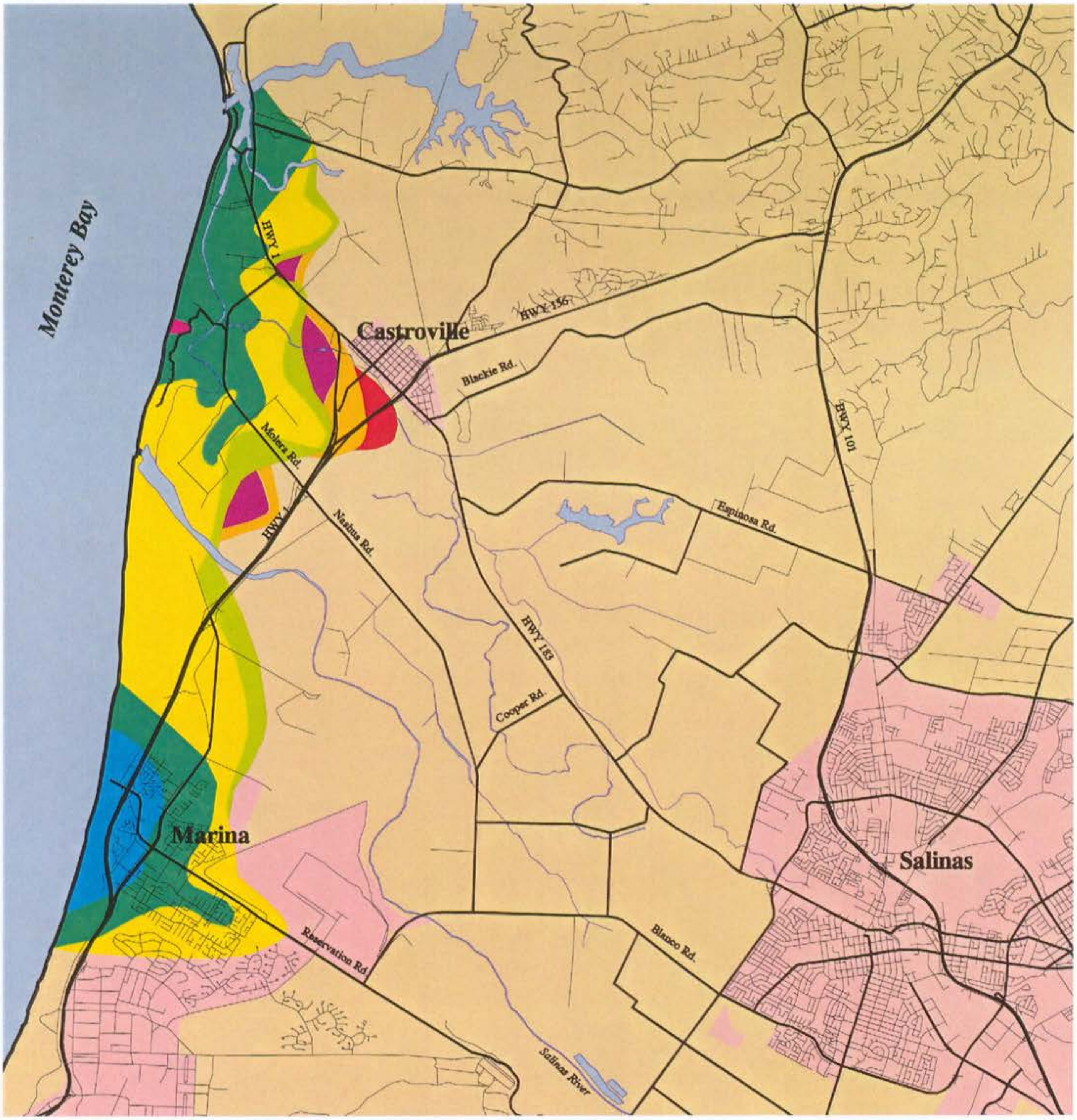
Monterey County

Water Resources Agency

Source: MCWRA 1999

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back of Figure 6.1



Historic Seawater Intrusion Map

Pressure 400-Foot Aquifer - 500 mg/L Chloride Areas

Figure 6.2

Legend:

- 1959 Intrusion Area
- 1966 Intrusion Area
- 1975 Intrusion Area
- 1985 Intrusion Area
- 1990 Intrusion Area
- 1993 Intrusion Area
- 1995 Intrusion Area
- 1997 Intrusion Area
- Major Roads
- Incorporated Areas
- Water Bodies

1 0 1 2 3

MILES

Monterey County

Water Resources Agency

Source: MCWRA 1999

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back of Figure 6.2

substantial changes in chloride ion concentrations. During the early months of 1995, increased precipitation caused increased recharge, thus reducing the rate of seawater intrusion. The current chloride data for the Pressure 180-Foot Aquifer early warning monitoring wells, Figure 6.3, indicates that the intrusion front has not reached these wells. The Pressure 400-Foot Aquifer intrusion front has progressed inland, according to 1995 data, by an estimated 107 acres since 1994 and a total of 406 acres since

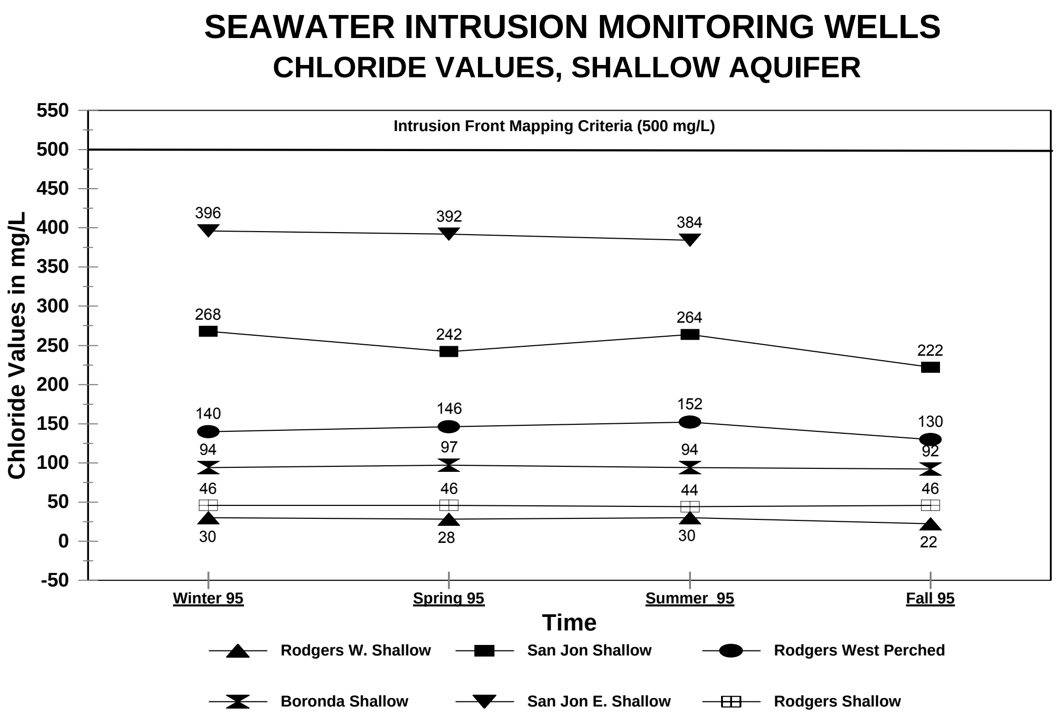


Figure 6.3

1993. Currently, the seawater intrusion fronts of the Pressure 180-Foot Aquifer and the 400-Foot Aquifers are two miles, and six miles respectively, from the nearest City of Salinas boundary.

Nitrate

The Salinas Valley Ground Water Basin annually supports a billion dollar agricultural industry and serves as the primary source of potable water for the local communities. Nitrate contamination of the ground water supply is of great concern. In 1978, the MCWRA initiated a nitrate water quality monitoring program for the collection and analysis of ground water samples from operating agricultural wells. Benefits of this program have included the ability to track nitrate trends in the Salinas Valley for many years to determine how the beneficial use of ground water has been impacted.

Sources of Nitrate

Nitrate may occur naturally in ground water due to biologic activity or decomposition of geologic deposits, but rarely do natural concentrations exceed the California Primary Drinking Water Standard (DWS) of 45 mg/L NO_3. Ground water degradation from nitrate pollution is usually indicative of contamination directly resulting from human influence and land use activities. The activities that have been most directly linked to high nitrate levels include agricultural fertilizer application, confined animal production facilities, and septic waste disposal systems.

Nitrate Health Effects

For humans, high nitrate is considered a health hazard. *Nitrate cannot be removed by boiling or carbon filtering the water.* It is colorless and odorless and can only be measured using laboratory analysis. The quality of drinking water supplies is regulated by both the Environmental Protection Agency (EPA) and the California Department of Health Services (DHS). These agencies regulate water quality at the tap and consider 45 mg/L NO_3 as the MCL. Presently, water purveyors for three cities in the Salinas Valley have had to abandon wells due to nitrate contamination.

The public health effects of nitrate are less well understood than the sources of nitrate contamination. Nationally, the health effects are the subject of current research. Nitrate ingested in high concentrations can cause methemoglobinemia (blue baby syndrome) in infants less than six months of age. Other nitrate-associated health hazards, for all ages, include an increased risk of cancer and birth defects.

Economic Consequences of High Nitrate

There is no MCL for nitrate in irrigation water, even though excessive nitrate levels can negatively affect production of some crops. Sugar beets, for example, under excessive nitrogen fertilization grow to a large size but with low sugar content. The amount of sugar produced per acre may actually be reduced. Grapes, in some instances, grow too vigorously, yields may be reduced, or the grapes may be late in maturing.

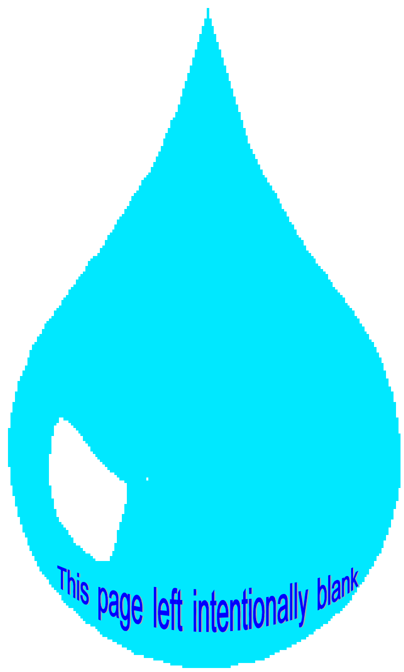
All nitrate as “N” and “NO_3“ in existing ground water used for irrigation is available to crops as fertilizer. The concentration of nitrate in the water may be converted from mg/L as nitrate to pounds per acre-foot of water for usage in fertilizer application calculations. The conversion factor can be found in Appendix A.

For most of the crops grown in the Salinas Valley, nitrate in irrigation water does not impact the ability of agriculture to put the water to beneficial use and produce a viable crop.

Transport of Nitrate

Model studies estimate that nitrate transport through the soil down to ground water can take up to 50 years. This means that what entered the soil many years ago may be detected in shallow ground water today.

The following five Figures, 6.4 through 6.8, represent more than 370 wells in the following four areas of the Salinas Valley Basin: Pressure Area (Pressure 180-Foot Aquifer and Pressure 400-Foot Aquifer), East Side Area, Forebay and Upper Valley Areas. Wells are indicated by colored circles; the number adjacent to the colored symbol is the well identification number. This well identification number found in Appendix F, 1995 Nitrate Values, corresponds to specific well names and values. Some of the wells represented in the data sheets do not appear on the maps due to unavailability of well coordinates for mapping purposes. Well locations with nitrate values less than the DWS are colored green, while wells with values greater than the DWS are colored red. This representation allows the reader to examine the areas of wells with higher nitrate concentrations.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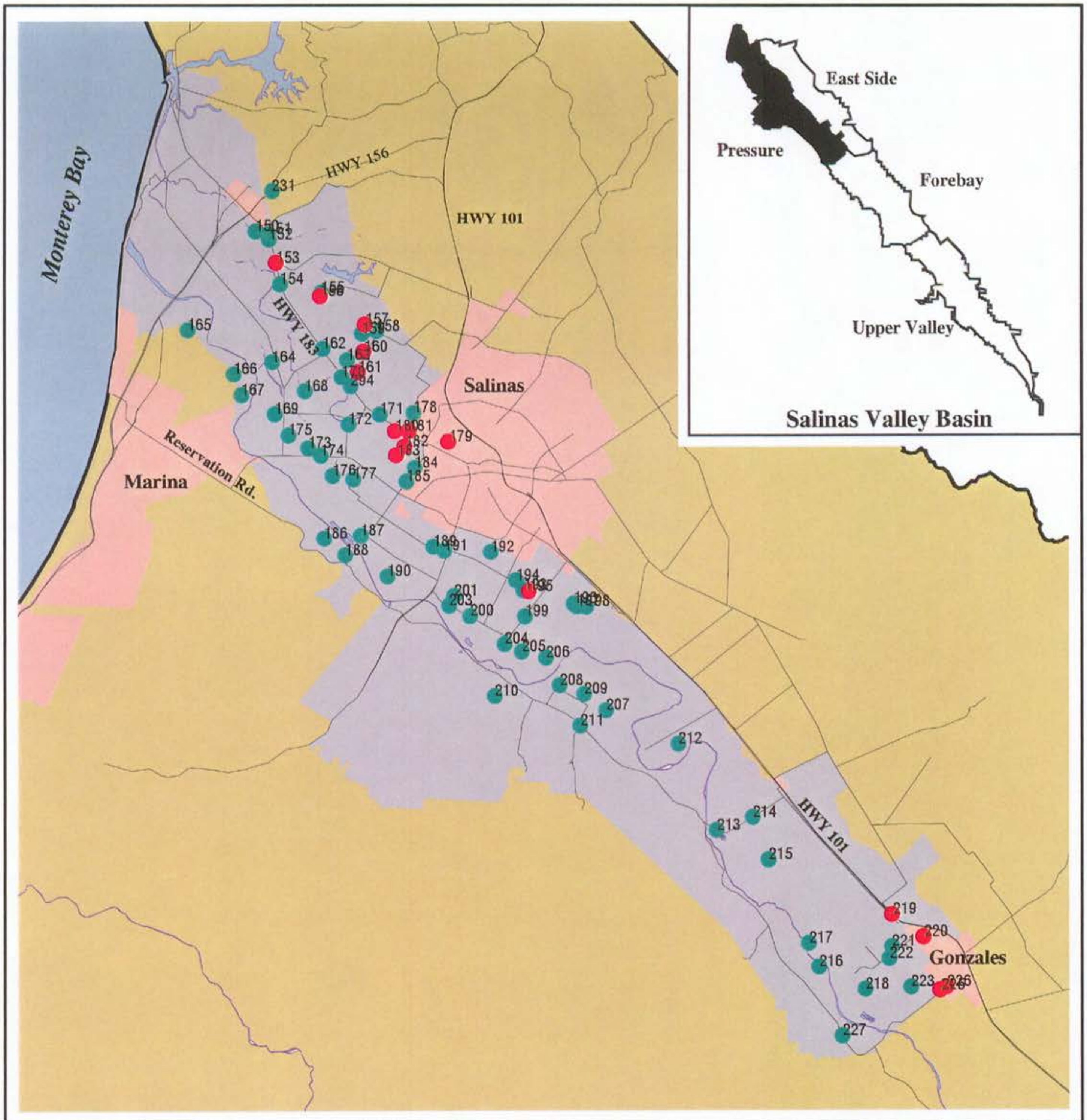

Figure 6.4

1995 Nitrate Values, Pressure 180-Foot Aquifer

Nitrate in Wells as NO3

Legend:

- **NO3 > 45 mg/L**
- **NO3 =< 45 mg/L**
- **Major Roads**
- **Pressure Area**
- **Incorporated Area**
- **Water Bodies / Channels**

Note: Number adjacent to symbol represents well identification number, see Appendix F.

1 0 1 2 3 4

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back side of Figure 6.4

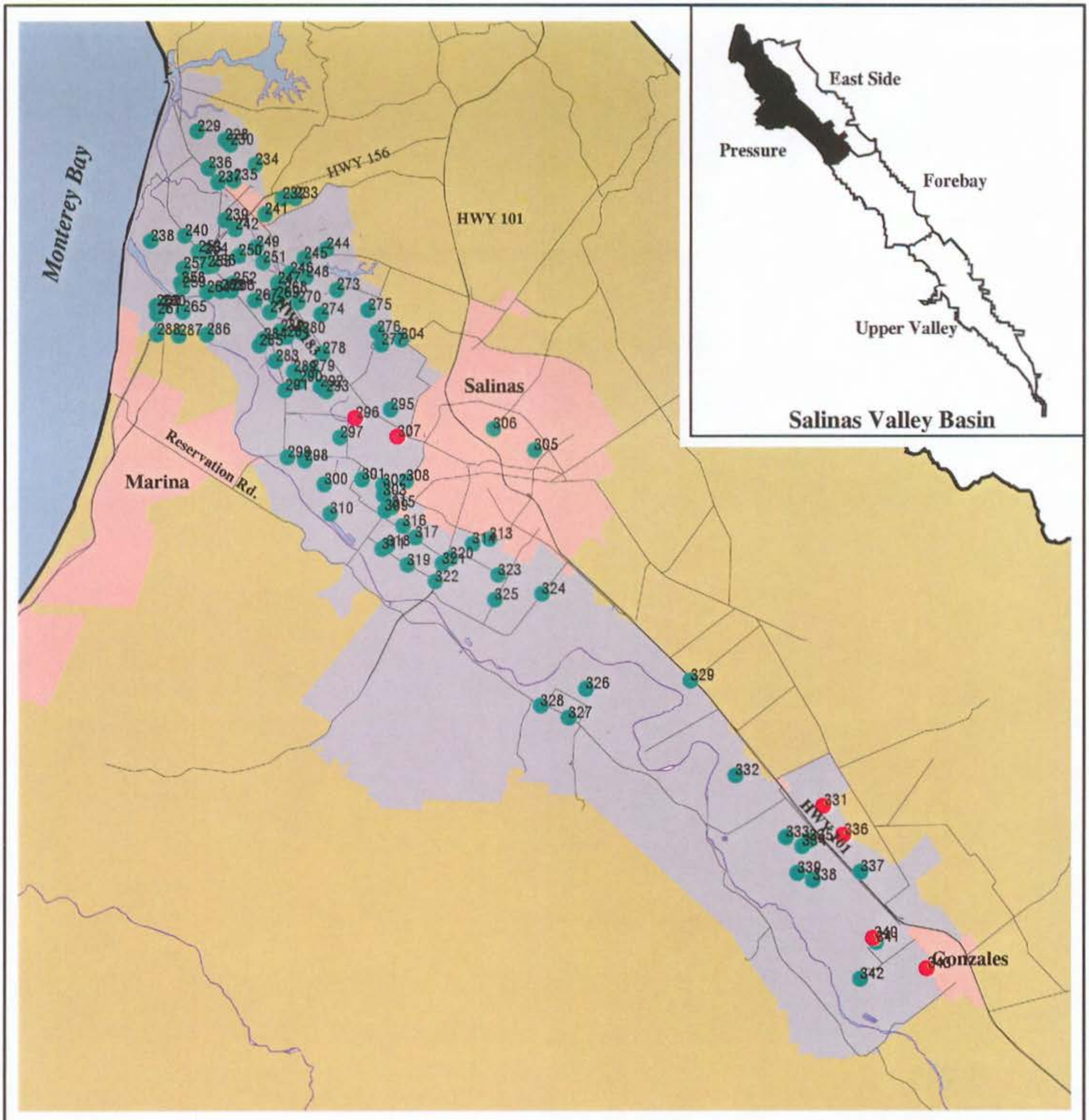

Figure 6.5

1995 Nitrate Values, Pressure 400-Foot Aquifer

Nitrate in Wells as NO3

Legend:

- NO3 > 45 mg/L
- NO3 =< 45 mg/L
- Major Roads
- Pressure Area
- Incorporated Area
- Water Bodies / Channels

Note: Number adjacent to symbol represents well identification number, see Appendix F.

1 0 1 2 3 4

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back side of Figure 6.5

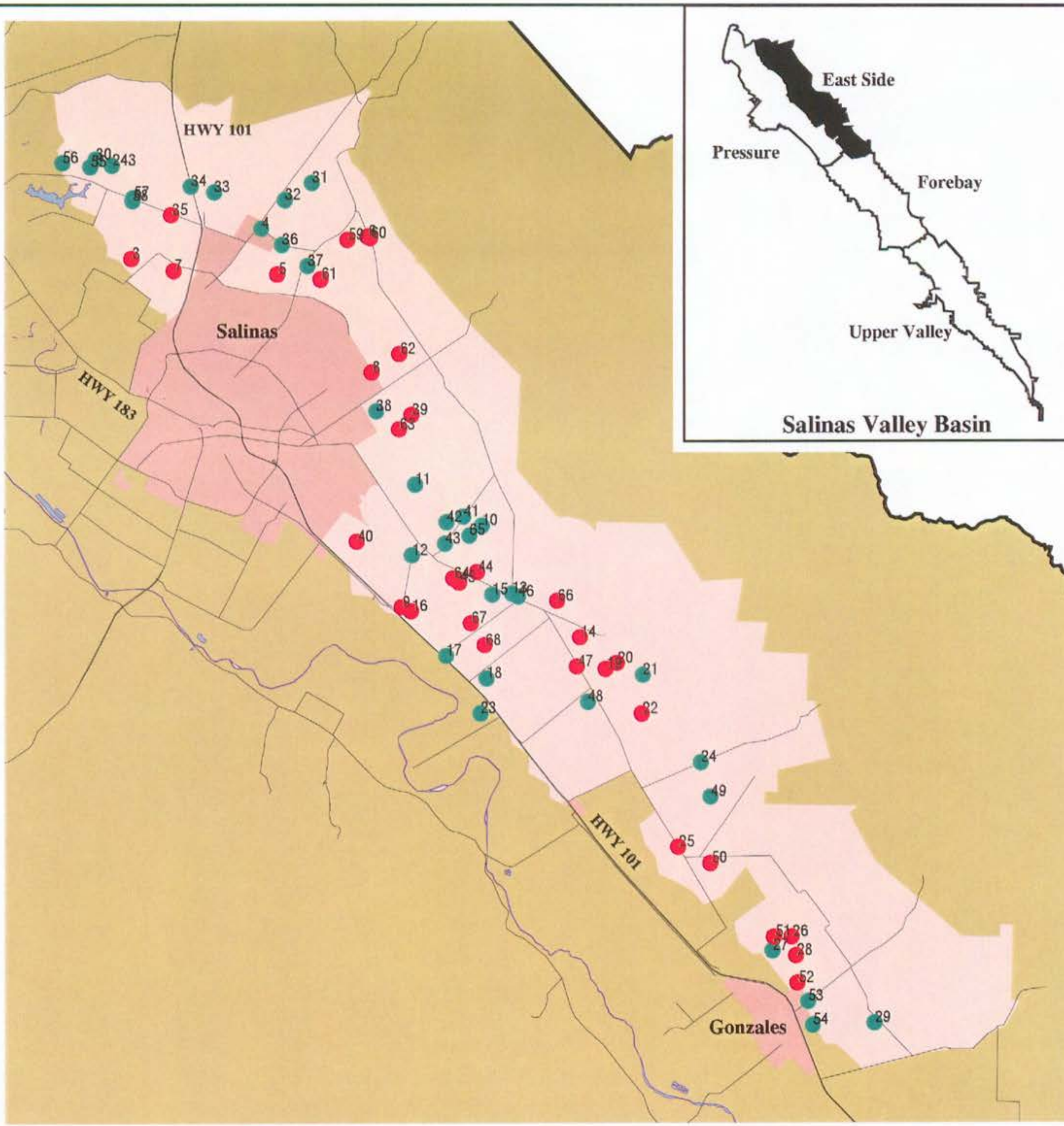

Figure 6.6

1995 Nitrate Values, East Side Area

Nitrate in Wells as NO3

Legend:

- NO3 > 45 mg/L
- NO3 =< 45 mg/L
- Major Roads
- East Side Area
- Incorporated Area
- Water Bodies / Channels

Note: Number adjacent to symbol represents well identification number, see Appendix F.

1 0 1 2 3

MILES

Monterey County Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back side of Figure 6.6

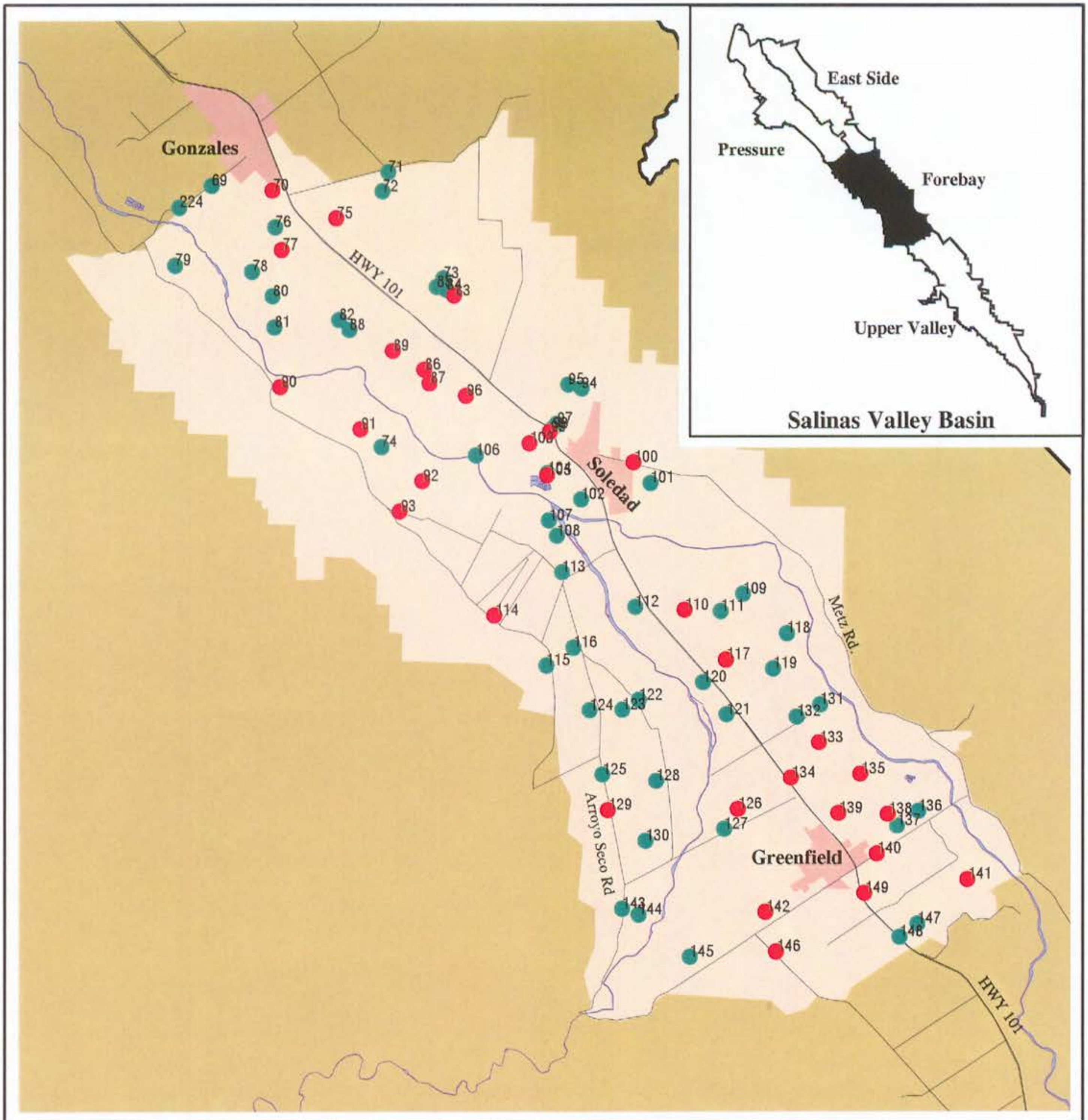

Figure 6.7

1995 Nitrate Values, Forebay Area

Nitrate in Wells as NO3

Legend:

- **NO3 > 45 mg/L**
- **NO3 =< 45 mg/L**
- **Major Roads**
- **Forebay Area**
- **Incorporated Area**
- **Water Bodies / Channels**

Note: Number adjacent to symbol represents well identification number, see Appendix F.

1 0 1 2 3 4

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back side of Figure 6.7

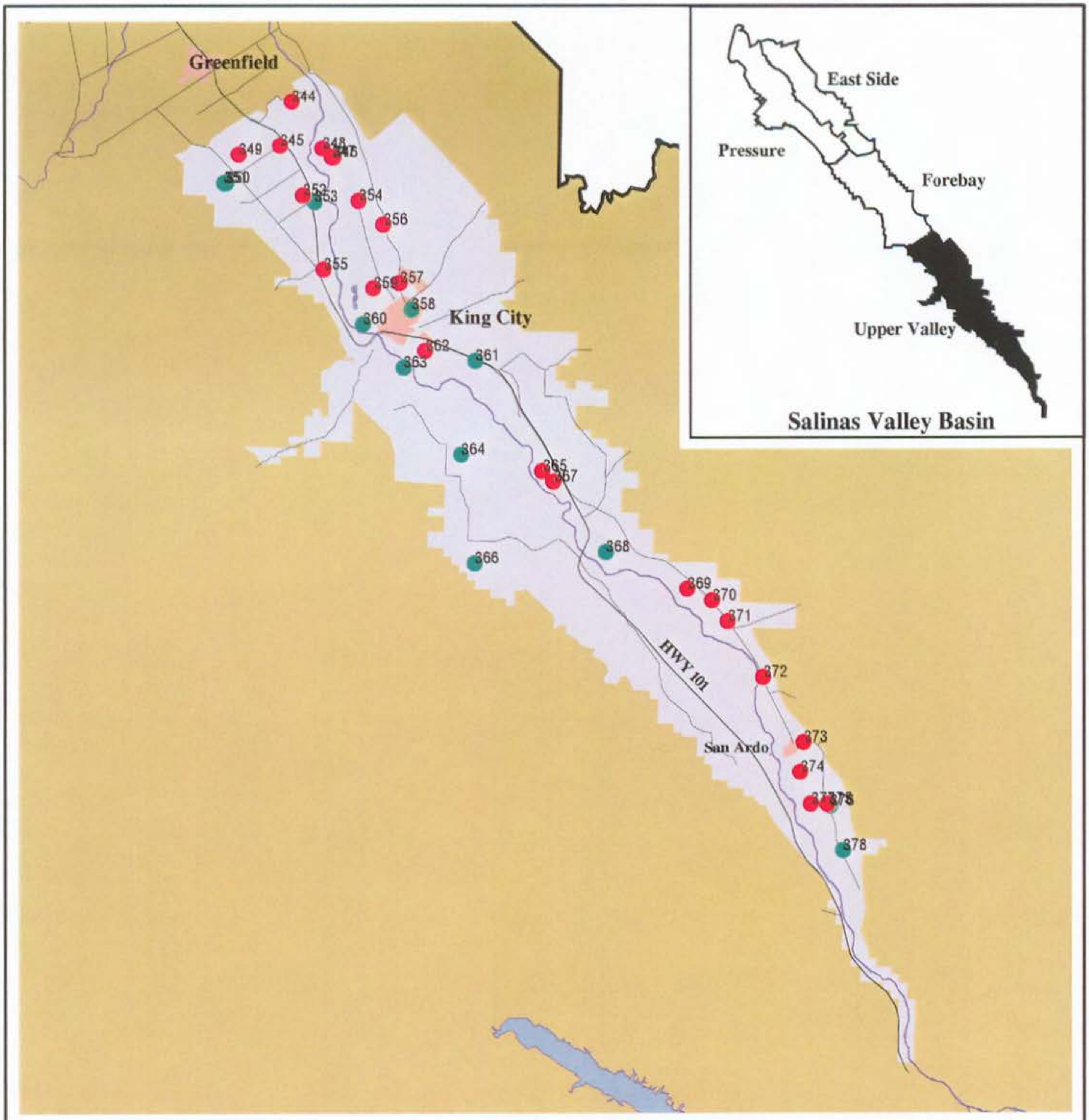

Figure 6.8

1995 Nitrate Values, Upper Valley Area

Nitrate in Wells as NO3

Legend:

- NO3 > 45 mg/L
- NO3 =< 45 mg/L
- Major Roads
- Upper Valley Area
- Incorporated Area
- Water Bodies / Channels

Note: Number adjacent to symbol represents well identification number, see Appendix F.

1 0 1 2 3 4 5

MILES

Monterey County

Water Resources Agency

Source: MCWRA Annual Report 1995 Water Year (MCWRA, 1997)

Note: The scale and configuration of all information shown hereon are approximate and are not intended as a guide for design or survey work.

Back side of Figure 6.8

Table 6.6 presents the nitrate concentrations for more than 350 water wells in the Salinas Valley Basin by subarea. In 1995, the highest average nitrate concentrations occurred in the Upper Valley Subarea followed by the East Side and Forebay Subareas. The lowest average concentration was in the Pressure Subarea, the only area with an average nitrate level below the DWS.

Table 6.6 1995 Nitrate Concentrations in the Salinas Valley Basin

Area or Aquifer	Number of Wells Sampled	Average Nitrate as NO_3 (mg/L)	Number of Wells Greater than DWS*	% of Wells Greater Than DWS*	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)
Pressure 180-Foot	78	35	15	19	Less than 1.0	402
Pressure 400-Foot	116	9	6	5	Less than 1.0	198
Pressure 180- and 400-Foot	194	19	21	11	Less than 1.0	402
East Side	68	69	32	47	Less than 1.0	397
Forebay	81	45	30	37	Less than 1.0	143
Upper	35	98	23	66	4.0	681
Total Areas	**378**	**41**	**106**	**28**	**Less than 1.0**	**681**
All Areas (excluding P-400 Foot)	**262**	**55**	**100**	**38**	**Less than 1.0**	**681**

* DWS-Drinking Water Standard

Table 6.7, 1995 Nitrate Value Distribution for 378 Study Wells in the Salinas Valley Basin, shows 72 percent of the wells have nitrate concentrations below the DWS, and 14 percent of the wells have concentrations up to two times greater than the DWS. Fourteen percent of the wells have concentrations three times or greater than the DWS for nitrate as NO_3. The percentage of wells below the drinking water limit appears high; however, one must examine where the wells with higher concentrations are located. The greatest density of agricultural monitoring wells lies in the Pressure Area numbering 194 wells, with 78 wells in the Pressure 180-Foot Aquifer and 116 wells in the Pressure 400-Foot Aquifer. The least number of wells on the program is in the Upper Valley Aea numbering 35 wells. Correspondingly, the area with the greatest density of wells has the lowest nitrate concentration average and the area least dense with wells has the highest nitrate average. It must be noted here that in each subarea, the age and construction of the well is very important to ground water quality determination.

Table 6.7 1995 Nitrate Value Distribution for 378 Study Wells in the Salinas Valley Basin

Nitrate * Concentration as NO_3	Number of Wells	% of Wells
Less than 45	272	72
46 to 90	50	14
91 to 135	32	8
Greater than 135	24	6

*DWS is 45mg/L NO_3

Many higher nitrate wells are found around the cities of Soledad, Greenfield and King City. While the overall percentage of wells with increased nitrate concentrations may be low, the impact on drinking water wells in these areas could be high.

Continued ambient monitoring in the Salinas Valley Basin is critical for detecting and tracking trends in ground water quality for determining beneficial uses and making watershed management decisions. This program supports the MCWRA mission of protecting and enhancing the quality of water for all citizens of the Salinas Valley Basin.

APPENDIX A

Acronyms

ALERT-	Automated Local Evaluation in Real Time
CIMIS-	California Irrigation Management Information System
DHS-	California Department of Health Services
DSOD-	Division of Safety of Dams
DWR-	Department of Water Resources
DWS-	Drinking Water Standard
EPA-	Environmental Protection Agency
ET-	Evapotranspiration
FERC-	Federal Energy Regulatory Commission
GIS-	Geographic Information System
MCDEH-	Monterey County Division of Environmental Health
MCWRA-	Monterey County Water Resources Agency
MSL-	Mean sea level
NOAA-	National Oceanographic and Atmospheric Administration
PMF-	Probable maximum flood
URL-	Universal resource locator
USGS-	United States Geological Survey

Glossary

acre-foot- A term used in measuring the volume of water equal to the quantity of water required to cover one acre, one foot in depth, or 43,560 cubic feet (325,851). One acre-foot of water serves between 3-4 average families (4-members) per year.

aquiclude- A geologic formation so impervious that, for all practical purposes, it completely obstructs the flow of ground water (although it may be saturated with water itself), and completely confines other strata with which it alternates in deposition. A shale or impervious tight clay is an example.

aquifer- A subsurface geologic formation or stratum containing water in its voids or pores that may be removed economically and used as a source of water supply.

chloride- One of the major negatively charged ions found in irrigation water; an anion. In coastal areas, high chloride concentrations in ground waters frequently can be related to sea water intrusion. Chloride also contributes to the increase in salinity of soils under irrigation. Plants develop normally in solutions containing only small amounts of chloride, but at high concentrations, chloride inhibits crop growth and becomes toxic.

climate- A description of an area's long-term climatic conditions.

electrical conductivity (specific electrical conductance, SEC)- A measure of the ability of a solution to conduct an electrical current which, in the case of water, can be related to the concentration of dissolved solids.

evapotranspiration- A combination of evaporation from soil surfaces and transpiration from the soil by plants.

mean- The value obtained by dividing the sum of a series of values by the number of values in the series; an average.

mean sea level (MSL)- A datum relating to the average height of the sea surface irrespective of tidal fluctuations.

overdraft- a condition in which the amount of water withdrawn is greater than the amount of recharge.

parts per million (ppm)- This refers to the number of parts, by weight, of a substance in solution per million parts in the same weight unit of solution, equivalent to milligrams per liter (mg/L).

percolation- The flow or trickling of water downward through soils or other filtering medium.

pressure aquifer- A confined aquifer, one which is separated from the surface by impermeable rock or strata (aquiclude). The water level in a well penetrating such an aquifer will stand above the bottom of the confining bed; if it stands above ground surface, a flowing artesian well results. A rise or fall of the piezometric surface (the standing water level) within the aquifer results primarily from changes in pressure rather than changes in storage volume.

rain year- A data collection period extending from July 1 to June 30 in any given year.

saturated zone- In the saturated zone all voids between soil grains, large and small, are ideally filled with water. The capillary fringe above the water table is the upper limit of this zone.

seawater intrusion (SWI)- The phenomenon occurring when a body of seawater invades a body of

Glossary (continued)

fresh water. It can occur either in surface or ground water bodies, but is limited to the invasion of ground water in the focus of this report.

total dissolved solids (TDS)- The dissolved mineral constituents in water, usually stated in parts per million by weight. The measure of all salts in solution.

total solubles- total dissolved solids

unconfined aquifer- A water-bearing formation where there is no confining beds between the zone of saturation and the surface.

weather- A state of the atmosphere with respect to heat or cold, wetness or dryness, calm or storm, clearness or cloudiness.

water year- A data collection period extending from October 1 to September 30 in any given year.

Conversion Factors

American Unit	**Multiply By**	**To Obtain Equivalent**
Length		
feet (ft)	0.304	meters (m)
miles (mi)	1609	meters (m)
	1.609	kilometers (km)
Area		
acres	4047	square meters (m^2)
	0.4047	hectares (ha)
	0.004047	square kilometers (km^2)
	43560	square feet per acre (ft^2/acre)
square miles (mi^2)	2.590	square kilometers (km^2)
Volume		
gallons (gal)	3.785	liters (L)
	0.003785	cubic meters (m^3)
	8.345	pounds
cubic feet (ft^3)	0.002832	cubic meters (m^3)
acre-foot of water	0.1234	hectare-meters
(ac-ft)	325851	gallons
Rate of Flow		
cubic feet per second	28.32	liters per second (L/s)
(ft^3/s) (cfs)		
	0.02832	cubic meters per second
gallons per minute	0.06309	(m^3/s)
(gal/min) (GPM)	5.451	liters per second (L/s)
		cubic meters per day (m^3/d)
Weight		
pounds (lb)	0.4536	kilograms (kg)
tons (short, 2,000 lb)	0.9072	tonnes (t)
	907.2	kilograms (kg)
Concentration		
parts per million (ppm)	1.0	milligrams per Liter (mg/L)
Electrical Conductance (EC)		
micromhos/cm	0.01	siemens/meter (*S*/m)
(Fmhos/cm) (FΩ /cm)	1.4286	total dissolved solids (TDS)
Nitrate		
nitrate as “NO_3" mg/L	0.2257	nitrate as “N” mg/L
nitrate as “NO_3" ppm	0.6	pounds nitrogen per acre foot of water
nitrate as “N” mg/L	4.43	nitrate as “NO_3" mg/L
Total Dissolved Solids (TDS)		
milligram per liter (mg/L)	0.7	electrical conductance (EC) (Fmhos/cm)
Temperature		
degree fahrenheit (^{E}F)	(5/9)(^{E}F-32) =	degree celcius (^{E}C)

APPENDIX B

MONTHLY PRECIPITATION IN INCHES
RAIN YEAR 1994-95

STATION NAME AND LOCATION	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
PRUNEDALE ECHO VALLEY ROAD T13S/R03E-04 ELEV. 525'	0.00	0.00	0.09_e	0.30	2.90	1.50	9.80	0.30_e	8.30	2.40	0.30	0.60	26.49_p
PRUNEDALE YARD COUNTY ROAD DEPT. T12S/R03E-30 ELEV. 80'	0.00	0.00	0.05	0.50	3.75	2.30	11.75	0.35	9.50	1.25	1.90	0.80	32.15
CASTROVILLE SEWAGE TREATMENT PLANT T13S/R02E-04 ELEV. 13'	0.00	0.00	0.10	0.50	3.20	1.60_e	6.70	0.30	8.30_e	2.10_e	0.16_e	0.66_e	23.62_p
NAT'L REFRACTORIES OLD STAGE ROAD T14S/R03E-02 ELEV. 205'	0.00	0.00	0.00	0.22	2.77	1.34	8.04	0.61	6.41	1.31	1.54	0.46	22.70
SALINAS GOLF AND COUNTRY CLUB T14S/R03E-03 ELEV. 160'	0.01	0.05	0.01	0.30	3.00	1.46	8.26	0.63_e	8.85_e	1.97	0.36	0.46_e	25.36_p
SALINAS YARD COUNTY ROAD DEPT. T14S/R03E-33 ELEV. 54'	0.00	0.00	0.80_e	0.37	2.10	1.55	6.30_e	0.28_e	2.85_e	1.01	0.96	0.50	16.72_p
SALINAS AIRPORT T14S/R03E-35 ELEV. 69'	0.00	0.00	0.05	0.33	2.58	1.72	7.81	0.69	5.31	1.62	0.26	0.55	20.92
LOS LAURELES GRADE HIDDEN HILLS T16S/R02E-16 EVEL. 1350'	0.00	0.00	0.00	0.20	2.10	1.40	9.20	0.40	6.60	1.30	0.70	1.00	22.90
JACKS PEAK COUNTY PARK, MONTEREY T16S/R01E-10 ELEV. 837'	0.01	0.02	0.07	1.02	2.83	2.49	10.70	0.79	7.19	1.94	1.04	1.39	29.49

e = Estimated data
p = Partially estimated record

MONTHLY PRECIPITATION IN INCHES
RAIN YEAR 1994-95

STATION NAME AND LOCATION	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
MONTEREY VIA GAYUBA ROAD T16S/R01E-00 ELEV. 385'	0.04	0.05	0.05	0.33	2.78	2.43	10.61	0.73	7.26	2.24	0.58	1.40	28.50
TORO COUNTY PARK HIGHWAY #68 T15S/R02E-25 ELEV. 182'	0.00	0.00	0.12	0.30	2.21	1.59	6.94	0.44	5.09	1.22	0.55	0.83	19.29
ARROYO SECO GOVERNMENT CAMP T19S/R05E-31 ELEV. 940'	0.00	0.00	0.10	1.60	1.70_e	3.65_e	8.21_e	1.54_e	15.00	2.95_e	1.30_e	0.50	36.55_p
PALMOA T18S/R04E-36 ELEV. 1775'	0.00	0.00	0.15	0.92	2.62	1.70	21.13	1.18	13.92	1.57	1.89	1.21	46.29
PINNACLES NAT'L PARK T16S/R07E-35 ELEV. 1307'	0.00	0.00	0.19	0.44	2.08	0.93	10.16	0.63	9.39	0.89	1.25	0.59	26.55
GREENFIELD YARD COUNTY ROAD DEPT. T18S/R07E-32 ELEV. 262'	0.00	0.00	0.10	0.30	1.27	0.30	2.80	0.53_e	4.09_e	0.20	0.82	0.48	10.89_p
KING CITY CA DEPT. OF FORESTRY T20S/R08E-05 ELEV. 342'	0.00	0.00	0.09	0.35	1.49	1.00	6.12	0.72	7.65	0.28	0.46	0.35	18.51
PRIEST VALLEY T20S/R12E-20 ELEV. 2300'	0.00	0.00	0.46	1.35	2.19	1.04	14.70	1.49	12.92	0.68	0.95	0.53	36.31
SAN ARDO YARD COUNTY ROAD DEPT. T22S/R10E-16 ELEV. 436'	0.00	0.00	0.36	0.75	1.48	0.87	9.74	1.45	10.21	0.40_e	0.74	0.33	26.33_p

e = Estimated data
p = Partially estimated record

APPENDIX C

NACIMIENTO RESERVOIR

OPERATIONS SUMMARY FOR WATER YEAR 1994-1995

MONTH	(1) LAKE PRECIPITATION (Inches)	(1) LAKE PRECIPITATION (Acre-Feet)	(2) LAKE EVAPORATION (Inches)	(2) LAKE EVAPORATION (Acre-Feet)	(3) NET EVAPORATION (Acre-Feet)	(4) LAKE RELEASES (Acre-Feet)	(5) NET OUTFLOW (Acre-Feet)	(6) CHANGE IN STORAGE (Acre-Feet)	(7) CALCULATED INFLOW (Acre-Feet)
OCTOBER	1.20	151	5.17	411	260	19,269	19,529	-17,532	950
NOVEMBER	1.44	115	2.30	128	13	5,884	5,897	-5,001	534
DECEMBER	1.13	88	1.52	84	-4	620	616	421	905
JANUARY	11.91	2,156	1.00	141	-2,015	830	-1,185	149,921	148,645
FEBRUARY	1.31	411	1.80	399	-12	1,400	1,388	22,365	23,588
MARCH	10.70	4,393	2.91	881	-3,512	78,679	75,167	165,090	244,513
APRIL	0.28	133	5.17	1,695	1,562	1,500	3,062	10,956	13,475
MAY	0.22	106	6.61	2,198	2,092	1,550	3,642	3,031	6,660
JUNE	0.19	90	8.97	2,974	2,884	7,824	10,708	-8,502	2,196
JULY	0.00	0	10.76	3,461	3,461	26,595	30,056	-28,796	1,248
AUGUST	0.00	0	10.96	3,421	3,421	2,139	5,560	-5,574	0
SEPTEMBER	0.00	0	7.88	2,364	2,364	44,538	46,902	-45,090	339
TOTAL:	28.38	7,643	65.05	18,157	10,514	190,828	201,342	241,289	443,053

Notes:
NET EVAPORATION (3) = LAKE EVAPORATION in Acre-Feet (2) minus - LAKE PRECIPITATION in Acre-Feet (1)
NET OUTFLOW (5) = NET EVAPORATION (3) plus + LAKE RELEASES (4)
CHANGE IN STORAGE (6) is the actual monthly change in lake elevation read at the Dam's staff gage.
CALCULATED INFLOW (7) is the total inflow into the reservoir from : all tributaries (not on table), bank storage (not on table), and LAKE PRECIPITATION in Acre-Feet (1).

SAN ANTONIO RESERVOIR
OPERATIONS SUMMARY FOR WATER YEAR 1994-1995

MONTH	(1) LAKE PRECIPITATION (Inches)	(1) LAKE PRECIPITATION (Acre-Feet)	(2) LAKE EVAPORATION (Inches)	(2) LAKE EVAPORATION (Acre-Feet)	(3) NET EVAPORATION (Acre-Feet)	(4) LAKE RELEASES (Acre-Feet)	(5) NET OUTFLOW (Acre-Feet)	(6) CHANGE IN STORAGE (Acre-Feet)	(7) CALCULATED INFLOW (Acre-Feet)
OCTOBER	0.85	112	5.03	452	340	7,169	7,509	-7,164	248
NOVEMBER	1.53	185	2.26	188	3	7,746	7,749	-7,265	325
DECEMBER	1.36	146	1.29	97	-49	8,176	8,127	-8,124	0
JANUARY	11.63	1,380	1.29	112	-1,268	1,352	84	47,471	47,410
FEBRUARY	1.26	230	2.03	261	31	168	199	9,594	9,829
MARCH	11.16	2,660	3.06	580	-2080	186	-1,894	96,377	94,508
APRIL	0.22	69	4.69	1,025	956	180	1,136	10,380	11,331
MAY	0.15	48	6.09	1,370	1,322	186	1,508	4,882	6,388
JUNE	0.14	45	8.80	1,995	1,950	180	2,130	200	2,323
JULY	0.00	0	10.26	2,314	2,314	186	2,500	-1,993	506
AUGUST	0.00	0	9.27	2,071	2,071	186	2,257	-2,256	0
SEPTEMBER	0.00	0	6.74	1,491	1,491	180	1,671	-1,672	0
TOTAL:	28.30	4,875	60.81	11,956	7,081	25,895	32,976	140,430	172,868

Notes:
NET EVAPORATION (3) = LAKE EVAPORATION in Acre-Feet (2) minus - LAKE PRECIPITATION in Acre-Feet (1)
NET OUTFLOW (5) = NET EVAPORATION (3) plus + LAKE RELEASES (4)
CHANGE IN STORAGE (6) is the actual monthly change in lake elevation read at the Dam's staff gage.
CALCULATED INFLOW (7) is the total inflow into the reservoir from : all tributaries (not on table), bank storage (not on table), and LAKE PRECIPITATION in Acre-Feet (1)

Summary of Streamflow in Monterey County

Station Name	Township, Range, Section Number, and Section Quadrant	Period of Record Water Year Ending	Average Annual Flow for Period of Record (Acre-Feet/ Year) *1	1994-95 WY Water Year (Acre-Feet/ Year)	1994-95 WY Percent of Average Flow
Pajaro River At Chittenden	T12S/R03E-12, SW 1/4	1940-95	110,000	273,900	249
Gabilan Creek Near Salinas *2	T13S/R03E-35, SE 1/4	1959-95	2,820	4,540	161
El Toro Creek Near Spreckels	T15S/R02E-35, SE 1/4	1962-95	1,310	3,930	0
Carmel River At Robles Del Rio	T17S/R02E-10, NE 1/4	1958-95	63,800	155,000	243
Carmel River Near Carmel	T16S/R01E-17, SE 1/4	1963-95	74,670	177,400	238
Big Sur River Near Big Sur *3	T19S/R02E-29, SW 1/4	1951-95	70,540	132,000	187
Salinas River Near Spreckels	T15S/R03E-18, NE 1/4	1930-95	265,500	837,000	315
Salinas River Near Chualar	T16S/R04E-08, NE 1/4	1977-95	341,600	886,200	259
Arroyo Seco Near Soledad	T19S/R06E-16, NE 1/4	1903-95	122,000	282,700	232
Salinas River At Soledad	T17S/R06E-33, NE 1/4	1969-78 1984-95	285,300	802,400	281
San Lorenzo Creek Below Bitterwater Creek	T19S/R08E-23, NE 1/4	1959-95	10,400	37,890	364
Salinas River Near Bradley	T23S/R10E-14, NW 1/4	1949-56 1958-95	372,800	749,700	201
San Antonio River Near Lockwood, Above Dam	T23S/R08E-27, SE 1/4	1966-95	76,970	172,500	224
Nacimiento River Below Sapaque Creek, Above Dam	T25S/R08E-03, NE 1/4	1972-95	132,000	249,000	189
Nacimiento River Near Bradley, Below Dam	T25S/R10E-14, NE 1/4	1958-95	194,500	182,300	94
Salinas River At Paso Robles	T26S/R12E-33, N 1/2	1940-65 1970-95	71,670	269,100	375

Source: Water Resources Data, California Water Year 1995; Volume 2; U.S. Geological Survey, Water-Data Report CA-95-2, unless otherwise noted.

Notes:

Streamflow data has been compiled for general comparison purposes only. For research or resource quantification purposes, please refer to the original source wherein accuracy of data for individual stations is shown

*1 Average Flow is based on the period of record which varies by station. For this reason, average flows should not be directly compared unless the period of record is similar.

*2 Prior to October 1970, data was published in reports by: Monterey County Flood Control and Water Conservation District.

*3 Prior to 1959, this station was published as "Sur River at Big Sur".

APPENDIX D

SALINAS RIVER BASIN

11149400 NACIMIENTO RIVER BELOW NACIMIENTO DAM, NEAR BRADLEY, CA

LOCATION.--Lat 35°45'41", long 120°51'16", in NE 1/4 NE 1/4 sec.14, T.25 S., R.10 E., San Luis Obispo County, Hydrologic Unit 18060005, Camp Roberts Military Reservation, on left bank 2.2 mi downstream from Nacimiento Dam, and 7.6 mi southwest of Bradley.

DRAINAGE AREA.--329 mi^2.

PERIOD OF RECORD.--October 1957 to current year.
CHEMICAL DATA: Water years 1963-66.

REVISED RECORDS.--WDR CA-84-2: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 597 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records fair except those for Mar. 31 to May 31, which are poor. Flow regulated by Lake Nacimiento (formerly Nacimiento Reservoir) beginning in February 1957, usable capacity, 340,000 acre-ft. No diversion upstream from station. See schematic diagram of Salinas River basin.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,340 ft^3/s, Feb. 25, 1969, gage height, 10.92 ft; no flow at times in 1958-63, 1965, 1977, 1990.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,180 ft^3/s, Mar. 14, gage height, 9.79 ft; minimum daily, 0.54 ft^3/s, Jan. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	367	284	6.2	2.3	22	23	39	32	32	325	41	33
2	361	283	5.9	2.2	22	23	38	32	30	327	29	33
3	351	280	6.5	4.2	21	23	37	32	33	318	29	33
4	360	278	6.9	8.3	22	23	37	31	34	325	30	33
5	368	275	6.5	5.1	22	24	37	31	34	327	29	242
6	368	272	6.6	2.0	22	23	37	31	35	325	29	865
7	323	258	7.1	5.0	22	23	36	31	35	383	29	1130
8	293	245	6.5	2.9	22	23	36	31	36	435	29	1120
9	293	244	5.4	6.3	22	25	34	31	37	434	30	1120
10	295	212	5.0	16	22	759	33	31	36	431	30	1120
11	297	127	5.5	5.7	23	3260	34	31	37	465	30	1120
12	298	39	6.1	1.9	23	5090	35	31	38	486	29	1110
13	299	7.2	5.9	1.1	23	3500	35	31	39	485	30	1100
14	300	6.1	4.8	1.1	23	3600	34	31	40	484	30	1090
15	301	6.0	.62	1.2	22	4100	34	31	41	482	30	1080
16	301	6.2	1.9	.86	23	4380	34	31	94	482	30	1020
17	300	6.4	5.2	.54	23	2120	34	33	217	488	30	860
18	300	6.4	6.4	.61	23	346	34	34	192	509	30	751
19	299	6.5	5.5	.59	23	145	33	34	212	507	30	659
20	300	6.8	3.8	.99	23	45	33	33	211	505	31	659
21	299	6.6	3.6	1.7	23	43	32	34	211	504	30	657
22	298	6.2	3.6	1.1	24	44	32	33	211	504	31	638
23	292	6.4	4.2	2.1	23	59	32	33	209	504	31	574
24	295	6.7	4.8	15	24	634	31	33	170	470	31	574
25	295	6.7	4.4	17	23	3120	31	34	170	444	33	573
26	295	6.9	4.6	23	23	3580	31	34	251	444	32	544
27	294	6.9	4.2	22	23	1600	31	33	324	444	32	426
28	291	6.6	1.9	22	23	365	31	30	317	439	32	450
29	289	6.5	2.0	21	---	274	31	31	323	427	29	450
30	287	6.5	2.0	21	---	228	31	31	325	427	33	451
31	284	---	1.9	21	---	43	---	32	---	280	33	---
TOTAL	9593	2914.6	145.52	235.79	634	37545	1017	991	3974	13410	952	20515
MEAN	309	97.2	4.69	7.61	22.6	1211	33.9	32.0	132	433	30.7	684
MAX	368	284	7.1	23	24	5090	39	34	325	509	41	1130
MIN	284	6.0	.62	.54	21	23	31	30	30	280	29	33
AC-FT	19030	5780	289	468	1260	74470	2020	1970	7880	26600	1890	40690

APPENDIX E

SALINAS VALLEY INVESTIGATION
SUMMARY OF MONTHLY WELL MEASUREMENTS

WATER YEAR : 1994-95

PRESSURE AREA
180-FOOT AQUIFER

DEPTH TO WATER SURFACE, IN FEET

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
13S/02E-33R01	40.8	38.5	38.0	34.9	31.3	29.7	32.2	34.1	36.6	40.5	42.0	41.4
14S/03E-31F01	59.7	52.8	48.9	42.3	39.5	36.9	40.8	45.6	53.7	61.5	64.2	63.9
15S/02E-01Q01	68.4	58.6	53.0	48.0	46.4	43.9	48.7	66.8	69.0	77.0	83.3	75.1
15S/03E-16M01	70.5	64.1	59.0	57.2	50.0	46.5	49.2	61.0 e	62.1	70.0 e	75.2	69.0
15S/03E-25Q01	72.8	62.2	58.9	52.8	48.3	44.0	45.2	52.0	52.8	60.9	66.0 e	69.4
16S/05E-30E01	44.7	41.4	40.7	38.0	36.7	34.1	34.8	35.1	35.7	38.4	42.0 e	38.6

e= estimated water level.

Mean of 6 Wells	59.5	52.9	49.8	45.5	42.0	39.2	41.8	49.1	51.7	58.1	62.1	59.6

REFERENCE POINT ELEVATIONS FOR THE INDIVIDUAL WELLS, REFERENCED TO MEAN SEA LEVEL (M.S.L.)

Well Number	R.P. Elevation, in Feet at M.S.L
13S/02E-33R01	25.0
14S/03E-31F01	37.8
15S/02E-01Q01	43.3
15S/03E-16M01	59.5
15S/03E-25Q01	72.0
16S/05E-30E01	118.0

Formula:

Reference Point (R.P.) Elevation, in Feet at Mean Sea Level (M.S.L.)
- Depth to Water Surface, in Feet
Water Surface Elevation, in Feet at M.S.L.

PRESSURE AREA
180-FOOT AQUIFER

WATER SURFACE ELEVATION, IN FEET AT M.S.L.

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
13S/02E-33R01	-15.8	-13.5	-13.0	-9.9	-6.3	-4.7	-7.2	-9.1	-11.6	-15.5	-17.0	-16.4
14S/03E-31F01	-21.9	-15.0	-11.1	-4.5	-1.7	0.9	-3.0	-7.8	-15.9	-23.7	-26.4	-26.1
15S/02E-01Q01	-25.1	-15.3	-9.7	-4.7	-3.1	-0.6	-5.4	-23.5	-25.7	-33.7	-40.0	-31.8
15S/03E-16M01	-11.0	-4.6	0.5	2.3	9.5	13.0	10.3	-1.5 e	-2.6	-10.5 e	-15.7	-9.5
15S/03E-25Q01	-0.8	9.8	13.1	19.2	23.7	28.0	26.8	20.0	19.2	11.1	6.0 e	2.6
16S/05E-30E01	73.3	76.6	77.3	80.0	81.3	83.9	83.2	82.9	82.3	79.6	76.0 e	79.4

SALINAS VALLEY INVESTIGATION
SUMMARY OF MONTHLY WELL MEASUREMENTS

WATER YEAR : 1994-95

PRESSURE AREA
400-FOOT AQUIFER

DEPTH TO WATER SURFACE, IN FEET

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
13S/02E-21N01	52.3	34.7	30.8	24.8	24.7	23.9	32.1	40.0 e	47.9	62.0 e	69.9	58.7
13S/02E-30A01	34.3	25.7	20.9	18.8	18.2	18.4	22.0	25.3	32.7	40.1	41.2	39.2
13S/02E-31N02	29.2	20.3	15.2	12.5	12.2	11.6	17.3	22.8	30.0 e	44.7	39.0	36.6
13S/02E-32A02	48.9	30.2	23.3	18.7	19.0	16.1	26.6	32.9	49.8	65.0	64.7	60.5
14S/02E-08M02	40.0 e	24.8	19.8	17.2	17.1	16.3	23.7	33.1	40.4	52.0 e	54.0 e	41.9
14S/02E-12Q01	91.0 e	86.0	82.5	79.6	72.5	72.0	74.2	79.5	86.0	93.0 e	97.7	95.6
14S/02E-34A01	60.2	48.5	44.4	40.5	39.0 e	37.0 e	42.0 e	44.0 e	53.0 e	56.0 e	60.0 e	58.0 e
14S/03E-18J01	85.8	79.8	76.0 e	82.7	71.5	71.4	73.0	75.0	81.3	89.5	87.5	85.5
14S/03E-31F02	64.0	54.9	48.7	43.5	41.0	39.4	45.5	54.8	64.4	70.0 e	74.0	69.7
16S/04E-10R02	57.9	51.6	53.0	45.7	43.4	40.5	44.0	46.0 e	50.1	52.0	53.2	53.3

e= estimated water level.

ean of 10 Wells	56.4	45.7	41.5	38.4	35.9	34.7	40.0	45.3	53.6	62.4	64.1	59.9

REFERENCE POINT ELEVATIONS FOR THE INDIVIDUAL WELLS, REFERENCED TO MEAN SEA LEVEL (M.S.L.)

Well Number	R.P. Elevation, in Feet at M.S.L
13S/02E-21N01	17.3
13S/02E-30A01	16.2
13S/02E-31N02	10.0
13S/02E-32A02	9.5
14S/02E-08M02	17.0
14S/02E-12Q01	63.0
14S/02E-34A01	31.5
14S/03E-18J01	70.0
14S/03E-31F02	38.3
16S/04E-10R02	99.0

Formula:

Reference Point (R.P.) Elevation, in Feet at Mean Sea Level (M.S.L.)
- Depth to Water Surface, in Feet
Water Surface Elevation, in Feet at M.S.L.

PRESSURE AREA
400-FOOT AQUIFER

WATER SURFACE ELEVATION, IN FEET AT M.S.L.

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
13S/02E-21N01	-35.0	-17.4	-13.5	-7.5	-7.4	-6.6	-14.8	-22.7 e	-30.6	-44.7 e	-52.6	-41.4
13S/02E-30A01	-18.1	-9.5	-4.7	-2.6	-2.0	-2.2	-5.8	-9.1	-16.5	-23.9	-25.0	-23.0
13S/02E-31N02	-19.2	-10.3	-5.2	-2.5	-2.2	-1.6	-7.3	-12.8	-20.0 e	-34.7	-29.0	-26.6
13S/02E-32A02	-39.4	-20.7	-13.8	-9.2	-9.5	-6.6	-17.1	-23.4	-40.3	-55.5	-55.2	-51.0
14S/02E-08M02	-23.0 e	-7.8	-2.8	-0.2	-0.1	0.7	-6.7	-16.1	-23.4	-35.0 e	-37.0 e	-24.9
14S/02E-12Q01	-28.0 e	-23.0	-19.5	-16.6	-9.5	-9.0	-11.2	-16.5	-23.0	-30.0 e	-34.7	-32.6
14S/02E-34A01	-28.7	-17.0	-12.9	-9.0	-7.5 e	-5.5 e	-10.5 e	-12.5 e	-21.5 e	-24.5 e	-28.5 e	-26.5 e
14S/03E-18J01	-15.8	-9.8	-6.0 e	-12.7	-1.5	-1.4	-3.0	-5.0	-11.3	-19.5	-17.5	-15.5
14S/03E-31F02	-25.7	-16.6	-10.4	-5.2	-2.7	-1.1	-7.2	-16.5	-26.1	-31.7 e	-35.7	-31.4
16S/04E-10R02	41.1	47.4	46.0	53.3	55.6	58.5	55.0	53.0 e	48.9	47.0	45.8	45.7

SALINAS VALLEY INVESTIGATION
SUMMARY OF MONTHLY WELL MEASUREMENTS

WATER YEAR : 1994-95

EAST SIDE AREA — **DEPTH TO WATER SURFACE, IN FEET**

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
14S/03E-06R01	170.9	130.9	129.5	123.6	114.9	113.9	125.5	128.8	153.0	171.5	173.8	173.0
14S/03E-15H03	212.5	204.8	178.0	149.5	163.7	162.0 e	169.9	185.0 e	208.7	213.0 e	215.0 e	212.2
14S/03E-25L02	208.6	188.5	188.0 e	187.1	187.0	183.4	172.2	186.0 e	197.9	203.0 e	209.8	218.5
15S/03E-12E02	100.1	88.5	82.3	76.8	72.0 e	71.1	79.0	86.0 e	94.5	105.4	111.0 e	106.4
15S/04E-06R01	142.3	122.3	120.6	121.4	103.3	101.9	109.9	136.0 e	143.5	149.5	156.0 e	159.7
15S/04E-07R01	71.4	69.1	70.3	71.7	64.8	64.2	63.5	64.0 e	64.0	68.0	66.8	66.0
15S/04E-07R02	101.3	85.5	80.0	75.1	72.6	70.2	75.5	81.3	90.2	99.0	100.3	98.2
15S/04E-21L02	132.0 e	127.0 e	125.0 e	123.0 e	120.0 e	118.0 e	121.0 e	123.0 e	125.0 e	131.0 e	136.0 e	134.0 e
15S/04E-22L02	207.0 e	195.2	194.0	191.6	179.6	177.5	181.6	188.0 e	199.9	211.0	205.5	215.3
16S/05E-08Q01	181.5	179.2	175.9	173.0	170.9	169.3	171.4	171.0	171.5	173.0	175.8	182.8
16S/05E-20R01	123.0 e	109.1	107.8	114.5	98.7	97.0 e	105.0 e	113.0 e	121.3	128.0	126.3	117.5
16S/05E-27Q01	214.1	204.8	213.0	219.6	184.2	183.9	186.9	204.4	222.3	243.5	246.2	232.1
16S/05E-28D01	119.0 e	111.1	108.5	112.7	95.0	95.1	99.1	104.0 e	111.1	121.9	125.0 e	117.0 e

e= estimated water level.

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Mean of 13 well	152.6	139.7	136.4	133.8	125.1	123.7	127.7	136.2	146.4	155.2	157.5	156.4

REFERENCE POINT ELEVATIONS FOR THE INDIVIDUAL WELLS, REFERENCED TO MEAN SEA LEVEL (M.S.L.)

Well Number	R.P. Elevation, in Feet at M.S.L
14S/03E-06R01	91.6
14S/03E-15H03	126.0
14S/03E-25L02	127.0
15S/03E-12E02	70.0
15S/04E-06R01	93.7
15S/04E-07R01	81.0
15S/04E-07R02	80.0
15S/04E-21L02	137.0
15S/04E-22L02	186.0
16S/05E-08Q01	222.0
16S/05E-20R01	170.0
16S/05E-27Q01	253.0
16S/05E-28D01	169.0

Formula:

Reference Point (R.P.) Elevation, in Feet at Mean Sea Level (M.S.L.)
- Depth to Water Surface, in Feet
Water Surface Elevation, in Feet at M.S.L.

EAST SIDE AREA — **WATER SURFACE ELEVATION, IN FEET AT M.S.L.**

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
14S/03E-06R01	-79.3	-39.3	-37.9	-32.0	-23.3	-22.3	-33.9	-37.2	-61.4	-79.9	-82.2	-81.4
14S/03E-15H03	-86.5	-78.8	-52.0	-23.5	-37.7	-36.0 e	-43.9	-59.0 e	-82.7	-87.0 e	-89.0 e	-86.2
14S/03E-25L02	-81.6	-61.5	-61.0	-60.1	-60.0	-56.4	-45.2	-59.0 e	-70.9	-76.0 e	-82.8	-91.5
15S/03E-12E02	-30.1	-18.5	-12.3	-6.8	-2.0 e	-1.1	-9.0	-16.0 e	-24.5	-35.4	-41.0 e	-36.4
15S/04E-06R01	-48.6	-28.6	-26.9	-27.7	-9.6	-8.2	-16.2	-42.3	-49.8	-55.8	-62.3 e	-66.0
15S/04E-07R01	9.6	11.9	10.7	9.3	16.2	16.8	17.5	17.0 e	17.0	13.0	14.2	15.0
15S/04E-07R02	-21.3	-5.5	0.0	4.9	7.4	9.8	4.5	-1.3	-10.2	-19.0	-20.3	-18.2
15S/04E-21L02	5.0 e	10.0 e	12.0 e	14.0 e	17.0 e	19.0 e	16.0 e	14.0 e	12.0 e	6.0 e	1.0 e	3.0 e
15S/04E-22L02	-21.0 e	-9.2	-8.0	-5.6	6.4	8.5	4.4	-2.0 e	-13.9	-25.0	-19.5	-29.3
16S/05E-08Q01	40.5	42.8	46.1	49.0	51.1	52.7	50.6	51.0	50.5	49.0	46.2	39.2
16S/05E-20R01	47 0 e	60.9	62.2	55.5	71.3	73.0 e	65.0 e	57.0 e	48.7	42.0	43.7	52.5
16S/05E-27Q01	38.9	48.2	40.0	33.4	68.8	69.1	66.1	48.6	30.7	9.5	6.8	20.9
16S/05E-28D01	50.0 e	57.9	60.5	56.3	74.0	73.9	69.9	65.0 e	57.9	47.1	44.0 e	52.0 e

e= estimated water level.

SALINAS VALLEY INVESTIGATION
SUMMARY OF MONTHLY WELL MEASUREMENTS

WATER YEAR : 1994-95

FOREBAY AREA

DEPTH TO WATER SURFACE, IN FEET

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
17S/05E-02N04	64.5	58.3	59.2	57.2	53.9	52.1	53.1	53.1	53.7	55.9	58.0	57.9
17S/05E-03L01	50.0	48.4	47.1	45.6	44.2	42.5	42.3	43.2	44.2	46.3	47.5	48.7
17S/05E-36J01	20.1	18.5	18.1	16.3	15.0	12.4	14.5	15.5	17.4	18.1	20.4	20.0
17S/06E-19D01	35.1	33.4	32.8	31.4	30.5	27.9	28.5	30.2	31.1	32.0 e	34.0	34.9
18S/06E-02N01	38.4	37.5	38.0	34.3	29.8	26.6	28.0	28.5	29.6	31.6	33.5	35.4
18S/06E-06M01	36.6	31.3	29.6	28.2	26.2	23.9	25.4	25.4	29.9	30.3	35.4	32.3
18S/06E-15M01	107.9	106.1	105.2	105.6	91.0	86.7	85.7	85.1	89.2	93.6	95.7	96.0 e
18S/06E-25F01	72.9	68.5	65.5	64.5	51.1	44.2	40.9	42.2	43.9	47.0 e	51.9	57.0 e
19S/06E-11C01	186.6	186.8	184.0	175.3	167.0	161.0	155.8	157.6	165.8	167.7	172.5	175.2
19S/07E-08D01	89.0 e	76.6	75.5	73.5	71.5	70.2	75.3	81.9	84.1	92.0 e	97.8	94.2

e= estimated water level.

Mean of 10 Well	70.1	66.5	65.5	63.2	58.0	54.8	55.0	56.3	58.9	61.5	64.7	65.2

REFERENCE POINT ELEVATIONS FOR THE INDIVIDUAL WELLS, REFERENCED TO MEAN SEA LEVEL (M.S.L.)

Well Number	R.P. Elevation, in Feet at M.S.L
17S/05E-02N04	165.0
17S/05E-03L01	154.0
17S/05E-36J01	167.0
17S/06E-19D01	170.0
18S/06E-02N01	202.0
18S/06E-06M01	194.0
18S/06E-15M01	277.0
18S/06E-25F01	255.0
19S/06E-11C01	375.0
19S/07E-08D01	292.0

Formula:

Reference Point (R.P.) Elevation, in Feet at Mean Sea Level (M.S.L.)
- Depth to Water Surface, in Feet
Water Surface Elevation, in Feet at M.S.L.

FOREBAY AREA

WATER SURFACE ELEVATION, IN FEET AT M.S.L.

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
17S/05E-02N04	100.5	106.7	105.8	107.8	111.1	112.9	111.9	111.9	111.3	109.1	107.0	107.1
17S/05E-03L01	104.0	105.6	106.9	108.4	109.8	111.5	111.7	110.9	109.8	107.7	106.5	105.3
17S/05E-36J01	146.9	148.5	148.9	150.7	152.0	154.6	152.5	151.5	149.6	148.9	146.6	147.0
17S/06E-19D01	134.9	136.6	137.2	138.6	139.5	142.1	141.5	139.8	138.9	138.0 e	136.0	135.1
18S/06E-02N01	163.6	164.5	164.0	167.7	172.2	175.4	174.0	173.5	172.4	170.4	168.5	166.6
18S/06E-06M01	157.4	162.7	164.4	165.8	167.8	170.1	168.6	168.6	164.1	163.7	158.6	161.7
18S/06E-15M01	169.1	170.9	171.8	171.4	186.0	190.3	191.3	191.9	187.8	183.4	181.3	181.0 e
18S/06E-25F01	182.1	186.5	189.5	190.5	203.9	210.8	214.1	212.8	211.1	208.0 e	203.1	198.0 e
19S/06E-11C01	188.4	188.2	191.0	199.7	208.0	214.0	219.2	217.4	209.2	207.3	202.5	199.8
19S/07E-08D01	203.0 e	215.4	216.5	218.5	220.5	221.8	216.7	210.1	207.9	200.0 e	194.2	197.8

e= estimated water level.

SALINAS VALLEY INVESTIGATION
SUMMARY OF MONTHLY WELL MEASUREMENTS

WATER YEAR : 1994-95

UPPER VALLEY AREA — **DEPTH TO WATER SURFACE, IN FEET**

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
19S/07E-10P01	89.3	84.2	83.7	81.6	81.1	81.2	84.4	86.7	88.8	91.6	93.0 e	96.7
19S/08E-19K03	27.2	25.3	24.9	23.9	22.9	20.6	22.0	22.7	24.1	25.2	25.5	27.1
20S/08E-05R03	69.0	65.6	63.3	65.2	60.2	59.0	61.0 e	62.0 e	67.3	70.0 e	71.0 e	72.0 e
20S/08E-14K01	52.6	51.5	52.7	53.2	49.0	47.4	47.6	49.2	51.3	53.5	53.9	54.4
20S/08E-15H03	29.2	27.0	26.5	24.9	24.3	21.6	23.7	24.7	27.0 e	28.0 e	29.7	31.5
20S/08E-25Q01	18.1	18.1	18.5	16.5	17.7	13.3	17.6	18.6	19.2	18.4	19.1	19.0
21S/09E-24L01	32.1	32.2	32.2	31.7	31.7	28.9	31.2	32.1	32.8	32.4	33.4	37.2
22S/10E-16P01	23.0	22.8	23.3	22.3	21.6	19.2	20.4	21.5	22.7	23.0 e	24.3	24.1
22S/10E-34G01	57.9	57.4	57.9	58.3	56.4	55.3	55.9	57.9	59.1	58.8	60.0 e	59.7

e= estimated water level.

Mean of 9 Wells	44.3	42.7	42.6	42.0	40.5	38.5	40.4	41.7	43.6	44.5	45.5	46.9

REFERENCE POINT ELEVATIONS FOR THE INDIVIDUAL WELLS, REFERENCED TO MEAN SEA LEVEL (M.S.L.)

Well Number	R.P. Elevation, in Feet at M.S.L
19S/07E-10P01	314.0
19S/08E-19K03	282.0
20S/08E-05R03	337.0
20S/08E-14K01	330.0
20S/08E-15H03	316.0
20S/08E-25Q01	335.0
21S/09E-24L01	397.0
22S/10E-16P01	425.0
22S/10E-34G01	476.0

Formula:

Reference Point (R.P.) Elevation, in Feet at Mean Sea Level (M.S.L.)
- Depth to Water Surface, in Feet
Water Surface Elevation, in Feet at M.S.L.

UPPER VALLEY AREA — **WATER SURFACE ELEVATION, IN FEET AT M.S.L.**

Well Number	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
19S/07E-10P01	224.7	229.8	230.3	232.4	232.9	232.8	229.6	227.3	225.2	222.4	221.0 e	217.3
19S/08E-19K03	254.8	256.7	257.1	258.1	259.1	261.4	260.0	259.3	257.9	256.8	256.5	254.9
20S/08E-05R03	268.0	271.4	273.7	271.8	276.8	278.0	276.0 e	275.0 e	269.7	267.0 e	266.0 e	265.0 e
20S/08E-14K01	277.4	278.5	277.3	276.8	281.0	282.6	282.4	280.8	278.7	276.5	276.1	275.6
20S/08E-15H03	286.8	289.0	289.5	291.1	291.7	294.4	292.3	291.3	289.0 e	288.0 e	286.3	284.5
20S/08E-25Q01	316.9	316.9	316.5	318.5	317.3	321.7	317.4	316.4	315.8	316.6	315.9	316.0
21S/09E-24L01	364.9	364.8	364.8	365.3	365.3	368.1	365.8	364.9	364.2	364.6	363.6	359.8
22S/10E-16P01	402.0	402.2	401.7	402.7	403.4	405.8	404.6	403.5	402.3	402.0 e	400.7	400.9
22S/10E-34G01	418.1	418.6	418.1	417.7	419.6	420.7	420.1	418.1	416.9	417.2	416.0 e	416.3

e= estimated water level.

SALINAS VALLEY BASIN INVESTIGATION
AUGUST WATER LEVEL MEASUREMENTS
Pressure Area
180-Foot Aquifer

State Well Number		Date of Measurement	Water Surface Elevation (Feet at Mean Sea Level)
13S/02E-26L01		08/27/95	-6.4
13S/02E-29R01		08/27/95	-7.9
13S/02E-33R01		08/27/95	-16.2
14S/02E-03K01		08/27/95	-30.7
14S/02E-10P01		08/27/95	-26.9
14S/02E-11G02		08/27/95	-25.7
14S/02E-13B02		08/27/95	-32.6
14S/02E-13F03		08/28/95	-27.9
14S/02E-14E01		08/27/95	-36.0
14S/02E-15G01		08/27/95	-27.9
14S/02E-17A01		08/27/95	-19.8
14S/02E-21J01		08/27/95	-21.5
14S/02E-22F01		08/27/95	-27.3
14S/02E-23A01		08/27/95	-31.4
14S/02E-24J01		08/27/95	-33.3
14S/02E-26P01		08/27/95	-31.3
14S/02E-27G02		08/27/95	-28.4
14S/02E-28H02		08/27/95	-29.6
14S/02E-34B01		08/27/95	-26.2
14S/02E-36E01		08/27/95	-33.5
14S/03E-18J01	**	08/27/95	-16.0
14S/03E-19G01		08/27/95	-32.7
14S/03E-19Q02		08/27/95	-34.1
14S/03E-28M02		08/31/95	-36.0
14S/03E-28N01	**	08/31/95	-35.0
14S/03E-28N03	**	08/31/95	-30.0
14S/03E-30N01		08/27/95	-29.4
14S/03E-31F01		08/27/95	-26.2
14S/03E-33G01		08/31/95	-32.0
15S/02E-01K01		08/27/95	-34.5
15S/03E-03C01	**	08/31/95	-30.0
15S/03E-09E03		08/27/95	-18.1
15S/03E-13N01		08/27/95	-11.5
15S/03E-14C01		08/27/95	-17.3
15S/03E-16M01		08/27/95	-12.0
15S/03E-18C02		08/27/95	-27.9
15S/03E-22G01		08/27/95	-2.9
15S/03E-25L01		08/28/95	7.9
15S/03E-26F01		08/27/95	-2.9
15S/04E-31A02		08/27/95	27.5
16S/04E-15D01		08/28/95	52.9

Note:
** Two asterisks designate a well that is perforated in both the Pressure 180-Foot and Pressure 400-Foot Aquifers.

SALINAS VALLEY BASIN INVESTIGATION
AUGUST WATER LEVEL MEASUREMENTS

Pressure Area
400-Foot Aquifer

State Well Number		Date of Measurement	Water Surface Elevation (Feet at Mean Sea Level)
13S/02E-19R01		08/27/95	-23.8
13S/02E-20J01		08/27/95	-44.7
13S/02E-21N01		08/27/95	-48.8
13S/02E-27L01	**	08/27/95	-52.4
13S/02E-27M01		08/27/95	-55.4
13S/02E-27P01		08/27/95	-72.1
13S/02E-27Q02		08/27/95	-61.7
13S/02E-28L02		08/27/95	-51.6
13S/02E-29F02		08/27/95	-35.5
13S/02E-30A01		08/27/95	-25.9
13S/02E-31N02		08/27/95	-27.5
13S/02E-32A02		08/27/95	-54.8
13S/02E-32J03		08/27/95	-47.0
13S/02E-33N03		08/27/95	-51.6
13S/02E-34G01		08/27/95	-66.4
13S/02E-34M01		08/27/95	-62.1
14S/02E-02C03		08/27/95	-90.8
14S/02E-03H01		08/27/95	-79.0
14S/02E-03K02		08/27/95	-83.2
14S/02E-03M02		08/27/95	-69.7
14S/02E-04B01		08/27/95	-63.7
14S/02E-04E02		08/27/95	-26.7
14S/02E-04H01		08/27/95	66.3
14S/02E-05C03		08/27/95	-41.4
14S/02E-05F04		08/27/95	-45.3
14S/02E-05K01		08/27/95	-45.4
14S/02E-05P02		08/27/95	-39.9
14S/02E-06J03		08/27/95	-37.1
14S/02E-07K01		08/27/95	-28.2
14S/02E-08C03		08/27/95	-40.3
14S/02E-08M02		08/27/95	-31.6
14S/02E-09L02		08/27/95	-36.9
14S/02E-10C01		08/27/95	-68.6
14S/02E-10E02		08/27/95	-62.5
14S/02E-11M03		08/27/95	-61.1
14S/02E-13F02		08/28/95	-52.8
14S/02E-14L03		08/27/95	-61.8
14S/02E-15A01		08/27/95	-59.1
14S/02E-15B01		08/27/95	-57.7

Note:
** Two asterisks designate a well that is perforated in both the Pressure 180-Foot and Pressure 400-Foot Aquifers.

SALINAS VALLEY BASIN INVESTIGATION
AUGUST WATER LEVEL MEASUREMENTS

Pressure Area
400-Foot Aquifer (Continued)

State Well Number	Date of Measurement	Water Surface Elevation (Feet at Mean Sea Level)
14S/02E-15C02	08/27/95	-53.5
14S/02E-15P01	08/27/95	-38.7
14S/02E-16A02	08/27/95	-56.5
14S/02E-17B02	08/27/95	-31.0
14S/02E-22B01	08/27/95	-41.0
14S/02E-22L01	08/27/95	-27.0
14S/02E-26J03	08/27/95	-34.2
14S/02E-34A03	08/27/95	-31.7
14S/02E-34B03	08/27/95	-27.1
14S/02E-35L02	08/27/95	-41.5
14S/03E-18C02	08/28/95	-51.7
14S/03E-20C01	08/31/95	-73.0
14S/03E-20M02	08/31/95	-61.0
14S/03E-21E03	08/31/95	-107.0
14S/03E-21L01	08/31/95	-60.0
14S/03E-29C01	08/31/95	-61.0
14S/03E-29Q01	08/31/95	-42.0
14S/03E-31L01	08/31/95	-30.0
14S/03E-31P01	08/31/95	-32.0
14S/03E-32N04	08/31/95	-34.0
14S/03E-33Q01	08/31/95	-31.0
14S/03E-34C01	08/31/95	-58.0
15S/02E-02G01	08/27/95	-43.8
15S/03E-02G01	08/31/95	-49.0
15S/03E-03N02	08/31/95	-22.0
15S/03E-03R02	08/31/95	-26.0
15S/03E-04Q01	08/31/95	-16.0
15S/03E-05C02	08/31/95	-34.0
15S/03E-06D02	08/27/95	-38.1
15S/03E-06K01	08/27/95	-37.6
15S/03E-14M03	08/27/95	-20.6
15S/03E-14P02	08/27/95	-20.9
15S/03E-15B01	08/27/95	-24.1
15S/03E-22A02	08/27/95	4.1
15S/03E-26A01	08/27/95	-6.6
15S/03E-28A01	08/31/95	-13.0
15S/03E-28B02	08/31/95	-8.0
15S/04E-19D02	08/27/95	-7.1
15S/04E-29Q02	08/27/95	13.5

SALINAS VALLEY BASIN INVESTIGATION
AUGUST WATER LEVEL MEASUREMENTS

East Side Area

State Well Number	Date of Measurement	Water Surface Elevation (Feet at Mean Sea Level)
13S/03E-35F01	08/31/95	29.0
13S/03E-35F02	08/31/95	32.0
14S/02E-01C01	08/27/95	-71.2
14S/02E-02A02	08/27/95	-80.8
14S/02E-12B02	08/28/95	-36.2
14S/02E-12B03	08/28/95	-62.8
14S/03E-04E01	08/27/95	-45.3
14S/03E-06L01	08/27/95	-64.9
14S/03E-06L02	08/27/95	-74.7
14S/03E-06R01	08/27/95	-67.8
14S/03E-07A01	08/27/95	-67.5
14S/03E-08Q03	08/31/95	-87.0
14S/03E-09B01	08/31/95	-82.0
14S/03E-09E02	08/31/95	-102.0
14S/03E-09P03	08/31/95	-88.0
14S/03E-10E01	08/31/95	-115.0
14S/03E-10G02	08/27/95	74.3
14S/03E-16E02	08/31/95	-84.0
14S/03E-16M01	08/31/95	-80.0
14S/03E-17F01	08/31/95	-110.0
14S/03E-22D01	08/31/95	-108.0
14S/03E-22E01	08/31/95	-86.0
14S/03E-22H01	08/31/95	-85.0
14S/03E-24H01	08/27/95	-109.0
14S/03E-24R02	08/27/95	-93.3 *
14S/03E-35N01	08/31/95	-27.0
14S/03E-36A01	08/27/95	-63.8
14S/04E-30R01	08/27/95	-78.4
15S/03E-12E02	08/27/95	-38.1
15S/03E-13G04	08/27/95	-9.1
15S/04E-06R01	08/27/95	-62.8
15S/04E-07R01	08/27/95	15.0
15S/04E-07R02	08/27/95	-22.2
15S/04E-08C01	08/27/95	-64.1 *
15S/04E-09D01	08/27/95	-121.9 *
15S/04E-15D02	08/27/95	-56.0 *
15S/04E-16E02	08/27/95	-38.6
15S/04E-17P02	08/27/95	-30.7
15S/04E-20B02	08/27/95	-2.6
15S/04E-33A01	08/27/95	30.1

Note:

* One asterisk designates a well that was operating when the water surface elevation was measured.

SALINAS VALLEY BASIN INVESTIGATION
FALL WATER LEVEL MEASUREMENTS

Pressure Area
180-Foot Aquifer

State Well Number		Date of Measurement	Water Surface Elevation (Feet at M.S.L.**)		State Well Number		Date of Measurement	Water Surface Elevation (Feet at M.S.L.)
13S/02E-16D01		12/11/95	2.2		15S/03E-05Q04		12/05/95	-4.7
13S/02E-27L01	*	12/11/95	-28.6		15S/03E-09E03		12/05/95	-1.2
13S/02E-29R01		12/11/95	-5.9		15S/03E-13N01		12/06/95	5.4
13S/02E-33R01		12/07/95	-11.0		15S/03E-14C01		12/06/95	3.6
14S/02E-03K01		12/08/95	-28.0		15S/03E-16M01		12/05/95	5.1
14S/02E-10P01		12/07/95	-15.1		15S/03E-18B01		12/06/95	-2.6
14S/02E-13B02		12/11/95	-16.4		15S/03E-18C02		12/06/95	-6.3
14S/02E-14E01		12/07/95	-21.6		15S/03E-18M02	*	12/04/95	-20.5
14S/02E-15G01		12/07/95	-14.2		15S/03E-22G01		12/05/95	11.9
14S/02E-17A01		12/06/95	-9.2		15S/03E-25L01		12/04/95	17.9
14S/02E-21J01		12/06/95	-12.3		15S/03E-25Q01		12/04/95	19.6
14S/02E-21L01		12/06/95	0.8		15S/03E-26F01		12/04/95	8.7
14S/02E-22F01		12/06/95	-11.4		15S/04E-31A02		11/21/95	36.5
14S/02E-22P02		12/06/95	-11.8		16S/04E-05M02		11/21/95	44.7
14S/02E-23A01		12/07/95	-14.7		16S/04E-08B01		11/21/95	44.9
14S/02E-24J01		12/07/95	-15.4		16S/04E-08J01		11/21/95	49.8
14S/02E-26P01		12/06/95	-10.7		16S/04E-09A01		11/30/95	52.8
14S/02E-27G02		12/06/95	-11.1		16S/04E-13H01		11/21/95	66.3
14S/02E-28H02	*	12/11/95	-14.4		16S/04E-13R02		11/20/95	71.4
14S/02E-34B01		12/06/95	-8.6		16S/04E-15D01		11/21/95	55.6
14S/02E-36E01		12/06/95	-11.5		16S/04E-15R02		11/21/95	63.4
14S/03E-18E03		12/07/95	-8.0	e	16S/04E-16E01		11/21/95	62.9
14S/03E-18J01	*	12/11/95	-8.8		16S/04E-25C01		11/21/95	79.2
14S/03E-19G01		12/07/95	-14.4		16S/04E-25P01		11/21/95	83.2
14S/03E-19Q02		12/07/95	-12.8		16S/04E-27B02		11/21/95	82.2
14S/03E-28M02		12/31/95	-9.0		16S/05E-19F01		11/20/95	75.7
14S/03E-28N01	*	12/31/95	-10.0		16S/05E-30E01		12/04/95	80.7
14S/03E-28N03	*	12/31/95	-7.0		16S/05E-31A01		11/29/95	89.0
14S/03E-30N01		12/07/95	-8.8		16S/05E-31M01		11/29/95	95.3
14S/03E-31F01		12/07/95	-8.1		16S/05E-31Q01		12/04/95	99.3
14S/03E-33G01		12/31/95	-20.0		16S/05E-32B02		11/29/95	91.6
15S/02E-01Q01		12/06/95	-9.6		16S/05E-32C01		11/29/95	88.3
15S/02E-12E02		12/06/95	-8.0		16S/05E-32E01		11/29/95	89.3
15S/03E-03C01		12/31/95	-11.0		17S/04E-01D01		11/29/95	100.6

e = estimated water surface elevation

* Note: An asterisk designates wells that are perforated in both the Pressure 180-Foot and Pressure 400-Foot Aquifers.

** Mean Sea Level (M.S.L.)

SALINAS VALLEY BASIN INVESTIGATION
FALL WATER LEVEL MEASUREMENTS

Pressure Area
400-Foot Aquifer

State Well Number	Date of Measurement	Water Surface Elevation (Feet at M.S.L.**)
13S/02E-19R01	12/11/95	-7.4
13S/02E-20J01	12/11/95	-14.7
13S/02E-21N01	12/11/95	-16.5
13S/02E-27M01 *	12/11/95	-22.2
13S/02E-27P01	12/15/95	-28.3
13S/02E-29D03	12/11/95	-8.9
13S/02E-29F02	12/11/95	-9.5
13S/02E-30A01	12/11/95	-9.1
13S/02E-31N02	12/11/95	-7.9
13S/02E-32A02	12/15/95	-16.4
13S/02E-32J03	12/07/95	-17.4
13S/02E-33N03	12/15/95	-13.0
14S/02E-02C03	12/11/95	-43.1
14S/02E-03K02	12/08/95	-42.0
14S/02E-03M02	12/07/95	-25.9
14S/02E-04B01	12/11/95	-20.5
14S/02E-04H01	12/07/95	-24.2
14S/02E-05C03	12/11/95	-10.9
14S/02E-05F04	12/11/95	-12.0
14S/02E-05K01	12/11/95	-11.4
14S/02E-06J03	12/11/95	-9.2
14S/02E-07K01	12/11/95	-7.4
14S/02E-08C03	12/11/95	-8.0
14S/02E-08M02	12/11/95	-8.5
14S/02E-10C01	12/07/95	-23.0
14S/02E-10E02	12/07/95	-18.3
14S/02E-11M03	12/07/95	-28.9
14S/02E-12L02	12/08/95	-21.6
14S/02E-12Q01	12/11/95	-15.6
14S/02E-14L03	12/07/95	-26.4
14S/02E-15A01	12/11/95	-22.0
14S/02E-15B01	12/07/95	-24.6
14S/02E-15K01	12/07/95	-15.6
14S/02E-15P01	12/06/95	-9.1
14S/02E-16A02	12/08/95	-18.0
14S/02E-17B02	12/08/95	-12.9
14S/02E-22L01	12/11/95	-10.3
14S/02E-26J03	12/06/95	-12.5
14S/02E-27G03	12/11/95	-12.8
14S/02E-34A03	12/06/95	-15.3
14S/02E-34B03	12/11/95	-11.5
14S/02E-35L02	12/06/95	-16.5
14S/02E-36G01	12/06/95	-8.5
14S/03E-18E04	12/07/95	-24.1 e
14S/03E-20C01	12/31/95	-33.0
14S/03E-20M02	12/31/95	-44.0
14S/03E-21E03	12/31/95	-59.0
14S/03E-21L01	12/31/95	-21.0
14S/03E-29C01	12/31/95	-45.0
14S/03E-29F03	12/31/95	-14.0
14S/03E-29Q01	12/31/95	-25.0
14S/03E-31F02	12/07/95	-10.5
14S/03E-31L01	12/31/95	-5.0
14S/03E-31P01	12/31/95	-4.0
14S/03E-32N04	12/31/95	-6.0
14S/03E-33Q01	12/31/95	-13.0
14S/03E-34C01	12/31/95	-42.0
15S/02E-01A03	12/06/95	-8.6
15S/02E-02G01	12/06/95	-20.5
15S/02E-12A01	12/06/95	-10.7
15S/03E-02G01	12/31/95	9.0
15S/03E-03N02	12/31/95	-4.0
15S/03E-03R02	12/31/95	-6.0
15S/03E-04K03	12/06/95	-3.1
15S/03E-04Q01	12/31/95	1.0
15S/03E-05C02	12/31/95	-8.0
15S/03E-06D02	12/06/95	-12.5
15S/03E-06K01	12/06/95	-9.0
15S/03E-07G01	12/06/95	-6.6
15S/03E-08F01	12/06/95	-8.3
15S/03E-08N03	12/06/95	-2.9
15S/03E-09J02	12/06/95	-7.1
15S/03E-14M03	12/06/95	1.3
15S/03E-14N03	12/06/95	-1.1
15S/03E-14P02	12/06/95	0.2
15S/03E-15B01	12/06/95	-2.7
15S/03E-16B03	12/05/95	0.0
15S/03E-22A02	12/05/95	1.3
15S/03E-26A01	12/04/95	10.1
15S/03E-28A01	12/31/95	7.0
15S/03E-28B02	12/31/95	10.0
15S/04E-19D02	12/04/95	7.0
15S/04E-29D01	11/21/95	17.8
15S/04E-29Q02	11/15/95	23.9
15S/04E-29R01	11/21/95	25.9
16S/04E-02Q03	11/20/95	43.6
16S/04E-04C01	11/21/95	40.8
16S/04E-10R02	11/15/95	51.7
16S/04E-25G01	11/21/95	75.0
16S/05E-30J02	11/29/95	88.8

* Note: An asterisk designates wells that are perforated in both the Pressure 180-Foot and Pressure 400-Foot Aquifers.
** Mean Sea Level (M.S.L.)
e = estimated water surface elevation

SALINAS VALLEY BASIN INVESTIGATION
FALL WATER LEVEL MEASUREMENTS

East Side Area

State Well Number	Date of Measurement	Water Surface Elevation (Feet at M.S.L.**)	
13S/02E-36F01	12/08/95	-39.2	
13S/03E-35F01	12/31/95	67.0	
13S/03E-35F02	12/31/95	69.0	
13S/03E-35N01	12/08/95	93.1	
14S/02E-01C01	12/11/95	-28.9	
14S/02E-02A02	12/08/95	-48.2	
14S/02E-11A02	12/08/95	-16.0	e
14S/02E-11A04	12/08/95	-31.0	e
14S/02E-12B02	12/08/95	-21.0	e
14S/02E-12B03	12/08/95	-28.0	e
14S/03E-02E03	12/11/95	78.8	
14S/03E-03K01	12/08/95	-63.1	
14S/03E-04E01	12/08/95	-51.8	
14S/03E-05B02	12/11/95	-41.7	
14S/03E-06L01	12/08/95	-31.7	
14S/03E-06L02	12/11/95	-38.8	
14S/03E-06R01	12/08/95	-42.1	
14S/03E-07A01	12/08/95	-34.4	
14S/03E-08C01	12/08/95	-42.8	
14S/03E-08Q03	12/31/95	-35.0	
14S/03E-09B01	12/31/95	-45.0	
14S/03E-09E02	12/31/95	-45.0	
14S/03E-09P02	12/07/95	-37.5	
14S/03E-09P03	12/31/95	-36.0	
14S/03E-10E01	12/31/95	-50.0	
14S/03E-10R02	12/07/95	-64.8	
14S/03E-11C02	12/07/95	-2.5	
14S/03E-11H01	12/07/95	39.9	
14S/03E-12E01	12/07/95	59.2	
14S/03E-14D01	12/07/95	92.0	
14S/03E-14N01	12/08/95	-58.9	
14S/03E-15H03	12/07/95	-55.5	
14S/03E-16E02	12/31/95	-34.0	
14S/03E-16M01	12/31/95	-37.0	
14S/03E-17F01	12/31/95	-73.0	
14S/03E-22A01	12/08/95	-59.9	
14S/03E-22D01	12/31/95	-48.0	
14S/03E-22E01	12/31/95	-42.0	
14S/03E-22H01	12/31/95	-44.0	
14S/03E-24H01	12/07/95	-88.2	
14S/03E-24N01	12/13/95	-59.6	
14S/03E-24R02	12/07/95	-70.7	
14S/03E-25L02	12/13/95	-56.3	
14S/03E-35N01	12/31/95	-1.0	
14S/03E-36A01	12/13/95	-47.2	
14S/03E-36P02	12/06/95	-29.9	

State Well Number	Date of Measurement	Water Surface Elevation (Feet at M.S.L.)
14S/04E-30N01	12/13/95	-59.9
14S/04E-30R01	12/13/95	-66.4
14S/04E-31F01	12/13/95	-64.0
15S/03E-12E02	12/06/95	-11.3
15S/03E-12F02	12/15/95	16.6
15S/03E-13G04	12/05/95	12.9
15S/04E-05M01	12/12/95	-29.2
15S/04E-06R01	12/06/95	-25.7
15S/04E-07A01	12/06/95	-15.5
15S/04E-07R01	12/06/95	19.2
15S/04E-07R02	12/06/95	1.3
15S/04E-08C01	12/12/95	-25.6
15S/04E-08L01	12/06/95	2.1
15S/04E-08N01	12/06/95	-1.9
15S/04E-08Q01	12/12/95	-16.0
15S/04E-09D01	12/12/95	-44.8
15S/04E-09J01	12/05/95	-44.8
15S/04E-09M01	12/12/95	-29.9
15S/04E-14N01	12/05/95	-21.0
15S/04E-15D02	12/12/95	-19.1
15S/04E-15P01	12/14/95	-23.0
15S/04E-15P02	12/06/95	-23.8
15S/04E-16D01	12/06/95	-18.7
15S/04E-16E02	12/06/95	-16.5
15S/04E-17P02	12/05/95	1.0
15S/04E-20B02	11/21/95	15.3
15S/04E-20J01	11/30/95	21.7
15S/04E-21F04	12/04/95	2.4
15S/04E-22L02	12/05/95	-1.7
15S/04E-24N03	11/20/95	-6.4
15S/04E-27G01	12/04/95	17.7
15S/04E-33A01	12/05/95	31.7
15S/04E-34L01	12/05/95	35.9
15S/04E-36H01	12/05/95	23.4
15S/04E-36R02	11/20/95	35.6
16S/05E-05N01	11/20/95	37.1
16S/05E-07G01	11/20/95	49.4
16S/05E-08Q01	11/15/95	48.6
16S/05E-17R01	11/29/95	65.4
16S/05E-20G02	11/29/95	77.5
16S/05E-20R01	11/30/95	65.0
16S/05E-21R01	11/29/95	78.0
16S/05E-27Q01	12/12/95	61.1
16S/05E-28D01	12/12/95	70.7
16S/05E-28P01	12/12/95	63.1

** Mean Sea Level (M.S.L.)

e = estimated water surface elevation

SALINAS VALLEY BASIN INVESTIGATION
FALL WATER LEVEL MEASUREMENTS

Forebay Area

State Well Number	Date of Measurement	Water Surface Elevation (Feet at M.S.L.**)	State Well Number	Date of Measurement	Water Surface Elevation (Feet at M.S.L.)
16S/05E-32H02	11/29/95	93.1	18S/06E-07A01	11/21/95	163.8
16S/05E-32M01	11/29/95	92.9	18S/06E-08R01	11/21/95	169.5
16S/05E-33Q01	11/29/95	95.4	18S/06E-09M01	11/20/95	167.4
17S/05E-01Q01	11/27/95	70.1	18S/06E-09M02	11/20/95	168.9
17S/05E-02N02	11/28/95	118.5	18S/06E-11J01	11/28/95	181.5
17S/05E-02N04	11/28/95	109.2	18S/06E-12A01	11/20/95	183.6
17S/05E-03L01	11/28/95	108.4	18S/06E-12R01	11/20/95	186.5
17S/05E-04K01	11/28/95	107.1	18S/06E-12R02	11/21/95	171.4
17S/05E-04N01	11/28/95	104.0	18S/06E-14B01	11/21/95	184.0
17S/05E-04R01	11/28/95	105.3	18S/06E-14R01	11/21/95	187.8
17S/05E-05G01	11/28/95	102.8	18S/06E-15F01	11/20/95	181.2
17S/05E-06Q01	11/27/95	101.2	18S/06E-15M01	11/17/95	179.4
17S/05E-08L01	11/27/95	114.7	18S/06E-16L01	11/28/95	172.4
17S/05E-09R01	11/28/95	115.6	18S/06E-22B02	11/20/95	181.2
17S/05E-10Q01	11/28/95	119.4	18S/06E-22B03	11/20/95	183.1
17S/05E-12E01	11/27/95	106.5	18S/06E-22B04	11/20/95	183.1
17S/05E-13E01	11/28/95	124.9	18S/06E-24M01	11/28/95	188.2
17S/05E-14D01	11/28/95	123.1	18S/06E-24M02	11/28/95	188.4
17S/05E-21A01	11/27/95	124.7	18S/06E-25F01	11/20/95	194.7
17S/05E-24G01	11/28/95	138.9	18S/06E-27A01	11/20/95	194.6
17S/05E-25L01	11/27/95	141.0	18S/06E-27C01	11/20/95	187.1
17S/05E-27A01	11/27/95	138.0	18S/06E-34A01	11/20/95	194.6
17S/05E-36F02	11/27/95	139.7	18S/06E-34B01	11/21/95	198.5
17S/05E-36J01	11/28/95	148.9	18S/06E-35F01	11/20/95	197.2
17S/06E-16N01	11/28/95	121.2	18S/06E-35F02	11/20/95	200.6
17S/06E-18G01	11/28/95	129.7	18S/07E-18D01	11/20/95	187.3
17S/06E-19D01	11/15/95	137.2	18S/07E-19G02	11/15/95	179.3
17S/06E-20E02	12/28/95	146.3	18S/07E-20K01	11/20/95	188.0
17S/06E-21N01	11/21/95	158.1	18S/07E-28K01	11/20/95	204.5
17S/06E-27E03	11/21/95	164.2	18S/07E-28N01	11/20/95	207.6
17S/06E-27K01	11/21/95	161.1	18S/07E-29M01	11/27/95	202.0
17S/06E-28B01	11/15/95	152.9	18S/07E-32G02	11/20/95	208.6
17S/06E-28K01	11/21/95	156.8	18S/07E-33J02	11/14/95	208.7
17S/06E-29C01	11/30/95	150.5	18S/07E-34P02	11/15/95	222.4
17S/06E-29K01	11/28/95	150.4	19S/06E-01H01	11/15/95	203.5
17S/06E-29Q01	11/15/95	152.6	19S/06E-03E02	11/20/95	193.6
17S/06E-30F01	11/28/95	137.3	19S/06E-11C01	11/14/95	201.2
17S/06E-35F01	11/21/95	172.1	19S/06E-12F01	11/15/95	194.2
17S/06E-35J01	11/21/95	176.1	19S/07E-04Q01	11/15/95	222.7
18S/06E-01E01	11/20/95	177.7	19S/07E-05B02	11/15/95	210.6
18S/06E-02N01	11/21/95	166.7	19S/07E-05J01	11/15/95	214.6
18S/06E-03P01	11/21/95	175.4	19S/07E-06P01	11/20/95	202.8
18S/06E-05R02	11/27/95	155.6	19S/07E-08D01	11/14/95	216.5
18S/06E-06M01	11/15/95	163.4			

** Mean Sea Level (M.S.L.)

SALINAS VALLEY BASIN INVESTIGATION
FALL WATER LEVEL MEASUREMENTS

Upper Valley Area

State Well Number	Date of Measurement	Water Surface Elevation (Feet at Mean Sea Level
19S/07E-01N01	11/14/95	231.7
19S/07E-03H02	11/15/95	220.7
19S/07E-08N01	11/05/95	226.9
19S/07E-10P01	11/27/95	229.1
19S/07E-13D01	11/14/95	232.2
19S/07E-14N02	11/21/95	234.1
19S/07E-16D01	11/15/95	219.4
19S/07E-24H02	11/14/95	249.9
19S/07E-27A01	11/15/95	371.5
19S/08E-19K03	11/14/95	256.6
19S/08E-27N03	11/14/95	300.3
19S/08E-31B01	11/14/95	259.4
19S/08E-33J02	11/14/95	289.0
20S/08E-05C01	11/14/95	262.1
20S/08E-05R03	11/14/95	271.3
20S/08E-06K01	11/14/95	267.1
20S/08E-07F01	11/21/95	268.0
20S/08E-09M01	11/14/95	267.2
20S/08E-14K01	11/14/95	279.4
20S/08E-15H03	11/14/95	289.8
20S/08E-16C01	11/20/95	283.3
20S/08E-25Q01	11/14/95	316.9
20S/08E-34G01	11/13/95	416.0
21S/09E-16B01	11/14/95	344.0
21S/09E-16E01	11/14/95	344.8
21S/09E-17Q01	11/14/95	341.5
21S/09E-23G01	11/14/95	362.4
21S/09E-24L01	11/14/95	365.2
21S/10E-30P01	11/14/95	376.2
21S/10E-32N01	11/15/95	379.3
22S/10E-09P01	11/14/95	401.1
22S/10E-16K01	11/14/95	402.4
22S/10E-16P01	11/14/95	402.4
22S/10E-21R01	11/14/95	408.5
22S/10E-22D02	11/14/95	406.0
22S/10E-34G01	11/14/95	426.2
23S/10E-14D01	11/14/95	451.0

Deep Zone Aquifer

State Well Number	Date of Measurement	Water Surface Elevation (Feet at Mean Sea Level
13S/01E-36J01	12/11/95	-35.7
13S/02E-19Q03	12/11/95	-33.4
13S/02E-31A02	12/15/95	-25.9
13S/02E-32E05	12/15/95	-28.4
14S/02E-06L01	12/15/95	-25.6

APPENDIX F

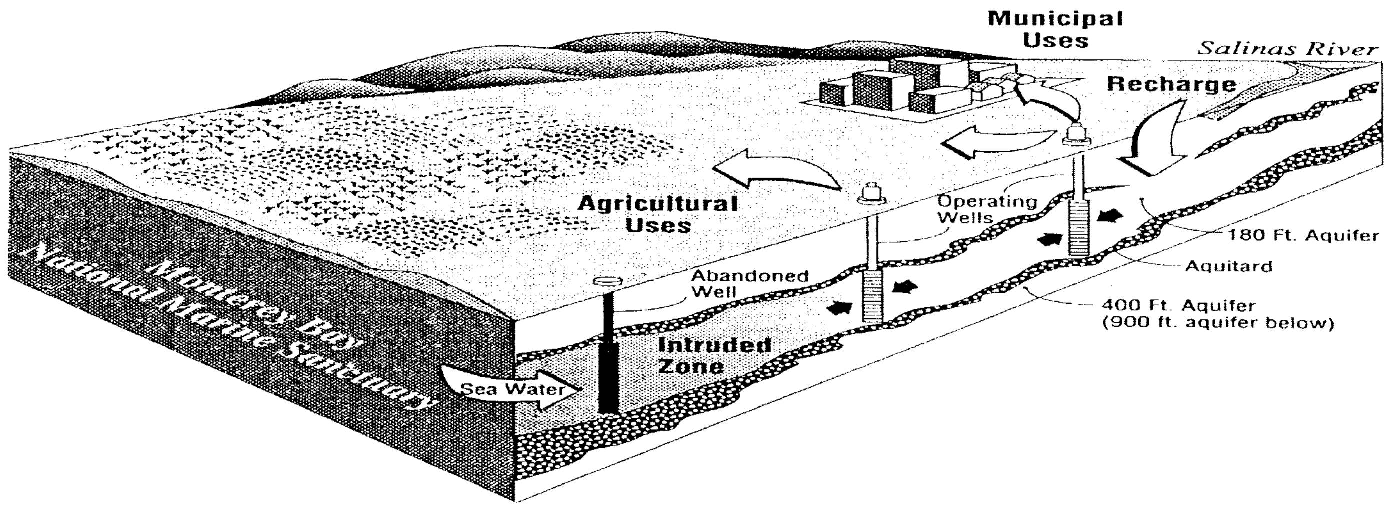

Figure F.1 Mechanism for Seawater Intrusion

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Pressure Area
180-Foot Aquifer

Figure 6.4 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
150	13S/02E-33R01	09/07/95	23.0
151	13S/02E-34M02	06/30/95	23.0
152	13S/02E-34N01	06/30/95	34.0
153	14S/02E-03F02	06/23/95	402.0
154	14S/02E-10C02	06/23/95	2.0
155	14S/02E-11C01	07/03/95	36.0
156	14S/02E-11D01	07/03/95	159.0
157	14S/02E-12N02	09/11/95	53.0
158	14S/02E-13B02	07/03/95	36.0
159	14S/02E-13D01	07/12/95	23.0
160	14S/02E-13F01	08/02/95	55.0
161	14S/02E-13P01	06/27/95	133.0
162	14S/02E-14L02	06/27/95	3.0
163	14S/02E-14R01	06/30/95	11.0
164	14S/02E-15L02	06/21/95	1.0
165	14S/02E-17C01	06/30/95	31.0
166	14S/02E-21F02	08/18/95	31.0
167	14S/02E-21L01	06/30/95	23.0
168	14S/02E-22H02	06/23/95	2.0
169	14S/02E-22P02	07/03/95	8.0
170	14S/02E-23A01	07/12/95	13.0
171	14S/02E-24Q01	06/23/95	31.0
172	14S/02E-25D04	06/23/95	9.0
173	14S/02E-26N03	06/21/95	2.0
174	14S/02E-26P01	06/26/95	0.5
175	14S/02E-27K01	08/30/95	0.5
176	14S/02E-35G01	08/28/95	0.5
177	14S/02E-36E01	09/06/95	4.0
178	14S/03E-19Q02	07/11/95	20.0
179	14S/03E-29L04	07/10/95	114.0
180	14S/03E-30E01	09/06/95	81.0
181	14S/03E-30F01	07/10/95	104.0
182	14S/03E-30F02	08/25/95	53.0
183	14S/03E-30N01	07/10/95	85.0
184	14S/03E-31B01	06/29/95	5.0
185	14S/03E-31F01	08/25/95	2.0
186	15S/02E-02Q01	09/07/95	2.0
187	15S/02E-12C01	09/07/95	14.0
188	15S/02E-12E02	06/26/95	2.0
189	15S/03E-05N01	08/07/95	1.0
190	15S/03E-07N01	08/30/95	34.0
191	15S/03E-08C06	07/18/95	0.5
192	15S/03E-09C01	09/06/95	44.0
193	15S/03E-10P01	07/14/95	1.0
194	15S/03E-10P03	07/07/95	2.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Pressure Area
180-Foot Aquifer

Figure 6.4 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
195	15S/03E-10R02	07/17/95	80.0
196	15S/03E-14C01	08/09/95	21.0
197	15S/03E-14G01	08/07/95	7.0
198	15S/03E-14H01	08/07/95	40.0
199	15S/03E-15L02	08/30/95	31.0
200	15S/03E-16M01	07/06/95	2.0
201	15S/03E-17B01	07/06/95	2.0
202	15S/03E-17B02	08/03/95	7.0
203	15S/03E-17G01	07/07/95	1.0
204	15S/03E-21A01	07/05/95	11.0
205	15S/03E-22F02	08/30/95	11.0
206	15S/03E-22G01	07/05/95	28.0
207	15S/03E-25L01	08/02/95	7.0
208	15S/03E-26D01	08/02/95	15.0
209	15S/03E-26H02	07/31/95	4.0
210	15S/03E-28G01	08/02/95	14.0
211	15S/03E-35B05	08/18/95	5.0
212	15S/04E-32E01	07/17/95	13.0
213	16S/04E-08J01	07/17/95	0.5
214	16S/04E-09A01	08/29/95	0.5
215	16S/04E-15D01	07/17/95	12.0
216	16S/04E-25K01	07/18/95	0.5
217	16S/04E-27G01	07/28/95	12.0
218	16S/04E-36B01	07/20/95	6.0
219	16S/05E-19F01	07/26/95	161.0
220	16S/05E-19R01	07/26/95	115.0
221	16S/05E-30C01	07/18/95	17.0
222	16S/05E-30G01	07/20/95	13.0
223	16S/05E-31A01	07/26/95	0.5
224	16S/05E-31Q01	07/26/95	0.5
225	16S/05E-32B02	07/20/95	176.0
226	16S/05E-32C01	07/20/95	190.0
227	17S/04E-01D01	07/31/95	9.0
228	17S/04E-01D01	7/31/95	9.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Pressure Area
400-Foot Aquifer

Figure 6.5 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
228	13S/02E-20J01	07/05/95	0.5
229	13S/02E-20M02	07/05/95	0.5
230	13S/02E-21N01	07/20/95	0.5
231	13S/02E-27M01	08/02/95	13.0
232	13S/02E-27P01	07/18/95	2.0
233	13S/02E-27Q02	07/20/95	2.0
234	13S/02E-28B01	07/03/95	3.0
235	13S/02E-28M02	07/05/95	8.0
236	13S/02E-29F02	06/30/95	1.0
237	13S/02E-29J01	06/30/95	2.0
238	13S/02E-31N02	07/12/95	2.0
239	13S/02E-32J03	06/30/95	2.0
240	13S/02E-32N01	09/06/95	3.0
241	13S/02E-33H03	07/18/95	8.0
242	13S/02E-33N04	09/07/95	2.0
243	14S/02E-01A01	08/02/95	2.0
244	14S/02E-02C03	07/20/95	3.0
245	14S/02E-03H01	08/07/95	4.0
246	14S/02E-03K02	06/23/95	3.0
247	14S/02E-03M02	06/23/95	3.0
248	14S/02E-03R02	07/11/95	3.0
249	14S/02E-04B01	06/27/95	3.0
250	14S/02E-04E02	06/27/95	3.0
251	14S/02E-04H01	06/30/95	3.0
252	14S/02E-04N03	06/21/95	3.0
253	14S/02E-05C03	06/23/95	3.0
254	14S/02E-05F04	06/23/95	3.0
255	14S/02E-05K01	06/29/95	2.0
256	14S/02E-05K02	07/05/95	3.0
257	14S/02E-06J03	07/13/95	2.0
258	14S/02E-06R02	06/30/95	1.0
259	14S/02E-07A01	06/30/95	3.0
260	14S/02E-07K01	06/27/95	2.0
261	14S/02E-07L04	06/27/95	2.0
262	14S/02E-07L05	06/30/95	3.0
263	14S/02E-08A01	07/12/95	2.0
264	14S/02E-08C03	07/12/95	2.0
265	14S/02E-08M02	09/06/95	3.0
266	14S/02E-09D03	09/06/95	3.0
267	14S/02E-09H03	06/27/95	3.0
268	14S/02E-10C01	06/23/95	3.0
269	14S/02E-10E02	06/29/95	2.0
270	14S/02E-10H01	08/02/95	4.0
271	14S/02E-10M02	06/21/95	3.0
272	14S/02E-10P02	08/10/95	2.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Pressure Area
400-Foot Aquifer

Figure 6.5 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
273	14S/02E-11B01	07/03/95	3.0
274	14S/02E-11M03	08/02/95	2.0
275	14S/02E-12L02	07/05/95	3.0
276	14S/02E-12Q01	07/12/95	21.0
277	14S/02E-13G01	08/07/95	38.0
278	14S/02E-14L03	06/27/95	4.0
279	14S/02E-14N03	06/23/95	4.0
280	14S/02E-15A01	06/23/95	4.0
281	14S/02E-15B01	09/08/95	3.0
282	14S/02E-15C02	08/18/95	3.0
283	14S/02E-15P01	06/23/95	4.0
284	14S/02E-16A02	09/07/95	2.0
285	14S/02E-16H01	06/21/95	4.0
286	14S/02E-17B02	09/06/95	7.0
287	14S/02E-18A01	06/30/95	4.0
288	14S/02E-18C01	08/18/95	3.0
289	14S/02E-22B01	07/07/95	4.0
290	14S/02E-22H01	07/20/95	3.0
291	14S/02E-22L01	06/21/95	3.0
292	14S/02E-23F01	06/23/95	5.0
293	14S/02E-23L02	06/21/95	10.0
294	14S/02E-24E01	07/12/95	24.0
295	14S/02E-24P02	06/29/95	18.0
296	14S/02E-25D03	06/29/95	60.0
297	14S/02E-26J03	07/20/95	2.0
298	14S/02E-34A03	06/29/95	2.0
299	14S/02E-34B03	07/07/95	1.0
300	14S/02E-35L02	06/26/95	2.0
301	14S/02E-36G01	09/07/95	1.0
302	14S/02E-36J02	07/18/95	1.0
303	14S/02E-36R02	06/26/95	1.0
304	14S/03E-18E02	07/03/95	29.0
305	14S/03E-28B02	07/10/95	13.0
306	14S/03E-28F02	07/05/95	19.0
307	14S/03E-30E03	06/29/95	70.0
308	14S/03E-31F02	09/07/95	1.0
309	15S/02E-01A03	07/06/95	1.0
310	15S/02E-02G01	09/08/95	1.0
311	15S/02E-12A01	09/07/95	1.0
312	15S/02E-12R01	07/06/95	5.0
313	15S/03E-04K03	07/06/95	1.0
314	15S/03E-04N03	07/06/95	0.5
315	15S/03E-06D02	07/17/95	1.0
316	15S/03E-06F02	08/07/95	0.5
317	15S/03E-06K01	06/26/95	0.5

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Pressure Area
400-Foot Aquifer

Figure 6.5 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
318	15S/03E-07D02	06/26/95	1.0
319	15S/03E-07G01	06/26/95	1.0
320	15S/03E-08B04	07/06/95	2.0
321	15S/03E-08F07	08/30/95	0.5
322	15S/03E-08N03	08/29/95	4.0
323	15S/03E-09K04	07/05/95	0.5
324	15S/03E-15B01	07/05/95	1.0
325	15S/03E-16B03	07/11/95	1.0
326	15S/03E-26A01	09/05/95	2.0
327	15S/03E-26P01	07/31/95	9.0
328	15S/03E-27J01	07/31/95	9.0
329	15S/04E-20N01	07/13/95	23.0
330	15S/04E-30M02	08/02/95	6.0
331	16S/04E-02Q03	07/07/95	104.0
332	16S/04E-04C01	07/17/95	5.0
333	16S/04E-10K01	07/27/95	0.5
334	16S/04E-10R02	07/17/95	10.0
335	16S/04E-11E02	07/13/95	10.0
336	16S/04E-12M01	07/19/95	198.0
337	16S/04E-13D01	08/08/95	11.0
338	16S/04E-14M02	07/20/95	0.5
339	16S/04E-15H02	07/17/95	1.0
340	16S/04E-24R01	08/02/95	49.0
341	16S/04E-25A01	08/02/95	0.5
342	16S/04E-25Q01	07/18/95	0.5
343	16S/05E-30J02	07/27/95	56.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

East Side Area

Subarea	Figure 6.6 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
EAST SIDE	1	14S/02E-02E02	09/05/95	0.5
	2	14S/02E-12B01	07/05/95	16.0
	3	14S/03E-07P02	07/13/95	175.0
	4	14S/03E-10F02	07/14/95	15.0
	5	14S/03E-10P01	07/10/95	66.0
	6	14S/03E-12E02	07/10/95	68.0
	7	14S/03E-17D01	09/01/95	320.0
	8	14S/03E-24N01	07/10/95	123.0
	9	15S/03E-13J02	07/06/95	91.0
	10	15S/04E-05K01	07/11/95	11.0
	11	15S/04E-06D04	07/21/95	18.0
	12	15S/04E-07E02	07/27/95	44.0
	13	15S/04E-09N01	07/11/95	27.0
	14	15S/04E-15P02	07/21/95	116.0
	15	15S/04E-17B01	07/07/95	28.0
	16	15S/04E-18L01	08/01/95	86.0
	17	15S/04E-19H03	07/14/95	17.0
	18	15S/04E-20Q01	07/14/95	4.0
	19	15S/04E-22J01	07/21/95	147.0
	20	15S/04E-23M01	07/19/95	187.0
	21	15S/04E-26G01	07/26/95	8.0
	22	15S/04E-28C01	07/27/95	200.0
	23	15S/04E-29K03	07/13/95	1.0
	24	15S/04E-36H01	07/07/95	23.0
	25	16S/04E-01L02	07/19/95	128.0
	26	16S/05E-17R01	07/19/95	91.0
	27	16S/05E-20C01	07/19/95	17.0
	28	16S/05E-20H01	07/27/95	95.0
	29	16S/05E-27G01	08/03/95	22.0
EAST SIDE BOTH	30	13S/02E-36J01	08/03/95	2.0
	31	14S/03E-02E03	09/01/95	34.0
	32	14S/03E-03K01	07/26/95	20.0
	33	14S/03E-04E01	08/02/95	7.0
	34	14S/03E-05B02	07/21/95	4.0
	35	14S/03E-08C01	07/26/95	67.0
	36	14S/03E-10F03	07/14/95	29.0
	37	14S/03E-10R02	07/13/95	11.0
	38	14S/03E-25L02	07/07/95	25.0
	39	14S/04E-30N01	07/21/95	79.0
	40	15S/03E-12E02	08/02/95	60.0
	41	15S/04E-05M01	09/05/95	15.0
	42	15S/04E-06R01	07/21/95	7.0
	43	15S/04E-07A01	07/06/95	18.0
	44	15S/04E-08L01	07/14/95	74.0
	45	15S/04E-08N01	08/28/95	68.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

East Side Area

Subarea	Figure 6.6 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
	46	15S/04E-16D01	07/11/95	28.0
	47	15S/04E-22L02	07/21/95	99.0
	48	15S/04E-27G01	07/26/95	44.0
	49	15S/04E-36R02	07/26/95	38.0
	50	16S/05E-07G01	09/01/95	67.0
	51	16S/05E-17P01	07/19/95	116.0
	52	16S/05E-20R01	07/18/95	64.0
	53	16S/05E-28D01	08/01/95	25.0
	54	16S/05E-28P01	08/01/95	12.0
EAST SIDE DEEP	55	14S/02E-01C01	08/02/95	2.0
	56	14S/02E-02A02	07/20/95	2.0
	57	14S/03E-06L02	07/26/95	16.0
EAST SIDE SHALLOW	58	14S/03E-06L01	09/05/95	3.0
	59	14S/03E-11H01	07/10/95	60.0
	60	14S/03E-12E01	07/10/95	88.0
	61	14S/03E-14D01	07/12/95	117.0
	62	14S/03E-24H01	07/10/95	72.0
	63	14S/03E-36A01	09/05/95	86.0
	64	15S/04E-07R01	07/07/95	393.0
	65	15S/04E-08C01	07/21/95	22.0
	66	15S/04E-15D02	07/06/95	72.0
	67	15S/04E-17P02	07/31/95	206.0
	68	15S/04E-20B02	07/31/95	397.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Forebay Area

Figure 6.7 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
69	16S/05E-32M01	07/31/95	1.0
70	16S/05E-33F01	07/19/95	63.0
71	16S/05E-35C01	08/22/95	30.0
72	16S/05E-35L01	07/27/95	23.0
73	17S/05E-01R01	08/23/95	11.0
74	17S/05E-02G01	08/01/95	5.0
75	17S/05E-03B01	07/27/95	56.0
76	17S/05E-04C01	07/19/95	4.0
77	17S/05E-04K01	08/01/95	91.0
78	17S/05E-04N01	07/26/95	30.0
79	17S/05E-06Q01	08/22/95	3.0
80	17S/05E-09G01	07/26/95	4.0
81	17S/05E-09Q01	07/26/95	4.0
82	17S/05E-10Q01	07/28/95	2.0
83	17S/05E-12B01	08/23/95	62.0
84	17S/05E-12B02	08/23/95	17.0
85	17S/05E-12B03	08/23/95	19.0
86	17S/05E-13L01	07/28/95	135.0
87	17S/05E-13L02	07/31/95	130.0
88	17S/05E-14D01	08/08/95	0.5
89	17S/05E-14G01	07/28/95	55.0
90	17S/05E-21A01	08/16/95	73.0
91	17S/05E-23L01	08/14/95	72.0
92	17S/05E-25L01	08/09/95	72.0
93	17S/05E-36F02	08/16/95	110.0
94	17S/06E-16N01	08/01/95	16.0
95	17S/06E-17R01	08/17/95	44.0
96	17S/06E-19D01	07/28/95	135.0
97	17S/06E-20K01	08/01/95	19.0
98	17S/06E-20Q02	07/28/95	42.0
99	17S/06E-20Q03	07/31/95	56.0
100	17S/06E-27E03	07/28/95	59.0
101	17S/06E-27L01	07/28/95	19.0
102	17S/06E-28N01	08/01/95	32.0
103	17S/06E-29C01	08/16/95	72.0
104	17S/06E-29K01	07/31/95	41.0
105	17S/06E-29Q01	08/09/95	45.0
106	17S/06E-30F01	07/28/95	17.0
107	17S/06E-32G01	07/28/95	43.0
108	17S/06E-32J02	07/28/95	44.0
109	18S/06E-01E01	08/03/95	24.0
110	18S/06E-02N01	08/07/95	142.0
111	18S/06E-02R01	08/03/95	0.5
112	18S/06E-03P01	08/04/95	17.0
113	18S/06E-05H01	07/28/95	7.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Forebay Area

Figure 6.7 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
114	18S/06E-07A01	08/08/95	85.0
115	18S/06E-08R01	08/08/95	17.0
116	18S/06E-09M02	08/01/95	18.0
117	18S/06E-11J01	08/07/95	47.0
118	18S/06E-12A01	08/03/95	7.0
119	18S/06E-12R02	08/03/95	0.5
120	18S/06E-14B01	08/04/95	14.0
121	18S/06E-14R01	08/03/95	13.0
122	18S/06E-15F01	08/01/95	37.0
123	18S/06E-15M01	08/01/95	8.0
124	18S/06E-16L01	08/10/95	22.0
125	18S/06E-21Q01	08/08/95	41.0
126	18S/06E-25F01	08/15/95	91.0
127	18S/06E-26R01	08/15/95	16.0
128	18S/06E-27A01	08/07/95	7.0
129	18S/06E-28J01	08/23/95	108.0
130	18S/06E-34B01	08/07/95	39.0
131	18S/07E-18K01	08/07/95	12.0
132	18S/07E-18P01	08/07/95	6.0
133	18S/07E-19G02	08/03/95	115.0
134	18S/07E-19N01	08/08/95	75.0
135	18S/07E-20K01	08/14/95	55.0
136	18S/07E-28K01	08/03/95	21.0
137	18S/07E-28N02	08/04/95	0.5
138	18S/07E-29J01	08/17/95	62.0
139	18S/07E-29M01	08/03/95	100.0
140	18S/07E-32G02	08/03/95	143.0
141	18S/07E-34P02	08/14/95	123.0
142	19S/06E-01H01	08/03/95	61.0
143	19S/06E-03E02	08/14/95	17.0
144	19S/06E-03K01	08/08/95	5.0
145	19S/06E-11C01	08/07/95	24.0
146	19S/06E-12A01	08/08/95	138.0
147	19S/07E-04G01	08/25/95	44.0
148	19S/07E-04Q01	08/09/95	41.0
149	19S/07E-05B02	08/04/95	120.0

SALINAS VALLEY BASIN INVESTIGATION
1995 NITRATE VALUES

Upper Valley Area

Figure 6.8 Map ID	State Well Number	Sample Date	Nitrate Values mg/L as NO3
344	19S/07E-03H02	08/04/95	96.0
345	19S/07E-10P02	08/04/95	54.0
346	19S/07E-13D01	08/22/95	191.0
347	19S/07E-13D02	08/23/95	172.0
348	19S/07E-13D03	08/23/95	257.0
349	19S/07E-16D01	08/28/95	85.0
350	19S/07E-20A01	08/04/95	38.0
351	19S/07E-20A02	08/04/95	4.0
352	19S/07E-23F01	08/09/95	95.0
353	19S/07E-23G01	08/16/95	24.0
354	19S/07E-24H02	08/15/95	305.0
355	19S/07E-36N01	08/10/95	98.0
356	19S/08E-30A01	08/15/95	91.0
357	20S/08E-05C02	08/24/95	62.0
358	20S/08E-05R03	08/15/95	38.0
359	20S/08E-06B01	08/09/95	148.0
360	20S/08E-07E01	08/10/95	8.0
361	20S/08E-15H03	08/10/95	16.0
362	20S/08E-16C01	08/10/95	93.0
363	20S/08E-17K03	08/14/95	7.0
364	20S/08E-34G01	08/14/95	30.0
365	20S/08E-36R01	08/10/95	53.0
366	21S/08E-15J01	08/14/95	13.0
367	21S/09E-06C01	09/14/95	89.0
368	21S/09E-16E02	08/15/95	11.0
369	21S/09E-23G01	08/22/95	681.0
370	21S/09E-24Q01	08/22/95	111.0
371	21S/10E-30E02	08/16/95	61.0
372	21S/10E-32N01	08/25/95	165.0
373	22S/10E-09P01	08/21/95	111.0
374	22S/10E-16P01	08/21/95	71.0
375	22S/10E-21C01	08/21/95	59.0
376	22S/10E-22N01	08/21/95	13.0
377	22S/10E-28B01	08/21/95	58.0
378	22S/10E-34G01	08/24/95	7.0