



# Yucaipa Valley Water District

## **Notice and Agenda of a Board Workshop** Tuesday, June 28, 2011 at 4:00 p.m.

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MEETING LOCATION: District Administration Building  
12770 Second Street, Yucaipa

MEMBERS OF THE BOARD: Director Ian Cuthbertson, Division 1  
Director Bruce Granlund, Division 2  
Director Jay Bogh, Division 3  
Director Lonni Granlund, Division 4  
Director Hank Wochholz, Division 5

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- I. Call to Order
- II. Public Comments: At this time, members of the public may address the Board of Directors on matters within its jurisdiction; however, no action or significant discussion may take place on any item not on the agenda. To provide comments on specific agenda items, please complete a speaker's request form and provide that form to the Board Secretary prior to the commencement of the Board meeting.
- III. Staff Comments
- IV. Presentations
  - A. Presentation of Water Resource Information by the United States Geological Survey in Cooperation with the San Bernardino Valley Municipal Water District [[Workshop Memorandum No. 11-087 - Page 3 of 103](#)]
  - B. Presentation of Historical State Water Project Allocation Information [[Workshop Memorandum No. 11-088 - Page 51 of 103](#)]
- V. Capital Improvement Projects
  - A. Status Report on the Construction of the Yucaipa Valley Regional Brineline [[Workshop Memorandum No. 11-089 - Page 57 of 103](#)]
  - B. Status Report on the Construction of Drinking Water Pipelines in Second Street, Yucaipa [[Workshop Memorandum No. 11-090 - Page 61 of 103](#)]

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Any person with a disability who requires accommodation in order to participate in this meeting should telephone Chelsie Fogus at (909) 797-5118, at least 48 hours prior to the meeting in order to make a request for a disability-related modification or accommodation.

Materials related to an item on this agenda submitted to the Board of Directors after distribution of the workshop packet are available for public inspection during normal business hours at the District office located at 12770 Second Street, Yucaipa. Meeting material may also be available on the District's website at [www.yvwd.dst.ca.us](http://www.yvwd.dst.ca.us)

## VI. Administrative Issues

- A. Appropriation Limitation for Fiscal Year 2011-2012 [[Workshop Memorandum No. 11-091 - Page 63 of 103](#)]
- B. Approval of Change Order No. 2 for Repairs to the Lining of the South Equalization Basin at the Wochholz Regional Water Recycling Facility [[Workshop Memorandum No. 11-092 - Page 82 of 103](#)]
- C. Water Service Agreement for Separate Fire Protection at the Yucaipa High School Campus [[Workshop Memorandum No. 11-093 - Page 85 of 103](#)]
- D. Construction Management Services for the Regional Brineline Extension and Non-Potable Water Distribution System Expansion Project [[Workshop Memorandum No. 11-094 - Page 91 of 103](#)]
- E. Proposed Bylaw Amendment and Board Election Information for the California Special Districts Association [[Workshop Memorandum No. 11-095 - Page 95 of 103](#)]

## VII. Director Comments

## VIII. Closed Session

- A. Conference with Labor Negotiator (Government Code 54957.6)  
District Negotiator: Joseph Zoba, General Manager  
Employee Organization: IBEW Local Union 14356 - YVWD Employees Association
- B. Conference with Labor Negotiator (Government Code 54957.6)  
District Negotiator: Joseph Zoba, General Manager  
Employee Organization: Supervisor Bargaining Unit
- C. Conference with Labor Negotiator (Government Code 54957.6)  
District Negotiator: Joseph Zoba, General Manager  
Employee Organization: Confidential Employee Bargaining Unit
- D. Conference with Labor Negotiator (Government Code 54957.6)  
District Negotiator: Joseph Zoba, General Manager  
Employee Organization: Exempt Employee Bargaining Unit
- E. Conference with Labor Negotiator (Government Code 54957.6)  
Unrepresented Employee: Joseph Zoba, General Manager

## IX. Adjournment



**Date: June 28, 2011**

**Subject: Presentation of Water Resource Information by the United States Geological Survey in Cooperation with the San Bernardino Valley Municipal Water District**

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The United States Geological Survey in cooperation with the San Bernardino Valley Municipal Water District has spent a great deal of time and effort studying the groundwater basins in the Yucaipa Valley. The complexity of our groundwater basin coupled with the sloped topography provides for unique water resource management challenges.

During this board workshop item, Wes Danskin and Greg Mendez from the U.S. Geological Survey will provide a presentation about the status of recent groundwater management and water resource issues.

A publication released by the U.S. Geological Survey about the Yucaipa Valley is attached for your review as background information about our local groundwater basins.

# **Surface-Water and Ground-Water Quality in the Yucaipa Area, San Bernardino and Riverside Counties, California, 1996–98**

*By* GREGORY O. MENDEZ, WESLEY R. DANSKIN, *and* CARMEN A. BURTON

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U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 00-4269

Prepared in cooperation with the

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

5020-74

Sacramento, California  
2001

U.S. DEPARTMENT OF THE INTERIOR  
GALE A. NORTON, Secretary

U.S. GEOLOGICAL SURVEY  
Charles G. Groat, Director

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Sacramento, CA 95819-6129

Copies of this report can be purchased from:

U.S. Geological Survey  
Information Services  
Box 25286  
Federal Center  
Denver, CO 80225

# CONTENTS

- Abstract..... 1
- Introduction ..... 1
  - Purpose and Scope..... 2
  - Methods of Investigation ..... 3
  - Previous Investigations ..... 7
  - Acknowledgments ..... 8
- Description of Study Area ..... 8
  - Physiography ..... 8
  - Population and Climate ..... 8
  - Geology ..... 9
  - Hydrology ..... 9
  - Land Use..... 11
  - Water Use..... 16
- Water Quality..... 16
  - Surface Water..... 16
  - Ground Water..... 22
    - Flowmeter Data ..... 26
    - Depth-Dependent Samples ..... 28
- Isotopic Composition of Water..... 29
  - Oxygen-18 and Deuterium ..... 29
  - Tritium ..... 31
- Limitations and Future Needs..... 31
- Summary and Conclusions ..... 34
- Selected References ..... 34

## FIGURES

- 1–3. Maps showing:
  - 1. Location of the Yucaipa area in the Santa Ana River drainage basin, southern California..... 2
  - 2. Physiography of the Yucaipa area, southern California ..... 3
  - 3. Selected wells and surface-water-quality sites in the Yucaipa area, southern California..... 4
- 4. Graph showing tritium activity in precipitation at Los Angeles, California, 1953–96 ..... 6
- 5–8. Maps showing:
  - 5. Surficial geology of the Yucaipa area, southern California..... 10
  - 6. Ground-water levels at selected wells in the Yucaipa area, southern California, spring 1997..... 12
  - 7. Land use in the Yucaipa area, southern California, 1990..... 14
  - 8. Water chemistry in samples from selected wells and surface-water sites in the Yucaipa area, southern California ..... 18
- 9. Trilinear diagrams showing major-ion composition of surface water and ground water in the Yucaipa area, southern California..... 20
- 10. Map and graphs showing precipitation stations and cumulative precipitation for three February 1998 storms in the Santa Ana River drainage basin, southern California..... 21
- 11. Boxplots showing concentration of selected constituents for selected wells and surface-water sites in the Yucaipa area, southern California ..... 23
- 12. Map showing concentration of dissolved solids, nitrites plus nitrates, and dissolved oxygen for selected wells and surface-water sites in the Yucaipa area, southern California..... 24
- 13. Diagram showing driller’s log, electric logs, vertical flow rate, well construction, and water-quality sampling for well 1S/2W-25R4 in the Yucaipa area, southern California ..... 27

14. Graph showing isotopic concentrations of delta deuterium compared to delta oxygen-18 by site and by storm for selected wells and surface-water sites in the Yucaipa area, southern California..... 30

15. Map showing delta deuterium, delta oxygen-18, and tritium activity in selected wells and surface-water sites in the Yucaipa area, southern California ..... 32

**TABLES**

1. Location and characteristics of selected surface-water sites and wells in the Yucaipa area, southern California.. 13

2. Chemical and isotopic analyses of water from selected surface-water sites in the Yucaipa area, southern California ..... 36

3. Chemical and isotopic analyses of water from selected wells in the Yucaipa area, southern California..... 39

**CONVERSION FACTORS, VERTICAL DATUM, ACRONYMS, AND ABBREVIATIONS, AND WELL-NUMBERING SYSTEM**

**Conversion Factors**

|   | <b>Multiply</b> | <b>By</b> | <b>To obtain</b>               |
|---|-----------------|-----------|--------------------------------|
| cubic foot per second (ft <sup>3</sup> /s)                |                 | 0.02832   | cubic meter per second         |
| foot (ft)   |                 | .3048     | meter                          |
| foot per year (ft/yr)                                     |                 | .3048     | meter per year                 |
| gallon per day per square foot [(gal/d)/ft <sup>2</sup> ] |                 | .3516     | liter per day per square meter |
| gallon per minute (gal/min)                               |                 | .003785   | cubic meter per minute         |
| inch (in)   | 25.4            |           | millimeter                     |
| inch per year (in/yr)                                     | 2.54            |           | centimeter per year            |
| mile (mi)   | 1.609           |           | kilometer                      |

Temperature is given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the following equation:

$$°F = 9/5(°C) + 32.$$

**Vertical Datum**

Sea level: In this report, “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

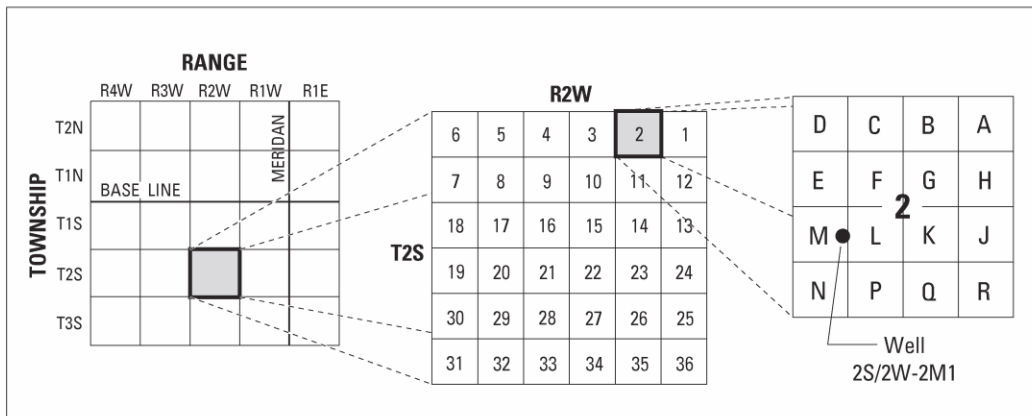
**Acronyms and Abbreviations**

|                   |   |
|-------------------|---|
| mg/L              | milligrams per liter                                |
| µg/L              | micrograms per liter                                |
| µS/cm             | microseimens per centimeter                         |
| δD                | delta deuterium                                     |
| δ <sup>18</sup> O | delta oxygen-18                                     |
| per mil           | parts per thousand, as used with delta (δ) notation |
| pCi/L             | picocuries per liter                                |
| <sup>14</sup> C   | carbon-14   |
| CCYN              | Carbon Canyon Dam                                   |
| CONV              | Converse Fire Station                               |
| DEVO              | Devore Fire Station                                 |
| GIS               | geographic information system                       |
| <sup>3</sup> H    | tritium   |

|                 |   |
|-----------------|---|
| LKMA            | Lake Mathews                                |
| LSD             | Land-Surface datum relative to NGVD of 1929 |
| MCL             | maximum contaminant level                   |
| MTS             | mountains                                   |
| NO <sub>2</sub> | nitrite                                     |
| NO <sub>3</sub> | nitrate                                     |
| OAKG            | Oak Glen                                    |
| PRDO            | Prado                                       |
| SAR5            | Santa Ana River 5th Street                  |
| SARM            | Santa Ana River near Mentone                |
| SMCL            | secondary maximum contaminant level         |
| SNTD            | San Antonio Dam                             |
| VSMOW           | Vienna Standard Mean Ocean Water            |

**Well-Numbering System**

Wells are identified and numbered according to their location in the rectangular system for the subdivision of public lands. The identification consists of the township number, north or south; the range number, east or west; and the section number. Each section is further divided into sixteen 40-acre tracts lettered consecutively (except I and O), beginning with "A" in the northeast corner of the section and progressing in a sinusoidal manner to "R" in the southeast corner. Within the 40-acre tract, wells are sequentially numbered in the order they are inventoried. The final letter refers to the base line and meridian. In California, there are three base lines and meridians; Humboldt (H), Mount Diablo (M), and San Bernardino (S). All wells in the study area are referenced to the San Bernardino base line and meridian (S). Well numbers consist of 15 characters and follow the format 002S002W02M001S. In this report well numbers are abbreviated and written 2S/2W-2M1. Wells in the same township and range are referred to only by their section designation, 2M1. The following diagram shows how the number for well 2S/2W-2M1 is derived.



**Well-numbering diagram**

# Surface-Water and Ground-Water Quality in the Yucaipa Area, San Bernardino and Riverside Counties, California, 1996–98

By Gregory O. Mendez, Wesley R. Danskin, and Carmen A. Burton

## ABSTRACT

The quality of surface water and ground water in the Yucaipa area was evaluated to determine general chemical characteristics and to identify areas of recent ground-water recharge. Water samples, collected from 8 sites on 3 creeks and from 25 wells, were analyzed for general chemistry, nutrients, tritium, and stable isotopes of hydrogen and oxygen. At one production well (1S/2W-25R4), water samples were collected at discrete depths during pumping and a continuous profile of the vertical flow rate inside the well casing was recorded. In addition to general-chemistry samples, tritium and carbon-14 samples were collected at this well to interpret the age of water at different depths.

Results indicate that most water in the Yucaipa area is a calcium-bicarbonate type. The general chemical composition of surface water resembles that of ground water, although the concentration of most constituents is higher in ground water. The chemical composition of most ground-water samples is similar. Elevated concentrations of nitrate in some ground-water samples may indicate recharge from agricultural areas.

In surface water that recharges ground water tritium activity ranged from 7 to 18 picocuries per liter. The range of tritium activity found in ground water indicates different times since recharge and possible mixing along ground-water flow paths. The oldest ground-water sample had a tritium activity less than 0.3 picocuries per liter, indicating more than 50 years since recharge. Water samples that had tritium activity greater than 0.3 picocuries per liter indicate that some of the water was

recharged since 1952. The youngest ground water (greater than 7 picocuries per liter) was found near the hills and mountains surrounding the Yucaipa area; the oldest ground water (less than 0.3 picocuries per liter) was found in the Western Heights subbasin.

Testing of the vertical contribution of ground water to well 1S/2W-25R4 showed that more than one-half of the water flowed into the well between depths of about 450 and 600 feet below land surface; the rest of the water flowed into the well between 600 and about 850 feet below land surface. At a discharge rate of 750 gallons per minute, virtually no water was contributed to the well below a depth of about 850 feet. The water samples collected at this well ranged in age from less than 50 to less than 400 years before present.

## INTRODUCTION

The Yucaipa area is about 12 mi southeast of the city of San Bernardino and about 75 mi east of the city of Los Angeles in the upper part of the Santa Ana River drainage basin (fig. 1). Since about 1970 and especially during the 1990's, the widespread urbanization of southern California has extended inland from the coast into the Yucaipa area. Undeveloped land, agricultural land, and sparsely populated residential land have been converted into housing tracts. The net effect of this change in land use has been an increase in the demand for water, especially potable water for domestic use. Because the local supply of both surface water and ground water is limited in this semiarid region, water purveyors need an accurate assessment of water resources. This report assesses the quality of water in

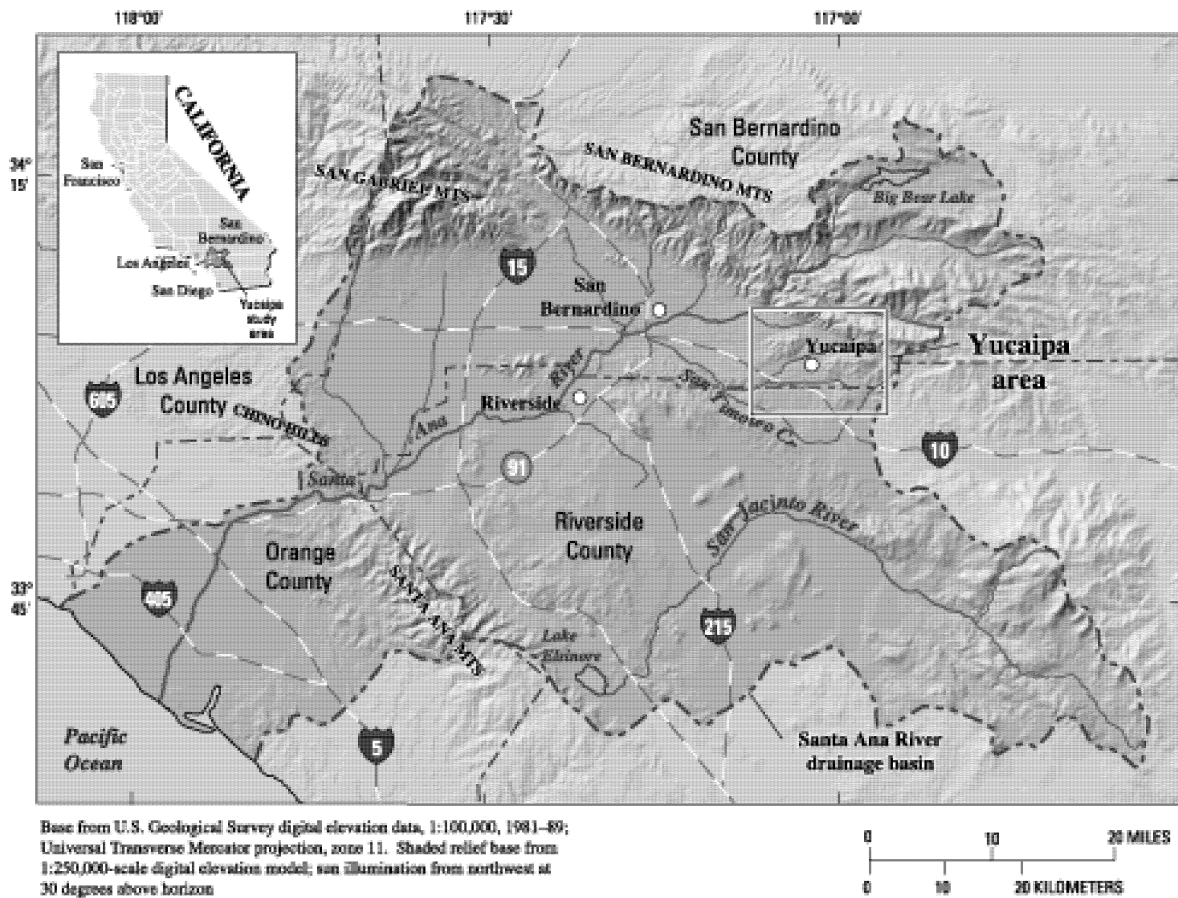
the Yucaipa area, primarily in the Yucaipa plain (fig. 2). The report will aid local water purveyors in understanding and evaluating local resources and using them most effectively in combination with water imported from northern California and from the adjacent San Bernardino area.

### Purpose and Scope

The purpose of this study, the results of which are presented in this report, was to survey the quality of surface water and ground water in the Yucaipa area. Water samples collected as part of the study were analyzed for general chemistry, nutrients, tritium, and stable isotopes of hydrogen and oxygen. Preliminary

analysis of these data was used to identify areas of recent ground-water recharge and evapotranspiration, and to determine generalized ground-water flow paths.

The scope of this study was to collect and analyze water samples from streams and wells in the Yucaipa area. All samples were collected during 1996–98 as composite (bulk) samples, which then were split into appropriate subsamples for analysis. Previously collected data, which did not include analysis for tritium or stable isotopes, were not included in this study. Several water samples were collected from the surrounding hills and mountains, but the focus of the sampling and subsequent analysis was on water quality of the Yucaipa plain. A sample collected from Mill Creek (fig. 3), which originates in the San Bernardino

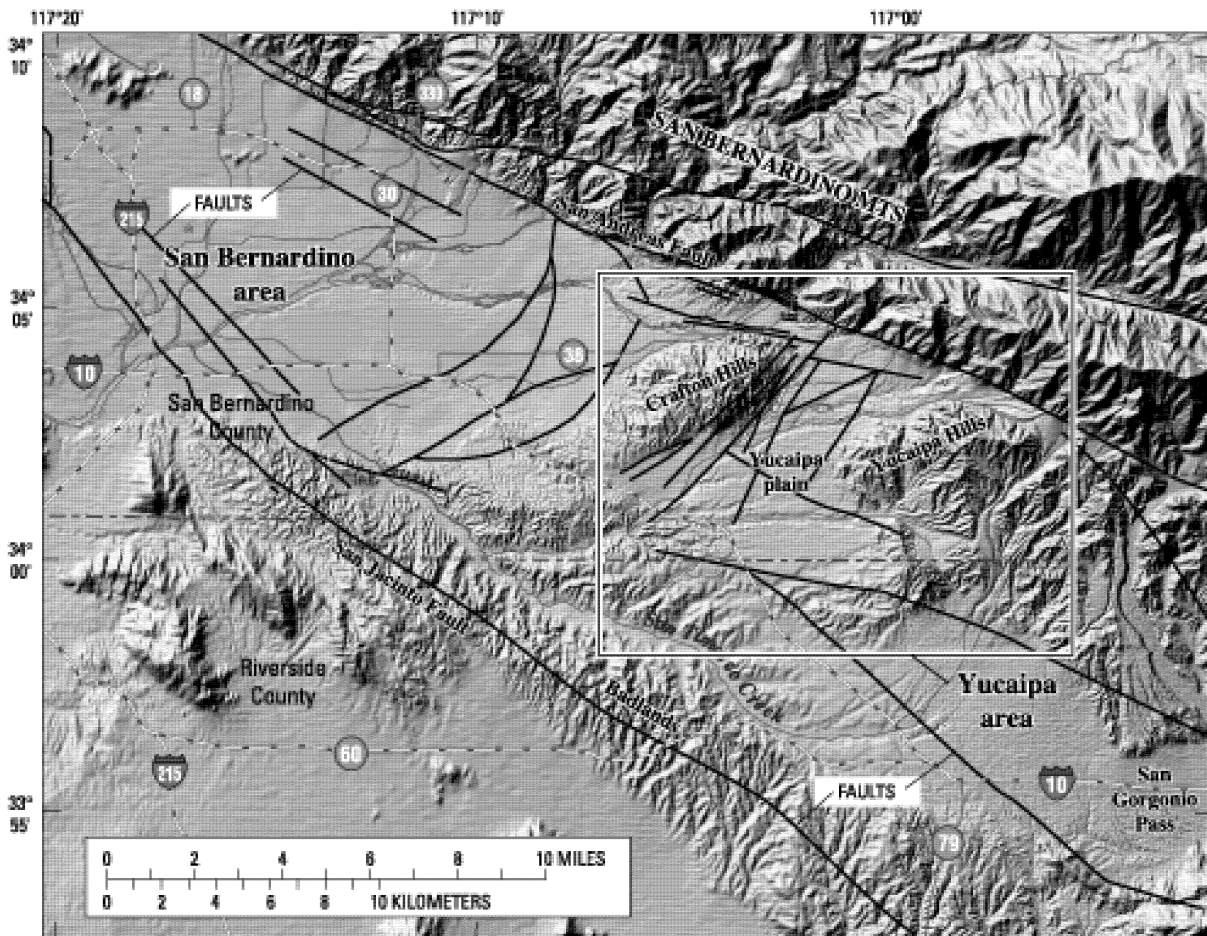


**Figure 1.** Location of the Yucaipa area in the Santa Ana River drainage basin, southern California.

Mountains east of Yucaipa, represents ground water emanating as springflow from nearby bedrock. This water is imported into the Yucaipa Regional Park and used to fill recreational lakes, and then recharges the ground water. Six depth-dependent water samples were collected from a single production well (1S/2W-25R4) and were compared to vertical flow rates within the well. A geographic information system (GIS) was developed to locate wells, to aid in interpretation of water-quality data, and to prepare figures for this report.

### Methods of Investigation

Collection of several areally distributed surface-water samples was required to characterize surface-water quality and to identify the likely interaction between surface water and ground water. Because streamflow on the Yucaipa plain is infrequent and of short duration, simply finding surface water to sample can be difficult in this semiarid region. Fortunately, the winter of 1997–98 was an El Niño year with greater than average runoff. Three storms in February 1998



Base from U.S. Geological Survey digital elevation data, 1:100,000, 1981–89; Universal Transverse Mercator projection, zone 11. Shaded relief base from 1:250,000-scale digital elevation model; sun illumination from northwest at 30 degrees above horizon.

Figure 2. Physiography of the Yucaipa area, southern California.

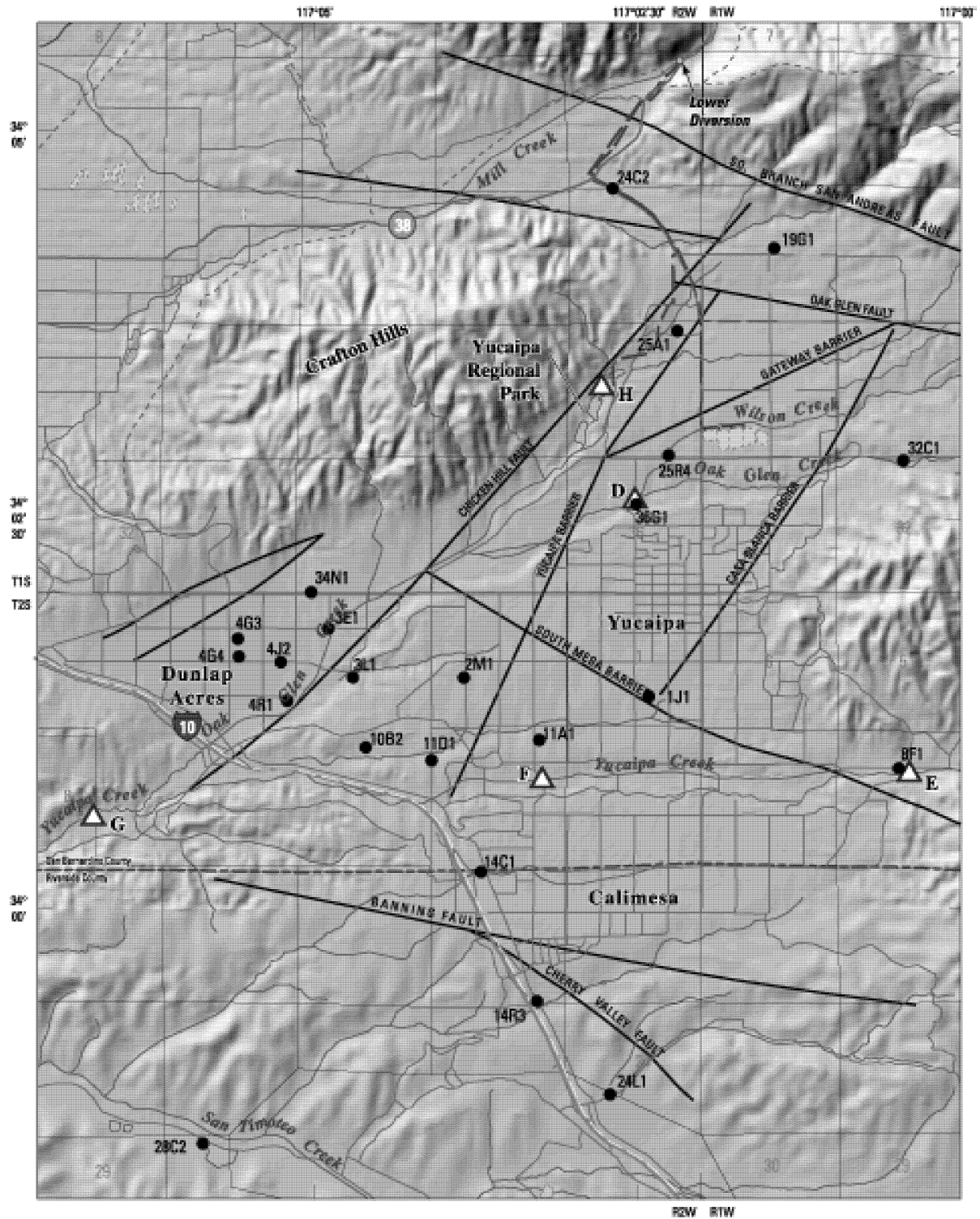


Figure 3. Selected wells and surface-water-quality sites in the Yucaipa area, southern California.

4 Surface-Water and Ground-Water Quality in the Yucaipa Area, San Bernardino and Riverside Counties, California, 1996–98

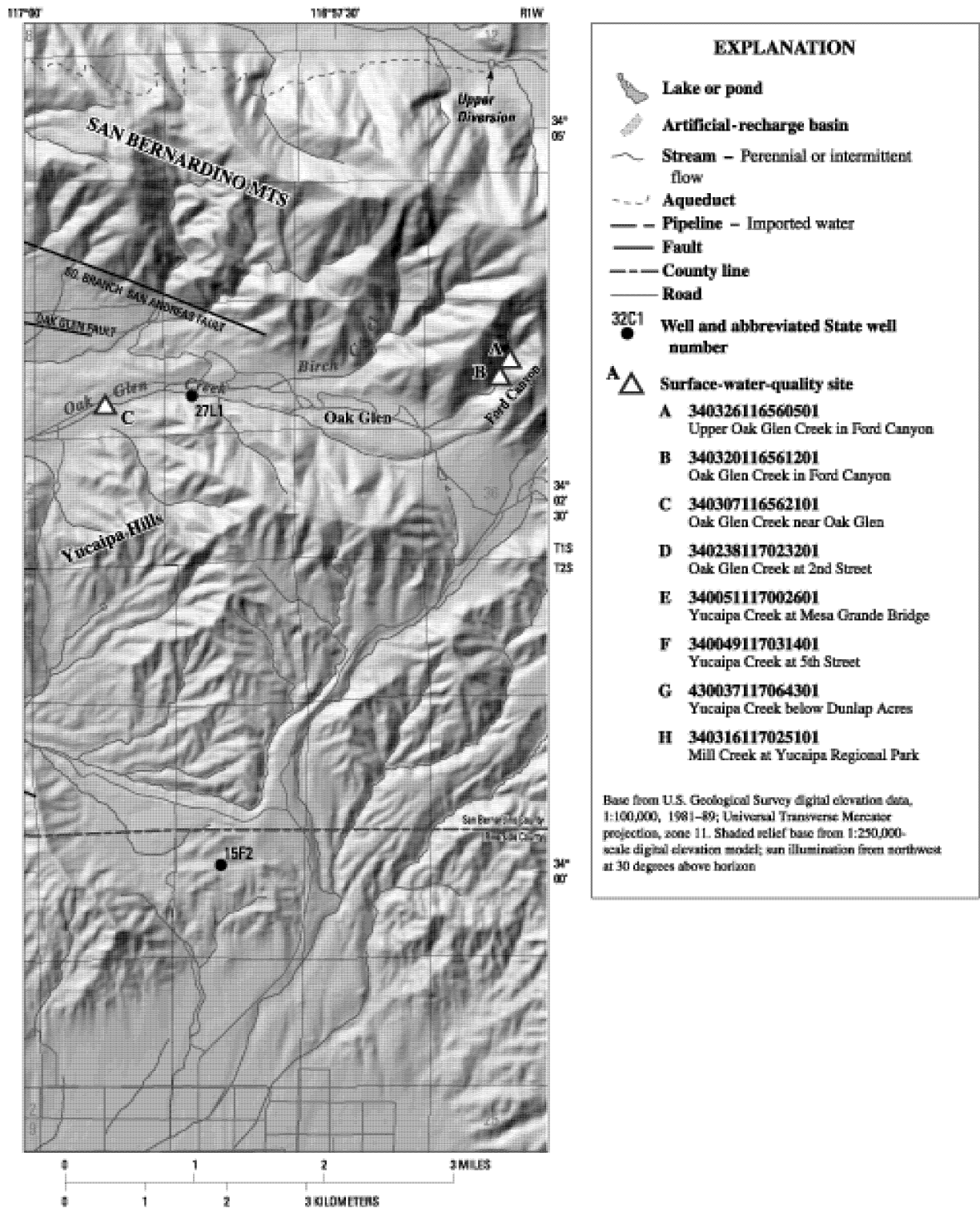


Figure 3—Continued.

were selected to collect water samples. Streamflow was sampled on Oak Glen and Yucaipa Creeks, which are the two primary streams in the area (fig. 3). Base-flow samples were collected on upper Oak Glen Creek in the foothills, where flow is present and originates as springflow from bedrock or as snowmelt. Yucaipa Creek originates in the southern part of the Yucaipa Hills and has no base flow. One water sample was collected from Mill Creek because part of its flow is pumped into the Yucaipa area in a pipeline and then is discharged at the Yucaipa Regional Park. The imported water is used for recreational purposes before it infiltrates into the ground. Water in the pipeline is a mixture of streamflow diverted in the upper Mill Creek drainage basin and streamflow diverted under Highway 38 (fig. 3). Water from Mill Creek was collected as a single grab sample; other surface-water samples were collected, depending on the stream conditions, as either an equal-width integrated sample or a grab sample.

The strategy for sampling ground water was to collect samples throughout the Yucaipa area to identify the general quality, the likely source of recharge, and the dominant paths of ground-water flow. Nearly all ground-water samples were obtained as bulk samples from discharge pipes of production wells. At a new production well (1S/2W-25R4), it was possible to obtain depth-dependent samples under pumped conditions using a sampling technique described by Izbicki and others (1999). Coincident with sampling, the flow rate inside the casing of the production well was measured using a spinner tool. Flow-rate measurements were used to determine the relative contributions of ground water from different strata to the pumped well.

In this study, naturally occurring stable isotopes of oxygen (oxygen-18) and hydrogen (deuterium) were used to help determine the source of ground water and to trace its movement. Atoms of oxygen-18 and deuterium have more neutrons and a greater atomic mass (weight) than do the more common isotopes,

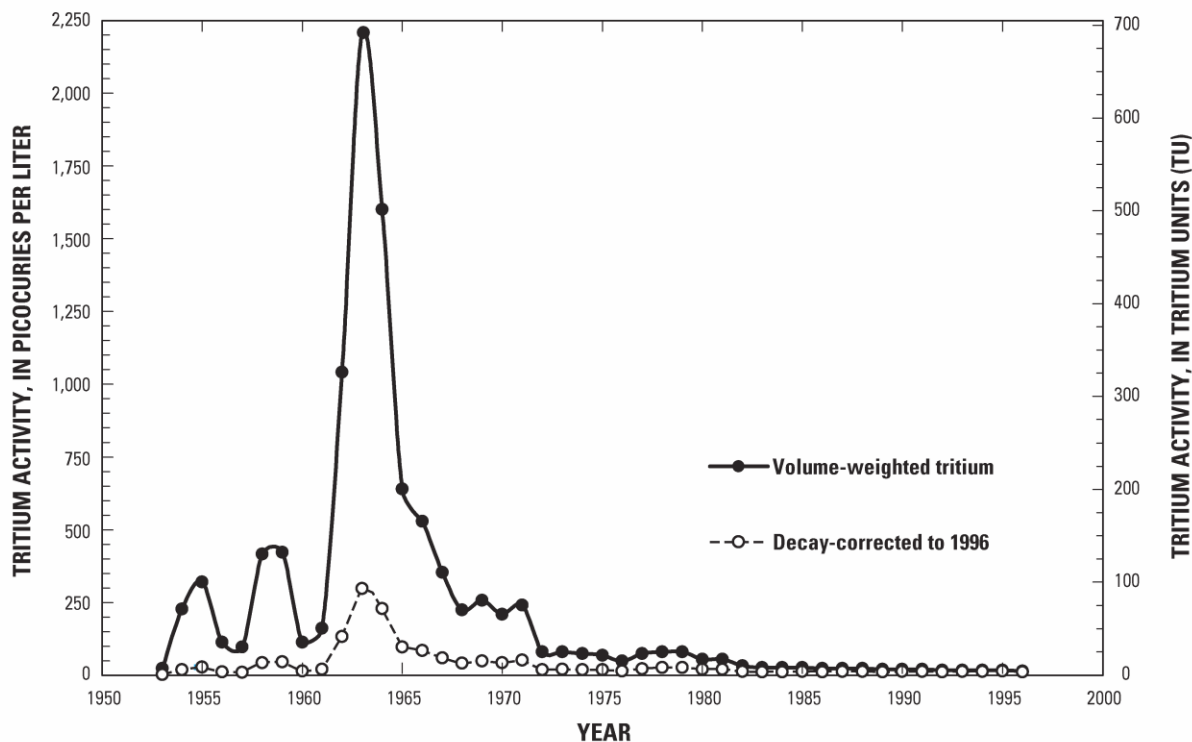


Figure 4. Tritium activity in precipitation at Los Angeles, California, 1953–96. Tritium was corrected using techniques from Michel (1989).

oxygen-16 and hydrogen. This difference in weight results in differences in the physical and chemical behavior of the heavier, less abundant isotopes (International Atomic Energy Agency, 1981).

Most of the world's precipitation originates from the evaporation of seawater. As a result, the oxygen-18 and deuterium composition of precipitation throughout the world is linearly correlated and often referred to on graphs as the meteoric water line (Craig, 1961). Oxygen-18 and deuterium abundances typically are expressed as ratios in delta notation ( $\delta$ ), as per mil (parts per thousand) differences, relative to the standard known as Vienna Standard Mean Ocean Water (VSMOW) (Gonfiantini, 1978). By convention, the value of VSMOW is 0 per mil. Oxygen-18 and deuterium ratios relative to VSMOW can be measured more precisely than absolute abundances. Analytical precision is generally within 0.05 per mil for  $\delta^{18}\text{O}$  (delta oxygen-18) and within 1.5 per mil for  $\delta\text{D}$  (delta deuterium) (Izbicki, 1996).

Water that condenses at cooler temperatures (typically associated with higher altitudes, cooler climatic regimes, or higher latitudes) is lighter (more negative) than water that condenses at warmer temperatures (typically associated with lower altitudes, warmer climatic regimes, or lower latitudes). In addition, water that has been partly evaporated is enriched by fractionation of the heavier isotopes relative to its original composition. On graphs of  $\delta^{18}\text{O}$  and  $\delta\text{D}$ , partly evaporated water samples plot to the right of the meteoric water line along a line known as the evaporative trend line. As a result, the  $\delta^{18}\text{O}$  and  $\delta\text{D}$  composition of a water sample can provide a record of the source and evaporative history of the water.

Tritium and carbon-14 samples were collected to help identify the age of water. Tritium ( $^3\text{H}$ ) is a naturally occurring radioactive isotope of hydrogen that has a half-life of about 12.4 years. In this study, the activity of tritium was measured in picocuries per liter (pCi/L); 1 pCi/L is equivalent to about 2.2 disintegrations of tritium per minute or about one tritium atom in  $3.1 \times 10^{17}$  atoms of hydrogen. Prior to 1952, tritium activity in precipitation in coastal southern California was about 6 pCi/L. As a result of atmospheric testing of nuclear weapons from 1952 to 1962, tritium activity increased to greater than 2,000 pCi/L (Michel, 1976). Tritium concentrations and decay-corrected values in precipitation at Los Angeles, California, were calcu-

lated using techniques described by Michel (1989), (fig. 4). Because tritium can be part of the water molecule, tritium is not affected by reactions other than radioactive decay; therefore, tritium is an excellent tracer of the movement of water on time scales ranging from 10 to about 50 years before present. Ground water having tritium activities less than the detection limit of 0.3 pCi/L is considered to have been recharged before 1952. Ground water having measurable tritium activity is considered to be recharged after 1952.

Carbon-14 ( $^{14}\text{C}$ ) is a naturally occurring radioactive isotope of carbon that has a half-life of about 5,730 years. Carbon-14 data are expressed as percent modern carbon by comparing  $^{14}\text{C}$  activities to the specific activity of National Bureau of Standards oxalic acid (12.88 disintegrations per minute per gram of carbon in 1950 equals 100 percent modern carbon). Carbon-14 is not part of the water molecule and  $^{14}\text{C}$  activities can be affected by chemical reactions between dissolved constituents and aquifer material. Carbon-14 is a tracer of the movement and relative age of water on time scales ranging from several hundred to more than 20,000 years before present.

Field parameters such as specific electrical conductance, pH, and dissolved oxygen were measured for both surface-water and ground-water samples in the field using probes calibrated with appropriate standards. Alkalinity was determined in the field by titration with a dilute sulfuric acid. All field measurements were made in accordance with the National Field Manual for the Collection of Water-Quality Data (Wilde and Radtke, 1998). The techniques used for the collection and processing of inorganic constituents were made in accordance with Horowitz and others (1994). Analyses for inorganic constituents were done by the U.S. Geological Survey National Water Quality Laboratory using techniques described by Fishman and Friedman (1989), Fishman (1993), Patton and Truitt (1992), and Struzeski and others (1996).

## Previous Investigations

Many investigations have been made since the early 1900's in the upper Santa Ana River drainage basin and, in particular, in the adjacent San Bernardino area (fig. 2). Several previous investigators have included parts of the Yucaipa area on the periphery of their study, but most have described only generalized

data and concepts for the Yucaipa area. Such generalized information includes description of the regional hydrology (Mendenhall, 1905), estimation of ground-water-storage capacity (Eckis, 1934), calculation of ground-water outflow from the Yucaipa area (Dutcher and Burnham, 1959; Burnham and Dutcher, 1960), depiction of ground-water levels and susceptibility of liquefaction during a major earthquake (Matti and Carson, 1991), and evaluation of regional water-management options (California Department of Water Resources, 1970, 1979, 1986).

The more detailed investigations in the Yucaipa area have focused on surficial geology and ground-water quantity. Surficial geology of the area has been mapped at a scale of 1:48,000 by Morton (1974) and more recently at a scale of 1:24,000 by Matti and others (1992). A detailed calculation of ground-water outflow from the area south of the Crafton Hills was made by Dutcher and Fenzel (1972). Sustainable yield of the ground-water basin was calculated by Mann (1986) and later by Todd (1988), and an explanation of the differences between the two yield calculations was made by Mann and Todd (1990). The potential for artificial recharge was evaluated by Moreland (1970). Changes in ground-water levels were summarized by Fletcher (1976) and Fox (1987), and a plan to monitor ground-water levels for much of the Yucaipa area was proposed by Fox (1990). A ground-water-flow model was developed for the upper part of the Oak Glen Creek drainage by Powers and Hardt (1974). Water-management plans were prepared for the Western Heights Water District (Egan and Associates, Inc., 1989) and for the Yucaipa Valley Water District (Camp, Dresser, and McKee, 1994).

Measurements of surface-water discharge in the Yucaipa area are scant. A much greater number of ground-water-level measurements are available for many wells in the area, including historical data that span several decades. Measurements of water quality for both surface water and ground water are made routinely to ensure that drinking-water standards are met. Other measurements of water chemistry, such as isotopic concentrations of hydrogen and oxygen, had not been made prior to this study.

## Acknowledgments

The authors thank the San Bernardino Valley Municipal Water District for providing cooperative funding for this project. Also, we thank several

individuals in the Yucaipa area—in particular, Joseph B. Zoba, John “Jack” Nelson, Brent J. Anton, and Frank E. Jubula with the Yucaipa Valley Water District; E. Bernice Long, previously with the Western Heights Water District; and Michael L. Huffstutler, previously with the City of Redlands—who greatly aided us in obtaining and understanding field data. We thank U.S. Geological Survey colleagues Jonathan C. Matti for providing geologic map data and Kelly R. McPherson for creating a geographical information system that aided in analysis of data and preparation of map figures. We also thank the several individuals who helped review and prepare the report, including Alan Welch (review), Jim Bowers (review), Larry G. Schneider (illustrations), Jerrald A. Woodcox (editing), and James B. Baker (layout and publication).

## DESCRIPTION OF STUDY AREA

### Physiography

The study area is bordered on the west by the Crafton Hills, on the east by the Yucaipa Hills, on the north by the San Bernardino Mountains, and on the south by the badlands (fig. 2). Between the hills and mountains is a gently sloping area of unconsolidated deposits, commonly referred to as the Yucaipa plain or the Yucaipa ground-water basin. On the northwest side, the plain merges into the San Bernardino valley, and on the southeast side, the plain opens to the San Gorgonio Pass. The Yucaipa plain ranges in altitude from about 1,800 to 3,600 ft above sea level. The hills and mountains surrounding the plain range in altitude from about 3,000 ft in the Crafton Hills, to 5,000 ft along the ridge of the Yucaipa Hills, to more than 8,000 ft in the San Bernardino Mountains.

### Population and Climate

The study area includes parts of San Bernardino and Riverside Counties and the major cities of Yucaipa and Calimesa (fig. 3). In 1998, the population in the Yucaipa study area was about 38,200. Most residents in the area live on the plain, but many live in the surrounding foothills. Recent residential development is concentrated on the east side of Crafton Hills, on the Yucaipa Hills, and along the lower altitudes of the San Bernardino Mountains.

Climate in the study area is moderate with long, dry summers and short, wet winters. On the plain, summer temperatures range from about 60 to 100 °F and winter temperatures range from about 40 to 70 °F. Annual precipitation in this semiarid region averages about 18 in/yr on the plain, and as much as 40 in/yr in the San Bernardino Mountains (Todd, 1988). Precipitation falls almost exclusively as rain on the plain; snow is the predominant precipitation above an altitude of about 6,000 ft. Snowpack in the San Bernardino Mountains commonly lasts into April and, occasionally, May.

## Geology

Bedrock, which forms the hills and mountains that surround the Yucaipa plain on the north, east, and west sides, is composed mostly of crystalline igneous and metamorphic rocks of Cenozoic to Mesozoic age (fig. 5). These basement rocks consist predominantly of granodiorite, although granite, quartz monzonite, tonalite, dioritic gneiss, and schist also are present (Matti and others, 1992). Basement rocks in the Yucaipa Hills are cataclastically deformed and contain abundant fractures and intruded quartz veins. Some sedimentary rocks, mostly sandstone, mantle part of the crystalline bedrock in the vicinity of Mill Creek. The badlands to the south consist of poorly to moderately consolidated continental deposits of Pleistocene and Pliocene age that have been uplifted and dissected. In the badlands, the deposits consist of alternating beds or lenses of gray, yellow, or brown gravel, sand, silt, and clay. The gravel is predominantly from granitic rocks but contains numerous fragments of metamorphic and volcanic rocks. These badland deposits are cut by numerous faults and in places are gently to intensely folded.

Between the San Bernardino Mountains and the badlands is a down-dropped block of crystalline rocks bounded on either side by the San Andreas Fault and the San Jacinto Fault (fig. 2). Erosion of the hills and mountains that surround the Yucaipa area has filled this tectonically created trough, called a graben, with alluvial deposits that are as much as 1,500 ft thick. The alluvial deposits are composed of several units ranging in age from late Pleistocene (very old alluvium) to Holocene age (recent alluvium) (fig. 5). The very old or older alluvium unconformably overlies most of the basement rocks. These alluvial deposits are both of late Pleistocene age and consist of boulders, gravel, sand, silt, and clay. Subsequent erosion of these moderately

to well-consolidated deposits has resulted in deeply incised streambeds such as the channels of Oak Glen and Yucaipa Creeks. Isolated deposits of slightly consolidated younger alluvium border parts of the stream channels and badlands. Unconsolidated recent alluvium is present in stream channels throughout the Yucaipa plain and has its greatest width in the Western Heights subbasin.

The geologic structure and landforms in the Yucaipa area are mostly a result of regional tectonism. To the north, the San Andreas Fault separates two tectonic plates—the North American Plate on the east and the Pacific Plate on the west (Harden, 1998, fig. 1–4). In addition to creating the sediment-filled graben that forms the Yucaipa ground-water basin, the structural forces associated with plate tectonics have caused several additional faults, some of which are visible at the land surface. One set of visible faults is subparallel to the northwest-trending San Andreas and San Jacinto Faults and includes the Banning and Oak Glen Faults; another set is nearly perpendicular to the first and includes the Chicken Hill Fault (fig. 5). Numerous additional barriers, which are hypothesized to be faults, have been inferred by geophysical and ground-water-level data.

## Hydrology

The Yucaipa area is within the upper part of the Santa Ana River drainage basin and encompasses much of the San Timoteo Creek drainage (figs. 1 and 2). Although surface-water drainage is well defined to the north in the San Bernardino Mountains, the drainage becomes progressively less defined to the south in the more extensively eroded badlands. The Yucaipa area is drained by three primary streams: Wilson and Oak Glen Creeks, which flow from the San Bernardino Mountains, and Yucaipa Creek, which flows from the Yucaipa Hills (fig. 3). These streams coalesce and flow into San Timoteo Creek, which exits the area to the southwest (fig. 2).

The semiarid conditions in the Yucaipa area limit the quantity and frequency of streamflow. Generally, streamflow is present in the middle and lower reaches of Wilson, Oak Glen, and Yucaipa Creeks only for brief periods after rain. Flow in the upper reaches of Oak Glen Creek is perennial as a result of ground-water discharge from Ford Canyon in the San Bernardino Mountains (fig. 3). Some of this flow is diverted for public supply. Just upstream from the Casa Blanca Barrier

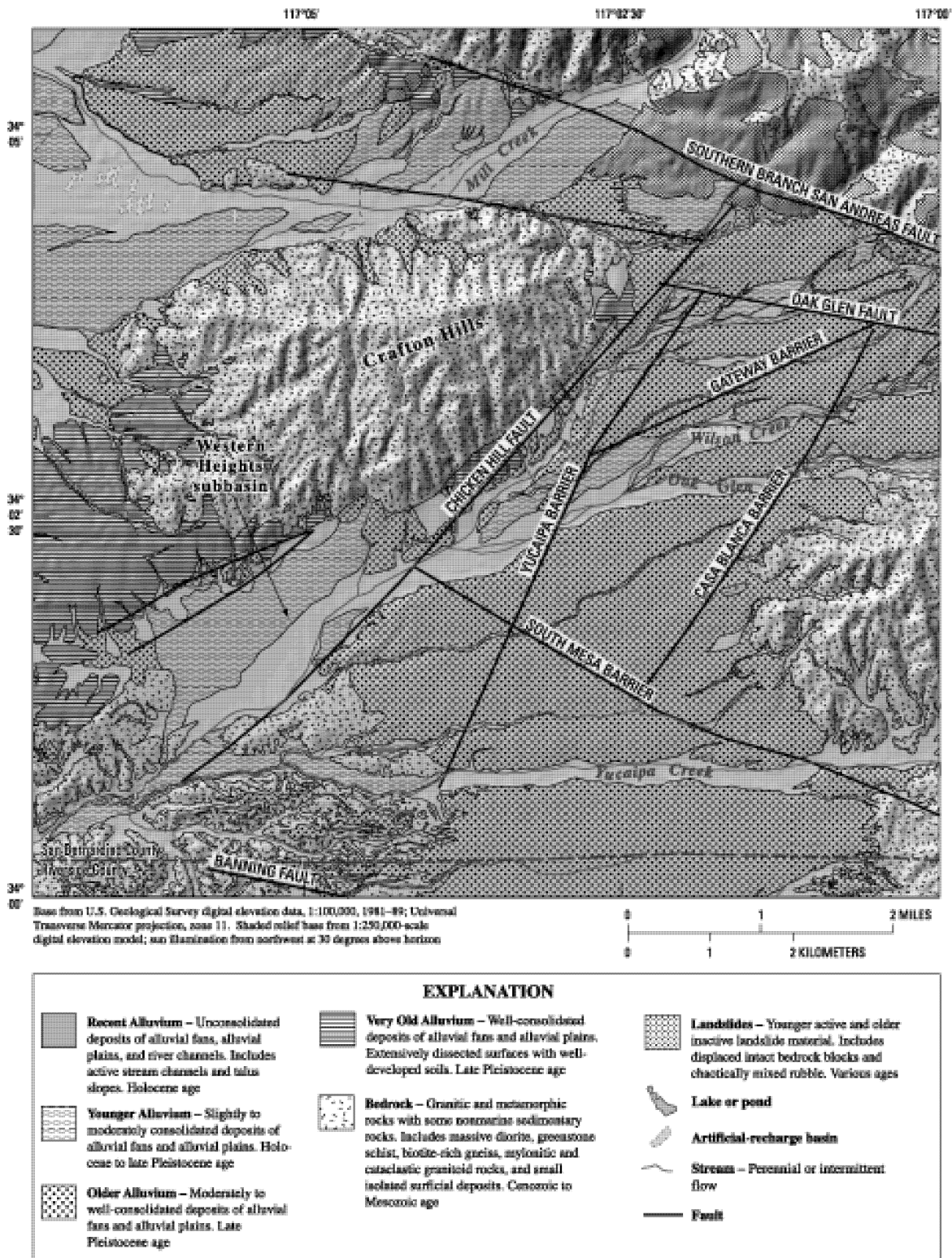


Figure 5. Surficial geology of the Yucaipa area, southern California.

(fig. 5), streamflow infiltrates into the unconsolidated deposits of the Yucaipa plain. In some places, flow in San Timoteo Creek is now perennial as a result of agricultural and urban runoff.

The unconsolidated deposits of the Yucaipa plain—the recent, younger, older, and very old alluvium (fig. 5)—constitute the primary source of ground water in the area and together compose the valley-fill aquifer. Permeability of these deposits ranges from 50 to 300 (gal/d)/ft<sup>2</sup> (Burnham and Dutcher, 1960, p. 80). Recent river-channel deposits, especially near the hills and mountains, appear to be unweathered and very permeable, but most are above the water table. Most ground water occurs in the older, moderately consolidated alluvium at minimum depths of about 200 ft below land surface. Although the base of the valley-fill aquifer is unknown, it probably is more than 1,500 ft below land surface in most parts of the Yucaipa plain. In the western part of the plain, ground water historically was under artesian conditions, which may indicate the presence of fine-grained material of lower permeability within the valley-fill aquifer.

For the most part, the crystalline rocks of the surrounding hills and mountains and underlying the valley-fill aquifer are poorly permeable. However, the multi-directional tectonic forces in the Yucaipa area have created highly fractured, cataclastic rock, which in some places is moderately permeable. Some wells, including large municipal wells, have been completed in the crystalline rocks in order to increase well yield.

Faults are important not only because of their influence on the general topography, but also because of their influence on the flow of ground water. Fault zones in consolidated rocks commonly consist of fissures that may serve as conduits for ground-water flow. Conversely, faults that transect permeable unconsolidated materials may produce barriers to ground-water flow. For example, the San Andreas Fault along the base of the San Bernardino Mountains is known to be a barrier to ground-water flow because its trace in the alluvium at the mouth of nearly every canyon is marked by springs and dense vegetation. Although the barrier effects displayed by faults are not completely understood, the presence of offset beds, gouge material, sharp folds, and chemical cementation are suspected to contribute to reduced permeability.

On a basinwide scale, the general movement of both surface water and ground water is southward and westward from the surrounding hills and mountains. On a local scale, however, the movement of ground

water is more complex. Faults in the area divide the ground-water basin into several subbasins (Moreland, 1970), which previous investigators have characterized as being relatively isolated from one another (fig. 6). Flow in and between subbasins is complex and is not well understood except as can be inferred from contour maps of ground-water levels (Moreland, 1970, figs. 6–8; Todd, 1988, fig. 11). This lack of understanding of ground-water movement was a major impetus for this water-quality study, in particular for the collection of isotopic data.

Detailed ground-water-level maps for different time periods, possibly corroborated by results from a ground-water flow model, are needed to better understand the flow between subbasins and to help interpret water-quality data. As a starting point, however, ground-water-level data from spring 1997 were obtained from local water agencies (fig. 6 and table 1). On the basis of these data and ground-water-level maps from Moreland (1970), ground water in the Triple Falls Creek subbasin (fig. 6) appears to flow from the east to the west toward the north end of Crafton Hills. In the Wilson Creek and Crafton subbasins, ground water flows generally from north to south. In the Calimesa subbasin, ground water flows from east to west, toward the San Bernardino area. Insufficient data were available in the Western Heights subbasin to determine the direction of ground-water flow, but in the past (1930–70), a pumping depression was present near Dunlap Acres (Moreland, 1970).

## Land Use

Originally, the Yucaipa area was inhabited by Native Americans, and the name “Yucaipa” is derived from the Serrano Indian word “Ucipe,” which means wet and sandy. Until the early 1800’s, the area was under Spanish rule as part of the San Bernardino Rancho. By 1860, the land was privately owned by a few families. In the early 1900’s, part of the area was subdivided into apple orchards, and the area became synonymous with red apples.

After 1940, the Yucaipa area became extremely popular as a retirement destination. Many mobile-home parks were built, mostly along the upper part of the Yucaipa plain near the San Bernardino Mountains. Rural-type residential development continued to be popular and covered much of the central part of the Yucaipa plain. As more of the area was urbanized, cultivation of citrus was moved to the edges of the plain,

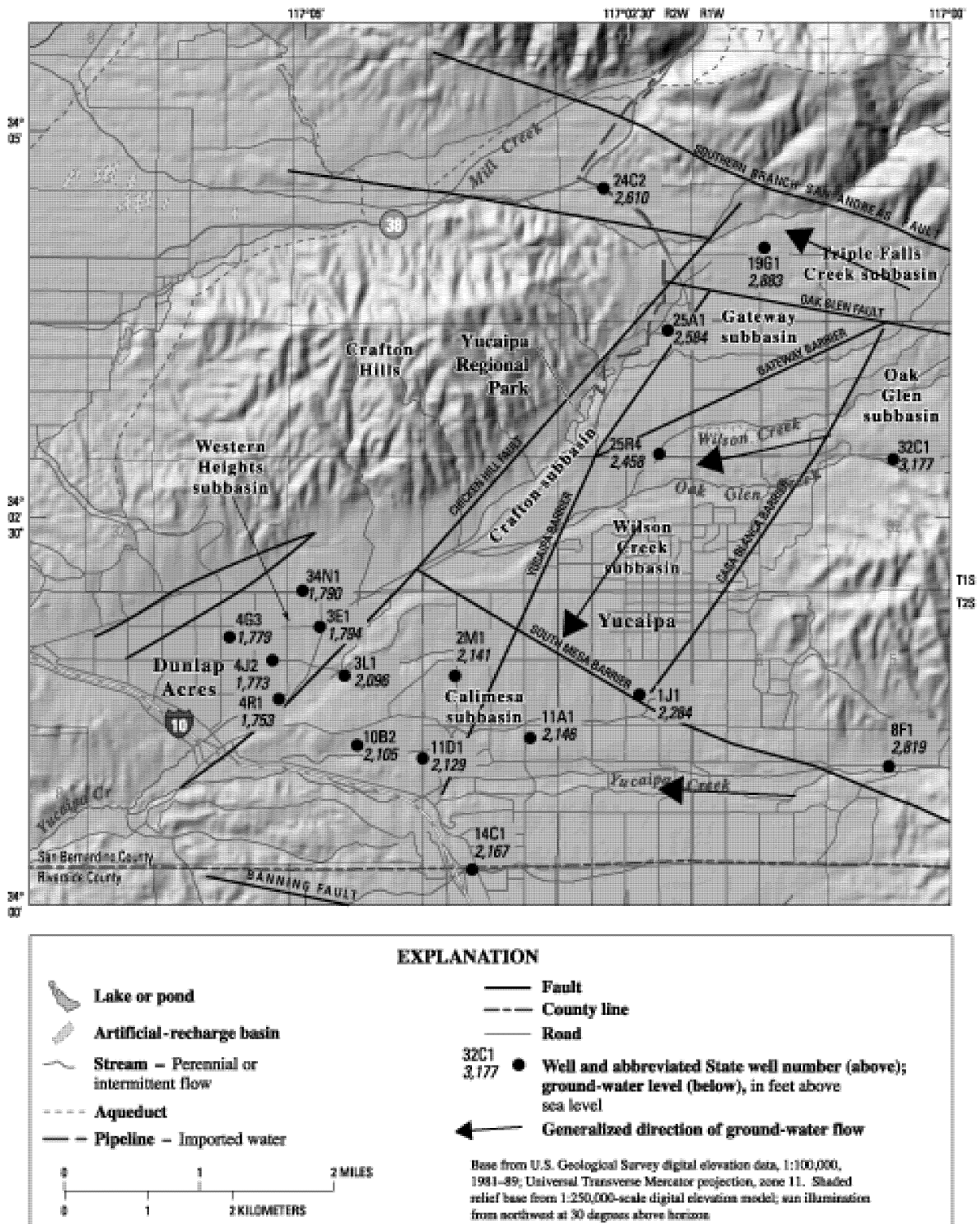


Figure 6. Ground-water levels at selected wells in the Yucaipa area, southern California, spring 1997.

**Table** Location and characteristics of selected surface-water sites and wells in the Yucaipa area, southern California.

[YVWD, Yucaipa Valley Water District; WHWD, Western Heights Water District; SMWD, South Mesa Water District; LSD, land-surface datum; ft, foot; na, not applicable; —, no data]

| Site name or State well number      | Well owner          | Other well identifiers | Latitude | Longitude | Altitude of LSD (ft) | Altitude of water table (ft above sea level) <sup>1</sup> | Depth of well (ft) | Open intervals below LSD (ft) |
|-------------------------------------|---------------------|------------------------|----------|-----------|----------------------|---|--------------------|-------------------------------|
| Upper Oak Glen Creek in Ford Canyon | na                  | na                     | 340326   | 1165605   | 5,920                | na  | na                 | na                            |
| Oak Glen Creek in Ford Canyon       | na                  | na                     | 340320   | 1165612   | 5,560                | na  | na                 | na                            |
| Oak Glen Creek near Oak Glen        | na                  | na                     | 340307   | 1165621   | 3,550                | na  | na                 | na                            |
| Oak Glen Creek at 2nd street        | na                  | na                     | 340238   | 1170232   | 2,620                | na  | na                 | na                            |
| Yucaipa Creek at Mesa Grande Bridge | na                  | na                     | 340051   | 1170026   | 2,880                | na  | na                 | na                            |
| Yucaipa Creek at 5th street         | na                  | na                     | 340049   | 1170314   | 2,390                | na  | na                 | na                            |
| Yucaipa Creek below Dunlap Acres    | na                  | na                     | 340037   | 1170643   | 1,880                | na  | na                 | na                            |
| Mill Creek at Yucaipa Regional Park | na                  | na                     | 340316   | 1170251   | 2,630                | na  | na                 | na                            |
| IS/1W-19G1                          | YVWD                | YVWD # 31              | 340415   | 1170127   | 3,086                | 2,883   | 384                | —                             |
| IS/1W-27L1                          | YVWD                | YVWD # 25              | 340312   | 1165839   | 3,875                | —   | 30                 | 15–30                         |
| IS/1W-32C1                          | YVWD                | YVWD # 13              | 340253   | 1170027   | 3,194                | 3,177   | 307                | 26–415                        |
| IS/2W-24C2                          | YVWD                | YVWD # 51              | 340438   | 1170242   | 2,695                | 2,610   | 610                | 230–590                       |
| IS/2W-25A1                          | YVWD                | YVWD # 37              | 340343   | 1170212   | 2,780                | 2,584   | 305                | —                             |
| IS/2W-25R4                          | YVWD                | YVWD # 53              | 340255   | 1170216   | 2,730                | 2,458   | 970                | 450–950                       |
| IS/2W-34N1                          | City of Redlands    | —                      | 340202   | 1170502   | 2,157                | 1,790   | —                  | —                             |
| IS/2W-36G1                          | YVWD                | YVWD # 46              | 340236   | 1170231   | 2,623                | —   | 1,150              | 340–1,140                     |
| 2S/1W-08F1                          | YVWD                | YVWD # 27              | 340054   | 1170029   | 2,878                | 2,819   | 314                | 164–314                       |
| 2S/1W-15F2                          | YVWD                | YVWD # 61              | 340003   | 1165825   | 3,515                | —   | 462                | 189–462                       |
| 2S/2W-01J1                          | YVWD                | YVWD # 50              | 340124   | 1170213   | 2,600                | 2,284   | 352                | 330–350                       |
| 2S/2W-02M1                          | YVWD                | YVWD # 11              | 340129   | 1170351   | 2,401                | 2,141   | 525                | 260–450; 465–525              |
| 2S/2W-03E1                          | WHWD                | WHWD # 6               | 340148   | 1170454   | 2,170                | 1,794   | 599                | 135–578                       |
| 2S/2W-03L1                          | City of Redlands    | Chicken Hill           | 340129   | 1170442   | 2,200                | 2,096   | 505                | 198–485                       |
| 2S/2W-04G3                          | WHWD                | WHWD # 2A              | 340144   | 1170536   | 2,100                | 1,779   | 630                | 400–620                       |
| 2S/2W-04G4                          | WHWD                | WHWD # 11              | 340137   | 1170535   | 2,080                | —   | 1,690              | 705–1,205; 1,210–1,690        |
| 2S/2W-04J2                          | WHWD                | WHWD # 5A              | 340135   | 1170516   | 2,095                | 1,773   | 1,100              | 390–1,090                     |
| 2S/2W-04R1                          | WHWD                | WHWD # 9               | 340120   | 1170513   | 2,091                | 1,753   | 600                | 150–576                       |
| 2S/2W-10B2                          | City of Redlands    | Hog Canyon #2          | 340106   | 1170450   | 2,180                | 2,105   | 700                | 260–440; 460–680              |
| 2S/2W-11A1                          | YVWD                | YVWD # 24              | 340105   | 1170316   | 2,446                | 2,146   | 585                | 320–585                       |
| 2S/2W-11D1                          | YVWD                | YVWD # 10              | 340057   | 1170406   | 2,327                | 2,129   | 515                | 170–500                       |
| 2S/2W-14C1                          | SMWD                | SMWD # 2               | 340014   | 1170343   | 2,393                | 2,167   | 363                | 205–363                       |
| 2S/2W-14R3                          | SMWD                | SMWD # 4               | 335924   | 1170317   | 2,340                | —   | 1,000              | 352–976                       |
| 2S/2W-24L1                          | YVWD                | YVWD # 48              | 335848   | 1170243   | 2,327                | —   | 1,180              | 380–870; 930–1,160            |
| 2S/2W-28C2                          | Fisherman's Retreat | —                      | 335829   | 1170552   | 1,943                | —   | —                  | —                             |

<sup>1</sup>Altitude of water levels provided by water districts for spring 1997.

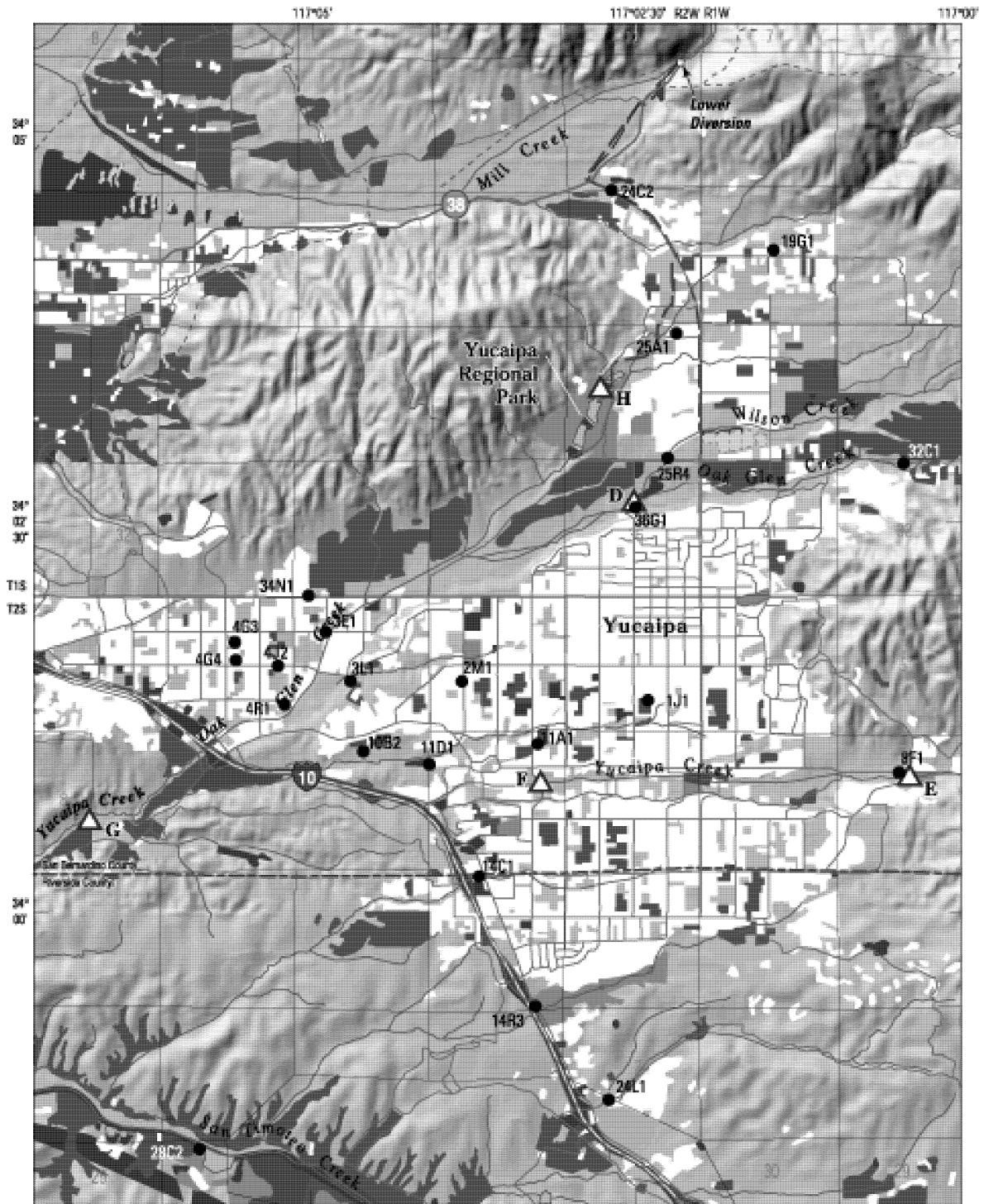


Figure 7. Land use in the Yucaipa area, southern California, 1990.

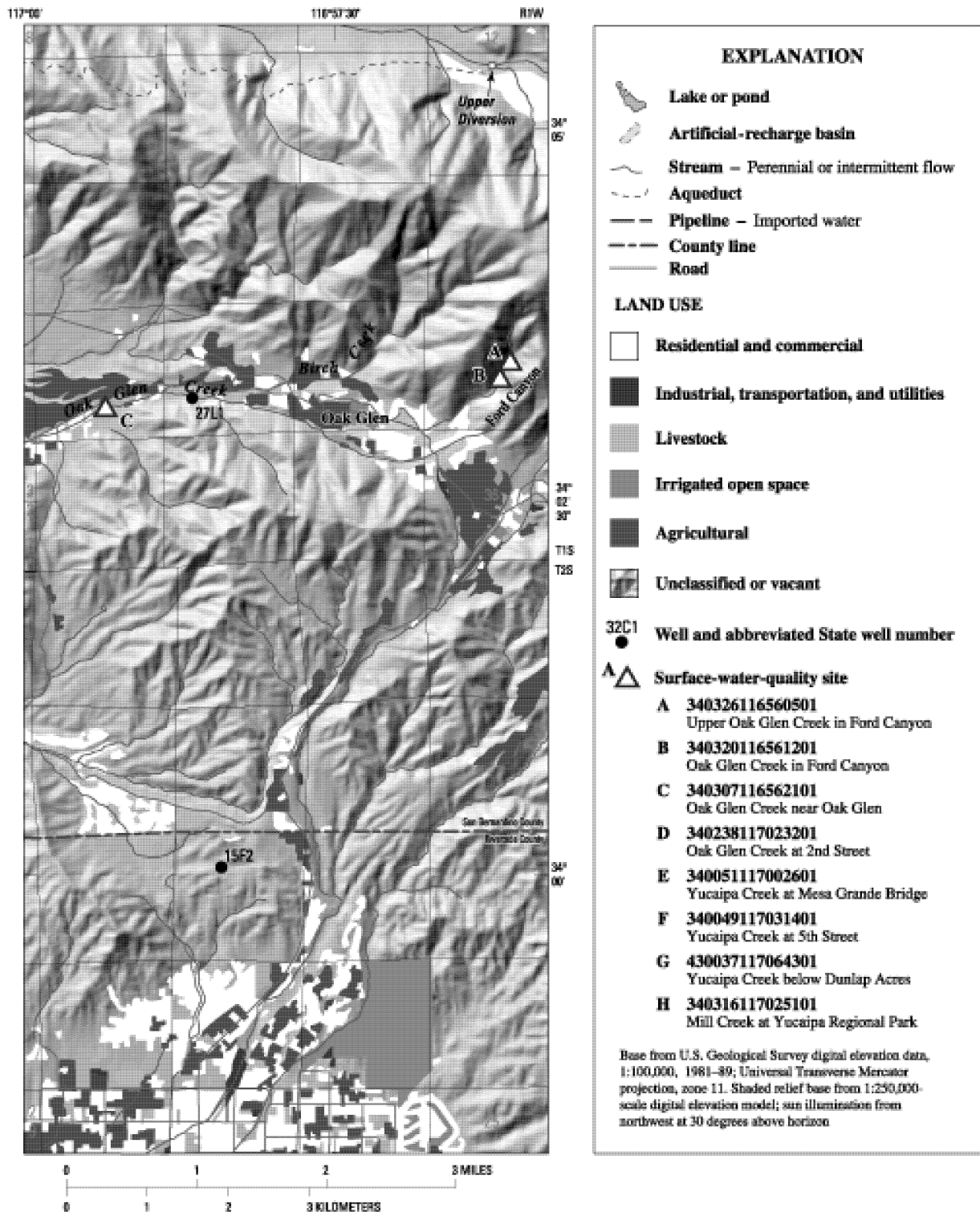


Figure 7—Continued.

and since about 1990, most of the citrus groves have been replaced with planned residential developments.

As of 1990, land use in the Yucaipa area was a combination of residential land covering much of the Yucaipa plain, and isolated pieces of agricultural land (fig. 7). The central part of the plain continues to be filled with small, older homes occupying as much as an acre of land. Mobile-home parks continue in their same location along the northern part of the plain. Recently constructed tract housing, at densities of 1 to 6 homes per acre, extends to the edges of the plain and onto the surrounding hills. Within the boundaries of the Yucaipa Valley Water District, which covers most of the plain, rural residential housing (less than or equal to 1 dwelling unit per acre) accounts for 35 percent of the land use, low-density residential housing (1 to 4 dwelling units per acre) accounts for 21 percent, and planned residential development (mixed residential, public land, and some commercial use) accounts for 29 percent (Camp, Dresser, and McKee, 1994).

The small amount of commercial development in the Yucaipa area is located along a few main streets, and there is almost no industrial development. Apple growing is still popular on the lower slopes of the San Bernardino Mountains, particularly along Oak Glen Creek, and each fall many visitors attend the apple harvest festival. The Yucaipa Regional Park, with its small lakes and grassy areas, is located on the northwest side of the Yucaipa plain adjacent to Crafton Hills. The small lakes are sustained by water imported from Mill Creek. On Wilson Creek, a large artificial-recharge basin has been constructed and can be used to recharge both local runoff and water imported from Mill Creek.

## Water Use

Prior to the late 1800's, the water supply of the Yucaipa area was limited to surface flow in the mountain streams and small quantities of springflow along the Chicken Hill Fault. In the 1890's and early 1900's, a number of flowing wells were completed in the Western Heights subbasin. At that time, several water companies were formed to distribute water for irrigation. Agricultural development during the period 1900–30 required the installation of more wells throughout the area. By the 1930's, this increased pumping had lowered the hydraulic head in the valley-fill aquifer to below land surface. This gradual decline in ground-water levels continued until the post-World War II development boom began in 1945. A combination of

increased pumpage and reduced recharge caused by below-normal precipitation resulted in an increased rate of decline in ground-water levels of 10 to 20 ft/yr. This rate continued into the early 1960's and then decreased to 5 to 10 ft/yr (Moreland, 1970). Because population predictions indicate that local water needs will increase sharply over the next decade, it is likely that ground-water levels will continue to decline in some parts of the Yucaipa area.

## WATER QUALITY

Water samples were collected from selected surface-water sites and wells in the Yucaipa area during 1996–98. These sites and wells are shown in figure 3 and listed in table 1. Results of chemical analyses of 15 surface-water samples from 8 sites on 3 creeks and of 32 ground-water samples from 25 wells are given in tables 2 and 3, respectively, in the back of this report. On the basis of these data, the major-ion composition of water was evaluated using Stiff (polygon) and Piper (trilinear) diagrams (figs. 8 and 9). A Stiff diagram shows the relative abundance of cations and anions expressed in milliequivalents per liter and plotted on one of four parallel horizontal axes (Stiff, 1951). The resulting polygon shows similarities or differences in general water chemistry, and the width of the polygon is an approximation of the total ionic content. A Piper diagram (Piper, 1944) shows the relative contribution of major cations and anions, on a charge-equivalent basis, to the total ionic content of the water. Percentage scales along the sides of the diagram indicate the relative concentrations, in milliequivalents per liter, of each major ion. Cations are shown in the left triangle, anions are shown in the right triangle, and the central diamond integrates the data.

## Surface Water

Oak Glen, Yucaipa, and Mill Creeks were selected for the collection of water-quality samples. Four sites were located on Oak Glen Creek, in downstream order: two sites in Ford Canyon, one site near the town of Oak Glen, and one site at the Second Street crossing, just downstream from the confluence with Wilson Creek. Three sites were chosen on Yucaipa Creek, in downstream order: at the Mesa Grande bridge, at the Fifth Street bridge, and southwest of Dunlap Acres downstream from the confluence with

Oak Glen Creek (fig. 3). One sample was collected at Yucaipa Regional Park where water from Mill Creek is imported to the park in a pipeline. The water in the pipeline originates as diversions from two locations on Mill Creek. The upper diversion is located in the incised drainage channel and is used as inflow to a powerhouse; the lower diversion is under the Highway 38 bridge (fig. 3).

The winter of 1997–98 was much wetter than average because of El Niño conditions. This weather pattern is caused by warming of the tropical Pacific Ocean and can result in extreme weather throughout the world and greater than average precipitation in southern California. As a result of El Niño conditions, February 1998 was the wettest February on record in southern California. Late-season storms typically come from the Pacific northwest, but also may result from warm, moist air drawn into southern California from the southwest. This latter effect produces many of the larger magnitude and longer duration storms.

Storms differ in magnitude, duration, intensity, and direction—each of which may produce changes in water chemistry. In February 1998, three storms were sampled. From the many precipitation stations in the Santa Ana River drainage basin, nine were chosen to show storm patterns (fig. 10). The first storm entered the basin from the west and started producing rain at Carbon Canyon Dam (CCYN). The rain started falling at about 0700 (local time) on February 3, was basin-wide in about 6 hours, and lasted about 16 hours. The greatest precipitation, 2.3 in., was recorded at Prado Dam (PRDO). The least precipitation, about 0.5 in., fell at higher altitudes in the mountains to the northeast of the study area at Converse Fire Station (CONV). Lower altitudes to the north and east of Yucaipa received approximately 2.0 in. of rain, as recorded at the Oak Glen station (OAKG).

The second storm was the smallest and entered the basin from the west and then moved eastward. Rain began falling in the western end of the Santa Ana River drainage basin during the morning of February 19 and moved into the rest of the basin starting at about 2000. The greatest precipitation, 0.8 in., was recorded at OAKG; the least was 0.1 in. at CONV.

The third storm was the largest and started in the mountains to the north. This storm is typical of an El Niño-influenced storm whereby tropical moisture from the southwest is entrained in a slow-moving, low-pressure system moving in from the northwest. The precipitation generally fell in two distinct periods,

except at the Devore Fire Station (DEVO) and San Antonio Dam (SNTD) stations, both of which recorded nearly constant rainfall (fig. 10). The first rain fell in the afternoon of February 22, and the rest fell in the early evening of February 23. The precipitation was greatest in the mountains to the north: 6.3 in. at DEVO; 5.2 in. at SNTD; and 4.5 in. at OAKG. The precipitation was least, about 1.9 in., in the southern part of the basin at the Santa Ana River at Fifth Street (SAR5) and at Lake Mathews (LKMA).

Storm runoff flows quickly out of the surrounding hills and mountains onto the plain with little time for the water to dissolve minerals and salts. As a result, water-quality samples from Yucaipa Creek had very low concentrations of dissolved solids, cations, and anions. At the two upstream sites, the concentration of dissolved solids (residue on evaporation) ranged from 40 to 57 mg/L (milligrams per liter) (table 2, at back of report). Calcium and bicarbonate, although low in concentration, were the dominant ions on the basis of milliequivalents (fig. 8).

The chemistry of Oak Glen Creek and Yucaipa Creek was similar in that water samples were dominated by calcium and bicarbonate ions. However, concentrations of sodium, magnesium, and sulfate were higher in samples from Oak Glen Creek. (fig. 8, table 2). Dissolved-solids concentrations also were higher in Oak Glen Creek, ranging from 74 to 249 mg/L (table 2). The higher concentrations of these constituents may result simply from the source of the water. Oak Glen Creek has its source in the San Bernardino Mountains and is perennial in the foothills, whereas the source for Yucaipa Creek is in the Yucaipa Hills. Samples collected during base flow in Oak Glen Creek near Oak Glen contained higher concentrations of ions than samples collected during stormflows (fig. 8). Calcium concentrations ranged from 24 to 45 mg/L in base-flow samples, and from 13 to 30 mg/L in stormflow samples. Dissolved-solids concentrations ranged from 120 to 249 mg/L during base flows, and from 74 to 227 mg/L during stormflows. Concentrations of other major ions also decreased during stormflows (fig. 8, table 2). This decrease in concentrations probably results from dilution of base flow with stormflow having a lower ionic strength.

The highest concentration of major ions in Yucaipa Creek was found at the downstream site, located below the confluence with Oak Glen Creek where the surface water exits the study area southwest of Dunlap Acres (figs. 8 and 9A). The dissolved-solids

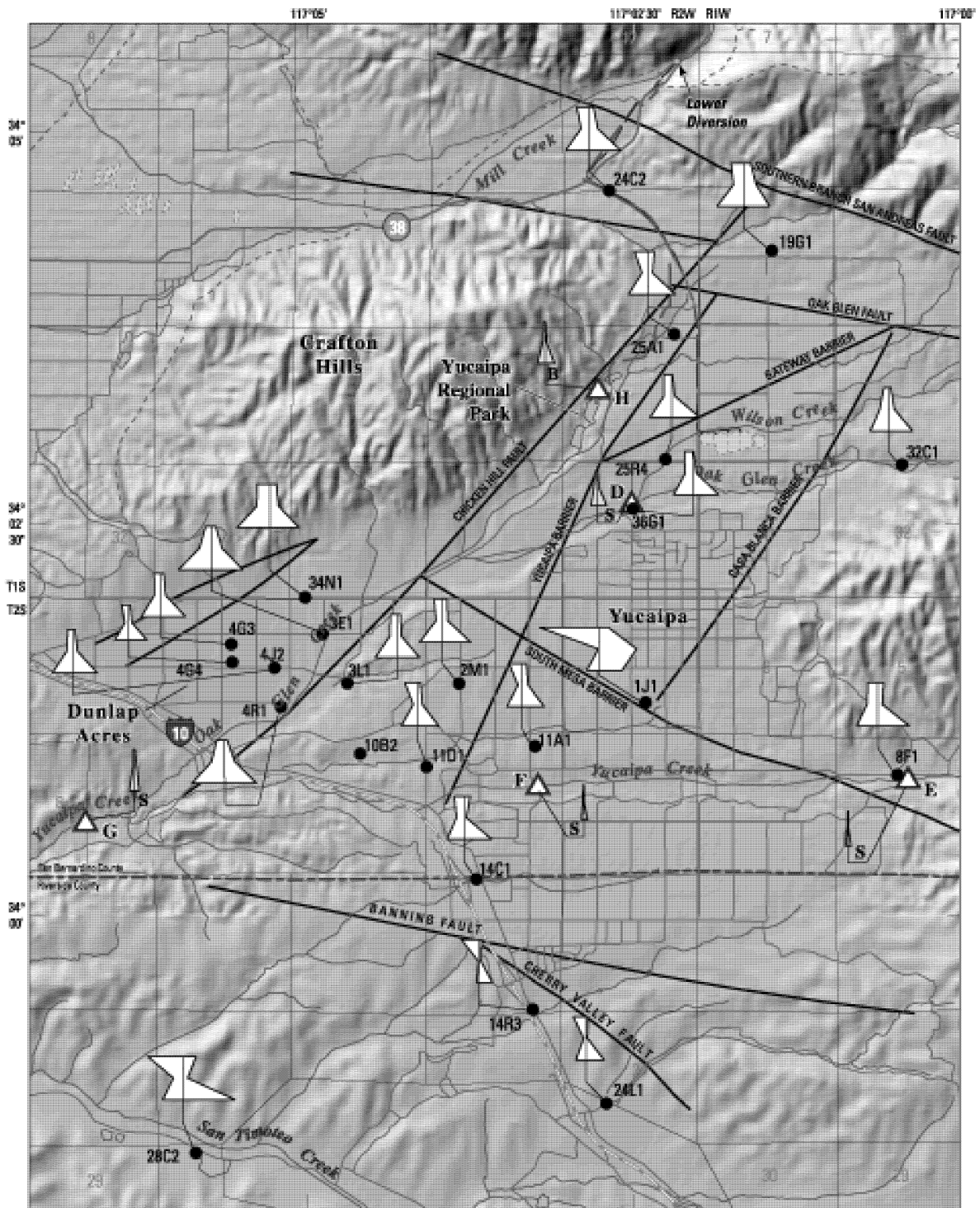


Figure 8. Water chemistry in samples from selected wells and surface-water sites in the Yucaipa area, southern California.

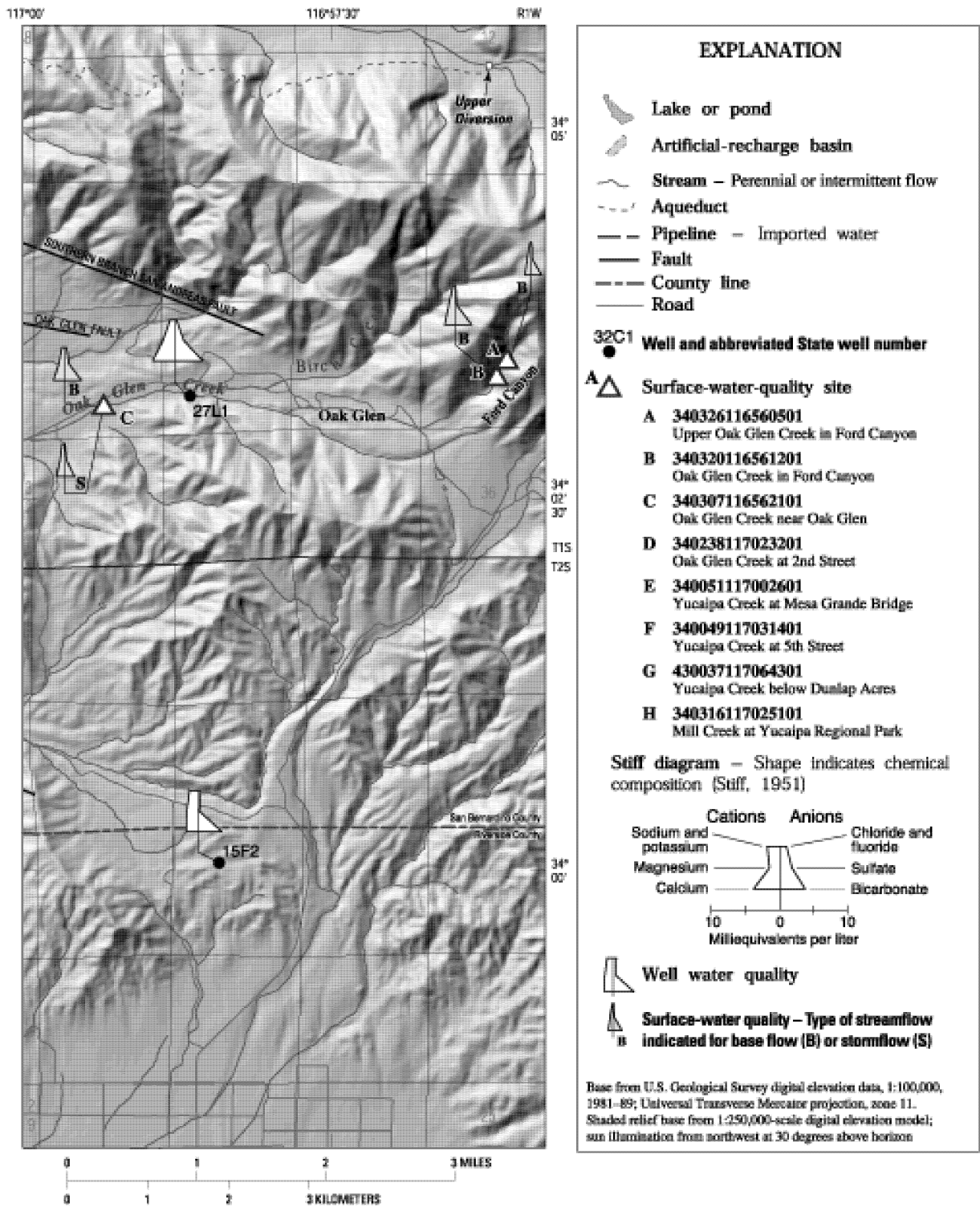
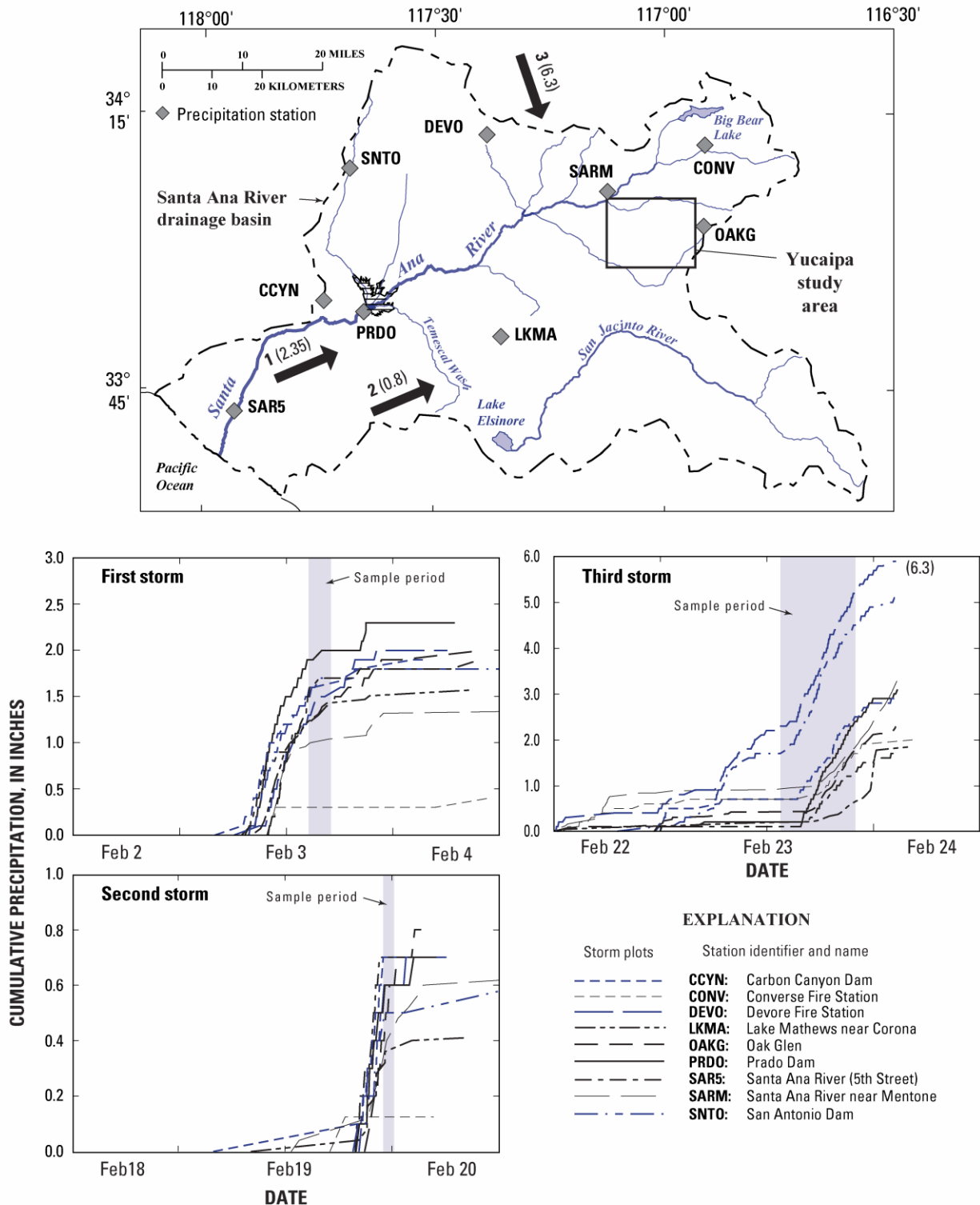


Figure 8—Continued.





**Figure 10.** Precipitation stations and cumulative precipitation for three February 1998 storms in the Santa Ana River drainage basin, southern California (note change in vertical scale on graphs). Arrows on map show direction storm started in basin; numbers indicate storm sequence sampled and largest amount of total precipitation, in inches. Precipitation data from U.S. Army Corps of Engineers (Gregory Peacock, written commun., 1998).

concentration was slightly greater than 100 mg/L (table 2). The Piper (trilinear) diagram for this surface-water sample shows that the dominant ions were mostly calcium and bicarbonate (fig. 9A). In comparison with the two upstream sites, this site had a much higher concentration of sulfate (22 mg/L compared to <3.2 mg/L) and a slightly higher concentration of chloride. The large differences in the concentrations of many constituents between the two upstream sites on Yucaipa Creek and the downstream site may be a result of runoff from Oak Glen Creek and the town of Yucaipa, or the differences may result from the larger discharge at the time of sampling of the downstream site (190 ft<sup>3</sup>/s in comparison to 2.3 ft<sup>3</sup>/s). The sample taken at the downstream site was collected during the rising limb of the runoff which typically carries more sediment.

As found in samples collected from Oak Glen Creek and Yucaipa Creek, the dominant ions in the sample collected from Mill Creek at the inlet to the Yucaipa Regional Park (site H) were calcium and bicarbonate (fig. 8). Most constituent concentrations, such as sodium, chloride, silica, phosphate, boron, and iron, were similar to concentrations in base-flow samples collected from Oak Glen Creek at site A and B in Ford Canyon (fig. 8 and table 2). These similarities would be expected because the source of the water in both creeks is the San Bernardino Mountains. Other constituents, such as calcium, magnesium, dissolved solids, and sulfate, had concentrations similar to those in stormflow (figs. 8 and 9; table 2). Lithium concentration [(5 µg/L) micrograms per liter] was higher in the Mill Creek sample.

In addition to Stiff and Piper diagrams, the major-ion composition of water samples was evaluated using boxplots. The variability of selected constituents as well as differences between surface and ground water can be observed from these boxplots (fig. 11). Boxplots show the range of values for a selected water-quality constituent. The vertical size of the box is determined by the range of the data, as in a histogram. The width of the box is meaningless and is for display purposes only. The median and selected percentiles of the data are indicated along with any outliers.

Phosphate showed the highest variability (ranging from the upper 75 to the lower 25 percentile fig. 11) of any constituent sampled, perhaps as a result of the higher phosphate concentrations found in storm runoff in Yucaipa Creek (table 2). Nitrate (NO<sub>3</sub>)

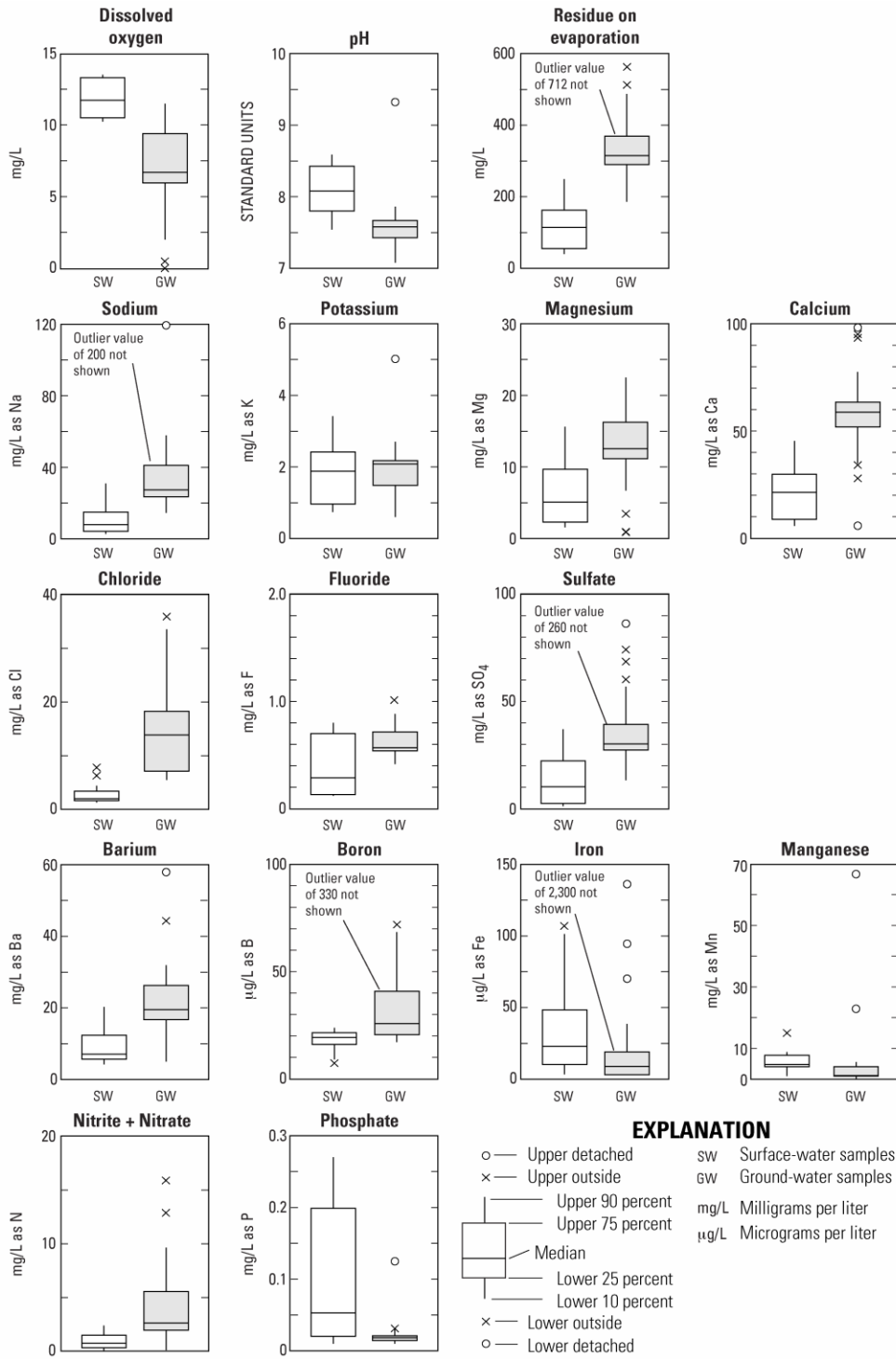
concentrations were low, ranging from 0.18 to 2.3 mg/L as nitrogen. These low values indicate the lack of a significant source of nitrate from runoff under these conditions. The higher values of nitrate were found in samples collected downstream from the agricultural land adjacent to Oak Glen Creek and Yucaipa Creek (figs. 7 and 12). Organic ammonia values ranged from less than the detection limit of 0.1 mg/L to 0.7 mg/L. More studies are needed to evaluate the rates at which species are converted to and from nitrate.

Calcium concentrations ranged from 5.8 to 45 mg/L. Chloride and fluoride concentrations ranged from 1.2 to 7.7 mg/L, and from 0.1 to 0.8 mg/L, respectively. Sulfate concentrations ranged from 1.4 to 37 mg/L. Sodium concentrations ranged from 2.2 to 15 mg/L. Iron and manganese concentrations ranged from less than the detection limit of 3 µg/L to 110 µg/L, and from less than the detection limit of 1 µg/L to 15 µg/L, respectively. Boron concentrations ranged from 7 to 24 µg/L. Barium concentrations ranged from 4.3 to 20 µg/L. All constituents were well below their respective maximum contaminant levels (MCL) (U.S. Environmental Protection Agency, 1994).

Concentrations of dissolved oxygen in samples collected during the summer from Mill and Oak Glen Creeks were 8.2 and 8.5 mg/L, respectively. Dissolved-oxygen concentrations in winter samples from Oak Glen and Yucaipa Creeks ranged from 9.4 to 10.8 mg/L. Lower dissolved-oxygen concentrations in the summer samples may result from less turbulence in the river than during winter stormflow, and may result from the lower solubility of oxygen in warmer water. Also in summer, dissolved oxygen can be depleted by biochemical processes, such as respiration by algae that consume dissolved, suspended, or precipitated organic matter.

## Ground Water

Ground-water samples were collected from 25 wells mostly on the Yucaipa plain (fig. 3) and from 1 well in San Timoteo Canyon. On the basis of these samples, most ground water in the Yucaipa area shows little areal variability and is of good quality by U.S. Environmental Protection Agency (EPA) drinking water standards (U.S. Environmental Protection Agency, 1994). Dissolved-solids concentrations ranged



**Figure 11.** Concentration of selected constituents for selected wells and surface-water sites in the Yucaipa area, southern California.

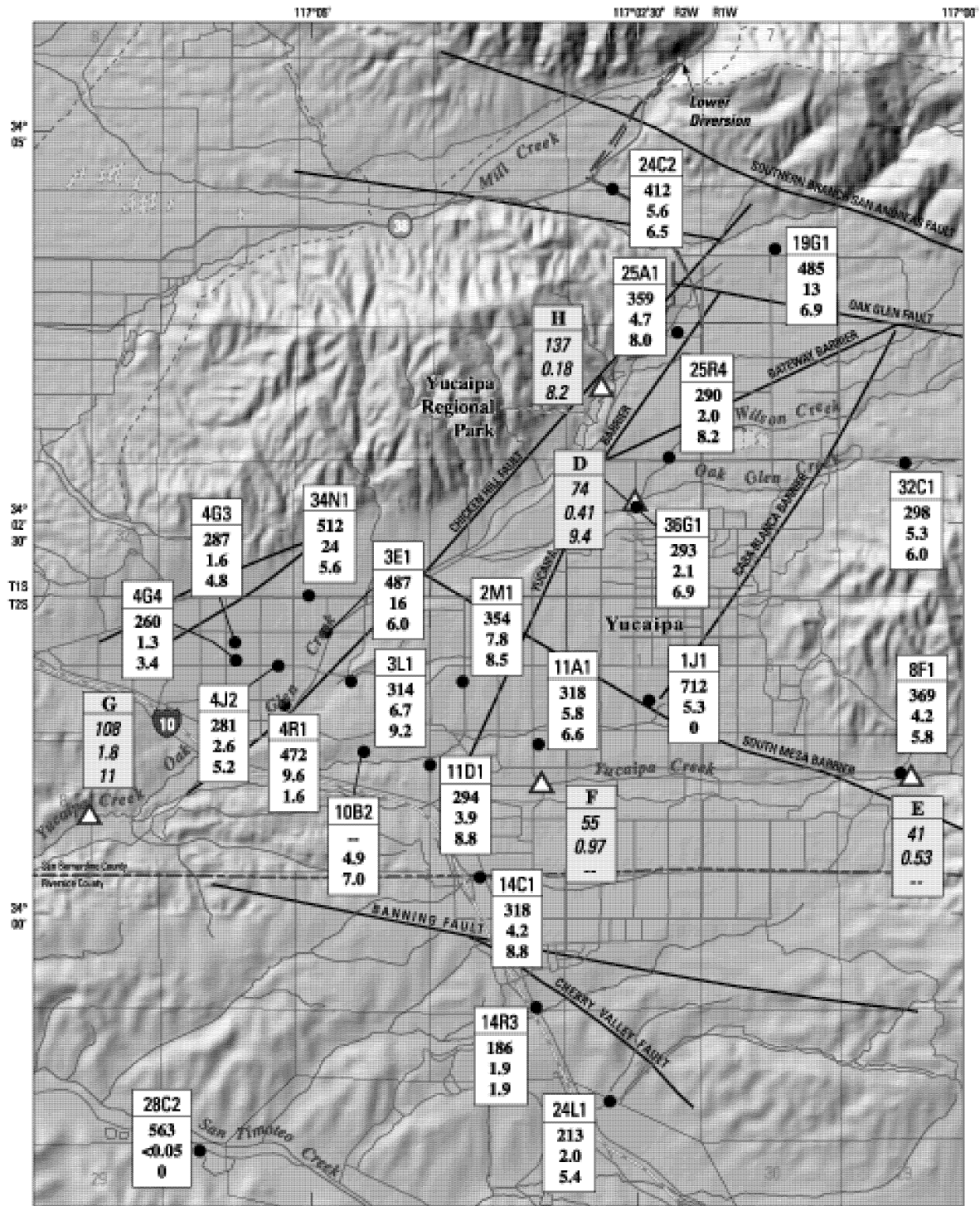


Figure 12. Concentration of dissolved solids, nitrites plus nitrates, and dissolved oxygen for selected wells and surface-water sites in the Yucaipa area, southern California.

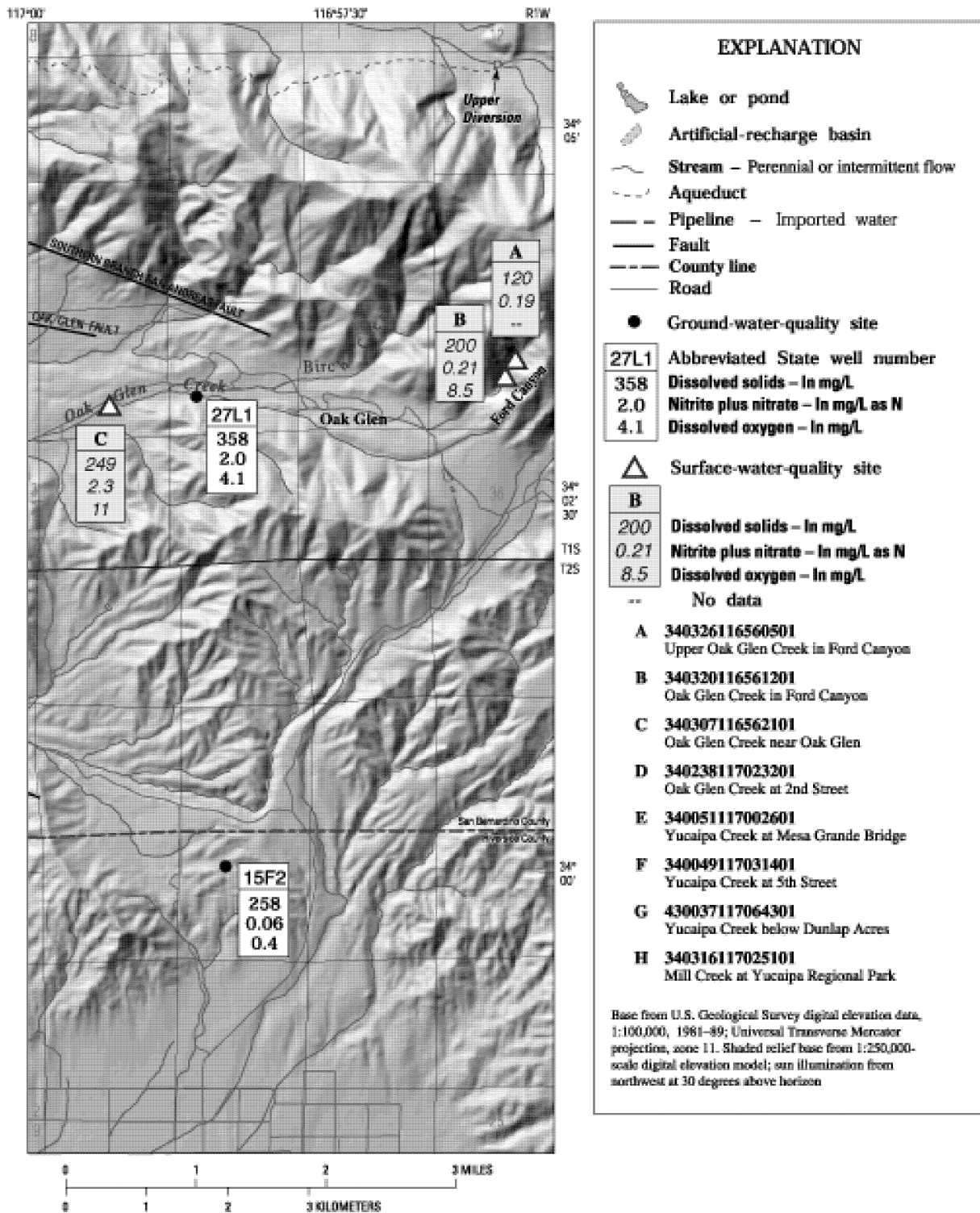


Figure 12—Continued.

from 186 to 563 mg/L (table 3, at back of report; fig. 12), with an outlier of 712 mg/L at well 2S/2W-1J1. Sodium concentrations ranged from 14 to 58 mg/L, with outliers of 120 mg/L and 200 mg/L at wells 2S/2W-28C2 and 2S/2W-1J1, respectively. Chloride concentrations ranged from 6.3 to 36 mg/L, with an outlier of 65 mg/L at well 2S/2W-28C2. Sulfate concentrations ranged from 13 to 86 mg/L, with an outlier of 260 mg/L at well 2S/2W-1J1. Iron concentrations ranged from less than the detection limit of 3 mg/L to 140 mg/L, with an outlier of 2,300 mg/L, also at well 2S/2W-1J1. This unusually high concentration of iron may result from corrosion of the steel well casing. The sample from well 2S/2W-1J1 also showed signs of a reducing environment and had no dissolved oxygen, a condition that causes iron to become soluble. Boron concentrations ranged from 20 to 70 µg/L, with an outlier of 330 µg/L at well 2S/2W-1J1.

As in surface water, calcium and bicarbonate were the major ions found in ground water on the basis of milliequivalence (figs. 8 and 9B). Four wells were not dominated by calcium and bicarbonate. Water from well 2S/2W-1J1 was high in sodium, sulfate, and dissolved-solids concentration and contained almost no magnesium. Water from this well also had elevated concentrations of fluoride and boron, which may indicate a contribution of mineralized ground water emanating from a nearby fault zone. This explanation seems plausible because well 2S/2W-1J1 is located near the intersection of the South Mesa and Casablanca Barriers (figs. 3 and 8). Wells 2S/2W-14R3 and 2S/2W-24L1 yielded water having more than 80 percent sodium and potassium and less than 20 percent calcium and magnesium (fig. 9B). These two wells are located south of the Banning and Cherry Valley Faults (figs. 3 and 8). Ground water moving to these wells probably has a geochemical signature more representative of the unconsolidated nonmarine sediment of the badlands than of the crystalline rocks found in the other hills and mountains in the Yucaipa area. Well 2S/2W-28C2 is located in San Timoteo Canyon, which is eroded into the badlands, and has the same water type as well 2S/2W-24L1 (fig. 9B). Well 2S/2W-28C2 is located near and probably downgradient from fishing ponds. The elevated concentrations of sodium, calcium, chloride, and bicarbonate in water from this well may result from evaporative processes

that occur in the ponds before water infiltrates into the ground.

Three wells (1S/2W-34N1, 2S/2W-3E1, and 2S/2W-4R1) located in the western part of the Yucaipa area and one well (1S/1W-19G1) in the northern part of the Yucaipa area yielded water with a high concentration of nitrate (fig. 12). Water from three of these wells (19G1, 34N1, and 3E1) had nitrate concentrations that exceed the MCL of 10 mg/L as N; water from well 2S/2W-4R1 had a nitrate concentration of 9.6 mg/L, just below the MCL. Water from these four wells also was higher in dissolved solids, sodium, calcium, chloride, sulfate, and bicarbonate. These wells are located downgradient from an area that has been used for agriculture (fig. 7). The high concentrations of these constituents at well 1S/2W-34N1 may result from agricultural practices and evaporative processes. The lower concentrations of nitrate in wells 2S/2W-3E1 and 2S/2W-4R1 may result either from a different source of nitrate or from dilution with less contaminated water as ground water moves through the area. The latter seems more plausible, suggesting a separate but converging ground-water-flow path, possibly coincident with Oak Glen Creek.

Most constituents analyzed in ground-water samples were below their respective MCL's. All sulfate concentrations, except for well 2S/2W-1J1, were below the Secondary Maximum Contaminant Level (SMCL) of 250 mg/L, as defined by the U.S. Environmental Protection Agency (1994). Water from one well (2S/2W-1J1) exceeded the SMCL for iron, which is 300 µg/L. Water from two wells (1S/1W-19G1 and 2S/2W-28C2) exceeded the SMCL for manganese, which is 50 µg/L. Barium concentration in all water samples was far below the MCL of 2,000 µg/L.

In general, sodium, calcium, magnesium, chloride, nitrate, sulfate, and dissolved-solids concentrations were higher in ground water than in surface water (fig. 11) probably as a result of dissolution of minerals in the aquifer matrix. However, concentrations of iron, manganese, and phosphate were higher in surface water than in ground water.

#### Flowmeter Data

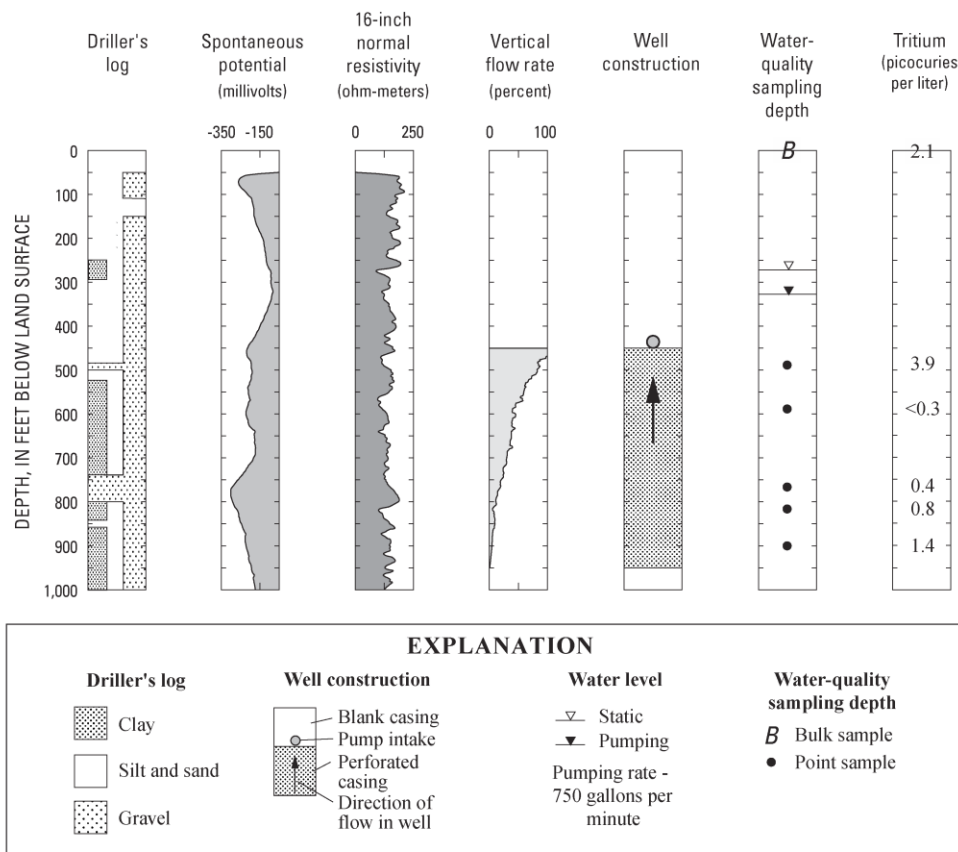
Flowmeter data were collected from well 1S/2W-25R4 using a commercial, vertical-axis current meter, commonly called a spinner tool. This tool

measures the velocity of water flowing inside the well casing by recording the number of revolutions per second made by a spinning impeller. Flowmeter data are helpful in determining the water-yielding characteristics of aquifer material opposite the screened interval and in evaluating mixtures of water collected at different depths within the well. A continuous profile of velocity was recorded for the entire depth of the well, and static data (stop counts) were collected every 10 ft.

Flowmeter data for well 1S/2W-25R4 demonstrate that water does not enter the well in a uniform manner (fig. 13). Rather, the data suggest that there are three distinct zones. About one-half of the total discharge from the well entered the casing through the top 150 ft of perforations—that is, between depths of 450 and 600 ft below land surface. The rest of the discharge

entered the well at a nearly uniform rate between depths of 600 and 820 ft. Virtually no water entered the well between depths of 820 and 950 ft. Because the water table was at a depth of about 300 ft below land surface, it is likely that some additional contribution of water to the well would have occurred if the well were perforated above a depth of 450 ft.

Variations in water yield can be caused by many factors such as the hydraulic characteristics of adjacent aquifer material or any encrustation of the well screen. The inferred change in aquifer characteristics at about 600 ft is not evident from the driller's or electric logs, but the change at 820 ft is supported by a change in signature of the 16-inch normal resistivity log (fig. 13). The material below 820 ft appears to have thinner layering and a higher percentage of clay. These observed



**Figure 13.** Driller's log, electric logs, vertical flow rate, well construction, and water-quality sampling for well 1S/2W-25R4 in the Yucaipa area, southern California.

changes in flow rate and possible changes in lithology were used to select specific depths at which to sample water quality.

### Depth-Dependent Samples

Depth-dependent and bulk samples for chemical and isotopic analyses were collected from production wells (table 3). Production wells generally have long screened intervals and can be open to more than one geologic or hydrogeologic unit. Bulk samples from production wells typically are a mixture of ground water from different units; nevertheless, only bulk samples were obtained for production wells sampled in this study, except for well 1S/2W-25R4, because of the expense and difficult logistics of depth-dependent sampling.

At well 1S/2W-25R4, depth-dependent chemical and flowmeter data were collected using special sample-collection techniques while the well was pumped. All depth-dependent water samples and one bulk sample were collected while the production well was discharging at a rate of 750 gal/min. To facilitate this discrete-depth sampling, the well had been modified with a temporary, lower capacity pump. A second bulk sample was collected while the well was pumped at a rate of 1,450 gal/min using the standard-capacity production pump. Depth-dependent water samples were collected using a high-pressure hose equipped with a one-way valve that allows water to enter from a specific depth (Gossell and others, 1995; Izbicki and others, 1999). The hose is lowered to the desired depth, the valve is opened, and the sample is collected. Then the hose is retrieved from the well, and the sample water is collected from the hose at land surface. Prior to sample collection, the well was pumped for over 12 hours to ensure that ground water entering the well through the screened interval was representative of the aquifer.

All samples were collected below the pump intake. The sample collected from the deepest part of the screened interval is interpreted as representing water entering below that depth. Water sampled above the lowest sample depth and below the pump intake is a mixture of water in the well at the first sample depth and water that entered the well between the two sample depths. The proportions of water in that mixture can be determined from the flowmeter data.

Results of the depth-dependent sampling show that the general water chemistry for the samples from well 1S/2W-25R4 are almost identical. Stiff diagrams of each sample collected at the different depths are similar to the Stiff diagram of the bulk sample shown in figure 8. This small vertical variability in general water chemistry can be explained in at least two ways. First, the geologic materials adjacent to the perforated intervals may be chemically similar despite their hydraulic differences (fig. 13). Second, ground water flowing in this recharge area near the mountains may not have had sufficient time to convert into chemically different, vertically stratified compositions.

Some vertical differences, however, were noted. The dissolved-oxygen concentrations were highest near the water table and lowest at the bottom of the well. The concentration of nitrate and nitrite also decreased with depth. Dissolved-solids and chloride concentrations tended to peak in the middle depths of the well. These results suggest that the most active part of the ground-water flow system is near the top of the well.

Tritium, a naturally occurring radioactive isotope of hydrogen, was used to determine the age (time since recharge) of the ground water. Tritium activity above the detection level of 0.3 pCi/L (picocuries per liter) was used as an indication of ground water recharged since 1952. Some processes that could affect tritium values are dispersion, mixing with different waters, and degassing during sampling. All depth-dependent samples from well 1S/2W-25R4 were analyzed for tritium. The highest tritium value (3.9 pCi/L) came from the shallowest sample depth, indicating that at least some of this water was recharged since 1952 (fig. 13). The other samples ranged from less than the detection limit of 0.3 pCi/L at 590 ft to 1.4 pCi/L (fig. 13 and table 3) at the bottom of the well.

The presence of an elevated value of tritium at the bottom of the well is unlikely, because it implies that younger water is present at the top and bottom of the well. A more likely explanation is that the bottom of the well is inactive and was not purged of water during pumping. This explanation is consistent with the flowmeter data showing that virtually no water enters the well below a depth of about 820 ft. If this explanation is correct, then all water-chemistry data collected for depths at 820 and 900 ft represent largely unpurged water originating from shallower perforated intervals.

Tritium values for the bulk samples were 2.1 pCi/L for a pumping rate of 750 gal/min and 3.4 pCi/L for a pumping rate of 1,450 gal/min. The higher tritium value for the higher pumping rate indicates that more water is being withdrawn from the uppermost zone.

Depth-dependent samples at the lower pumping rate (750 gal/min) also were analyzed for  $^{14}\text{C}$  (table 3). The collected water samples are relatively young given the time scale for waters dated using  $^{14}\text{C}$ . Expressed as percent modern carbon, the  $^{14}\text{C}$  value was 86.1 in the well where no tritium ( $< 0.3$  pCi/L) was detected (fig. 13). Assuming radioactive decay, with an initial  $^{14}\text{C}$  activity of 90 percent modern carbon (Izbicki and others, 1997, p. 16) and neglecting reactions with the aquifer material, this sample has an approximate time of recharge of less than 400 years before present.

A simple three-cell mixing model can be used to test the data and interpretations of the depth-dependent sampling. If  $Q_1$ ,  $Q_2$ , and  $Q_3$  are the discharge rates for the upper, middle, and lower zones, respectively; and  $C_1$ ,  $C_2$ , and  $C_3$  are concentrations of a selected constituent for the same zones, then

$$Q_T C_T = Q_1 C_1 + Q_2 C_2 + Q_3 C_3, \quad (1)$$

where  $Q_T$  and  $C_T$  are total discharge and concentration from the well. Using flowmeter and tritium data,

$$750 (2.1) = 375 (3.9) + 375 (0) + 0 (1.4), \text{ or} \quad (2A)$$

$$2.1 \sim \frac{375(3.9)}{750}, \quad (2B)$$

which suggests that the assumed contribution from each zone to total discharge is reasonable. Applying the same test to other constituents (alkalinity, sulfate, nitrate) yielded similar results. Additional depth-dependent samples from nearby wells might help verify these results and extend analysis to other parts of the Yucaipa area.

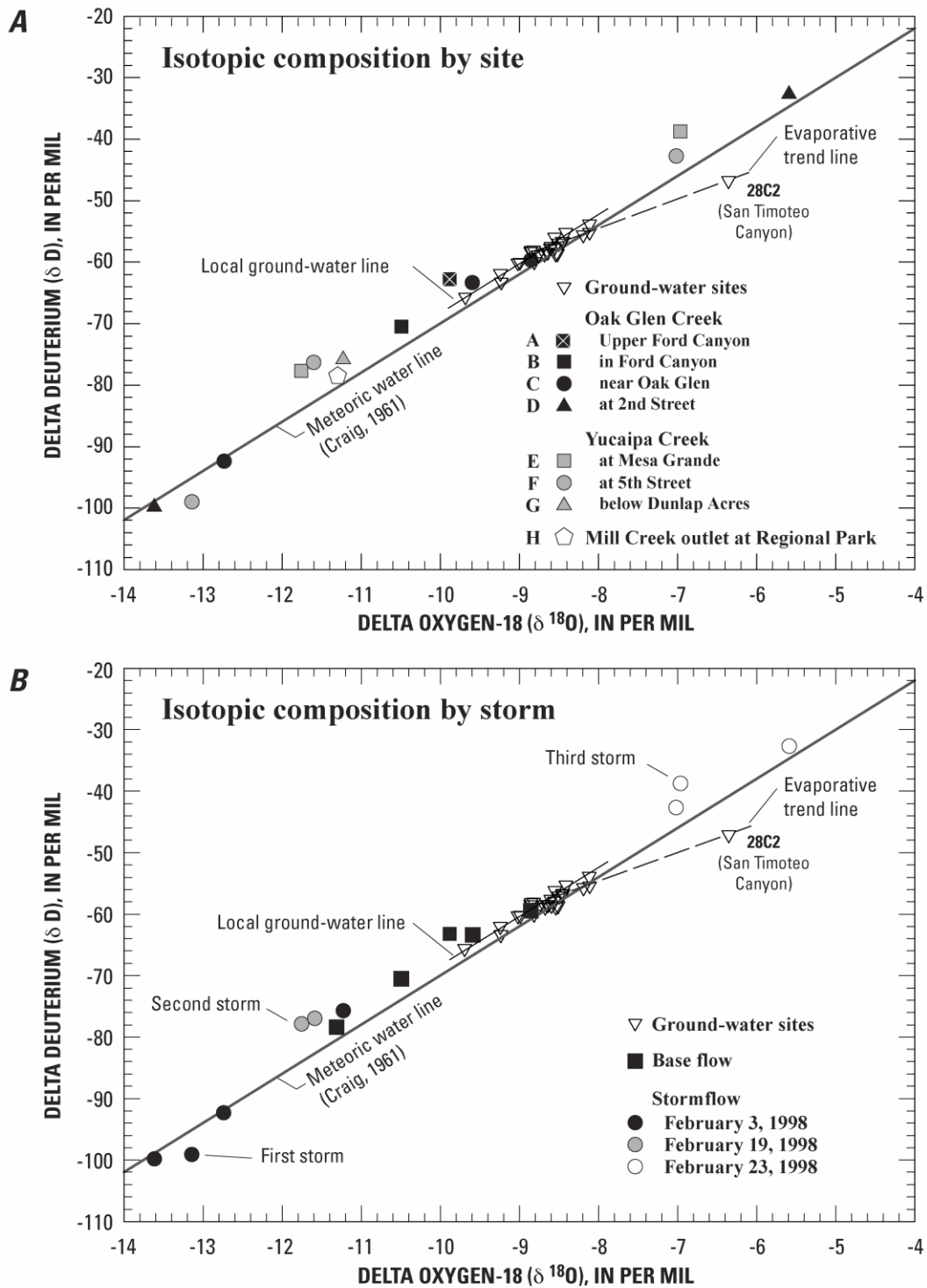
## ISOTOPIC COMPOSITION OF WATER

### Oxygen-18 and Deuterium

Surface-water isotopes at a particular site have a wide range of values (fig. 14A) which are highly influenced by the direction from which storms are generated and over time will approximate the values of ground water. Although all three storms originated in the northwest, the first and second storms entered the basin from the west and moved northeastward (fig. 10). The third storm entered the basin from the north and produced much more precipitation than did the first two storms. The third storm had warm moist air drawn into the system from the west. This effect typically occurs later in the rainy season and produces many of the larger magnitude, longer duration storms. Because the moist air from the storm is generated from a lower latitude and warmer climate than is air from the north, the precipitation is isotopically heavier (fig. 14).

Isotopic values for base flow (table 2) plot slightly above the meteoric water line (fig. 14B), and mean isotope ratios are  $-10.3$  and  $-69.0$  for  $\delta^{18}\text{O}$  and  $\delta\text{D}$ , respectively. The mean isotopic ratios for the first storm are  $-12.7$  and  $-91.8$  for  $\delta^{18}\text{O}$  and  $\delta\text{D}$ , respectively. These values are grouped below the meteoric water line near the bottom of the graph and indicate that this runoff is isotopically much lighter than is base flow. The mean isotope ratios for the second storm are  $-11.7$  and  $-77.3$  for  $\delta^{18}\text{O}$  and  $\delta\text{D}$ , respectively, and are grouped above the meteoric water line and slightly below the middle of the graph. The mean isotopic ratios for the third storm are  $-6.51$  and  $-38.2$  for  $\delta^{18}\text{O}$  and  $\delta\text{D}$ , respectively, and are grouped above the meteoric water line, near the top of the graph. Runoff from this storm is isotopically much heavier than is base flow.

Over time, the isotopic ratio of water vapor in different storms trends to an average value; therefore, the isotopic ratio of ground water is determined primarily by local differences in the temperature of condensation of water vapor, prior to its being recharged in different places and at different times. The deuterium content of precipitation varies seasonally as well as by storm and is highly dependent on storm-track trajectories (Friedman and others, 1992). The  $\delta^{18}\text{O}$  and  $\delta\text{D}$  ratios of water from most wells ranged from  $-8.11$



**Figure 14.** Isotopic concentrations of delta deuterium ( $\delta D$ ) compared to delta oxygen-18 ( $\delta^{18}O$ ) by site (A) and by storm (B) for selected wells and surface-water sites in the Yucaipa area, southern California.

to  $-9.97$  per mil and from  $-53.8$  to  $-65.5$  per mil, respectively, and the values are tightly grouped above the meteoric water line. The average  $\delta^{18}\text{O}$  and  $\delta\text{D}$  ratios of surface water samples was  $-10.2$  and  $-68.3$  per mil which approximate ground-water values. The isotopic ratio of water from wells plots along a local ground-water line about 1 per mil above, and parallel to, the meteoric water line. Similar data from Woolfenden (1994) and Izbicki and others (1997) corroborate the local ground-water line for the western slope of the San Bernardino Mountains. Snow and, in turn, snowmelt have been shown to plot above the meteoric water line (Magaritz and others, 1989). The heaviest (least negative) water sampled, with respect to  $\delta^{18}\text{O}$ , is from well 2S/2W-28C2. Because the well is near fishing ponds, water moving to the well may have been partly evaporated prior to being recharged. An evaporative trend line can be drawn from well 2S/2W-28C2 to a point that intersects the local ground-water line near the mean value (fig. 14).

### Tritium

Tritium activity in water from wells (table 3 and fig. 15) in the Yucaipa area ranged from less than the detection limit of 0.3 to 15 pCi/L, and tritium activity in water from surface-water sites (table 2) ranged from 7.3 to 18 pCi/L. Tritium activity in 27 of 31 well samples ranged from 0.7 to 15 pCi/L, indicating that all or part of the pumped water was recharged after 1952. Many of these wells are located on the Yucaipa plain and likely extract ground water from a water-bearing zone that is hydraulically connected to areas of recent recharge (fig. 15). Tritium activity in water from wells near the hills and mountains—in particular north of the Oak Glen Fault, or east of the Casa Blanca Fault and north of the South Mesa Barrier—ranged from 7.2 to 11 pCi/L. These values are similar to surface-water samples, and probably indicate that most pumped water was recharged recently.

Tritium activity in water from well 2S/2W-28C2 was 7.8 pCi/L. The proximity of the well to the fishing ponds, as well as the general chemistry data and the anomalous  $\delta^{18}\text{O}$  and  $\delta\text{D}$  data, suggests that the ponds may be a source of recharge to the well. The tritium activity in water from well 2S/2W-3E1 was 15 pCi/L,

the highest value found in ground-water samples. Well 2S/2W-3E1 is located along Oak Glen Creek, which may be a source of recharge to the well.

In water from wells 2S/2W-4G3, 2S/2W-4G4, and 2S/2W-4J2, tritium activity was less than the detection limit of 0.3 pCi/L. These wells are located at the west end of Yucaipa in the Western Heights subbasin and have the oldest water sampled. The depth of two of the three wells is greater than 1,000 ft (1,690 and 1,090 ft), and the wells may be extracting a greater proportion of deeper, older ground water than other, shallower wells. The Western Heights subbasin, in particular Dunlap Acres, also historically had a pumping depression, which is caused by ground-water extractions exceeding recharge. The pumping depression, the absence of tritium, and the greater distance of this area from the greater precipitation found in the San Bernardino Mountains suggests that Dunlap Acres receives less recharge than other parts of the Yucaipa area.

### LIMITATIONS AND FUTURE NEEDS

The primary limitation of this study is the small number of vertically discrete ground-water samples that were obtained. No multiple-depth monitoring wells were available in the Yucaipa area at the time of this study. Since sampling was done for this study, some multiple-depth monitoring wells have been installed. If these wells were sampled for the same chemical constituents, the data likely would aid in understanding the vertical and horizontal characteristics of ground-water flow in the Yucaipa area. Depth-dependent sampling of production wells is logistically challenging, but can yield excellent flow and water-quality data to compare with water-level and water-quality data from multiple-depth monitoring wells.

The second major limitation of this study is the lack of detailed, ground-water-level maps—ideally for different time periods and for each significant hydrogeologic unit in the Yucaipa area. Because areal and vertical ground-water-level data are sparse, and the arrangement of subbasins is complex, this mapping may need to be done iteratively with development of a ground-water flow model.

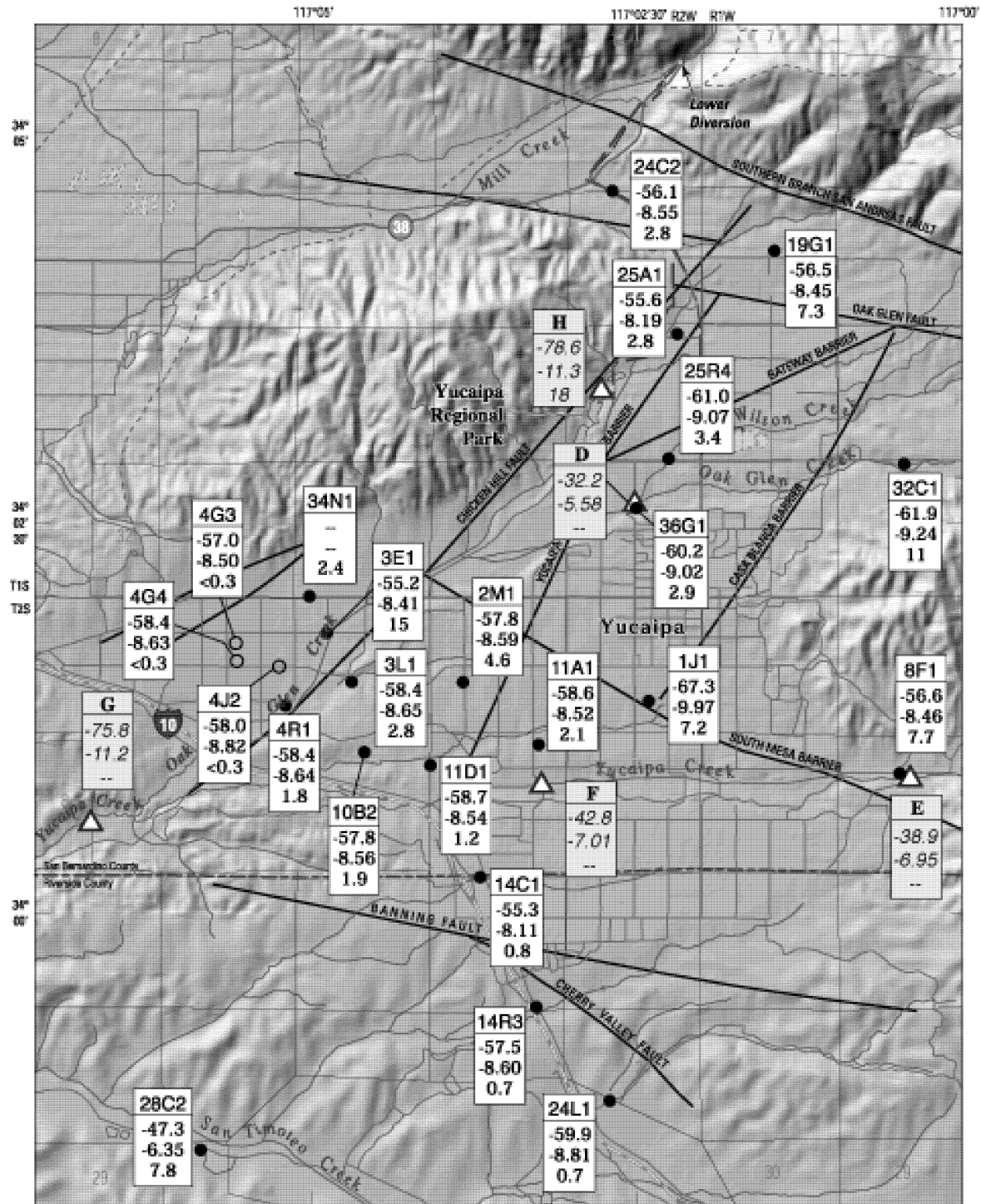


Figure 15. Delta deuterium ( $\delta D$ ), delta oxygen-18 ( $\delta^{18}O$ ), and tritium activity in selected wells and surface-water sites in the Yucaipa area, southern California.

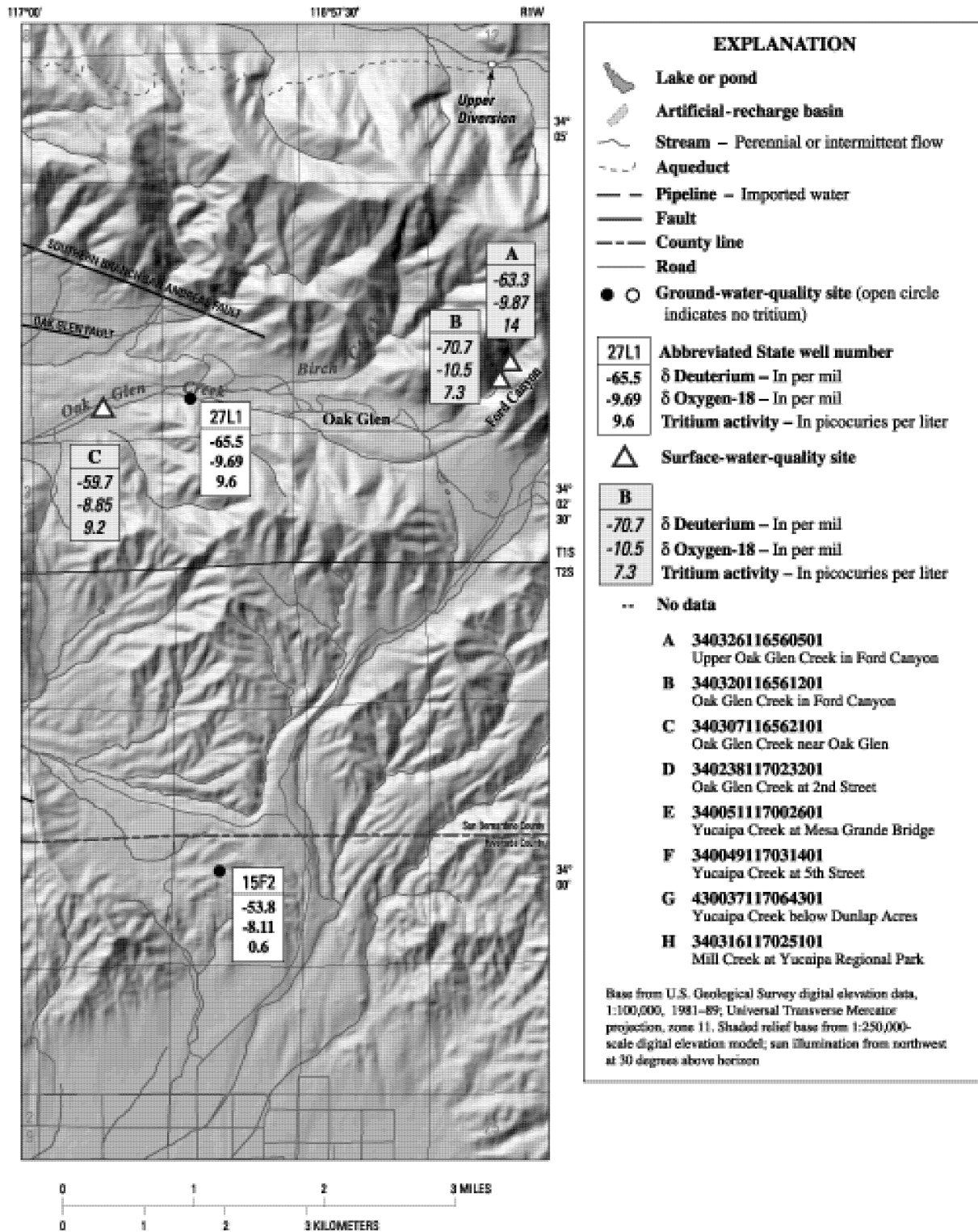


Figure 15—Continued.

## SUMMARY AND CONCLUSIONS

Most water sampled in the Yucaipa area is a calcium-bicarbonate type. The general chemical composition of surface water resembles that of ground water, although the concentrations of most constituents are higher in ground water. The ionic strength of most ground-water samples was similar. Elevated concentrations of nitrate were found in some ground-water samples from wells and may indicate recharge of water from agricultural areas. Water samples from nearby wells suggest that the elevated nitrate concentrations are diluted by ground water that originates as recharge from Oak Glen Creek.

Ground water was found to have a range of tritium activity, indicating different times since recharge and possible mixing along ground-water flow paths. The oldest water had tritium values less than 0.3 pCi/L, indicating more than 50 years since recharge. Tritium values greater than 0.3 pCi/L indicate that at least part of the pumped water was recharged since 1952. Ground water near the hills and mountains—in particular, ground water that is north of the Oak Glen Fault, or east of the Casa Blanca Barrier and north of the South Mesa Barrier—had tritium values similar to those of surface-water samples and indicates that it is likely to be the most recently recharged ground water.

Flowmeter data from well 1S/2W-25R4 showed that more than one-half of the water flowed into the well between depths of 450 and 600 ft below land surface. At a flow rate of 750 gal/min, virtually no water was contributed to the well below a depth of about 820 ft. Water recharged since 1952 was found in the uppermost part of the well. Water flowing into the well from depths below 590 ft probably was recharged more than 50 years and less than about 400 years before present. Tritium and flowmeter data from well 1S/2W-25R4 suggest that the well could extract additional water if perforations were present between the water table at a depth of about 300 ft below land surface and the top of existing perforations at a depth of 450 ft.

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**Table 2.** Chemical and isotopic analyses of water from selected surface-water sites in the Yucaipa area, southern California

[USGS, U.S. Geological Survey; ft<sup>3</sup>/s, cubic foot per second; μS/cm, microsiemen per centimeter at 25 °C; mg/L, milligram per liter; °C, degree Celsius; B, base flow; μg/L, micrograms per liter; pCi/L, picocurie per liter; per mil, parts per thousand; <, less than; —, no data]

| USGS station name                   | USGS station number | Date    | Time | Discharge (ft <sup>3</sup> /s) | Specific conductance (μS/cm) | pH, field (standard units) |
|-------------------------------------|---------------------|---------|------|--------------------------------|------------------------------|----------------------------|
| Upper Oak Glen Creek in Ford Canyon | 340326116560501     | 4/30/98 | 1715 | 0.31B                          | 216                          | 7.8                        |
| Oak Glen Creek in Ford Canyon       | 340326116560601     | 7/31/97 | 0940 | .60B                           | 351                          | 8.4                        |
| Oak Glen Creek near Oak Glen        | 340307116592101     | 2/3/98  | 1645 | 2.2                            | 260                          | 8.3                        |
|                                     |                     | 1/13/98 | 0750 | .79B                           | 395                          | 8.5                        |
|                                     |                     | 1/3/97  | 1040 | 1.4                            | 361                          | 8.5                        |
| Oak Glen Creek at 2nd St.           | 340238117023201     | 2/23/98 | 1545 | 6.9                            | 190                          | 8.5                        |
|                                     |                     | 2/23/98 | 1330 | 2.3                            | 384                          | 8.6                        |
|                                     |                     | 2/3/98  | 1615 | 4.3                            | 117                          | 7.9                        |
| Yucaipa Creek at Mesa Grande Bridge | 340051117002601     | 2/23/98 | 2115 | 100                            | 74                           | 7.5                        |
|                                     |                     | 2/19/98 | 2245 | 15                             | 63                           | 7.6                        |
| Yucaipa Creek at 5th St.            | 340049117031401     | 2/23/98 | 2200 | 110                            | 75                           | 7.8                        |
|                                     |                     | 2/20/98 | 0010 | 26                             | 55                           | 7.9                        |
|                                     |                     | 2/3/98  | 1530 | 2.4                            | 78                           | 7.7                        |
| Yucaipa Creek below Dunlap Acres    | 340037117064301     | 2/3/98  | 1430 | 190                            | 172                          | 8.3                        |
| Mill Creek at Yucaipa Regional Park | 340316117025101     | 7/10/96 | 1330 | 1.0B                           | 240                          | 8.1                        |

|                                     | Oxygen, dissolved (mg/L) | Temp-erature, air (°C) | Temp-erature, water (°C) | Calcium, dissolved (mg/L) | Magnesium, dissolved (mg/L) | Sodium, dissolved (mg/L) |
|-------------------------------------|--------------------------|------------------------|--------------------------|---------------------------|-----------------------------|--------------------------|
| Upper Oak Glen Creek in Ford Canyon | —                        | 15.5                   | 7.5                      | 24                        | 9.4                         | 4.4                      |
| Oak Glen Creek in Ford Canyon       | 8.5                      | 17.0                   | 12.5                     | 40                        | 15                          | 7.6                      |
| Oak Glen Creek near Oak Glen        | —                        | 5.5                    | 6.5                      | 30                        | 9.6                         | 8.1                      |
|                                     | 10.8                     | 6.0                    | 7.5                      | 45                        | 16                          | 15                       |
| Oak Glen Creek at 2nd St.           | —                        | 13.0                   | 12.0                     | 43                        | 14                          | 12                       |
|                                     | —                        | 11.0                   | 11.0                     | 23                        | 7.6                         | 6.7                      |
|                                     | 9.4                      | 13.0                   | 12.5                     | —                         | —                           | —                        |
| Yucaipa Creek at Mesa Grande Bridge | —                        | 6.0                    | 7.0                      | 13                        | 3.8                         | 3.8                      |
|                                     | —                        | 10.0                   | 9.0                      | 8.3                       | 2.1                         | 2.4                      |
| Yucaipa Creek at 5th St.            | —                        | 9.0                    | 7.0                      | 6.9                       | 1.8                         | 2.2                      |
|                                     | —                        | 11.0                   | 7.0                      | 8.9                       | 2.3                         | 3.1                      |
| Yucaipa Creek below Dunlap Acres    | —                        | 7.0                    | 6.5                      | 5.8                       | 1.5                         | 2.2                      |
|                                     | —                        | 10.0                   | 8.5                      | 9.1                       | 2.2                         | 2.8                      |
|                                     | 10.6                     | 12.0                   | 11.0                     | 20                        | 4.3                         | 5.2                      |
| Mill Creek at Yucaipa Regional Park | 8.2                      | 32.5                   | 15.5                     | 28                        | 5.7                         | 4.7                      |

**Table 2.** Chemical and isotopic analyses of water from selected surface-water sites in the Yucaipa area, southern California—Continued

| USGS station name                   | Potassium dissolved (mg/L) | Alkalinity, field (mg/L as CaCO <sub>3</sub> ) | Sulfate, dissolved (mg/L) | Chloride, dissolved (mg/L) | Fluoride, dissolved (mg/L) | Bromide, dissolved (mg/L) |
|-------------------------------------|----------------------------|--|---------------------------|----------------------------|----------------------------|---------------------------|
| Upper Oak Glen Creek in Ford Canyon | 2                          | 98   | 6.7                       | 1.6                        | 0.7                        | <0.01                     |
| Oak Glen Creek in Ford Canyon       | 3                          | 160  | 17                        | 2.2                        | .8                         | <.01                      |
| Oak Glen Creek near Oak Glen        | 2                          | 99   | 22                        | 4.3                        | .8                         | <.01                      |
|                                     | 2                          | 150  | 32                        | 7.7                        | .5                         | .02                       |
|                                     | 2                          | 130  | 37                        | 6.2                        | .5                         | —                         |
| Oak Glen Creek at 2nd St.           | 2                          | —  | 17                        | 3.3                        | .3                         | <.01                      |
|                                     | —                          | —  | —                         | —                          | —                          | —                         |
|                                     | 2                          | 45   | 7.8                       | 2.5                        | .2                         | <.01                      |
| Yucaipa Creek at Mesa Grande Bridge | .9                         | 27   | 2.2                       | 1.7                        | .1                         | <.01                      |
|                                     | .9                         | 24   | 1.9                       | 1.6                        | .1                         | <.01                      |
| Yucaipa Creek at 5th St.            | .9                         | 34   | 2.5                       | 1.7                        | .1                         | <.01                      |
|                                     | .7                         | 22   | 1.4                       | 1.3                        | .1                         | <.01                      |
|                                     | 1                          | 28   | 3.2                       | 1.4                        | .2                         | <.01                      |
| Yucaipa Creek below Dunlap Acres    | 1                          | 43   | 22                        | 2.5                        | .3                         | <.01                      |
| Mill Creek at Yucaipa Regional Park | 2                          | 84   | 13                        | 1.2                        | .8                         | <.01                      |

|                                     | Iodide, dissolved (mg/L) | Silica, dissolved (mg/L) | Residue at 180°C (mg/L) | Nitrite, dissolved (mg/L as N) | NO <sub>2</sub> + NO <sub>3</sub> , dissolved (mg/L as N) | Ammonia, dissolved (mg/L as N) |
|-------------------------------------|--------------------------|--------------------------|-------------------------|--------------------------------|---|--------------------------------|
| Upper Oak Glen Creek in Ford Canyon | <0.001                   | 7.0                      | 120                     | 0.01                           | 0.19  | 0.05                           |
| Oak Glen Creek in Ford Canyon       | <.001                    | 10                       | 200                     | <.01                           | .21   | <.01                           |
| Oak Glen Creek near Oak Glen        | .001                     | 11                       | 162                     | <.01                           | .92   | <.02                           |
|                                     | .001                     | 21                       | 249                     | <.01                           | 2.3   | .03                            |
|                                     | .001                     | 17                       | 227                     | .03                            | 1.5   | .08                            |
| Oak Glen Creek at 2nd St.           | .002                     | 8.5                      | 124                     | <.01                           | 1.5   | .07                            |
|                                     | —                        | —                        | —                       | —                              | —   | —                              |
|                                     | .001                     | 4.3                      | 74                      | <.01                           | .41   | .04                            |
| Yucaipa Creek at Mesa Grande Bridge | .001                     | 4.4                      | 51                      | <.01                           | .67   | .06                            |
|                                     | .001                     | 3.3                      | 41                      | <.01                           | .53   | <.02                           |
| Yucaipa Creek at 5th St.            | .001                     | 5.2                      | 55                      | <.01                           | .97   | <.02                           |
|                                     | .001                     | 3.2                      | 40                      | <.01                           | .57   | .04                            |
|                                     | .002                     | 3.2                      | 57                      | .01                            | 1.6   | .09                            |
| Yucaipa Creek below Dunlap Acres    | .002                     | 3.3                      | 108                     | .03                            | 1.8   | .09                            |
| Mill Creek at Yucaipa Regional Park | <.001                    | 12                       | 137                     | <.01                           | .18   | .02                            |



**Table 3. Chemical and isotopic analyses of water from selected wells in the Yucaipa area, southern California**

[State well number, see "Well-Numbering System" in text; USGS, U.S. Geological Survey; gal/min, gallons per minute; ft blw LSD, feet below land-surface datum;  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 °C; mg/L, milligram per liter;  $\mu\text{g}/\text{L}$ , microgram per liter; pCi/L, picocurie per liter; per mil, parts per thousand; °C, degree Celsius; B, bulk sample; <, less than; —, no data]

| State well number        | USGS station number | Date    | Time | Flow rate (gal/min) | Depth to sample (ft blw LSD) | Specific conductance ( $\mu\text{S}/\text{cm}$ ) | pH, field (standard units) | Oxygen, dissolved (mg/L) | Temperature, air °C | Temperature, water °C |
|--------------------------|---------------------|---------|------|---------------------|------------------------------|--|----------------------------|--------------------------|---------------------|-----------------------|
| IS/1W-19G01              | 340415117012701     | 7/29/97 | 1330 | 180                 | —                            | 745  | 7.3                        | 6.9                      | 25.0                | 18.5                  |
| IS/1W-27L01              | 340312116583901     | 7/29/97 | 0930 | 240                 | —                            | 568  | 7.1                        | 4.1                      | 19.5                | 14.0                  |
| IS/1W-32C01              | 340253117002701     | 7/29/97 | 1145 | 90                  | —                            | 476  | 7.2                        | 6.0                      | 23.0                | 16.5                  |
| IS/2W-24C02              | 340438117024201     | 7/31/97 | 1230 | —                   | —                            | 650  | 7.4                        | 6.5                      | 32.5                | 20.0                  |
| IS/2W-25A01              | 340343117021201     | 7/17/97 | 1330 | 260                 | —                            | 584  | 7.6                        | 8.0                      | —                   | 21.5                  |
| IS/2W-25R04(B)           | 340255117021601     | 2/25/98 | 1600 | 750                 | —                            | 477  | 7.6                        | —                        | 11.0                | 19.0                  |
| -25R04                   | 340255117021601     | 2/25/98 | 1730 | 750                 | 480                          | 458  | 7.4                        | 8.2                      | 10.5                | 11.0                  |
| -25R04                   | 340255117021601     | 2/25/98 | 1930 | 750                 | 590                          | 491  | 7.4                        | 7.5                      | 6.0                 | 13.5                  |
| -25R04                   | 340255117021601     | 2/25/98 | 2100 | 750                 | 770                          | 510  | 7.5                        | 7.4                      | 3.5                 | 12.0                  |
| -25R04                   | 340255117021601     | 2/25/98 | 2330 | 750                 | 820                          | 513  | 7.5                        | 6.0                      | 2.5                 | 12.0                  |
| -25R04                   | 340255117021601     | 2/26/98 | 0030 | 750                 | 900                          | 486  | 7.4                        | 6.0                      | 2.5                 | 12.5                  |
| -25R04(B)                | 340255117021601     | 5/1/98  | 1000 | 1450                | —                            | 463  | 7.6                        | 8.2                      | 13.5                | 19.5                  |
| IS/2W-34N01              | 340202117050201     | 7/10/96 | 1430 | 600                 | —                            | 831  | 7.6                        | 5.6                      | 32.0                | 20.5                  |
| IS/2W-36G01              | 340236117023101     | 7/18/97 | 0950 | 1,700               | —                            | 466  | 7.6                        | 6.9                      | —                   | 20.0                  |
| 2S/1W-08F01              | 340054117002901     | 7/16/97 | 1210 | 250                 | —                            | 601  | 7.2                        | 5.8                      | —                   | 18.0                  |
| 2S/1W-15F02              | 340003116582501     | 7/16/97 | 1430 | 140                 | —                            | 445  | 7.8                        | .4                       | —                   | 20.0                  |
| 2S/2W-01J01 <sup>1</sup> | 340124117021301     | 6/2/98  | 1945 | 2.5                 | —                            | 1,100  | 7.8                        | .0                       | 24.5                | 22.5                  |
| 2S/2W-02M01              | 340129117035101     | 7/15/97 | 1200 | 550                 | —                            | 569  | 7.7                        | 8.5                      | —                   | 20.5                  |
| -02M01                   | 340129117035101     | 7/10/98 | 1210 | 550                 | —                            | 553  | 7.7                        | —                        | 29.5                | 20.0                  |
| 2S/2W-03E01              | 340148117045401     | 7/9/96  | 1330 | 1,200               | —                            | 734  | 7.5                        | 6.0                      | 30.0                | 20.0                  |
| 2S/2W-03L01              | 340129117044201     | 7/11/96 | 1120 | 450                 | —                            | 498  | 7.7                        | 9.2                      | 30.0                | 19.5                  |
| 2S/2W-04G03              | 340144117053601     | 7/10/96 | 1020 | 1,000               | —                            | 477  | 7.6                        | 4.8                      | 29.0                | 19.0                  |
| 2S/2W-04G04              | 340137117053501     | 4/30/98 | 1430 | 1,550               | —                            | 417  | 7.6                        | 3.4                      | 29.0                | 21.5                  |
| 2S/2W-04J02              | 340135117051601     | 7/10/96 | 0900 | 2,000               | —                            | 455  | 7.7                        | 5.2                      | 30.0                | 19.0                  |
| 2S/2W-04R01              | 340120117051301     | 7/9/96  | 1430 | 300                 | —                            | 717  | 7.4                        | 1.6                      | 34.5                | 19.5                  |
| 2S/2W-10B02              | 340106117045001     | 7/11/96 | 0930 | 750                 | —                            | 510  | 7.8                        | 7.0                      | 28.5                | 21.0                  |
| 2S/2W-11A01              | 340105117031601     | 7/15/97 | 1450 | 725                 | —                            | 496  | 7.8                        | 6.6                      | —                   | 21.5                  |
| 2S/2W-11D01              | 340057117040601     | 7/15/97 | 1000 | 700                 | —                            | 462  | 7.8                        | 8.8                      | —                   | 21.0                  |
| 2S/2W-14C01              | 340014117034301     | 7/17/97 | 1000 | 250                 | —                            | 522  | 7.6                        | 8.8                      | —                   | 21.5                  |
| 2S/2W-14R03              | 335924117031701     | 7/17/97 | 0915 | 775                 | —                            | 297  | 9.3                        | 1.9                      | —                   | 24.5                  |
| 2S/2W-24L01              | 335848117024301     | 7/16/97 | 0925 | 2,100               | —                            | 346  | 7.9                        | 5.4                      | —                   | 23.0                  |
| 2S/2W-28C02 <sup>1</sup> | 335829117055201     | 7/28/97 | 1620 | —                   | —                            | 942  | 7.6                        | .0                       | 29.5                | 24.0                  |

See footnote at end of table.

**Table 3** 39

**Table 3.** Chemical and isotopic analyses of water from selected wells in the Yucaipa area, southern California—Continued

| State well number        | Calcium, dissolved (mg/L) | Magnesium, dissolved (mg/L) | Sodium, dissolved (mg/L) | Potassium, dissolved (mg/L) | Alkalinity, field (mg/L as CaCO <sub>3</sub> ) | Sulfate, dissolved (mg/L) | Chloride, dissolved (mg/L) | Fluoride, dissolved (mg/L) | Bromide, dissolved (mg/L) | Iodide, dissolved (mg/L) |
|--------------------------|---------------------------|-----------------------------|--------------------------|-----------------------------|--|---------------------------|----------------------------|----------------------------|---------------------------|--------------------------|
| 1S/1W-19G01              | 78                        | 18                          | 42                       | 1                           | 190  | 86                        | 34                         | 0.8                        | 0.10                      | 0.001                    |
| 1S/1W-27L01              | 67                        | 22                          | 14                       | 2                           | 220  | 69                        | 9.7                        | .7                         | .04                       | .001                     |
| 1S/1W-32C01              | 53                        | 16                          | 16                       | 2                           | 170  | 39                        | 11                         | .5                         | .05                       | .001                     |
| 1S/2W-24C02              | 69                        | 15                          | 42                       | 1                           | 220  | 57                        | 18                         | .8                         | .07                       | .001                     |
| 1S/2W-25A01              | 57                        | 11                          | 45                       | 1                           | 200  | 31                        | 30                         | .8                         | .17                       | .001                     |
| 1S/2W-25R04(B)           | 59                        | 12                          | 25                       | 2                           | 190  | 28                        | 6.9                        | .6                         | .04                       | <.001                    |
| -25R04                   | 55                        | 12                          | 23                       | 2                           | 200  | 27                        | 6.4                        | .6                         | .04                       | <.001                    |
| -25R04                   | 61                        | 13                          | 25                       | 2                           | 180  | 29                        | 7.3                        | .6                         | .04                       | <.001                    |
| -25R04                   | 63                        | 13                          | 28                       | 2                           | 190  | 29                        | 7.9                        | .6                         | .04                       | <.001                    |
| -25R04                   | 63                        | 13                          | 23                       | 2                           | 140  | 29                        | 8.0                        | .6                         | .04                       | <.001                    |
| -25R04                   | 61                        | 14                          | 21                       | 2                           | 170  | 27                        | 7.0                        | .6                         | .04                       | .001                     |
| -25R04(B)                | 61                        | 12                          | 24                       | 2                           | —  | 24                        | 6.3                        | .6                         | .04                       | .001                     |
| 1S/2W-34N01              | 95                        | 23                          | 40                       | 2                           | 210  | 60                        | 32                         | .5                         | .13                       | .002                     |
| 1S/2W-36G01              | 53                        | 12                          | 24                       | 2                           | 190  | 32                        | 7.3                        | .5                         | .05                       | .001                     |
| 2S/1W-08F01              | 62                        | 19                          | 33                       | .6                          | 230  | 29                        | 28                         | .6                         | .13                       | .002                     |
| 2S/1W-15F02              | 34                        | 20                          | 25                       | 5                           | 190  | 16                        | 18                         | .4                         | .09                       | .015                     |
| 2S/2W-01J01 <sup>1</sup> | 34                        | 1.0                         | 200                      | 1                           | 170  | 260                       | 36                         | 6.0                        | .12                       | .019                     |
| 2S/2W-02M01              | 68                        | 12                          | 28                       | 2                           | 200  | 31                        | 19                         | .7                         | .09                       | .001                     |
| -02M01                   | 70                        | 13                          | 25                       | 3                           | 190  | 29                        | 17                         | .5                         | .07                       | .001                     |
| 2S/2W-03E01              | 98                        | 22                          | 21                       | 2                           | 220  | 68                        | 17                         | .5                         | .14                       | .001                     |
| 2S/2W-03L01              | 63                        | 13                          | 21                       | 2                           | 160  | 30                        | 17                         | .5                         | .07                       | .001                     |
| 2S/2W-04G03              | 58                        | 12                          | 22                       | 2                           | 180  | 31                        | 12                         | .6                         | .06                       | .001                     |
| 2S/2W-04G04              | 50                        | 8.5                         | 27                       | 2                           | 160  | 27                        | 7.9                        | .6                         | .04                       | .002                     |
| 2S/2W-04J02              | 61                        | 12                          | 17                       | 2                           | 170  | 29                        | 7.8                        | .5                         | .04                       | .001                     |
| 2S/2W-04R01              | 94                        | 22                          | 23                       | 2                           | 240  | 74                        | 15                         | .5                         | .09                       | .001                     |
| 2S/2W-10B02              | 55                        | 8.7                         | 41                       | 3                           | 160  | —                         | —                          | —                          | —                         | —                        |
| 2S/2W-11A01              | 46                        | 8.0                         | 44                       | 2                           | 160  | 39                        | 18                         | .9                         | .08                       | .002                     |
| 2S/2W-11D01              | 46                        | 6.8                         | 39                       | 2                           | 160  | 36                        | 16                         | .6                         | .08                       | .001                     |
| 2S/2W-14C01              | 51                        | 14                          | 33                       | 1                           | 200  | 13                        | 26                         | .9                         | .13                       | .001                     |
| 2S/2W-14R03              | 5.8                       | .9                          | 58                       | .6                          | 100  | 15                        | 14                         | .5                         | .07                       | .003                     |
| 2S/2W-24L01              | 28                        | 3.5                         | 39                       | 2                           | 140  | 14                        | 11                         | .5                         | .07                       | .001                     |
| 2S/2W-28C02 <sup>1</sup> | 59                        | 17                          | 120                      | 1                           | 380  | 32                        | 65                         | 1.0                        | .38                       | .063                     |

See footnote at end of table.

**Table 3.** Chemical and isotopic analyses of water from selected wells in the Yucaipa area, southern California—Continued

| State well number        | Silica, dissolved (mg/L) | Residue at 180°C (mg/L) | Nitrite, dissolved (mg/L as N) | NO <sub>2</sub> + NO <sub>3</sub> , dissolved (mg/L as N) | Ammonia, dissolved (mg/L as N) | Ammonia + organic, (mg/L as N) | Phosphorus, dissolved (mg/L as P) | Phosphorus ortho, dissolved (mg/L as P) | Arsenic, dissolved (µg/L) | Barium, dissolved (µg/L) | Boron, dissolved (µg/L) |
|--------------------------|--------------------------|-------------------------|--------------------------------|---|--------------------------------|--------------------------------|-----------------------------------|---|---------------------------|--------------------------|-------------------------|
| 1S/1W-19G01              | 23                       | 485                     | 0.09                           | 13  | 0.14                           | 0.2                            | <0.01                             | 0.02                                    | <1                        | 45                       | 70                      |
| 1S/1W-27L01              | 20                       | 358                     | <0.1                           | 2.0   | .03                            | <2                             | <0.1                              | <0.1                                    | <1                        | 12                       | 20                      |
| 1S/1W-32C01              | 21                       | 298                     | .02                            | 5.3   | .02                            | <2                             | <0.1                              | .01                                     | <1                        | 16                       | 20                      |
| 1S/2W-24C02              | 25                       | 412                     | <0.1                           | 5.6   | <0.2                           | <2                             | <0.1                              | .02                                     | <1                        | 27                       | 70                      |
| 1S/2W-25A01              | 25                       | 359                     | <0.1                           | 4.7   | <0.2                           | <2                             | .01                               | .02                                     | <1                        | 19                       | 60                      |
| 1S/2W-25R04(B)           | 28                       | 295                     | <0.1                           | 2.0   | .03                            | <1                             | <0.1                              | .02                                     | 3                         | 17                       | 30                      |
| -25R04                   | 28                       | 283                     | <0.1                           | 1.9   | .03                            | <1                             | <0.1                              | .02                                     | 3                         | 16                       | 40                      |
| -25R04                   | 28                       | 305                     | <0.1                           | 2.2   | .03                            | <1                             | <0.1                              | .02                                     | 3                         | 17                       | 40                      |
| -25R04                   | 28                       | 317                     | <0.1                           | 1.9   | .02                            | <1                             | <0.1                              | .02                                     | 2                         | 18                       | 40                      |
| -25R04                   | 28                       | 315                     | <0.1                           | 1.4   | .03                            | <1                             | <0.1                              | .02                                     | 3                         | 18                       | 50                      |
| -25R04                   | 28                       | 303                     | <0.1                           | 1.0   | .03                            | <1                             | <0.1                              | .02                                     | 3                         | 19                       | 40                      |
| -25R04(B)                | 26                       | 290                     | .01                            | 2.0   | .06                            | <1                             | <0.1                              | <0.1                                    | 3                         | 16                       | 30                      |
| 1S/2W-34N01              | 25                       | 512                     | <0.1                           | 24  | .02                            | <2                             | .01                               | .03                                     | <1                        | 58                       | 30                      |
| 1S/2W-36G01              | 26                       | 293                     | <0.1                           | 2.1   | <0.2                           | <2                             | <0.1                              | .01                                     | <1                        | 15                       | 20                      |
| 2S/1W-08F01              | 24                       | 369                     | <0.1                           | 4.2   | <0.2                           | <2                             | .03                               | .03                                     | <1                        | 28                       | 20                      |
| 2S/1W-15F02              | 17                       | 258                     | <0.1                           | .06   | <0.2                           | <2                             | <0.1                              | <0.1                                    | <1                        | 24                       | 20                      |
| 2S/2W-01J01 <sup>1</sup> | 16                       | 712                     | .05                            | 5.3   | .08                            | <1                             | <0.1                              | .02                                     | <1                        | 8                        | 330                     |
| 2S/2W-02M01              | 23                       | 363                     | <0.1                           | 7.9   | <0.2                           | <2                             | <0.1                              | .01                                     | <1                        | 21                       | 20                      |
| -02M01                   | 25                       | 354                     | <0.1                           | 7.8   | .03                            | <1                             | <0.1                              | .02                                     | <1                        | 21                       | 20                      |
| 2S/2W-03E01              | 24                       | 487                     | <0.1                           | 16  | .03                            | <2                             | <0.1                              | .02                                     | <1                        | 27                       | 20                      |
| 2S/2W-03L01              | 26                       | 314                     | <0.1                           | 6.7   | .03                            | .2                             | <0.1                              | .02                                     | <1                        | 15                       | 20                      |
| 2S/2W-04G03              | 24                       | 287                     | <0.1                           | 1.6   | .03                            | <2                             | .03                               | .02                                     | <1                        | 23                       | 20                      |
| 2S/2W-04G04              | 23                       | 260                     | .01                            | 1.3   | .05                            | <1                             | <0.1                              | .02                                     | <1                        | 17                       | 30                      |
| 2S/2W-04J02              | 25                       | 281                     | <0.1                           | 2.6   | .03                            | <2                             | <0.1                              | .02                                     | <1                        | 18                       | 20                      |
| 2S/2W-04R01              | 25                       | 472                     | .01                            | 9.6   | .03                            | <2                             | .02                               | .03                                     | <1                        | 29                       | 20                      |
| 2S/2W-10B02              | —                        | —                       | <0.1                           | 4.9   | .02                            | <2                             | <0.1                              | .01                                     | <1                        | 26                       | —                       |
| 2S/2W-11A01              | 24                       | 318                     | <0.1                           | 5.8   | <0.2                           | <2                             | .02                               | .02                                     | <1                        | 24                       | 30                      |
| 2S/2W-11D01              | 22                       | 294                     | <0.1                           | 3.9   | <0.2                           | <2                             | .03                               | .02                                     | <1                        | 19                       | 20                      |
| 2S/2W-14C01              | 26                       | 318                     | <0.1                           | 4.2   | <0.2                           | <2                             | .03                               | .03                                     | <1                        | 32                       | 20                      |
| 2S/2W-14R03              | 15                       | 186                     | <0.1                           | 1.9   | <0.2                           | <2                             | <0.1                              | .02                                     | 5                         | 5                        | 20                      |
| 2S/2W-24L01              | 17                       | 213                     | <0.1                           | 2.0   | <0.2                           | <2                             | <0.1                              | .01                                     | <1                        | 22                       | 20                      |
| 2S/2W-28C02 <sup>1</sup> | 22                       | 563                     | .02                            | <0.05   | .44                            | .3                             | .01                               | .13                                     | <1                        | 130                      | 50                      |

See footnote at end of table.

**Table 3** 41

**Table 3.** Chemical and isotopic analyses of water from selected wells in the Yucaipa area, southern California—Continued

| State well number        | Iron, dissolved (µg/L) | Lithium, dissolved (µg/L) | Manganese, dissolved (µg/L) | Strontium, dissolved (µg/L) | H-2/H-1 isotope ratio (per mil) | O-18/O-16 isotope ratio (per mil) | Tritium, total (pCi/L) | C-13/C-12 isotope ratio (per mil) | C-14 dissolved, (percent modern carbon) |
|--------------------------|------------------------|---------------------------|-----------------------------|-----------------------------|---------------------------------|-----------------------------------|------------------------|-----------------------------------|---|
| 1S/1W-19G01              | 140                    | 5                         | 67                          | 490                         | -56.5                           | -8.45                             | 7.3                    | —                                 | —                                       |
| 1S/1W-27L01              | <3                     | 4                         | <1                          | 270                         | -65.5                           | -9.69                             | 9.6                    | —                                 | —                                       |
| 1S/1W-32C01              | 31                     | <4                        | 6                           | 250                         | -61.9                           | -9.24                             | 11                     | —                                 | —                                       |
| 1S/2W-24C02              | <3                     | 4                         | <1                          | 350                         | -56.1                           | -8.55                             | 2.8                    | —                                 | —                                       |
| 1S/2W-25A01              | 9                      | <4                        | <1                          | 340                         | -55.6                           | -8.19                             | 2.8                    | —                                 | —                                       |
| 1S/2W-25R04(B)           | <10                    | <4                        | <4                          | 250                         | -60.1                           | -8.99                             | 2.1                    | -12.9                             | 86.9                                    |
| -25R04                   | <10                    | <4                        | <4                          | 230                         | -63.2                           | -9.23                             | 3.9                    | —                                 | —                                       |
| -25R04                   | 70                     | <4                        | <4                          | 260                         | -58.1                           | -8.85                             | <3                     | -13.4                             | 86.1                                    |
| -25R04                   | <10                    | <4                        | <4                          | 270                         | -58.8                           | -8.76                             | .4                     | -13.8                             | 85.4                                    |
| -25R04                   | 34                     | <4                        | <4                          | 270                         | -58.8                           | -8.68                             | .8                     | -13.2                             | 87.3                                    |
| -25R04                   | <10                    | <4                        | <4                          | 260                         | -58.4                           | -8.86                             | 1.4                    | —                                 | —                                       |
| -25R04(B)                | 19                     | <4                        | <4                          | 251                         | -61.0                           | -9.07                             | 3.4                    | —                                 | —                                       |
| 1S/2W-34N01              | 12                     | <4                        | 2                           | 470                         | —                               | —                                 | 2.4                    | —                                 | —                                       |
| 1S/2W-36G01              | <3                     | <4                        | <1                          | 230                         | -60.2                           | -9.02                             | 2.9                    | —                                 | —                                       |
| 2S/1W-08F01              | <3                     | <4                        | <1                          | 270                         | -56.6                           | -8.46                             | 7.7                    | —                                 | —                                       |
| 2S/1W-15F02              | 39                     | <4                        | 5                           | 170                         | -53.8                           | -8.11                             | .6                     | —                                 | —                                       |
| 2S/2W-01J01 <sup>1</sup> | 2,300                  | <4                        | 23                          | 362                         | -67.3                           | -9.97                             | 7.2                    | —                                 | —                                       |
| 2S/2W-02M01              | 4                      | <4                        | <1                          | 290                         | —                               | —                                 | 4.6                    | —                                 | —                                       |
| -02M01                   | 17                     | <4                        | <4                          | 296                         | -57.8                           | -8.59                             | —                      | —                                 | —                                       |
| 2S/2W-03E01              | 8                      | <4                        | <1                          | 390                         | -55.2                           | -8.41                             | 15                     | —                                 | —                                       |
| 2S/2W-03L01              | <3                     | <4                        | <1                          | 270                         | -58.4                           | -8.65                             | 2.8                    | —                                 | —                                       |
| 2S/2W-04G03              | 4                      | <4                        | <1                          | 260                         | -57.0                           | -8.50                             | <3                     | —                                 | —                                       |
| 2S/2W-04G04              | <10                    | <4                        | <4                          | 254                         | -58.4                           | -8.63                             | <3                     | —                                 | —                                       |
| 2S/2W-04J02              | <3                     | <4                        | <1                          | 250                         | -58.0                           | -8.82                             | <3                     | —                                 | —                                       |
| 2S/2W-04R01              | 22                     | <4                        | <1                          | 350                         | -58.4                           | -8.64                             | 1.8                    | —                                 | —                                       |
| 2S/2W-10B02              | <3                     | <4                        | <1                          | 270                         | -57.8                           | -8.56                             | 1.9                    | —                                 | —                                       |
| 2S/2W-11A01              | <3                     | <4                        | <1                          | 260                         | -58.6                           | -8.52                             | 2.1                    | —                                 | —                                       |
| 2S/2W-11D01              | 6                      | <4                        | <1                          | 260                         | -58.7                           | -8.54                             | 1.2                    | —                                 | —                                       |
| 2S/2W-14C01              | <3                     | <4                        | <1                          | 230                         | -55.3                           | -8.11                             | .8                     | —                                 | —                                       |
| 2S/2W-14R03              | <3                     | <4                        | <1                          | 50                          | -57.5                           | -8.60                             | .7                     | —                                 | —                                       |
| 2S/2W-24L01              | 3                      | <4                        | <1                          | 330                         | -59.9                           | -8.81                             | .7                     | —                                 | —                                       |
| 2S/2W-28C02 <sup>1</sup> | 95                     | 4                         | 410                         | 520                         | -47.3                           | -6.35                             | 7.8                    | —                                 | —                                       |

<sup>1</sup>Not a production well.



## Workshop Memorandum 11-088

**Date:** June 28, 2011

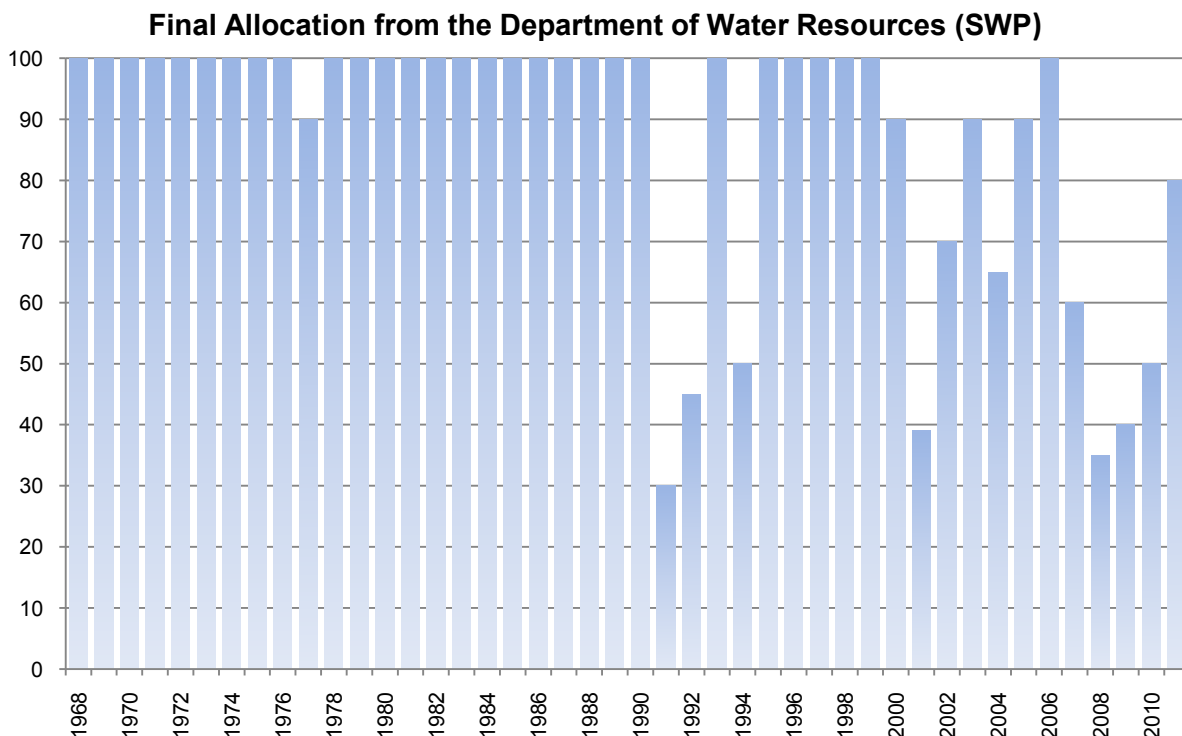
**Subject:** Presentation of Historical State Water Project Allocation Information

On June 15, 2011, the Yucaipa Valley Water District adopted the Urban Water Management Plan and the Regional Urban Water Management Plan. During the staff presentation of these reports, information was provided about the documented reliability of the State Water Project.

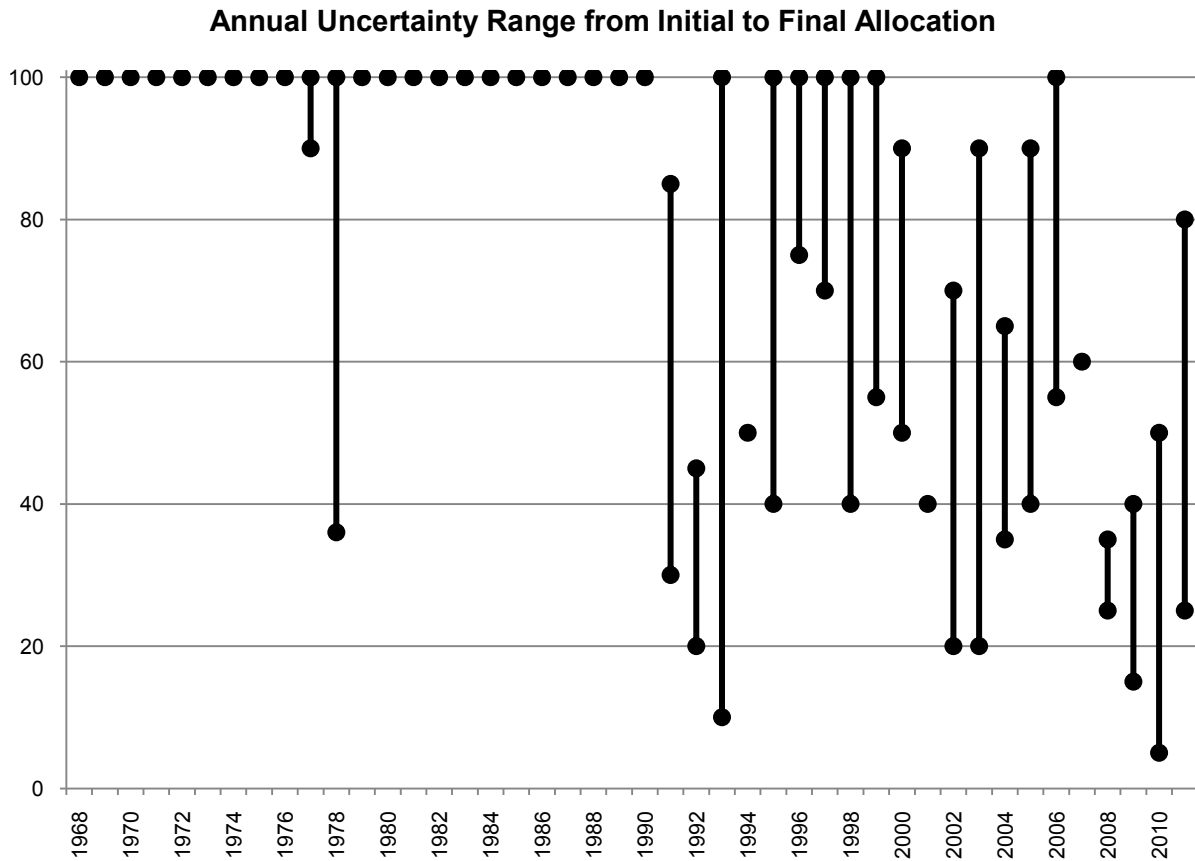
Based on the 2009 State Water Project Delivery Reliability Report issued by the Department of Water Resources, the Yucaipa Valley Water District anticipates the San Bernardino Valley Municipal Water District and the San Gorgonio Pass Water Agency will achieve an average delivery of 60% of their contract amount.

| State Water Project Contractor                 | Total Table A Contract Amount (Acre Feet) | Average State Water Project Reliability of 60% (Acre Feet) |
|--|---|--|
| San Bernardino Valley Municipal Water District | 102,600 Acre Feet                         | 61,560 Acre Feet   |
| San Gorgonio Pass Water Agency                 | 17,300 Acre Feet                          | 10,380 Acre Feet   |

Over the past decade, the average final allocation of the State Water Project was 68%.



As a result of numerous factors, the amount of uncertainty from the initial allocation to the final allocation of water from the State Water Project has increased significantly. The difference between the initial allocation and the final allocation over the past decade has resulted in an average annual variance of 38%. This increased level of risk is one of the main reasons why the Yucaipa Valley Water District continues to maximize sustainability concepts, recycled water and water banking.



California Department of Water Resources  
Bay-Delta Office  
September 27, 2010

Summary:

## Final State Water Project Delivery Reliability Report, 2009

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The *State Water Project Delivery Reliability Report 2009* updates DWR's estimate of the current (2009) and future (2029) water delivery reliability of the SWP. The report is produced every two years as part of a settlement agreement signed in 2003.

The report shows that future SWP deliveries will be impacted by two significant factors. The first is significant restrictions on SWP and Central Valley Project (CVP) Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). The second is climate change, which is altering the hydrologic conditions in the State.

This report represents the state of water affairs if no actions for improvement are taken. It shows continued erosion of SWP water delivery reliability under the current method of moving water through the Delta. The updated analysis shows that the primary component of the annual SWP deliveries (referred to as Table A deliveries) will be less under current and future conditions, when compared to the preceding report (*State Water Project Delivery Reliability Report 2007*).

The report discusses areas of significant uncertainty to SWP delivery reliability:

- restrictions on SWP and CVP operations due to State and federal biological opinions to protect endangered fish such as delta smelt and spring-run salmon;
- climate change and sea level rise; and
- the vulnerability of Delta levees to failure due to floods and earthquakes.

As in previous reports, estimates of SWP deliveries are based upon operation simulations with DWR's CalSim II model using an extended record of runoff patterns. These patterns have been adjusted to reflect the levels of development in the source areas and, for future conditions, possible impact due to climate change and accompanying sea level rise. Potential deliveries under current conditions are estimated at the 2009 level and assume current methods of conveying water across the Delta and the current operational rules contained in the federal biological opinions. Potential deliveries under future conditions are estimated at the 2029 level and are also based on the assumptions that no changes will be made in either the way water is conveyed across the Delta or in the operational rules. The analysis of future conditions incorporates a climate change scenario from DWR's 2009 report, *Using Future Climate Projections to Support Water Resources Decision Making in California*, which represents the median effects of the 12 scenarios contained in the report.

The 2009 report shows greater reductions in water deliveries on average when compared to the 2007 report. The 2007 report incorporates the interim operation rules established by Judge Wanger in the federal court in 2007. It shows very significant reductions in SWP deliveries when compared to the 2005 report, which assumes operation rules that were less restrictive. The 2007 report shows current SWP annual Table A deliveries averaging 63% (2595 taf) of the maximum contract amount of 4,133 thousand acre-feet (taf) per year. The 2009 report shows a corresponding value of 60% (2485 taf). The 2007 report projects an annual average of 66% to 69% (2725-2850 taf) for the future condition, whereas the updated report has 60%.

Although the averages of the updated estimates are less than were estimated in the 2007 report, the annual deliveries during drier conditions are projected to be somewhat higher than estimated in the 2007 report. This is due to the updated analysis incorporating the ability of SWP contractors to save water allocated in one year for delivery in the subsequent year and because water stored upstream cannot be delivered in some years due to export restrictions and is, therefore, available in drier times. This phenomenon is illustrated in the tables and curves below.

Under current conditions, annual SWP Table A deliveries from the Delta average 60% of the maximum annual amount of 4,133 taf per year. Over the 82-year simulation period, annual SWP Table A deliveries range from 7% to 81% of the maximum amount. Over multiple-year dry periods, average annual Table A deliveries vary from 34% to 36% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 67 to 71% of the maximum Table A amount. Under current conditions, annual SWP Article 21 deliveries, a secondary component of annual deliveries, average 85 taf and range from 2 taf to 850 taf over the 82-year simulation period.

Under future conditions, annual SWP Table A deliveries from the Delta also average 60% of the maximum Table A amount. Over the 82-year simulation period, annual SWP Table A deliveries range from 11% to 97% of the maximum amount. Over multiple-year dry periods, average annual Table A deliveries vary from 32% to 38% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 72 to 93% of the maximum Table A amount. Under future conditions, annual SWP Article 21 deliveries average 60 taf, ranging from 1 taf to 540 taf over the 82-year simulation period.

The *State Water Project Delivery Reliability Report, 2009* is available for public review at <http://baydeltaoffice.water.ca.gov>. The report is an update to the *State Water Project Delivery Reliability Report, 2007* issued as final in 2008.

**Table 1. Highlighted SWP Table A delivery percent exceedance values under Current Conditions**

| Exceedance | Annual SWP Table A Delivery (taf)                |                        | Change in delivery compared to 2007 report (taf) |
|------------|--|------------------------|--|
|            | 2007 SWP Delivery Reliability Report, Study 2007 | Updated Studies (2009) |  |
| 25%        | 3218   | 2920                   | -298   |
| 50%        | 2976   | 2675                   | -301   |
| 75%        | 2168   | 2397                   | +229   |

Table 1 compares the probability estimates for current conditions from the 2007 report and the 2009 report. The comparison is also shown in Figure 1. The 2009 report estimates that for any given year in the future,

- There is a 25% chance that SWP deliveries will be at or above 2,920 taf.
- There is an equal chance (50%) that SWP deliveries will be above or below 2,675 taf. (Illustrated by the dotted lines.)
- There is 75% chance that SWP deliveries will be above 2,397 taf. Another way to state this is that there is a 25% chance that deliveries will be below this value.

**Figure 1 SWP Table A delivery probability under Current Conditions**

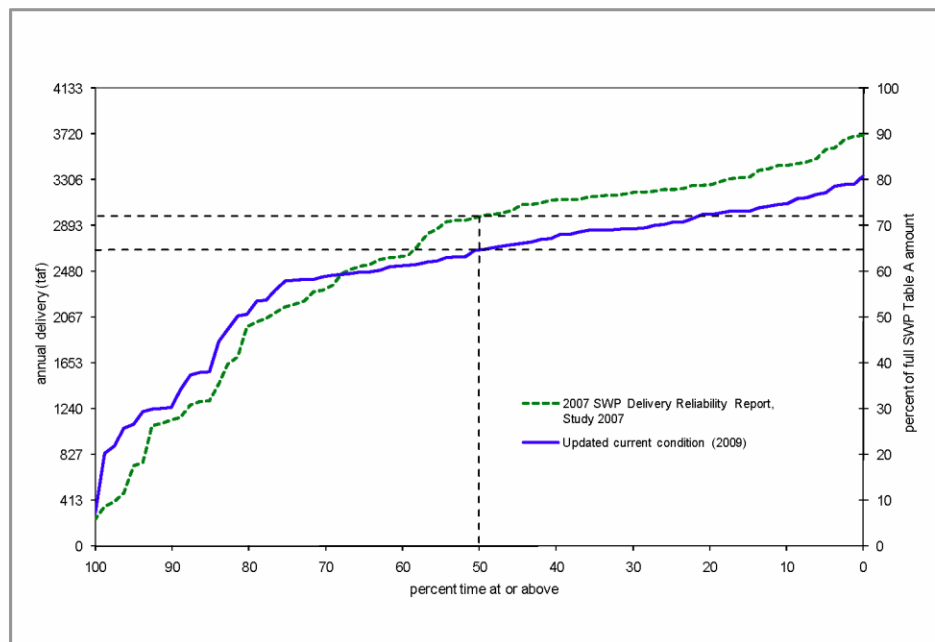


Figure 1 is a plot of all the annual estimates of SWP deliveries in ascending order, with the smallest value on the left and largest on the right.

**Table 2 Highlighted SWP Table A delivery percent exceedence values under Future Conditions**

| Exceedence | Annual SWP Table A Delivery (taf)                             |                        | Change in delivery in updated studies compared to 2007 report (taf) |
|------------|---|------------------------|---|
|            | 2007 SWP Delivery Reliability Report, Study 2027 <sup>1</sup> | Updated Studies (2029) |   |
| 25%        | 3687 – 3815   | 2915                   | -772 to -900  |
| 50%        | 2967 – 3205   | 2596                   | -371 to -609  |
| 75%        | 1860 – 2077   | 2137                   | +60 to +277   |

1/ Range in value reflects four modified scenarios of climate change.

Table 2 compares the probability estimates for future conditions from the 2007 report and the 2009 report. The 2009 report estimates that for any given year in the future,

- There is 1 chance in 4 (25% chance) that SWP deliveries will be at or above 2,915 taf.
- There is an equal chance (50% chance) that SWP deliveries will be above or below 2,596 taf. (Illustrated by the dotted lines in Figure 2.)
- There is 75% chance that SWP deliveries will be above 2,137 taf. Another way to state this is that there is a 25% chance that deliveries will be below this range.

**Figure 2 SWP Delta Table A delivery probability under Future Conditions**

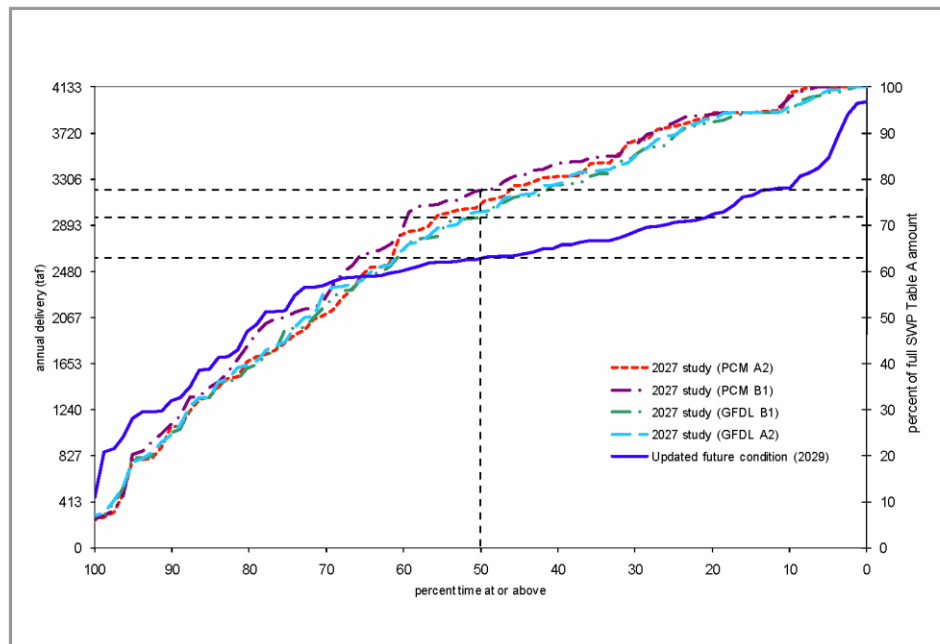


Figure 2 is the corresponding plot of all the annual delivery estimates for the future condition.

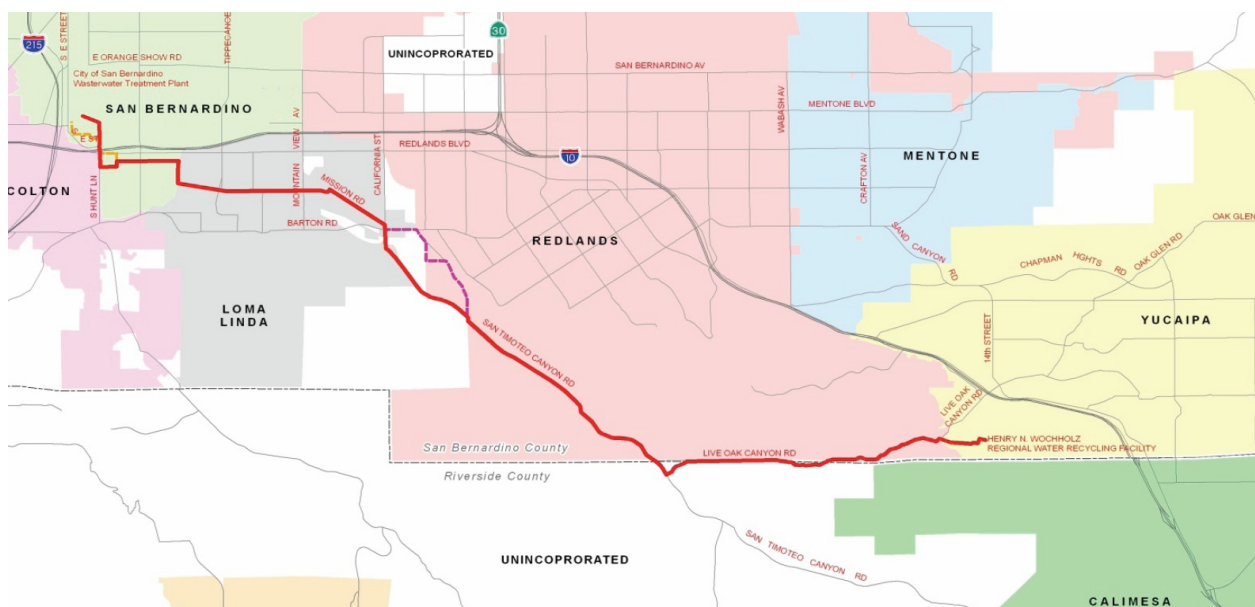
**Date:** June 28, 2011

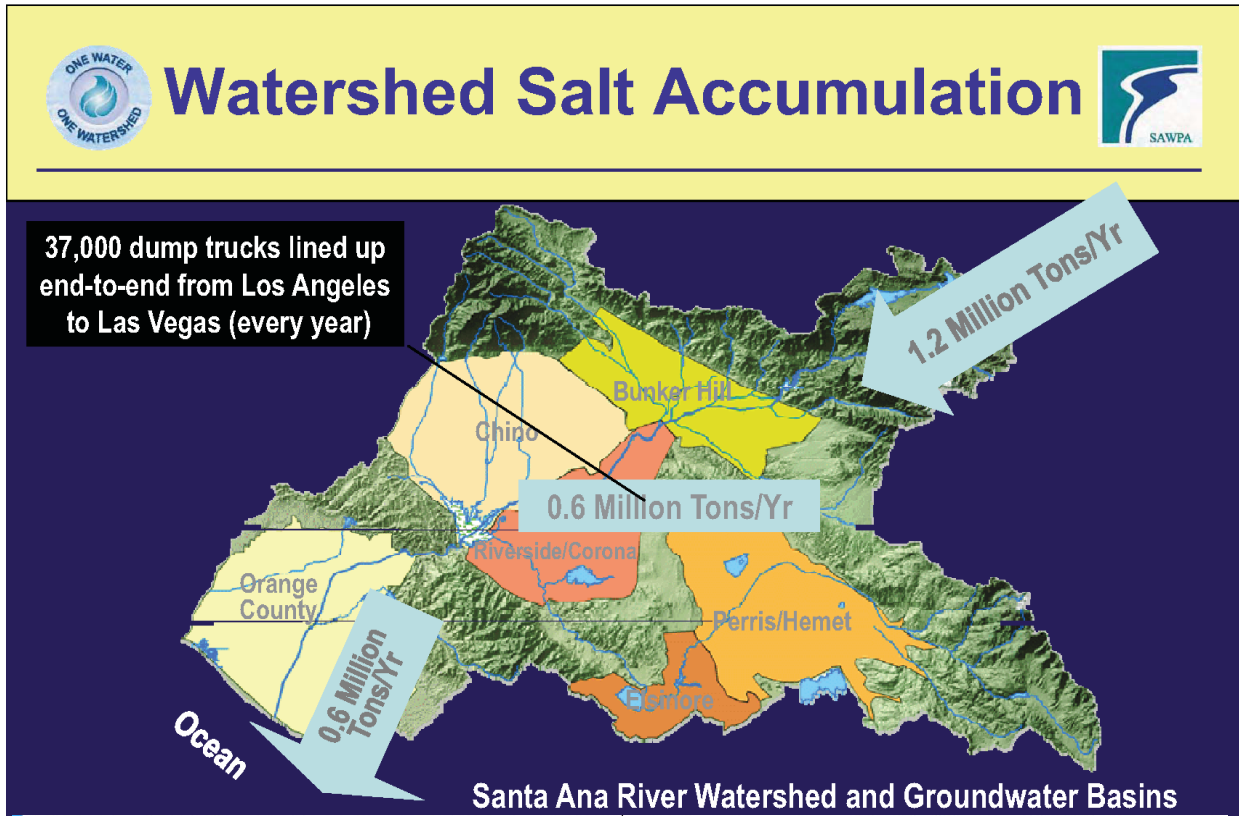
**Subject:** Status Report on the Construction of the Yucaipa Valley Regional Brinline

Yucaipa Valley Water District is in the process of constructing the Yucaipa Valley Regional Brinline in order to produce recycled water that complies with groundwater basin objectives as established by the Regional Water Quality Control Board. In order to comply with these limits, the District is required to add a reverse osmosis process to the wastewater treatment plant. This will enable the District to remove salts and minerals from depositing in to the groundwater basin. The proposed reverse osmosis system will produce salt water, referred to as “brine”, that must be sent to the Pacific Ocean so it does not impact any fresh water supplies downstream of the Yucaipa Valley.

The Yucaipa Valley Regional Brinline Project consists of a 15-mile pipeline through which the District can safely and effectively dispose of the salt water produced. This pipeline will commence at the Wochholz Regional Water Recycling Facility and terminate at an existing brinline extending another 73 miles traversing San Bernardino, Riverside and Orange counties to Orange County Sanitation District Wastewater Treatment Plant No. 2 in Huntington Beach, where the salt water is treated with domestic sewage and then sent to the ocean or reclaimed by Orange County Water District.

During this agenda item, the District staff will be providing an update of the construction status of the Yucaipa Valley Regional Brinline Project.





Yucaipa Valley Regional Water Supply Renewal Project





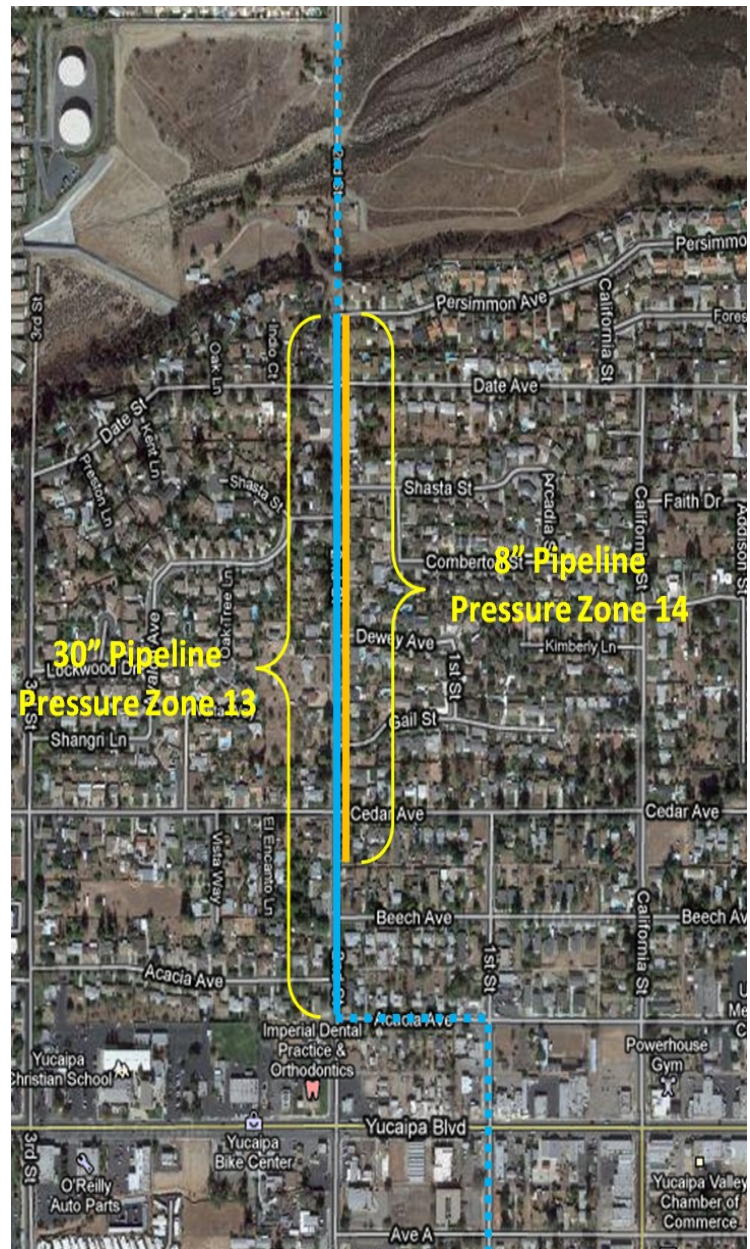
**Date:** June 28, 2011

**Subject:** Status Report on the Construction of Drinking Water Pipelines in Second Street, Yucaipa

The District staff has initiated the construction of two drinking water pipelines in Second Street. These pipelines include:

- Construction of about 2,000 feet of an 8" diameter ductile iron pipeline on Second Street from Persimmon Avenue to a point south of Cedar Avenue; and
- Construction of about 2,600 feet of a 30" diameter ductile iron conveyance pipeline on Second Street from Persimmon Avenue to Acacia Avenue.

An update on the status of the project will be provided to the board members and public at the workshop.







**Date: June 28, 2011**

**Subject: Appropriation Limitation for Fiscal Year 2011-2012**

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Article XIII B of the State Constitution provides a limit on the total amount of money collected as General Fund property taxes that a governing Board could appropriate (authorize for expenditures) in a year. This limitation is adjusted each year based on changes in the growth in per capita personal income or increase in assessed valuation of new construction and population change.

The District has completed the computation associated with the appropriation limitation for fiscal year 2011-2012 ("FY 2012"). Based on the attached calculation, the proposed adjustment to the District's appropriation limit includes an increase of 2.51% for the change in per capita income and a weighted average increase of 1.17% for population change. These percentages have been used to calculate an increase in the appropriation limit from \$45,247,292 in FY 2011 to \$46,925,967 in FY 2012. This represents an overall increase of 3.71% in the appropriation limit.

The documentation and calculation methodology used in the determination of the appropriation limit will be made available to the public for a period fifteen days prior to the July 20, 2011 board meeting.

Financial Considerations:

The District receives only a portion of the entire appropriation limit each year in ad valorem taxes; therefore, the appropriation limit has a limited impact on the District's projects or programs.



Yucaipa Valley Water District

## Director Memorandum 11-0xx

**Date:** July 20, 2011 **Job:** N/A  
**Prepared By:** Vicky Elisalda, Controller **G/L:** N/A  
**Subject:** Adoption of Resolution No. xx-2011 Establishing the Appropriation Limit for Fiscal Year 2011-2012

**Recommendation:** That the Board adopts Resolution No. xx-2011.

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Article XIII B of the State Constitution provides a limit on the total amount of money collected as General Fund property taxes that a governing Board could appropriate (authorize for expenditures) in a year. This limitation is adjusted each year based on changes in the growth in per capita personal income or increase in assessed valuation of new construction and population change.

The documentation used in the determination of the appropriation limit has been made available to the public for a period fifteen days prior to the adoption of Resolution No. 1x-2011.

The District has completed the computation associated with the appropriation limitation for fiscal year 2011-2012 ("FY 2012"). Based on the attached calculation, the proposed adjustment to the District's appropriation limit includes an increase of 2.51% for the change in per capita income and a weighted average increase of 1.17% for population change. These percentages have been used to calculate an increase in the appropriation limit from \$45,247,292 in FY 2011 to \$46,925,967 in FY 2012. This represents an overall increase of 3.71% in the appropriation limit.

Financial Considerations:

The District receives only a portion of the entire appropriation limit each year in ad valorem taxes; therefore, the appropriation limit has a limited impact on the District's projects or programs.

## RESOLUTION NO. xx-2011

RESOLUTION OF THE BOARD OF DIRECTORS  
OF THE YUCAIPA VALLEY WATER DISTRICT  
ESTABLISHING THE APPROPRIATION LIMIT FOR FISCAL YEAR 2012

WHEREAS, Article XIII-B of the California Constitution provides that the State and each local government shall be subject to an appropriations limit, to govern the maximum amount of each entity's appropriations subject to limitation, in any fiscal year, as the same are defined in Article XIII-B; and

WHEREAS, California Government Code Section 7910 provides for the annual establishment by local jurisdictions of their appropriations limit for each fiscal year, and further provides that upon establishment of such appropriations limit any judicial action or proceeding to attack, review, set aside, void, or annul such action by the District must be commenced within forty-five (45) days of the effective date of the resolution establishing the appropriations limit; and

WHEREAS, documentation used in determining the appropriations limit has been made available to the public for a period of not less than fifteen (15) days prior to Board consideration of this resolution.

THEREFORE, BE IT RESOLVED by the Board of Directors of the Yucaipa Valley Water District as follows:

1. That in accordance with Article XIII B of the California Constitution and Section 7910 of the Government Code of this State the appropriation limit for the Fiscal Year 2012 for this District is established as \$46,925,967.
2. The adjustment factors for computation of the FY 2012 appropriation limitation have been identified as follows:
  - A. Percentage change in per capita income; and
  - B. Population - Growth San Bernardino and Riverside Counties.
3. That documentation used in the determination of such appropriation limit has been available to the public at least fifteen days prior to this meeting of the Board of Directors.
4. This Resolution is effective immediately upon adoption.

PASSED AND ADOPTED this 20<sup>th</sup> day of July 2011.

YUCAIPA VALLEY WATER DISTRICT

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Jay Bogh, President Board of Directors

ATTEST:

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Joseph B. Zoba, General Manager



12770 Second Street, Yucaipa, California 92399

## Appropriation Limit for the Yucaipa Valley Water District

Fiscal Year 2011-2012

Prepared by: Vicky Elisalda, Controller

## Overview of Appropriation Limit

### Introduction

In the 1970s soaring property values in California led to dramatic increases in property taxes, prompting a tax revolt that resulted in the passage of Proposition 13 in the June 1978 California primary. Proposition 13 reduced local property taxes by 57% and thereby slashed the revenue base for local governments and schools. Over the years the revenue loss has been made up by a varying mix of state funds and new revenue from specialized local fees and taxes, as well as by outright local budget cuts.

The California tax revolt did not end with Proposition 13. Seventeen months later, in November 1979, voters passed the Proposition 4, known as the Gann Amendment. Proposition 4 imposed a limit on most state and local government expenditures from tax sources. The limit is calculated annually according to a formula based on population and the cost of living. Under Proposition 4, excess revenues must be returned to the taxpayers.

Both Propositions 13 and 4 have been modified in the years since their passage. While weakened by the changes, Propositions 13 and 4 remain constraints on California state and local budgeting, and continue to be focal points in the public policy debate about California taxing and spending.

### Summary of Proposition 4 and Related Voter Initiatives

Modern spending limits in California began in 1979 with the passage of Proposition 4 (Article XIII B of the California Constitution). Also called the Gann Initiative after its chief sponsor, Paul Gann, Proposition 4 places an appropriations limit on most spending from tax proceeds. The limit for each year is equal to the prior year's spending with upward adjustments allowed for changes in population and the cost of living. Most state and local government appropriations are subject to the limit. However, the law exempts certain appropriations from the limit including capital outlay, debt service and local government subventions. When the limit is exceeded, Proposition 4 requires the surplus to be returned to the taxpayers within two years. Appropriations in the two year period can be averaged before becoming subject to the excess revenue provisions of the Gann limit.

Voters approved the Gann limit in a November 1979 special election by a 74% margin. The late 1970s were a time of surplus state revenues in California, and voter exasperation at the inability of the legislature and the governor to agree on a plan to return the surplus to the taxpayers in the form of refunds or property tax relief helped fuel the tax revolt that led first to Proposition 13 and then to Proposition 4. With the Gann limit, voters took the matter of spending limits into their own hands, and ignored objections that spending limit formulas are an artificial constraint on policy making and hamper the government's ability to address citizen needs.

During the early 1980s, increases in population and the consumer price index outpaced the growth in state revenue, and the Gann limit was not reached. However, a surge in state revenues in 1987 caused the limit to be breached, and led to the first refund to taxpayers.

Voters have modified the Gann limit in a series of initiative measures. Proposition 99 (1988) and Proposition 10 (1998) exempted new tobacco taxes from the Gann limit. Proposition 98 (1988) required public schools to receive a share of revenues exceeding the Gann limit. That share was changed to a flat 50% by Proposition 111 (1990). Proposition 111 also added three exemptions to the Gann limit: capital outlay spending, appropriations supported by increased gas taxes, and appropriations resulting from national disasters. Most significantly, Proposition 111 changed the formula used for calculating annual adjustments to the Gann limit. Under Proposition 111, the population factor is based on a weighted average of population and K-14 school enrollment growth (instead of population only), and the cost of living factor is based solely on California per-capita personal income growth (and no longer takes into account the Consumer Price Index).

The changes to the Gann limit formula under Proposition 111 substantially raised the Gann limit, making it less likely that the limit will be reached in the future. Many observers believe that in its current weakened state the Gann limit has ceased to be a meaningful constraint on state spending.

## How the Appropriations Limit Works

### Which Revenues Are Subject to Limit?

Article XIII B places a limit on appropriations from most, but not all, government revenue sources. The limit applies to appropriations from proceeds of taxes from both the general fund and special funds of government entities. Proceeds of taxes include tax revenues, interest earnings on invested tax revenues, and any revenues collected by a regulatory license fee or user charge in excess of the amount needed to cover the cost of providing the regulation, product, or service.

### Which Appropriations Are Subject to Limit?

Appropriations for almost all government functions are subject to limitation under Article XIII B. However, there are some important exceptions. The original Proposition 4 provided that the following appropriations are not limited, even if made from proceeds of taxes:

- Subventions from the state to local governments and schools, the use of which is unrestricted (these subventions are not subject to the state's limit, but instead are counted as subject to the local entity's limit);
- Appropriations to pay for costs of complying with federal laws and court mandates;
- Payments for interest and redemption charges on pre-existing (i.e., pre-Proposition 4) or voter-approved bonded indebtedness;
- Withdrawals from previously appropriated reserve funds; and
- Refunds of taxes.

Proposition 111 excluded capital outlay from the appropriations limit. This change reflects the fact that while capital outlay appropriations are made during a single budget year, they reflect long-term investments that are utilized over a number of years. Appropriations directly related to an emergency, such as a fire, earthquake, or other natural disaster, were also excluded from the limit by Proposition 111. No reduction in future limits is required for appropriations made for these emergency purposes.

### The "Base Year" Limit.

The first year that limits were in effect was FY 1980-81. The base year for determining the appropriations limit in FY 1980-81 was FY 1978-79. Actual appropriations in the FY 1978-79 fiscal year that had been financed by the proceeds of taxes were the starting point. Appropriations not subject to limitation were subtracted from that figure and this became the "base year" level of appropriations for computing all subsequent years' limits. Proposition 111 updated the base year for calculating the limit for each government entity to FY 1986-87. For fiscal years beginning with FY 1990-91, the limit for each entity is the FY 1986-87 limit adjusted annually as specified by Article XIII B as amended by Proposition 111.

### Annual Adjustments to the Limit.

The appropriations limit for each year since FY 1980-81 is calculated by adjusting the base year limit for changes in the cost-of-living and population. Proposition 111, passed by the voters in June 1990, revised each of the adjustment factors. Specifically, annual adjustments to limits, either upward or downward, are made as follows:

- Cost-of-Living.
  - State and schools are adjusted by the change in California per capita personal income.
  - Local agencies are adjusted by the change in California per capita personal income or the change in the local property tax roll due to the addition of new nonresidential construction.
- Population.
  - The State uses a population factor calculated by adding: (a) the change in the state's total population weighted by the percent of the budget spent on non-educational programs, and (b) the change in average daily attendance (ADA) for K-14 education weighted by the percentage of the budget spent on K-14 education.
  - Local agencies use a population factor that is the percentage change in the jurisdiction or in the county in which the jurisdiction is located. Special districts located in two or more counties may use the change in the county in which the district has the highest assessed valuation.
  - Counties. The population change for counties can be calculated by using one of three methods: (a) the percentage change in population within the county; (b) the percentage change in population for both the county itself and contiguous counties; or (c) the percentage change in population within the incorporated portion of the county.
  - K-14 Schools use the change in population is the percentage change in average daily attendance.
- Program Transfers. Limits of governmental entities are modified to reflect transfers of financial responsibility from one level of government to another. The limit of the new service provider is increased by the amount the former service provider's limit is reduced.
- Funding Transfers. Adjustments either upward or downward are made to account for transfers of program funding sources, for example from tax revenues (subject to limit) to fees (not subject to limit).

The level of appropriations actually made by a government entity in any year does not have any bearing on the calculation of the appropriations limit for the subsequent years. Each year's limit is computed based on the prior year's limit, not the prior year's appropriations.

If the governing body actually appropriates less money than what would be permitted by the limit, it has "room" under its limit, and the limit will be further adjusted the following year for cost-of-living and population changes. A government entity does not "lose" room under its limit for the future by appropriating less than the maximum permitted in any year.

#### Appropriations Permitted in Excess of the Limit.

Article XIII B sets forth two circumstances under which governments may make appropriations in excess of their limits:

- Emergency. Appropriations for declared emergencies do not count towards and may be made in excess of the limit. Proposition 111 removed the requirement that the limits for future years must be reduced over a three-year period so that there would be no total increase in allowable appropriations.
- Voter Approval. Article XIII B permits voters of a jurisdiction to authorize an increase in the appropriations limit. However, no voter-approved increase may be in effect for more than four years. At the end of the four-year period, either the voters must approve another increase or the limit must return to the level it would otherwise have been.

#### When Revenues Exceed the Appropriations Limit.

A government entity may receive revenues during a fiscal year that exceed its appropriations limit. Proposition 111 allows governments to average appropriations over a two year period before becoming subject to the excess revenue provisions of Article XIII B. In other words, a government entity can offset appropriations that exceeds its appropriations limit in one year of a two-year period by appropriating less than the limit in the other year. If, after taking this two year averaging into account, authority to appropriate is not provided by either an emergency declaration or voter approval, Article XIII B as amended by Propositions 98 and 111 sets forth a process for disposing of the excess State revenues:

- Education Programs. After the two-year averaging period, 50% of any excess revenues are transferred to the State School Fund for elementary, secondary and community college education. A portion of this excess revenue (25%) may effectively be built into the base used to calculate future funding required by Proposition 98 if the excess funds are used for a specified purpose. The transfer to education is not required if the state's average expenditure per student and average class size is equal to or exceeds that of the ten states with the best performance in these areas.
- Return of Excess. The 50% of excess revenues remaining after the transfer to education must be returned to taxpayers within the following two years. The return can be made through a reduction in the tax rate or as a fee reduction.

#### Sources:

- "Government Appropriations Limit: Article XIII B of the Constitution." In: *Revenue and Taxation Reference Book 2003*. Sacramento: Assembly Revenue and Taxation Committee, Chapter 5, January 2004, pp. 150-7.
- "Tax and Expenditure Limitation in California: Proposition 13 & Proposition 4", Institute of Governmental Studies, University of California at Berkeley (<http://www.igs.berkeley.edu/library/htTaxSpendLimits2003.html>)

## Calculation of Appropriation Limitation

### Appropriation Limit Calculation – Part I

|   |   |               |
|---|---|---------------|
| Greater of California per capita income or<br>increase in non-residential assessed valuation<br>of new construction |   | 1.0251        |
| Population percentage change factor   | x | <u>1.0117</u> |
| Ratio of change   |   | <u>1.0371</u> |

### Appropriation Limit Calculation – Part II

|  |   |                     |
|--|---|---------------------|
| Ratio of change                            |   | 1.0371              |
| Prior year appropriation limit (2010-2011) | x | <u>\$45,247,292</u> |
| Current year appropriation (2011-2012)     |   | <u>\$46,925,967</u> |

## Computation of Appropriation Limitation

### Adjustment Factors

Cost of Living Price Factor: The computation of the appropriation limitation involves the greater of the two cost of living factors:

|  |    |   |
|--|----|---|
| Percentage change in<br>per capita income <sup>1</sup> | or | Percentage change in local<br>assessment roll due to addition of<br>non-residential new construction <sup>2</sup> |
| <b><u>2.51%</u></b>                                    |    | -2.31%  |

Population: The computation of the appropriation limitation involves the greater of the following factors for each county:

|   |    |                                       |
|---|----|---------------------------------------|
| Growth within<br>San Bernardino County <sup>3</sup> | or | Growth within the<br>City of Yucaipa  |
| <b><u>1.05%</u></b>                                 |    | 0.73%                                 |
| Growth within<br>Riverside County <sup>4</sup>      | or | Growth within the<br>City of Calimesa |
| <b><u>1.81%</u></b>                                 |    | 1.12%                                 |

The underlined factors above were used in calculating the District's appropriation limit for the 2011-2012 fiscal year. The resolution adopted by the Board of Directors will specify these factors.

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<sup>1</sup> State of California, Department of Finance correspondence dated May 2011 (Enclosure I)  
<sup>2</sup> Ms. Conchita White Eagle, Controller Office, General Accounting Section, Aug. 2010 (909) 386-8776  
<sup>3</sup> State of California, Department of Finance correspondence dated May 2011 (Enclosure II-SB)  
<sup>4</sup> State of California, Department of Finance correspondence dated May 2011 (Enclosure II-RIV)

## Procedure for Administering Revenue and Taxation Code Section 2228(a)

The Revenue and Taxation Code, Section 2228(a) requires the following:

If a special district is located within a single county or within more than one city or any combination of cities and incorporated area within a single county, the annual percentage change in population for the district shall be that established for the county or the weighted average of the percentage change of each city and the unincorporated area.

If a special district is located within more than one county, the annual percentage change in population for the district shall be the weighted average of the percentage change of each county or city or unincorporated area within the district or any combination provided that the areas selected are mutually exclusive.

The State of California, Department of Finance has specified that the weights applied shall be the relative share of the assessed valuation (A.V.) of the district in each local agency.

Population Percentage Change Factor:

| <u>Local Agency</u>   | <u>Percentage<br/>Population<br/>Change</u> | <u>Assessed<br/>Valuation</u> | = | <u>Percentage<br/>Change x A.V.</u> |
|-----------------------|---|-------------------------------|---|-------------------------------------|
| San Bernardino County | 1.05%                                       | x 4,916,820,355               | = | 51,626,614                          |
| Riverside County      | 1.81%                                       | x 939,028,837                 | = | 16,996,422                          |
| Total District        |   | 5,855,849,192                 |   | 68,623,036                          |

Weighted Average Percent Change:

$$\frac{\text{Total District (Percentage Change x A.V.)}}{\text{Total District Assessed Valuation}} = \frac{68,623,036}{5,855,895,192} = \underline{\underline{0.011719}}$$

## **Attachments**



EDMUND G. BROWN JR. ■ GOVERNOR

915 L STREET ■ SACRAMENTO CA ■ 95814-3706 ■ WWW.DOF.CA.GOV

May 2011

Dear Fiscal Officer:

**Subject: Price and Population Information****Appropriations Limit**

The California Revenue and Taxation Code, Section 2227, mandates the Department of Finance (Finance) to transmit an estimate of the percentage change in population to local governments. Each local jurisdiction must use their percentage change in population factor for January 1, 2011, in conjunction with a change in the cost of living, or price factor, to calculate their appropriations limit for fiscal year 2011-2012. Enclosure I provides the change in California's per capita personal income and an example for utilizing the price factor and population percentage change factor to calculate the 2011-2012 appropriations limit. Enclosure II provides city and unincorporated county population percentage changes, and Enclosure IIA provides county's and incorporated area's summed population percentage changes. The population percentage change data excludes federal and state institutionalized populations and military populations.

**Population Percent Change for Special Districts**

Some special districts must establish an annual appropriations limit. Consult the Revenue and Taxation Code, Section 2228 for further information regarding the appropriation limit. You can access the Code from the following website: "<http://www.leginfo.ca.gov/calaw.html>" check box: "Revenue and Taxation Code" and enter 2228 for the search term to learn more about the various population change factors available to special districts to calculate their appropriations limit. Article XIII B, Section 9(C), of the State Constitution exempts certain special districts from the appropriations limit calculation mandate. Consult the following website: "[http://www.leginfo.ca.gov/const/article\\_13B](http://www.leginfo.ca.gov/const/article_13B)" for additional information. Special districts required by law to calculate their appropriations limit must present the calculation as part of their annual audit. Any questions special districts have on this issue should be referred to their respective county for clarification, or to their legal representation, or to the law itself. No State agency reviews the local appropriations limits.

**Population Certification**

The population certification program applies only to cities and counties. The Federal 2010 Census population counts for cities and counties have been certified to the State Controller's Office. Revenue and Taxation Code Section 11005.6 mandates Finance to automatically certify any population estimate that exceeds the current certified population with the State Controller's Office. **Finance will certify the higher estimate to the State Controller by June 1, 2011.**

**Please Note:** The population estimates provided in this report incorporate 2010 Census numbers as benchmarks. Therefore, the population estimates for 2010 and 2011 published in this report for your jurisdiction may be noticeably different from the previous year estimates.

If you have any questions regarding this data, please contact the Demographic Research Unit at (916) 323-4086.

May 2011

Enclosure I

- A. **Price Factor:** Article XIII B specifies that local jurisdictions select their cost-of-living factor to compute their appropriation limit by a vote of their governing body. The cost-of-living factor provided here is per capita personal income. If the percentage change in per capita personal income is selected, the percentage change to be used in setting the 2011-2012 appropriation limit is:

| Per Capita Personal Income |                                   |
|----------------------------|-----------------------------------|
| Fiscal Year (FY)           | Percentage change over prior year |
| 2011-2012                  | 2.51                              |

- B. Following is an example using sample population change and the change in California per capita personal income as growth factors in computing a 2011-2012 appropriation limit.

**2011-2012:**

Per Capita Cost of Living Change = 2.51 percent  
 Population Change = 0.77 percent

Per Capita Cost of Living converted to a ratio:  $\frac{2.51 + 100}{100} = 1.0251$

Population converted to a ratio:  $\frac{0.77 + 100}{100} = 1.0077$

Calculation of factor for FY 2011-2012:  $1.0251 \times 1.0077 = 1.0330$

**Enclosure II**  
**Annual Percent Change in Population Minus Exclusions**  
**January 1, 2010 to January 1, 2011 and Total Population, January 1, 2011**

| <u>County</u><br><u>City</u> | <u>Percent Change</u> | <u>-- Population Minus Exclusions --</u> |               | <u>Total</u>                         |
|------------------------------|-----------------------|--|---------------|--------------------------------------|
|                              | <u>2010-2011</u>      | <u>1-1-10</u>                            | <u>1-1-11</u> | <u>Population</u><br><u>1-1-2011</u> |
| San Bernardino               |                       |  |               |                                      |
| Adelanto                     | 1.22                  | 30,699                                   | 31,073        | 31,671                               |
| Apple Valley                 | 0.82                  | 69,100                                   | 69,668        | 69,668                               |
| Barstow                      | 1.92                  | 22,015                                   | 22,438        | 22,839                               |
| Big Bear Lake                | 0.68                  | 5,017                                    | 5,051         | 5,051                                |
| Chino                        | 1.25                  | 70,108                                   | 70,986        | 78,537                               |
| Chino Hills                  | 0.91                  | 74,663                                   | 75,345        | 75,345                               |
| Colton                       | 0.76                  | 52,103                                   | 52,498        | 52,498                               |
| Fontana                      | 1.54                  | 195,453                                  | 198,456       | 198,456                              |
| Grand Terrace                | 0.62                  | 12,034                                   | 12,109        | 12,109                               |
| Hesperia                     | 0.65                  | 90,139                                   | 90,726        | 90,726                               |
| Highland                     | 0.69                  | 53,080                                   | 53,444        | 53,444                               |
| Loma Linda                   | 0.64                  | 23,185                                   | 23,333        | 23,395                               |
| Montclair                    | 1.11                  | 36,624                                   | 37,031        | 37,031                               |
| Needles                      | 0.72                  | 4,839                                    | 4,874         | 4,874                                |
| Ontario                      | 0.98                  | 163,794                                  | 165,392       | 165,392                              |
| Rancho Cucamonga             | 1.87                  | 165,101                                  | 168,181       | 168,181                              |
| Redlands                     | 0.77                  | 68,703                                   | 69,231        | 69,231                               |
| Rialto                       | 0.94                  | 99,092                                   | 100,021       | 100,021                              |
| San Bernardino               | 0.59                  | 208,152                                  | 209,373       | 211,076                              |
| Twentynine Palms             | 2.96                  | 11,379                                   | 11,716        | 24,646                               |
| Upland                       | 0.68                  | 73,703                                   | 74,207        | 74,207                               |
| Victorville                  | 1.61                  | 111,056                                  | 112,848       | 117,219                              |
| Yucaipa                      | 0.73                  | 51,341                                   | 51,717        | 51,717                               |
| Yucca Valley                 | 0.72                  | 20,686                                   | 20,834        | 20,834                               |
| Unincorporated               | 0.87                  | 282,242                                  | 284,699       | 294,229                              |
| County Total                 | 1.05                  | 1,994,308                                | 2,015,251     | 2,052,397                            |

(\*) Exclusions include residents on federal military installations and group quarters residents in state mental institutions, state and federal correctional institutions and veteran homes.

**Enclosure II**  
**Annual Percent Change in Population Minus Exclusions**  
**January 1, 2010 to January 1, 2011 and Total Population, January 1, 2011**

| County<br>City     | Percent Change | --- Population Minus Exclusions --- |           | Total<br>Population |
|--------------------|----------------|-------------------------------------|-----------|---------------------|
|                    | 2010-2011      | 1-1-10                              | 1-1-11    | 1-1-2011            |
| Riverside          |                |                                     |           |                     |
| Banning            | 1.14           | 29,507                              | 29,844    | 29,844              |
| Beaumont           | 4.66           | 36,496                              | 38,195    | 38,195              |
| Blythe             | 1.09           | 13,153                              | 13,296    | 20,158              |
| Calimesa           | 1.12           | 7,853                               | 7,941     | 7,941               |
| Canyon Lake        | 1.13           | 10,528                              | 10,647    | 10,647              |
| Cathedral City     | 1.12           | 50,984                              | 51,556    | 51,603              |
| Coachella          | 2.57           | 40,464                              | 41,502    | 41,502              |
| Corona             | 1.18           | 151,854                             | 153,649   | 153,649             |
| Desert Hot Springs | 5.92           | 25,852                              | 27,383    | 27,383              |
| Hemet              | 1.62           | 78,335                              | 79,607    | 79,607              |
| Indian Wells       | 1.40           | 4,941                               | 5,010     | 5,010               |
| Indio              | 2.72           | 75,122                              | 77,165    | 77,165              |
| Lake Elsinore      | 2.06           | 51,445                              | 52,503    | 52,503              |
| La Quinta          | 1.42           | 37,307                              | 37,836    | 37,836              |
| Menifee            | 2.82           | 77,267                              | 79,444    | 79,444              |
| Moreno Valley      | 1.33           | 192,654                             | 195,216   | 195,216             |
| Murrieta           | 1.33           | 103,085                             | 104,459   | 104,459             |
| Norco              | 1.13           | 22,673                              | 22,929    | 27,060              |
| Palm Desert        | 2.03           | 48,132                              | 49,111    | 49,111              |
| Palm Springs       | 1.39           | 44,385                              | 45,002    | 45,002              |
| Perris             | 2.80           | 67,879                              | 69,781    | 69,781              |
| Rancho Mirage      | 1.72           | 17,168                              | 17,463    | 17,463              |
| Riverside          | 1.31           | 302,814                             | 306,779   | 306,779             |
| San Jacinto        | 1.26           | 44,043                              | 44,597    | 44,597              |
| Temecula           | 2.05           | 99,611                              | 101,657   | 101,657             |
| Wildomar           | 1.68           | 32,006                              | 32,543    | 32,543              |
| Unincorporated     | 1.92           | 501,859                             | 511,518   | 511,623             |
| County Total       | 1.81           | 2,167,417                           | 2,206,633 | 2,217,778           |

(\*) Exclusions include residents on federal military installations and group quarters residents in state mental institutions, state and federal correctional institutions and veteran homes.

Page (7)  
 P1P1112  
 COUNTY OF SAN BERNARDINO  
 PROPERTY INFORMATION SYSTEM  
 AGENCY PERCENTAGE CHANGE REPORT  
 DATE 08/03/2010  
 PAGE 7

| AGENCY                            | NEW CONST<br>INCREASE | TOTAL<br>INCREASE | PERCENTAGE<br>CHANGE |
|-----------------------------------|-----------------------|-------------------|----------------------|
| VICTOR VALLEY RDA - 1993          | 26,212,773.00         | 779,655,747.00-   | 3.3620-              |
| VICTOR VALLEY UNION HIGH SCH DIST | 34,775,626.00         | 1,018,249,708.00- | 3.4152-              |
| VICTORVILLE OLD/MIDTOWN RDA       | 7,634,444.00          | 3,858,399.00-     | 197.8809-            |
| VICTORVILLE RDA BEAR VALLEY ROAD  | 4,280,850.00          | 56,265,201.00-    | 7.5722-              |
| VICTORVILLE STREET LIGHT DISTRICT | 14,867,376.00         | 312,229,136.00-   | 4.7616-              |
| VICTORVILLE WATER DISTRICT        | 31,554,443.00         | 700,828,637.00-   | 4.5024-              |
| WEST VALLEY MUCD                  | 206,778,873.00        | 19,147,681.00-    | 79.9160-             |
| WEST VALLEY WATER DISTRICT        | 37,536,049.00         | 107,304,361.00-   | 34.9899-             |
| YERMO COMMUNITY SERVICES DISTRICT | .00                   | 6,831,902.00-     | 0.0000               |
| YUCAIPA RDA                       | 391,999.00            | 1,453,664.00      | 26.9660              |
| YUCAIPA VALLEY WATER DISTRICT     | 4,364,232.00          | 188,968,399.00-   | 2.3095-              |
| YUCAIPA-CALIFORNIA JOINT UNIFIED  | 4,364,232.00          | 193,879,469.00-   | 2.2510-              |
| YUCAIPA VALLEY RDA                | .00                   | 25,550,343.00-    | 0.0000               |
| 29 PALMS CEMETERY DISTRICT        | 3,173,920.00          | 20,058,663.00-    | 15.8231-             |

07/29/10  
PAGE 285

SAN BERNARDINO COUNTY AUDITOR-CONTROLLER  
PROPERTY TAX DIVISION  
AGENCY NET VALUATIONS

PI163  
20:58:26  
AGENCY: WW29 YUCAIPA VALLEY WATER DISTRICT  
ADDRESS: P.O. BOX 730  
YUCAIPA, CA 923990730

| ACCT CODE                               | ACCT NAME | NET VALUE BEFORE RDA | RDA INCREMENT | NET VALUE AFTER RDA | HOME OWNERS EXEMPTION | TAX ROLL VALUE |
|---|-----------|----------------------|---------------|---------------------|-----------------------|----------------|
| <b>DA01 DEBT SERVICE IMP 2</b>          |           |                      |               |                     |                       |                |
|   |           | 694,042,103          | 60,642,998    | 633,399,105         | 10,082,800            | 623,316,305    |
|   |           | 0                    | 0             | 0                   | 0                     | 0              |
|   |           | 13,100,809           | 5,452,493     | 7,648,316           | 0                     | 7,648,316      |
|   |           | 707,142,912          | 66,095,491    | 641,047,421         | 10,082,800            | 630,964,621    |
| <b>GA01 GENERAL TAX LEVY</b>            |           |                      |               |                     |                       |                |
|   |           | 3,280,507,635        | 141,143,635   | 3,139,364,000       | 60,936,337            | 3,078,427,663  |
|   |           | 0                    | 0             | 0                   | 0                     | 0              |
|   |           | 68,546,749           | 16,912,165    | 51,634,584          | 0                     | 51,634,584     |
|   |           | 3,349,054,384        | 158,055,800   | 3,190,998,584       | 60,936,337            | 3,130,062,247  |
| <b>GA02 GENERAL TAX LEVY IMP DIST A</b> |           |                      |               |                     |                       |                |
|   |           | 1,945,559,140        | 67,811,746    | 1,877,747,394       | 39,354,702            | 1,838,392,692  |
|   |           | 0                    | 0             | 0                   | 0                     | 0              |
|   |           | 39,880,203           | 9,808,263     | 30,071,940          | 0                     | 30,071,940     |
|   |           | 1,985,439,343        | 77,620,009    | 1,907,819,334       | 39,354,702            | 1,868,464,632  |

FY2010-11 District Assessed Valuations  
 DISTRICT VALUATION - SPECIAL DISTRICT 06/28/2010  
 04-4896 YUCAIPA VALLEY COUNTY WATER  
 TAX RATE

|                  | STATE ASSESSED | LOCAL SECURED | TOTAL SECURED | LOCAL UNSECURED | TOTAL       |
|------------------|----------------|---------------|---------------|-----------------|-------------|
| NET VALUES       | 0              | 569,503,395   | 569,503,395   | 9,814,299       | 579,317,694 |
| HOME OWNER VALUE | 0              | 9,769,891     | 9,769,891     | 0               | 9,769,891   |
| BUS INV VALUE    | 0              | 0             | 0             | 0               | 0           |
| VAL FOR TAX RATE | 0              | 579,273,286   | 579,273,286   | 9,814,299       | 589,087,585 |

DISTRICT VALUATION - SPECIAL DISTRICT 06/28/2010  
 04-4897 YUCAIPA VALLEY CO WTR IMP #1  
 TAX RATE

|                  | STATE ASSESSED | LOCAL SECURED | TOTAL SECURED | LOCAL UNSECURED | TOTAL       |
|------------------|----------------|---------------|---------------|-----------------|-------------|
| NET VALUES       | 0              | 180,383,612   | 180,383,612   | 5,236,248       | 185,619,860 |
| HOME OWNER VALUE | 0              | 3,256,628     | 3,256,628     | 0               | 3,256,628   |
| BUS INV VALUE    | 0              | 0             | 0             | 0               | 0           |
| VAL FOR TAX RATE | 0              | 183,640,240   | 183,640,240   | 5,236,248       | 188,876,488 |

DISTRICT VALUATION - SPECIAL DISTRICT 06/28/2010  
 04-4898 YUCAIPA VAL CO WTR IMP 2  
 TAX RATE

|                  | STATE ASSESSED | LOCAL SECURED | TOTAL SECURED | LOCAL UNSECURED | TOTAL       |
|------------------|----------------|---------------|---------------|-----------------|-------------|
| NET VALUES       | 0              | 111,296,147   | 111,296,147   | 389,254         | 111,685,401 |
| HOME OWNER VALUE | 0              | 1,246,000     | 1,246,000     | 0               | 1,246,000   |
| BUS INV VALUE    | 0              | 0             | 0             | 0               | 0           |
| VAL FOR TAX RATE | 0              | 112,542,147   | 112,542,147   | 389,254         | 112,931,401 |

DISTRICT VALUATION - SPECIAL DISTRICT 06/28/2010  
 28-4897 YUCAIPA VAL CO WTR IMP 1 DEBT SV  
 TAX RATE

|                  | STATE ASSESSED | LOCAL SECURED | TOTAL SECURED | LOCAL UNSECURED | TOTAL      |
|------------------|----------------|---------------|---------------|-----------------|------------|
| NET VALUES       | 0              | 63,573,164    | 63,573,164    | 0               | 63,573,164 |
| HOME OWNER VALUE | 0              | 0             | 0             | 0               | 0          |
| BUS INV VALUE    | 0              | 0             | 0             | 0               | 0          |
| VAL FOR TAX RATE | 0              | 63,573,164    | 63,573,164    | 0               | 63,573,164 |

**Date:** June 28, 2011

**Subject:** Approval of Change Order No. 2 for Repairs to the Lining of the South Equalization Basin at the Wochholz Regional Water Recycling Facility

---

On October 6, 2010 the District Board approved a contract with Barber-Webb Company to repair the Secondary Equalization Basin liners at the Wochholz Plant for a sum not to exceed \$23,227 [Director Memorandum No. 10-075]. The original scope of work, for both the north and south equalization ponds included:

- Repairing an approximately 18 inch tear in the seam of the north equalization pond liner.
- Repair and patching of liner seal at the drain and install new gaskets, batten bars, and epoxy sealer.
- Removal and replacement of existing pipe boots with seamless boots.
- Excavating and cutting a section of liner at the top of the divider wall and replacing it with a new liner and batten to wall with mastic sealant. (This was discovered during site inspection – evidence of surface water undercutting the pond liner can be seen).
- Furnish and install HDPE welded-on safety ladder for a safer mode of entry/exit of pond.
- Smoke test the entire pond liner and patch all voids. Smoke testing involves injecting a high volume of smoke and air under the liner. Any leaks found, as evidenced by escaping smoke, will be patched. The testing and repairs are performed as a lump sum basis, so the number of voids found does not affect the quote.

As a result of water trapped beneath the north pond, the District approved Change Order No. 1 in the amount of \$4,078 for additional repair work. [Director Memorandum No. 10-095]

The original estimate for upgrading and repairing the south pond liner was based on historical information since the basin could not be de-watered at the time of the original estimate. Work commenced on the south equalization pond liner in June 2011, but once de-watered the following conditions were found:

- The bottom of the liner was found to have shifted in an easterly direction. This misalignment caused a two foot high wrinkle at the east toe of the pond. The shifting created a ridge, or weak spot, at the top of the wrinkle and caused the liner to bridge



(suspend above the ground) at the north and south toe. Water was also found under the bottom of the pond which was most likely caused by a failing seal of the boot around the influent pipe.

Barber-Webb recommended removing the entire bottom section of the south liner and replacing it with new material. The District staff agreed with this recommendation.

The following quotation from Barber-Webb was used for the additional repair work in the amount of \$2,885.

# THE BARBER-WEBB COMPANY

**INCORPORATED**

3833 EAST MEDFORD STREET  
 LOS ANGELES, CALIFORNIA 90063  
 PHONE (323) 264-4800 FAX (323) 260-7164

PAGE 1 OF 1

Yucaipa Valley Water District  
 12770 2nd St.  
 Yucaipa, Cal. 92399  
 PHONE#: 909-795-2491  
 FAX# : [kking@yvwd.dst.ca.us](mailto:kking@yvwd.dst.ca.us)  
 CONTACT: Kevin King

DATE 6/8/2011  
 QUOTATION NO. 19357

THIS OFFER MAY BE ACCEPTED ONLY BY DELIVERY  
 TO SELLER AT SELLER'S PLANT OF DULY EXECUTED  
 (1) ACCEPTANCE COPY OF THIS QUOTATION OR  
 (2) BUYER'S PURCHASE ORDER CONTAINING ON  
 ITS FACE THE PROVISION INDICATED BELOW.

THANK YOU FOR YOUR INQUIRY  
 WE OFFER YOU THE FOLLOWING AT THE PRICES INDICATED BELOW.

|   | PRICE                |
|---|----------------------|
| Provide the following additional services for repair of existing HDPE Geomembrane Pond Liner as detailed in Barber-Webb inspection report of 6-8-11, in 1 ea. South Effluent Water Holding Pond at Vallley Water District Wastewater Treatment Plant, Yucaipa, Cal.:<br><br>- Furnish and Install new 60 mil HDPE Geomembrane Lining in pond bottom only, approx. 24' x 40' ( 960 sf) and weld new bottom liner to exisiting sideslope liner. | Lump Sum \$ 2,885.00 |
| (cont.)   |                      |

**The following must appear on the face of any purchase order for the goods and/or services offered by this quotation:**  
 "NOT WITH STANDING ANYTHING HEREIN TO THE CONTRARY THIS TRANSACTION IS GOVERNED EXCUSIVELY BY THE TERMS AND CONDITIONS SET FORTH IN SELLER'S QUOTATION NO. 19357 ."

**ESTIMATED DELIVERY:** 1 week  
**ESTIMATED INSTALLATION:** add 1 day  
**TERMS OF PAYMENT:** Net 30 days from invoice date.  
**PRICE AND DELIVERY:** FOB JOB SITE.  
**DELINQUENT ACCTS:** Interest will be charged on overdue

**THE BARBER-WEBB COMPANY, INCORPORATED**

accounts at 10% per annum.

BY:

*Memo Alvarran*

Memo Alvarran, Project Manager

**ACCEPTANCE**

The above offer is accepted and you are requested to proceed immediately with the work.

Dated \_\_\_\_\_

Yucipa Valley Water District  
 \_\_\_\_\_  
 Company Name

By \_\_\_\_\_  
 Authorized Signature



**Date: June 28, 2011**

**Subject: Water Service Agreement for Separate Fire Protection at the Yucaipa High School Campus**

---

Representatives from Western Heights Mutual Water Company, Yucaipa-Calimesa Joint Unified School District and the Yucaipa Valley Water District have met on numerous occasions to discuss the current fire flow conditions at Yucaipa High School.

The attached draft agreement has been prepared by the parties to address the fire flow issue.

The purpose of this agenda item is to share the draft agreement and discuss any implementation issues.

## **WATER SERVICE AGREEMENT**

This Water Service Agreement (“Agreement”) is made by Western Heights Water Company, a California corporation (“Company”), Yucaipa Valley Water District, a public entity (“Water District”), and Yucaipa-Calimesa Joint Unified School District, a public entity (“School District”) as of August 1, 2011 (“Effective Date”). Company, Water District and School District are sometimes collectively referred to as “Parties” and individually as “Party”.

A. Company is a California Mutual Water Company authorized to provide water service to its shareholders and to a school district. The Company operates and maintains a water service meeting the health and quality standards consistent with the requirements of the State of California, Department of Public Health.

B. Water District is a County Water District that is capable of establishing a connection with Company to provide water for emergency fire flow purposes to Yucaipa High School (“High School”). The Water District operates and maintains a water service meeting the health and quality standards consistent with the requirements of the State of California, Department of Public Health.

C. School District owns and operates Yucaipa High School and desires to enter into this Agreement with Company and Water District for the provision of water service for emergency fire flow purposes to Yucaipa High School.

Therefore, for good and valuable consideration the receipt of which is acknowledged, the Parties agree as follows.

### **1. Water Service; Connection**

School District, at its sole cost and expense, shall construct a water pipeline and meter, pursuant to the standard specifications of the Water District, to School District’s water delivery system at a mutually agreeable location. The constructed pipeline and water meter shall be deemed the property of the Water District upon final acceptance by the Water District. The Water District shall provide water to the Company through the connection for delivery exclusively to the High School for emergency fire flow purposes only. For purposes of this Agreement, “emergency fire flow purposes” includes water service necessary to meet applicable fire code requirements and flushing for maintenance purposes. Nothing in this Agreement shall be deemed a waiver by the Company and the Water District of the “fire fighting immunities” under Government Code, Sections 850 *et. seq.*

This Agreement is not intended to provide routine potable water service from the Water District until such time as other agreements are executed by the Parties and facility capacity charges have been paid.

### **2. Consideration**

(a) Water District shall invoice Company for School District’s water consumption under this Agreement at Water District’s standard potable water commodity rates and in accordance with its standard procedures, and the Company shall pay the Water District’s invoice for such water consumption within 30 days of the date of such invoice with all invoices subject to Water District rules, regulations, and policies.

(b) Company shall invoice School District for water usage at Water District's rate plus an account maintenance fee based on the size of the water service meter. The account maintenance fee is subject to change in Company's sole discretion.

### **3. Term; Termination**

(a) This Agreement shall be effective as of the Effective Date and terminate for failure to make timely payments, or if any of the Parties hereto cease to operate or exist, or as provided in Section 3(b), (c) and (d) below.

(b) In the event of default, a Party may serve a 30-day notice of default to the defaulting party as provided in paragraph 7 herein. If the default is not cured within the 30-day period, this Agreement shall terminate immediately without any further action by any Party. If the nature of the default is such that more than thirty days are reasonably required for its cure, then the defaulting Party shall not be deemed to be in default if that Party has commenced such cure within the thirty day period and thereafter diligently prosecute such cure to completion.

(c) Any Party may terminate this Agreement upon 60 days written notice to the other Parties if Company is able to provide sufficient emergency fire flow services to School District directly from Company's distribution system.

(d) Notwithstanding the foregoing, any Party may terminate this Agreement upon 90 days advance written notice to the other Parties.

(e) Termination of this Agreement shall revert the fire protection for the High School back to the Water Company by virtue of the discontinuation of the water supply by the Water District.

### **4. Rights of Way; Access**

The School District shall obtain, if necessary, all rights of way, easements, encroachment permits or other permissions for the installation, operation and maintenance of the pipeline and meter connection and delivery of water under this Agreement.

### **5. Representations and Warranties**

Each Party represents and warrants that it has the authority, and that all necessary approvals have been obtained, to enter into this Agreement, and that no other action is required by that Party's governing board in order to effectuate this Agreement.

### **6. Assignment**

No Party shall assign this Agreement, or transfer any rights, obligation or duties hereunder, without the written consent of the other Parties, which consent shall not be unreasonably withheld.

**7. Notice**

All notices required hereunder shall be personally delivered, delivered by overnight courier, or sent by registered or certified mail, return receipt requested and postage prepaid, addressed as follows:

Company: Western Heights Water Company  
Attn: Superintendent  
32352 Avenue D  
Yucaipa, California 92399

Water District: Yucaipa Valley Water District  
Attn: General Manager  
12770 Second Street  
Yucaipa, California 92399

School District: Yucaipa-Calimesa Joint Unified School District  
Attn: Assistant Superintendent – Business Services  
12797 Third Street  
Yucaipa, California 92399

Notices personally delivered shall be deemed given the day so delivered. Notices given by overnight courier shall be deemed given on the first business day following the mailing date. Notices mailed as provided herein shall be deemed given on the third business day following the mailing date. Any Party may change its address for purposes of this subsection by giving written notice of such change to the other Party in the manner provided in this subsection.

**8. Force Majeure**

If any Party is prevented from complying with any express or implied covenant of this Agreement or performing any other activity reasonably related to and/or required by this Agreement by reason of war, terrorism, rebellion, riots, acts of God, or similar events that are beyond the control of the party (collectively referred to as a “Force Majeure Condition”), then, while so prevented, restricted or delayed, the Party’s obligation to perform hereunder shall be suspended and excused to the extent of prevention, restriction or delay, and the Party shall not be liable for damages for failure to comply with such obligation.

**9. Successors and Assigns**

This Agreement shall inure to the benefit of and be binding upon Company, Water District and School District, any assignee, and their respective heirs, transferees, successors and assigns, and all persons claiming under them.

**10. No Waiver**

No waiver of any right under this Agreement shall be effective for any purpose unless it is in writing and is signed by the Party hereto possessing the right, nor shall any such waiver be construed to be a waiver of any subsequent right, term or provision of this Agreement.

**11. Entire Agreement; Amendment**

This Agreement, together with its attached exhibits, contains the entire agreement between the Parties with respect to the subject matter hereof, and any prior or contemporaneous agreements, discussions or understandings, written or oral (including any options or agreements for leases, confidentiality agreements, and/or access agreements previously entered into by the Parties with respect to the Property), are superseded by this Agreement and shall be of no force or effect. No addition or modification of any term or provision of this Agreement shall be effective unless set forth in writing and signed by each of the Parties.

**12. Governing Law**

The terms and provisions of this Agreement shall be interpreted in accordance with the laws of the State of California without reference to its choice of law principles. This Agreement is made and to be performed in the County of San Bernardino, State of California.

**13. Interpretation**

The Parties agree that the terms and provisions of this Agreement embody their mutual intent and that such terms and conditions are not to be construed more liberally in favor of, or more strictly against, either Party.

**14. Partial Invalidity**

Should any term or provision of this Agreement, or the application thereof to any person or circumstance, to any extent, be invalid or unenforceable, the remainder of this Agreement or the application of such term or provision to persons or circumstances other than those to which it is held invalid or unenforceable, shall not be affected thereby, and each remaining term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

**15. Attorney Fees**

In any legal action arising from this Agreement, the prevailing party shall recover its costs, expenses and fees, including reasonable attorney, consultant and expert fees, including those incurred on appeal and in the enforcement of a judgment.

**16. Other General Provisions**

The covenants contained herein are made solely for the benefit of the Parties and their respective successors and assigns, and shall not be construed as benefiting any person or entity who is not a Party to this Agreement. Neither this Agreement nor any agreements or transactions contemplated hereby shall be interpreted as creating any partnership, joint venture, association or other relationship between the Parties.

**17. Counterparts**

This Agreement may be executed and recorded in two or more counterparts, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument.

Company, Water District and School District, acting through their duly authorized representatives, have executed this Agreement with the intent that it be effective as of the date first stated above, and acknowledge that they have read, understand and agree to the terms and conditions of this Agreement.

**WESTERN HEIGHTS WATER COMPANY**

By \_\_\_\_\_

Approved as to form

Lemieux & O'Neill

\_\_\_\_\_  
Water Company Counsel

**YUCAIPA VALLEY WATER DISTRICT**

By \_\_\_\_\_  
President

Attest

\_\_\_\_\_  
Secretary

Approved as to form

\_\_\_\_\_  
Water District Counsel

**YUCAIPA-CALIMESA JOINT UNIFIED SCHOOL DISTRICT**

By \_\_\_\_\_  
Assistant Superintendent – Business Services

Approved as to form

By \_\_\_\_\_  
School District Counsel



**Date: June 28, 2011**

**Subject: Construction Management Services for the Regional Brineline Extension and Non-Potable Water Distribution System Expansion Project**

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On April 7, 2010, the Board awarded a contract to Krieger & Stewart to provide construction management services for Phase 1 and 2 of the Regional Brineline Extension and Non-Potable Water Pipeline Project [Director Memorandum No. 10-022].

Due to the unforeseen trench conditions, the construction period for the pipe installation was extended requiring additional inspection and compaction testing.

District staff recommends that the Board approve Task Order No. 2 for Krieger & Stewart to cover these additional costs in the amount of \$174,620.00.

YUCAIPA VALLEY WATER DISTRICT

INDEPENDENT CONSULTANT'S TASK ORDER

(Project Title: Regional Brineline Extension and Phase II Regional Non-Potable Water Distribution System Expansion Project)

TASK ORDER NO.: Two

CONSULTANT:      Name:            Krieger & Stewart Inc.  
                         Address:        3602 University Avenue  
                                            Riverside, California 92501  
                         Telephone:    (951) 684-6900  
                         Fax:            (951) 684-6986  
                         Fed. Tax Id.: 95-2695159

THIS TASK ORDER is issued pursuant to that certain Agreement for Services by Independent CONSULTANT between the YUCAIPA VALLEY WATER DISTRICT ("OWNER") and KRIEGER & STEWART INC. ("CONSULTANT") dated April 7, 2010 (the "AGREEMENT").

1.      Task to be Performed. CONSULTANT shall provide all labor, materials and equipment to perform the following task (check one):

- See Exhibit "A", attached hereto
- Description of Task:

2.      Time of Performance. The CONSULTANT shall complete performance of such services by September 1, 2011.

3.      Liaison of OWNER. (Check one:) The  Engineering Project Integrator, Brent Anton, shall serve as liaison between OWNER and CONSULTANT.

4.      Staff Assignments. CONSULTANT will assign the following staff personnel to perform the services required by this Task Order:  
(Check if Not Applicable: )

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5.      Deliverables. CONSULTANT shall deliver to OWNER not later than the date or dates indicated, the following: (Check if Not Applicable: )

As-built Plans

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| REGIONAL BRINELINE EXTENSION AND NON-POTABLE OUTFALL - PHASES 1 AND 2                |                                       | ORIGINAL CONSTRUCTION PERIOD - 9 MONTHS | EXTENDED CONSTRUCTION PERIOD - 3 MONTHS  |
|--|---------------------------------------|---|--|
|  | NOTICE TO PROCEED - MAY 18, 2011      | ORIGINAL COMPLETION DATE - FEB 25, 2011 | ACTUAL COMPLETION DATE - MAY 24, 2011    |
| ITEM   | PROPOSAL TIME                         | ACTUAL TIME                             | FEE ADJUSTMENT REQUESTED                 |
| CONTRACT SCHEDULE TO SUBSTANTIAL COMPLETION  | ORIGINAL CONTRACT AMOUNT<br>\$979,100 |   | CONTRACT INCREASE REQUESTED<br>\$174,620 |
| K&S ONSITE INSPECTION SERVICES   | 280 CALENDAR DAYS                     | 360 CALENDAR DAYS                       | \$83,200                                 |
| K&S ADDITIONAL SURVEYING SERVICES (RESET STAKES LOST DURING STORMS, STAKE BORE PITS) | 0 CALENDAR DAYS                       | 5 CALENDAR DAYS                         | \$11,250                                 |
|  |                                       | K&S TOTAL                               | \$94,450                                 |
| CHJ ONSITE INSPECTION SERVICES   | 824 HOURS                             | 1,600 HOURS                             | \$80,170                                 |
|  |                                       | CHJ TOTAL                               | \$80,170                                 |
|  |                                       | FEE ADJUSTMENT TOTAL                    | \$174,620                                |



**Date: June 28, 2011**

**Subject: Proposed Bylaw Amendment and Board Election Information for the California Special Districts Association**

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The District has received information pertaining to a proposed bylaw change and the election of board members for the California Special Districts Association.

The bylaw change pertains to local and statewide membership issues. (See page 2 of 9.)

Information has also been received about candidates seeking election to the California Special Districts Association Board of Directors. (See pages 4 to 9.)

Both items will be scheduled for your consideration at the regular board meeting on July 6, 2011.

No action is required at this time.

RECEIVED  
JUN 08 2011  
YUCAIPA VALLEY  
WATER DISTRICT

MEMORANDUM

DATE: June 1, 2011

TO: California Special Districts Association (CSDA) Voting Members

FROM: Jo MacKenzie, CSDA Board President  
Neil McCormick, CSDA Executive Director

SUBJECT: Proposed CSDA Bylaws Amendments

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The CSDA Board of Directors has approved that attached recommended changes to the CSDA Bylaws to bring forward to CSDA voting members for consideration.

These recommended changes only affect one section of the bylaws (Article VIII – Local Chapters) as indicated in the attached document. The main reason for the proposed change to the bylaws is to require all newly formed chapters to have 100% of their members as dues paying members of the state association (CSDA) as well.

**Approving this bylaws change will not affect any existing CSDA chapter or its members. This is for newly formed chapters only.**

CSDA strongly encourages all chapters to promote membership in CSDA at the statewide level as it significantly helps in supporting the wide variety of efforts by the association throughout California and delivered on behalf of all districts. Ultimately, CSDA is trying to build and strengthen the relationship and connection between the statewide organization and chapters so we can better work together, communicate and have consistency in membership which makes us stronger.

The proposed changes are indicated in mark-up form on the attached excerpt from the Bylaws. A full version of the current CSDA bylaws can be found online at [www.csdanet.org/bylaws](http://www.csdanet.org/bylaws).

Once your district has reviewed the proposed CSDA bylaws updates, please use the enclosed official ballot with the prepaid postage to cast your vote by mail in favor or not in favor of the changes. **Completed ballots must be received by Friday, July 29, 2011 at 5:00 pm to be counted.** Only official and fully completed ballots returned via regular mail will be counted. The results of the Bylaws ballot will be announced in the CSDA e-News and on the CSDA website -- [www.csdanet.org](http://www.csdanet.org). If approved, the updated bylaws will take effect on August 1, 2011.

If you have any questions or require hard copies of any of any of these documents, you may contact Charlotte Lowe, Executive Assistant at [charlottel@csda.net](mailto:charlottel@csda.net) or (916) 442-7887.

**Thank you for your participation and continued support of CSDA!**



MAIL BALLOT FOR PROPOSED BYLAWS AMENDMENT

**Shall the 2011 Proposed CSDA Bylaws Amendments be Adopted?**

- Yes
- No

CSDA Member District Name: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_  
(GM or Board President)

View current 2010 CSDA Bylaws at [csda.net/bylaws](http://csda.net/bylaws)  
View proposed new bylaws also at [csda.net/bylaws](http://csda.net/bylaws)

(If you require a hard copy of either of the above listed bylaws or have questions, please call Charlotte Lowe, CSDA Executive Assistant at (877) 924-CSDA.) If approved, bylaws will become effective August 1, 2011.

RECEIVED  
JUN 20 2011  
YUCAIPA VALLEY  
WATER DISTRICT



**CALIFORNIA SPECIAL DISTRICTS ASSOCIATION**  
**2011 BOARD ELECTIONS**  
**MAIL BALLOT INFORMATION**

Dear Member:

A mail ballot has been enclosed for your district's use in voting to elect a representative to the CSDA Board of Directors in your Region for Seat C. Each of CSDA's six (6) regional divisions has three seats on the Board. Each of the candidates is either a board member or management-level employee of a member district located in your geographic region. Each Regular Member (district) in good standing shall be entitled to vote for one (1) director to represent its region.

We have enclosed the candidate statements for each candidate who submitted one. Please vote for **only one** candidate to represent your region in Seat C and be sure to sign, date and fill in your member district information (*in some regions, there may only be one candidate*). If any part of the ballot is not complete, the ballot will not be valid and will not be counted.

Please utilize the enclosed return envelope to return the completed ballot. Ballots must be received at the CSDA office at 1112 I Street, Suite 200, Sacramento, CA 95814 by **5:00pm on Friday, August 5, 2011**.

If you do not use the enclosed envelope, please mail in your ballot to:

**California Special Districts Association**  
**Attn: 2011 Board Elections**  
**1112 I Street, Suite 200**  
**Sacramento, CA 95814**

Please contact Charlotte Lowe toll-free at 877.924.CSDA or [charlottel@csla.net](mailto:charlottel@csla.net) with any questions.

**JIM ACOSTA**  
**P.O. BOX 4464**  
**VENTURA, CA 93007**  
**805.647.6477 cell 805.340.0870 email:acostabserv@aol.com**

My name is Jim Acosta and I am currently on the board of directors of CSDA. I am seeking re-election to the CSDA board of directors. I would like your support to continue the work of representing you at CSDA.

I am proud of the accomplishments of CSDA during my time on the board. Working in conjunction with the rest of the directors, we have increased the membership numbers, targeting small districts, by offering incentives to become members of CSDA. We also have increased the number of member benefit programs. One of the accomplishments that I am most proud of is the Annual Conference. We have focused resources on the Annual Conference to elevate it to the stature of a premier conference amongst the different associations. We have accomplished that by bringing in speakers to the conference that are timely, and bringing a message that is pertinent to special districts.

This past year has seen many challenges for Independent Special Districts. The transparency laws that were put in place presented another challenge to Special Districts and CSDA was there to assist members to comply and meet the deadline. The CSDA continues to meet those kinds of challenges and I think we have a good board that works well together. For these reasons I would like your support for re-election to the board of CSDA

I serve as President of the Saticoy Sanitary District, and treasurer of the Saticoy Lions Club, and Secretary Treasurer for the Downtown Center for the Arts. I have served as a director of the Ventura Regional Sanitation District and the Triunfo Sanitary District. I have also served as a commissioner of the Ventura County LAFCO, representing the Special Districts of Ventura County. Other boards that I have served include the Ventura County Special District Association, the Boys and Girls Club of Ventura and the Saticoy Community Council.

Please support me in my bid for re-election.

CSDA BOARD OF DIRECTORS  
JOHN FOX'S CANDIDATE STATEMENT

I joined the Board in 1989 and have served CSDA continuously in many capacities including Board Member over 18 years, President 2006-07, Chair of most committees, Santa Barbara Chapter President 4 times, CSDA Finance Corporation President 7 times.

I believe very strongly that Special Districts serves an important role as the third leg of local government in bringing mostly single purpose focus to grass roots in more than twenty different infrastructure and community needs through over 2100 independent Special Districts statewide. I feel my background and experience over a considerable period of time uniquely qualify me to provide a leadership contribution to maintaining and strengthening CSDA further during the current unsettling times.

My primary thrust at present is on five project areas:

CSDA Finance Corporation - Current President of this dynamic activity which has financed almost one BILLION dollars in Capital Improvements and equipment leases to over 70 Special Districts.

I am also actively involved in the following:

Chapter Development  
Membership Committee  
Education Committee  
New Products and Services

Creative Programs designed to address membership retention and growth, low cost tax exempt loans and consideration of new products and services are underway and I look forward to participating in those deliberations.

Space does not allow further elaboration here but I will be sending a letter to you expanding on these and other topics in the near future.

CSDA needs dedicated directors who are willing and able to commit substantial amounts of time to attending meeting in Sacramento and elsewhere and communicating by Email and phone regarding all manner of

actions. I have the dedication, time, willingness, energy, enthusiasm and commitment for the job.

I would welcome your call with questions and comments at any time. Try it to see! Call 805-967-9071 or Email - [FXYJON@aol.com](mailto:FXYJON@aol.com).

Your vote would be greatly appreciated.

John R. Fox

## **RJ Kelly, Castaic Lake Water Agency Region 5**

RJ Kelly has been serving on the Castaic Lake Water Agency Board for the past 8 years. How did this happen? RJ's private practice is in the finance and tax field. This led the Board to request him to replace an outgoing director that was retiring. During the 8 years of service RJ has served as Board Vice President for 4 years and Board president for the last 2 years.

RJ earned the CSDA award of Board President of the Year in 2010. RJ has been promoting CSDA to his Board and Agency (which has been a member for several years) and attends the annual conferences. He completed and was certified with both the SDI and CSDI Governance programs. RJ is committed to giving a 100% to the CSDA Region 5 Board if elected and looks forward to your votes and resolutions of support.



**CSDA BOARD OF DIRECTORS  
ELECTION 2011**  
*All Fields Must Be Completed for ballot to be counted.  
(Please vote for only one.)*

**REGION FIVE**

●  
*Seat C - term  
ends 2014*

**Jim Acosta\***  
*Saltcoy Sanitary District*

**R.J. Kelly**  
*Castaic Lake Water Agency*

**John Fox**  
*Goleta Sanitary District*

[REDACTED]

\* incumbent

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Member District: \_\_\_\_\_

Must be received by 5pm, August 5, 2011. CSDA, 1112 I Street, Suite 200, Sacramento, CA 95814