Calaveras County Water District

Groundwater Management Plan 2007 Update

Prepared for:

Calaveras County Water District

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SECTION 1 INTRODUCTION

Water is a precious resource that enables homes, business, and agricultural interests to continue to grow in the Sierra Nevada foothills and upland areas of the San Joaquin Valley. In the last fifteen years, these areas have experienced some of the fastest growth rates in all of California. This rapid development and changing land use increases the demand on water supplies, water quality, and water delivery infrastructure.

Groundwater is a major portion of the overall water supplies in Calaveras County. Management of this vital resource in conjunction with other water supply sources is a high priority for Calaveras County Water District (CCWD). As such, the CCWD has developed this update to the Groundwater Management Plan, which meets the requirements of State Bill 1938 (SB 1938).

1.1 PURPOSE STATEMENT

The Purpose of a Groundwater Management Plan (GWMP) is to provide management direction to the stewards of groundwater resources with discrete goals, objectives and methods for achieving those goals and objectives. The purpose of this GWMP is no different, and is stated below:

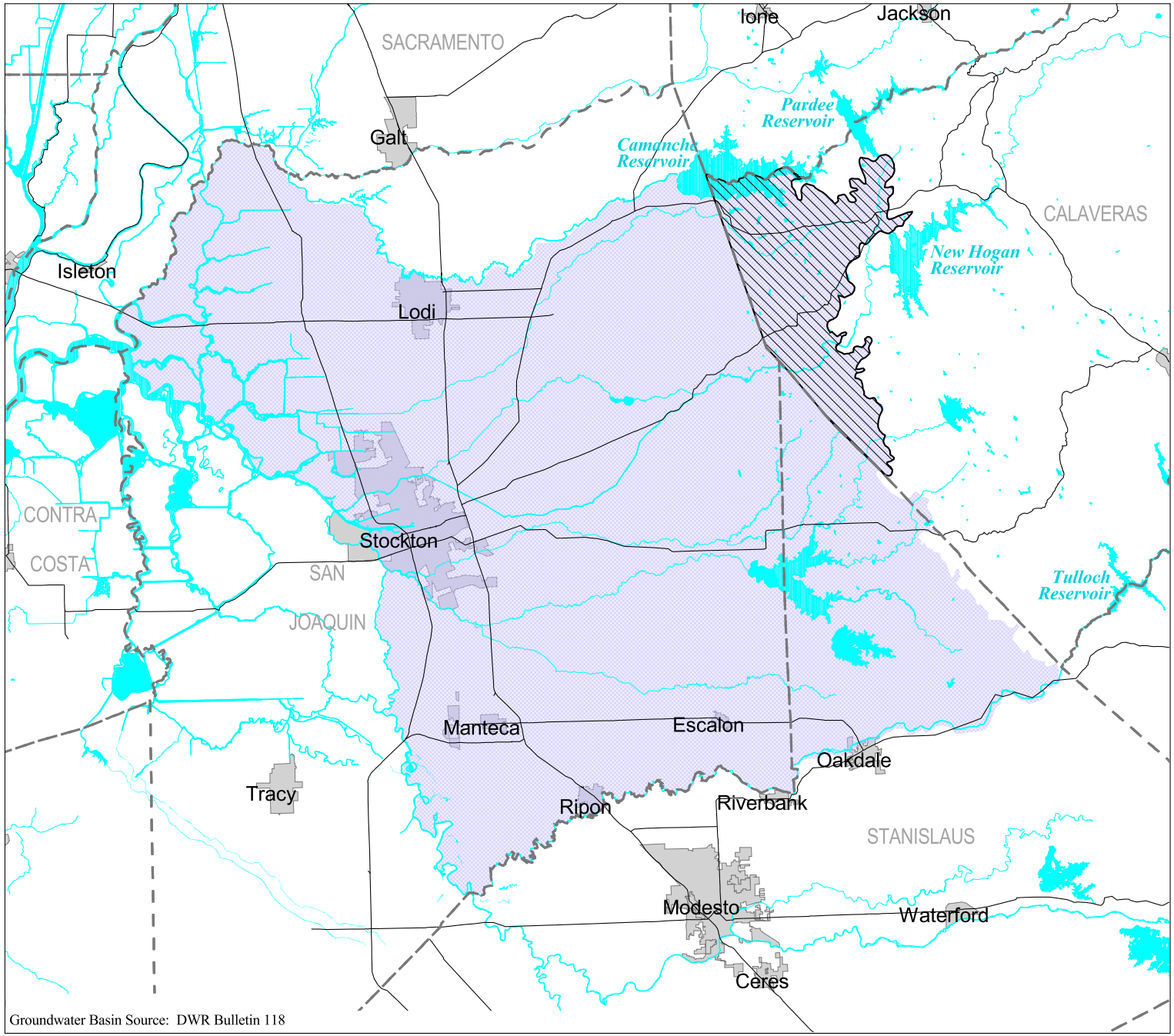
> *The purpose of the Calaveras County Water District Groundwater Management Plan 2007 Update is to provide management direction for the continued beneficial use and stewardship of the portion of the Eastern San Joaquin groundwater sub-basin that lies within Calaveras County.*

1.2 CALAVERAS COUNTY WATER DISTRICT

CCWD was formed in 1946 under the laws of the State of California as a public agency for the purpose of developing and administering the water resources of Calaveras County. CCWD adopted the current groundwater management plan in 2001, to meet the requirements of Assembly Bill 3030, and has continued to develop additional groundwater information since that time as described herein.

1.3 PLAN AREA

The Eastern San Joaquin groundwater sub-basin is a 707,000 acre basin that includes parts of San Joaquin, Stanislaus, and Calaveras County. The Plan Area for this Groundwater Management Plan is the portion of the Eastern San Joaquin groundwater sub-basin that overlies Calaveras County. This portion of the groundwater basin, known as the Camanche/Valley Springs Area, is located in the northwestern portion of Calaveras County. Figure 1-1 shows the



Regional Setting

FIGURE 1-1

- Groundwater Management Plan Area
- Eastern San Joaquin Subbasin
- Roads
- County Boundary
- Lake
- River

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groundwater basin boundaries as defined by the California Department of Resources (DWR) Bulletin 118, the location of Calaveras County, and the Plan Area. The Eastern San Joaquin Basin has been identified in Bulletin 118 as being in a state of overdraft.

The Plan Area contains several communities that share with CCWD the responsibility of managing local groundwater resources. These communities include Valley Springs, Wallace, and Jenny Lind. These three communities are shown in Figure 1-2.

The Valley Springs community water supply is administered by Valley Springs Public Utility District (VSPUD). The VSPUD also supplies water to the Valley Oaks Shopping Center and Zippy Mart. Water for the VSPUD is supplied entirely by groundwater, with 2 storage tanks providing combined storage of 400,000 gallons.

The Wallace community water service is managed by Wallace Community Services District (CSD). Water for the CSD is supplied by four groundwater wells.

The Jenny Lind community is supplied water by CCWD. CCWD receives the water for Jenny Lind from the Calaveras River though a non-Central Valley Project (CVP) contract with the United States Bureau of Reclamation (USBR). This water is stored in New Hogan Reservoir and is diverted and treated one mile downstream of New Hogan Dam. The treatment plant has a capacity of 6.0 million gallon per day (mgd).

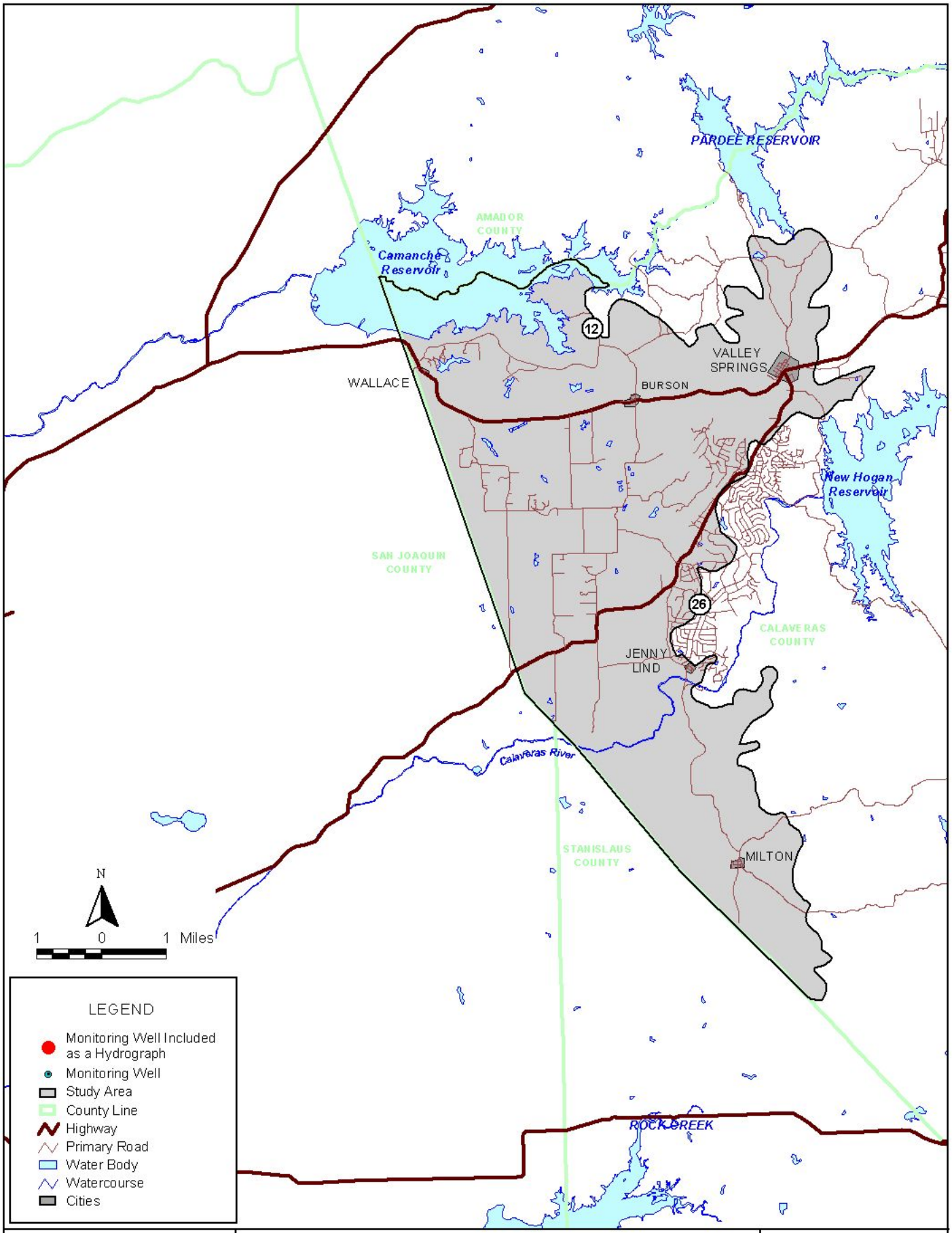
In addition, the populated place of Burson (per the United States Census Bureau) has no formal water service, but has formed the Burson Water Committee, a group of citizens who are concerned about managing local groundwater resources.

1.4 CALAVERAS COUNTY WATER RESOURCES BACKGROUND

Calaveras County is located in the Mother Lode region of the central Sierra Nevada foothills. The county is bordered by San Joaquin and Stanislaus Counties to the west, Amador County to the north, Alpine County to the east, and Tuolumne County to the south. Topographically, the county is situated between the Central Valley to the west and the Sierra Nevada to the east. Elevations vary dramatically across the county, from approximately 200 feet above mean sea level (msl) in the west to 8,170 feet above msl in the east. Within the project area, the mean elevation is roughly 400 feet above msl.

1.4.1 SURFACE WATER RESOURCES

Historically, CCWD has met a significant portion of the water needs of Calaveras County with surface water from the Mokelumne, Calaveras, and Stanislaus Rivers. These rivers flow west to the Sacramento/San Joaquin Delta. Figure 1-3 shows the location of these three rivers and their associated watersheds.



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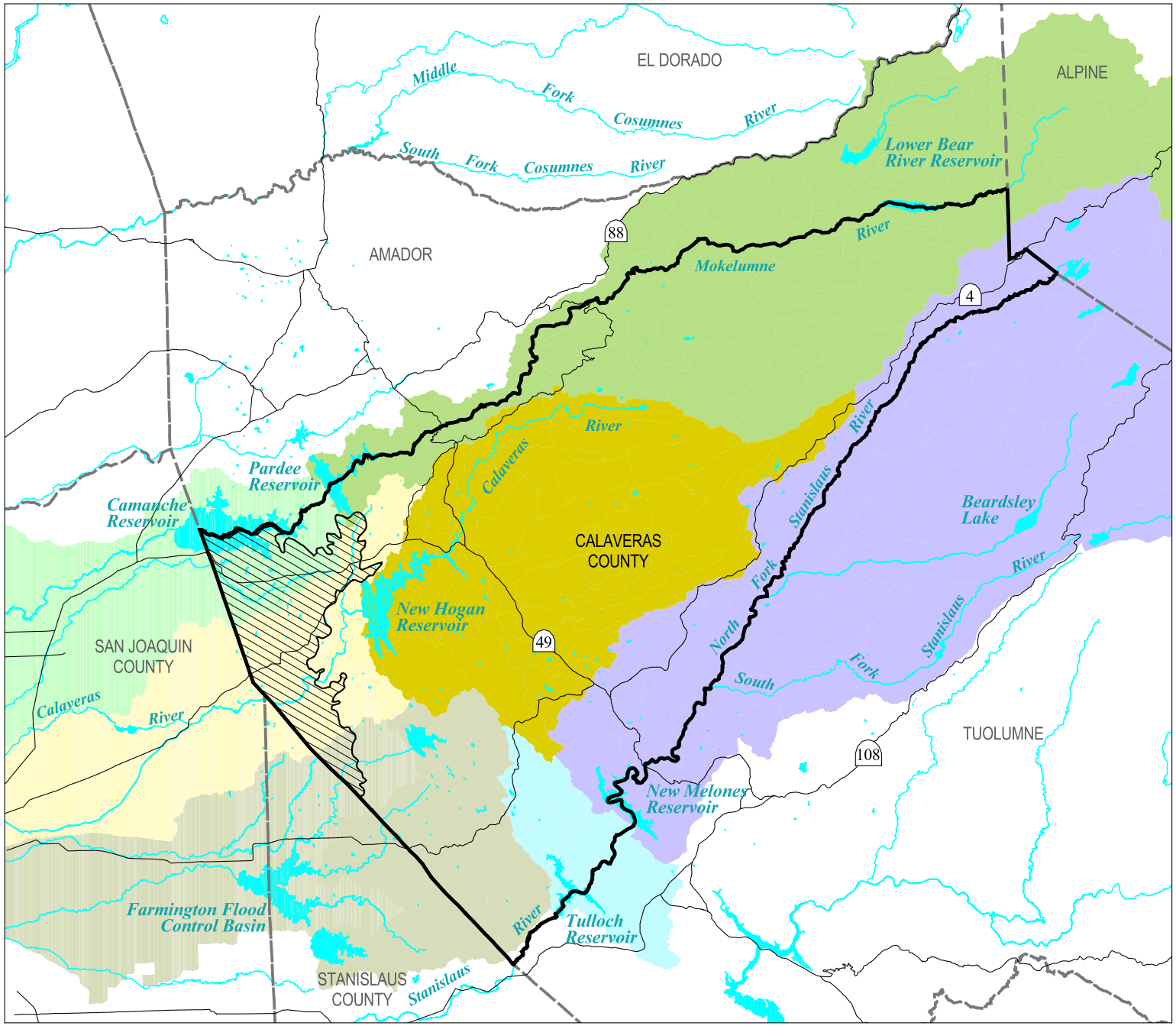
Calaveras County Water District Groundwater Management Plan

Plan Area

FIGURE 1-2



Watersheds of Major Rivers Within Calaveras County

FIGURE 1-3

- Groundwater Management Plan Area
- Roads
- Calaveras County Boundary
- County Boundary
- Lake
- River

WATERSHED

- Mokelumne River (above Pardee)
- Mokelumne River (below Pardee)
- Calaveras River (above New Hogan)
- Calaveras River (below New Hogan)
- Stanislaus River (above New Melones)
- Stanislaus River (below New Melones)
- Lower San Joaquin River

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1.4.2 GROUNDWATER RESOURCES

The bulk of Calaveras County is underlain by the faulted and folded igneous and metamorphic rocks of the Sierra Nevada, the Plan Area is underlain by westward thickening alluvial sediments. Groundwater occurs in the faults and fractures of the Sierra Nevada rocks and in the pore space of alluvial sediments in the Plan Area. Wells drilled into the Sierra Nevada rocks may yield small amounts of water to domestic wells; however, water supply and availability are unpredictable. Wells drilled into the alluvial sediments of the Plan Area are more reliable than those in the Sierra Nevada rocks, but have been becoming less reliable as the demands placed on the aquifer have increased. In recent years, an increasing number of wells have been drilled into these rocks for small domestic supply wells, dramatically increasing demand on a finite resource. Groundwater is used by local water purveyors and individuals to meet domestic and agricultural demands. One of CCWD's goals is to maximize the beneficial use of its surface water rights within Calaveras County, through development and implementation of conjunctive use programs in coordination with groundwater resources.

In the northwest portion of Calaveras County, the bedrock of the Sierra Nevada is overlain by the alluvial sediments of the Central Valley. The alluvial aquifer yields more water than the bedrock aquifer, and is more reliable and manageable. Groundwater wells in the project area typically extract water from these eastward-thinning alluvial deposits.

1.5 CALAVERAS COUNTY GROUNDWATER MANAGEMENT BACKGROUND

CCWD has been actively involved in proactive groundwater management since 2001, the following presents a brief summary of those actions:

- September 2001: CCWD adopts AB 3030 Groundwater Management Plan (Phase I);
- May 2003: CCWD adopts the Camanche/Valley Springs Groundwater Sampling and Analysis Plan (GWSAP) thereby initiating the Groundwater Monitoring Plan;
- July 2003: CCWD finalizes the Camanche/Valley Springs Area Hydrogeologic Assessment;
- June 2005: CCWD finalized but does not adopt the Phase II Groundwater Management Study (Phase II), and
- October 2007: CCWD initiates the CCWD Groundwater Management Plan 2007 Update.

CCWD adopted their first groundwater management plan consistent with Assembly Bill 3030 in September 2001 for the Camanche/Valley Springs Area of Calaveras County. The Plan, known as Phase I, began the development of a better understanding of the groundwater resources in

northwestern Calaveras County to improve groundwater management through the first effort to present all known hrdrogeologic information for the Plan Area in one report.

As part of the developing the Phase I, CCWD worked with other agencies and local groups to gather data and other information, involved entities are listed below:

- Calaveras County Environmental Health Department;
- East Bay Municipal Utility District (EBMUD);
- United States Army Corps of Engineers (USACE);
- Wallace Community Services District (WCSD), and
- Burson Water Committee.

In 2003 the CCWD received an AB 303 grant for the DWR. Work done under the 2003 grant was divided into two primary components:

- Camanche/Valley Springs Area Hydrogeologic Assessment.
- Annual Groundwater Assessment.

The purpose of the Hydrogeologic Assessment was to develop an initial hydrogeologic understanding of the Plan Area based on available information. The Hydrologic Assessment is being used to develop a better understanding of potential groundwater management opportunities in the Plan Area. Camanche/Valley Springs Groundwater Sampling and Analysis Plan

The purpose of the Annual Groundwater Assessment was to develop a groundwater level and water quality monitoring program consistent with the groundwater management goals of the AB 3030 Groundwater Management Plan adopted by CCWD. The GWSAP was developed as a means of implementation and standardization for the Annual Groundwater Assessment described in the Hydrogeologic Assessment. Groundwater level data and water quality data were collected for Spring 2003 and are presented in this report.

A Phase II study was prepared in 2005 for the purposes of developing a SB 1938 compliant groundwater management plan. The goal of Phase II was to continue developing a better understanding of the available groundwater resources in northwestern Calaveras County and their impact on water supply conditions to support the current and future land use in the Plan Area. The 2005 Phase II document was not formally adopted by the CCWD Board. This report is an updated Phase II document prepared for adoption by the CCWD Board and to comply with SB 1938.

1.6 GROUNDWATER MANAGEMENT PLAN COMPONENTS AND CONSISTENCY WITH THE CALIFORNIA WATER CODE

Groundwater management is the planned and coordinated local and regional efforts of sustaining the groundwater basin to meet future water supply needs. With the passage of AB 3030 in 1992, local water agencies were provided a systematic way of formulating

groundwater management plans (California Water Code, Sections 10750 et seq.). AB 3030 also encourages coordination between local entities through joint-power authorities or MOUs. SB 1938, passed in 2002, further emphasized the need for groundwater management in California. SB 1938 requires groundwater management plans to contain specific plan components in order to receive state funding for water projects. This CCWD GWMP includes the seven mandatory components that are required under SB 1938. The GWMP also addresses the 12 specific technical issues identified in the California Water Code. Table 1-1 lists required and recommended components and identifies the specific location within this GWMP where the information can be found. In addition, there are seven suggested components identified in DWR Bulletin 118 which are discussed in Section 5.

Table 1-1. CCWD GWMP Components

Description	Section(s)
SB 1938 Mandatory Components	
1. Documentation of public involvement	3.1
2. BMO(s)	3.2
3. Monitoring and management of groundwater elevations, groundwater quality, inelastic land subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality	3.3
4. Plan to involve other agencies located in the groundwater basin	3.4
5. Adoption of monitoring protocols	3.5
6. Map of groundwater basin boundary, as delineated by DWR Bulletin 118, with agencies boundaries that are subject to GWMP	Figures 1.1, 1.2, & 1.3
7. For agencies not overlying groundwater basins, prepare the GWMP using appropriate geologic and hydrogeologic principles	3.7
AB 3030 and SB 1938 Voluntary Components	
1. Control of saline water intrusion	4.1
2. Identify and manage well protection and recharge areas	4.2
3. Regulate the migration of contaminated groundwater	4.3
4. Administer well-abandonment and destruction program	4.4
5. Control and mitigate groundwater overdraft	4.5
6. Replenish groundwater	4.6
7. Monitor groundwater levels	3.3
8. Develop and operate conjunctive use projects	4.7
9. Identify well-construction policies	4.8
10. Develop and operate groundwater contamination cleanup, recharge, storage, conservation, water-recycling, and extraction projects	4.9
11. Develop relationships with state and federal regulatory agencies	4.10
12. Review land use plans and coordinate with land use planning agencies to assess activities that create reasonable risk of groundwater contamination	4.11
DWR Bulletin 118 Suggested Components	
1. Manage with guidance of advisory committee	5
2. Describe area to be managed under GWMP	5
3. Create links between BMOs and goals and actions of GWMP	3.2
4. Describe GWMP monitoring programs	3.3
5. Describe integrated water–management planning efforts	5
6. Report of implementation of GWMP	6
7. Evaluate GWMP periodically	6

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SECTION 2 WATER RESOURCE SETTINGS AND CURRENT CONDITIONS

This section summarizes the groundwater and water supply issues that are present in the CCWD GWMP area. It describes the historical and current conditions and contains an overview of the physical setting, including the climate, soils, and geology. Current land use and water demands, groundwater conditions, water supplies and sources, existing water supply facilities, and water quality in the groundwater basin are presented.

2.1 GEOLOGIC SETTING

The Plan Area lies in the foothills of the Sierra Nevada. The ridge and valley topography of the area marks the transition between the flat-lying, sediment-filled basin of the Central Valley and the uplifted and faulted rocks of the Sierra Nevada.

The geologic units in the Plan Area consist of relatively flat-lying, westward-dipping Tertiary and Quaternary sediments overlying the tilted Sierra Nevada bedrock complex. The geologic units in the Plan Area are summarized in Figure 2-1 and described below. They include the Eocene Ione Formation, the Oligocene to Miocene Valley Springs Formation, the Miocene to Pliocene Mehrten Formation, the Pliocene Laguna Formation, and the Pliocene to recent alluvial deposits. The surficial geology in the Plan Area is shown in Figure 2-2.

2.1.1 SOILS AND NEAR-SURFACE CONDITIONS

The U.S. Department of Agriculture National Resource Conservation Service (NRCS) has tabular and spatial data soil available through its Soil Data MART. The Plan Area lies within soil survey area CA630 (Calaveras Area, California, Parts of Calaveras and Stanislaus Counties). Unfortunately the NRCS has no electronically published data available for this soil survey area

The California Department of Forestry published several soil vegetation surveys as a portion of the U.S. Department of Agriculture Service Resource Bulletin PSW-13/1974. These maps provide basic information about soils and vegetation; their characteristics, location, extent and relationships. There are four 7.5-minute quadrangle maps detailing the vegetation and soils of the Plan Area that are included in bulletin PSW-13/1974.

The surface recharge potential of soils was interpreted based on the hydrologic soil group, as categorized by the NRCS. Hydrologic soil groups are classified according to their ability to infiltrate water and affect runoff. Soils are grouped according to the rate of infiltration when the soils are saturated and receive additional precipitation. The four hydrologic soil groups are:

Figure 2-1. Geologic Units in Plan Area

System and Series			Geologic Unit	Lithologic Character	Thickness in Study Area (ft)[1]	Water-bearing Character
CENOZOIC	QUATERNARY	Holocene	Alluvial Deposits (Q)	Composed of clay, silt, sand and gravel. Includes all post-Mehrten alluvial deposits.	50	Includes the Victor Formation and Arroyo Seco gravels. Typically moderately permeable throughout[2] and generally more permeable than the underlying layers.
CENOZOIC	QUATERNARY	Pleistocene	Laguna Formation (Tl)	Poorly exposed consolidated and non- to poorly bedded[3] continental alluvial clay, silt, sand, and gravel[1,2,3] composed mostly of granitic and metamorphic detritus from the Sierra Nevada bedrock complex with some volcanic detritus[1,2]. Non and poorly bedded and poorly exposed[3].	200	Moderate permeability results in less water production than the overlying alluvial deposits or the underlying volcanic rocks from the Sierra Nevada[2]. The Laguna Formation may supply water to wells from its numerous bodies of perched water in permeable sand lenses[2,3]. In general, gravel deposits are not significant sources of water[2].
CENOZOIC	TERTIARY	Pliocene	Mehrten Formation (Tm)	West of the Melones Fault in the Sierra Nevada Foothills, the Mehrten Formation is predominantly composed of fluviatile andesitic siltstone, sandstone and conglomerate and contains tuff flow breccia (lahar) deposits[1,2,3]. Bluish gray crossbedded sandstone[2], tuffaceous sandstone, tuff and rhyolite[1] are also found within this formation.	75-400	The permeable well sorted and poorly consolidated conglomerate and sandstone beds yielding large amounts of water are confined by interbedded cemented and fine-grained layers resulting in extremely variable permeability[2]. The overall permeability is high to moderate[4].
CENOZOIC	TERTIARY	Miocene / Oligocene	Valley Springs Formation (Tvs)	Tuff, claystone, siltstone, sandstone, conglomerate[1], quartz sand[2], pumice, volcanic ejectiles[3], silicious ash, and greenish grey clay[2,3] predominantly of rhyolitic origin[1,2,3]. In general, the Valley Springs Formation is fine-grained, containing less coarse grained deposits than fine grained.	75-525	This formation is the primary water producing deposit in the study area, as it composes most of the tapped alluvial aquifer in Calaveras County. Although the large amount of clay and pumiceous material results in an overall low permeability, the Valley Springs Formation is regarded as a good producer of good quality groundwater near areas of outcrop[5].
CENOZOIC	TERTIARY	Eocene	Ione Formation (Ti)	Light colored anauxitic sand and clay[2,3], quartzose[1] and dark reddish or brownish iron-rich sandstone[2] interbedded with kaolinitic clay[1], and a minor amount of lignitic material[2,3].	400	Not highly permeable[3]. Contains fresh water near the eastern edge of the Sacramento Valley[2].
MESOZOIC	CRETACEOUS / JURASSIC		Undifferentiated Bedrock (Jud)	Igneous, metamorphic, and ultramafic rocks[1].		Largely non-water-bearing, but may contain water in fault and fracture zones or in zones of weathering[3].

Notes:

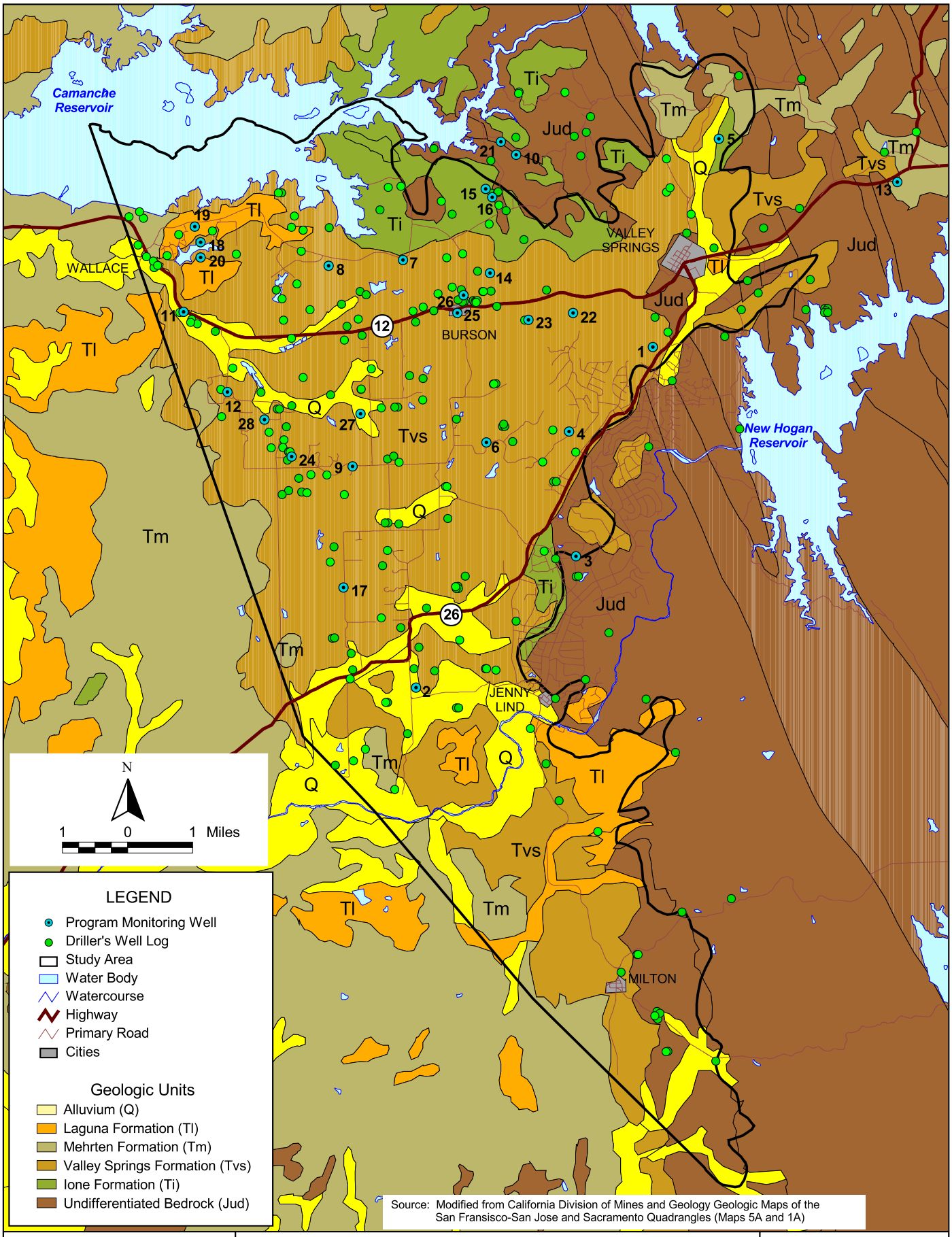
[1] Geologic Map of the Sacramento-San Jose Quadrangle, CDMG Map 5A, 1981.

[2] Geologic Features and Ground-Water Storage Capacity of the Sacramento Valley, California, USGS 1497.

[3] Geology and Ground-Water Hydrology of the Mokelumne Area, California, USGS 780, 1939.

[4] San Joaquin County Groundwater Investigation, DWR Bulletin 146, 1967.

[5] Evaluation of Groundwater Resources, Bulletin 118-3 DWR, 1974.



Source: Modified from California Division of Mines and Geology Geologic Maps of the San Fransisco-San Jose and Sacramento Quadrangles (Maps 5A and 1A)

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CALAVERAS COUNTY WATER DISTRICT GROUNDWATER MANAGEMENT PLAN

Surface Geology Map

FIGURE 2-2

- **Group A**: Soils having a high infiltration rate (low runoff potential) when saturated;
- **Group B**: Soils having a moderate infiltration rate when saturated;
- **Group C**: Soils having a slow infiltration rate when saturated; and
- **Group D**: Soils having a very slow infiltration rate (high runoff potential) when saturated.

There are no Group A soils in the Plan Area. Group B soils were digitized from the maps available from Bulletin PSW-13. Figure 2-3 shows the distribution of the three types of Group B soils in the Plan Area.

2.1.2 BEDROCK

Multiple sedimentary units in the Plan Area lie unconformably on top of the Sierra Nevada bedrock complex.

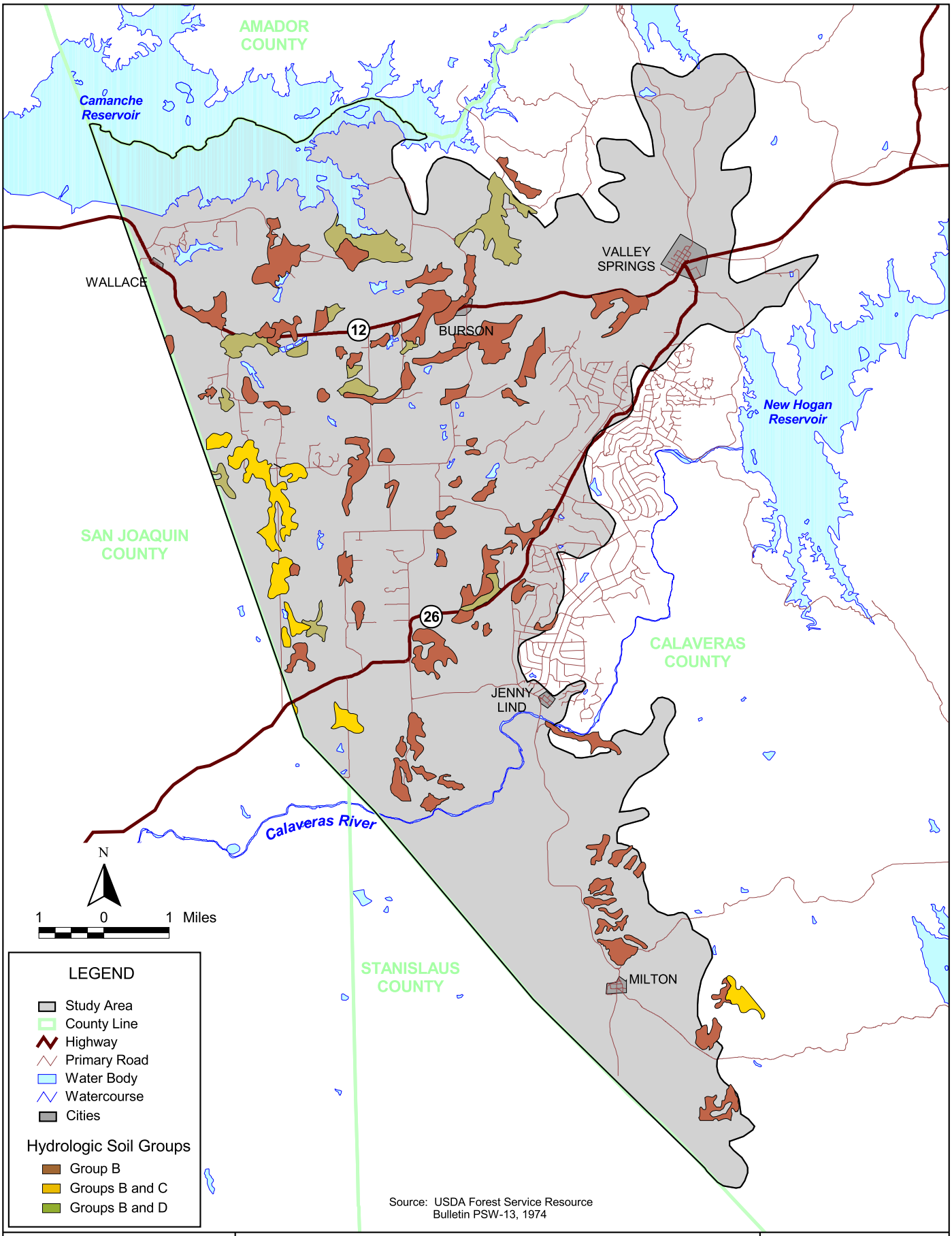
Fracture sets and joints within the resistant metamorphic and igneous rocks of the Sierra Nevada bedrock complex may contain sufficient groundwater for domestic or agricultural supplies; however, water supplies and occurrence are unpredictable. In general, bedrock wells show a high degree of variability of well yields, even over short distances.

2.1.3 IONE FORMATION

The Eocene Ione Formation unconformably overlies the Sierra Nevada bedrock complex and is composed of marine to non-marine clay, sand, sandstone, and conglomerate. The thick beds of clay range in color from white to red, and from blue to gray with lignite. These clay beds, along with the typically medium-grained quartz rich sand and sandstone, may also contain coarse granular kaolinite (anauxite), a characteristic clay mineral of the Ione Formation. The conglomerate generally is composed of quartz and metamorphic rock material derived from the Sierra Nevada bedrock complex. In localized areas near the Sierra Nevada foothills, the formation contains fresh water.

2.1.4 VALLEY SPRINGS FORMATION

The Miocene Valley Springs Formation lies unconformably on the Ione Formation and is composed of tuff, ash, clay, sandstone, and conglomerates, all of rhyolitic origin. The Valley Springs deposits are distinguished from the Ione deposits by their volcanic nature. Typical tuff deposits are either a white vitric tuff or a fine-grained green tuff. These tuffs may display alteration to clays, and in extreme cases, only a claystone bed with relict tuffaceous texture remains. Pure deposits of rhyolitic ash exist in areas, while many sand and ash beds are present. In general, the clay beds of the Valley Springs Formation are greenish in color, and may contain silt, sand, and large pumice fragments. The sandstones range in grain size from fine to coarse, and are typically well cemented. Predominantly composed of quartz and pre-



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CALAVERAS COUNTY WATER DISTRICT GROUNDWATER MANAGEMENT PLAN

Location of Group B Soils

FIGURE 2-3

cretaceous material, the relatively sparse conglomerate lenses within the tuff, clay, and sandstone may also contain pumice fragments. In general, the Valley Springs Formation is predominantly fine-grained. The Valley Springs Formation is the predominant lithology of the alluvial aquifer in the Plan Area. This formation outcrops over most of the Plan Area as it is present at ground surface throughout the Plan Area.

The Valley Springs Formation is the primary water-producing deposit in the Plan Area. Although the large amount of clay and pumiceous material results in an overall low permeability, the Valley Springs Formation is regarded as a reliable source and good producer of good quality groundwater near areas of outcrop.

2.1.5 MEHRTEN FORMATION

The Miocene to Pliocene Mehrten Formation unconformably overlies the Valley Springs Formation. The Mehrten Formation is thin and discontinuous over much of the Plan Area. This formation can be seen capping hilltops in some areas of Calaveras County. In the Sierra Nevada, this formation is composed of andesite and basalt lava flows with volcanic mudflows (lahars). Further from the mountains, and closer to the Central Valley, this formation consists of fluvial sandstone interbedded with conglomerate, siltstone, claystone, and mudflows, all of andestic and basaltic origin. In many areas, basal deposits contain reworked detritus of the Valley Springs and older formations. Dark gray to blue and black sandstone is very widespread and composes approximately 50 percent of the Mehrten deposits. Well-cemented siltstones and claystones are generally gray to blue and dark brown, and exist in thin to massive beds. The hard, impervious mudflows are composed of weakly graded, angular, andesitic detritus.

The Mehrten Formation is the primary water-bearing unit in neighboring San Joaquin County. However, this formation lacks sufficient widespread presence in the Plan Area to be the predominant water source for Calaveras County. Typically, in the sparse locations where the Mehrten Formation is present within the Plan Area, wells tap the underlying Valley Springs Formation. Permeability within the Mehrten deposits varies from highly permeable sandstone and conglomerate beds to low permeability mudflow deposits. The high percentage of sandstone versus fine-grained deposits results in an overall high to moderate permeability.

2.1.6 LAGUNA FORMATION

The Pliocene to Pleistocene Laguna Formation is composed of granitic, metamorphic, and volcanic clay, sand, silt, and gravel. Typically these poorly exposed stream-laid alluvial deposits form high terraces and are associated with the last major uplift in the Sierra Nevada. The discontinuous nature of these deposits limits the water-bearing capabilities of the Laguna Formation in the Plan Area. Permeable sand lenses and occasional perched water zones may supply water to domestic wells.

2.1.7 ALLUVIUM

In the Plan Area, the alluvium consists of all deposits younger than the Laguna Formation. Although these deposits encompass a long depositional period, they are of common lithology. These unconsolidated deposits are composed of clay, silt, sand, and gravel, and form a thin veneer over the older deposits in the Plan Area. These deposits can be found forming terraces as well as in stream and river channels.

The alluvial deposits in the Plan Area are typically moderately permeable throughout and generally more permeable than the underlying layers. However, these deposits lack the widespread presence and thickness needed to be a reliable source of water.

2.2 HYDROGEOLOGIC SETTING

2.2.1 GROUNDWATER BASIN DEFINITION

The Plan Area is located in the northeast corner of the Eastern San Joaquin groundwater sub-basin as defined in DWR Bulletin 118. Deposits composing the alluvial aquifer in the Plan Area include: the Ione Formation, the Valley Springs Formation, and the Pliocene to recent alluvial deposits. The primary water-bearing deposits in the Eastern San Joaquin groundwater sub-basin west of the Plan Area include the Alluvium and Modesto/Riverbank Formations, Flood Basin Deposits, Laguna Formation, and Mehrten Formation. The Mehrten Formation is considered to be the oldest significant fresh-water-bearing formation on the east side of the basin. Where the Laguna Formation and Mehrten Formation are present, the underlying Valley Springs Formation and Ione Formation are not utilized extensively.

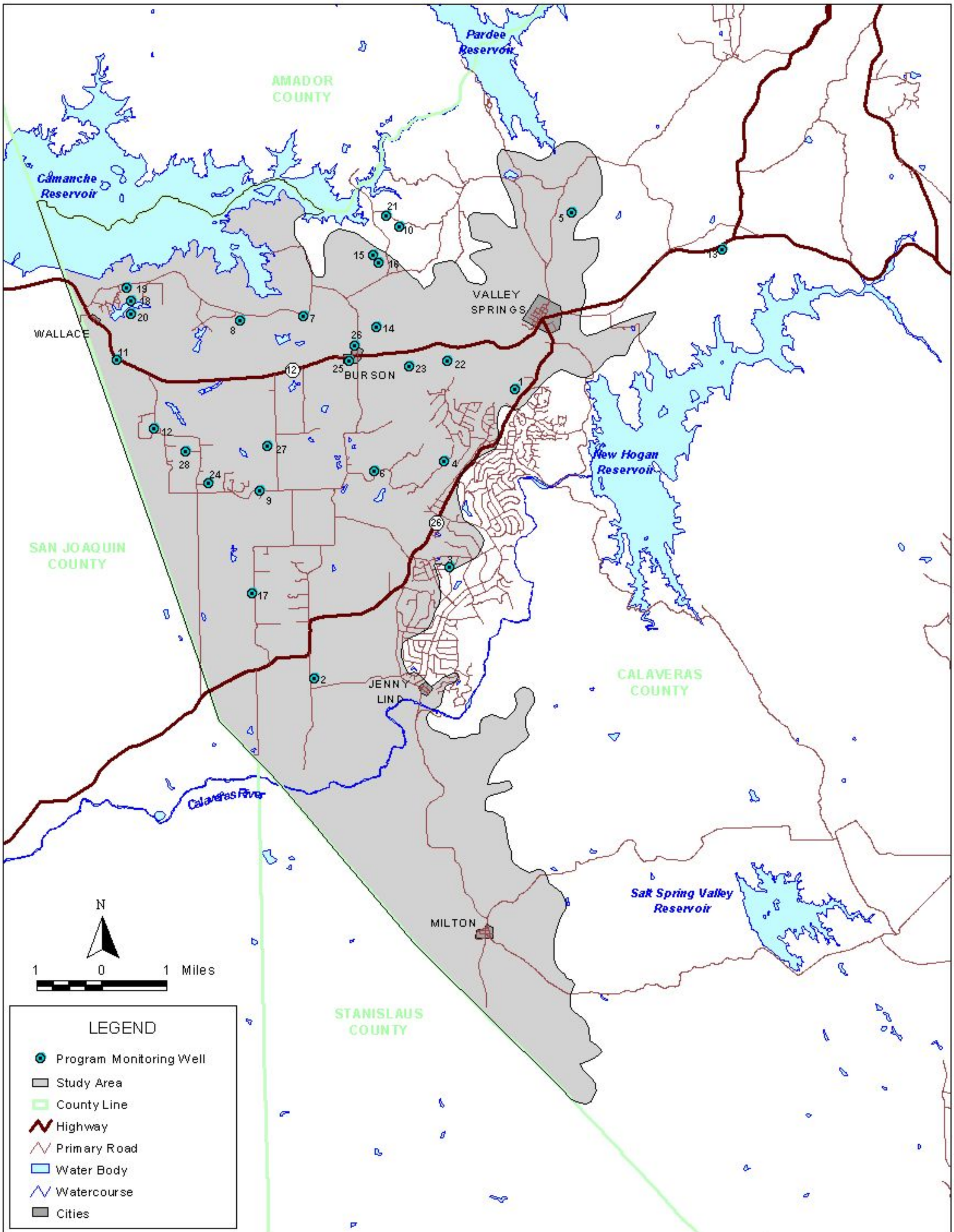
2.2.2 GROUNDWATER LEVEL MONITORING NETWORK

CCWD's monitoring network consists of 28 domestic and municipal water supply wells. The network was developed primarily from volunteers who wanted to assist CCWD in its documentation of groundwater conditions in the area. Each well was assigned a unique number for tracking monitoring data. Figure 2-4 shows the location of each well with this unique tracking number. Table 2-1 contains data collected on each of the 28 monitoring wells in Spring of 2003.

2.2.3 GROUNDWATER CONTOURS

2.2.3.1 Regional Contours

DWR, San Joaquin County Flood Control and Water Conservation, State Department of Public Health, and co-operators collectively monitor approximately 926 wells within the Eastern San Joaquin groundwater sub-basin. Water level data from these wells are used to develop water



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CALAVERAS COUNTY WATER DISTRICT GROUNDWATER MANAGEMENT PLAN

Program Monitoring Wells

FIGURE 2-4

Table 2-1. Spring 2003 Monitoring Well Information
CCWD Groundwater Management Program

Site ID	Reference Point Elevation (ft msl)	Total Well Depth (ft bgs)	Static Water Level (ft bgs)	Water Surface Elevation (ft msl)	Geologic Units
1	642.5	600	46.82	595.68	Ione and Basement
2	223.7	180	71.93	151.77	Ione and Valley Springs
3	526.3	NA	203	323.3	Basement
4	704.1	620	>498	>206	Valley Springs and Ione
5	732.6	120	37.47	695.13	Possibly Ione
6	474.4	400	169.52	304.88	Valley Springs and Ione
7	366.4	341	184	182.4	Valley Springs and Ione
8	341.1	NA	181.21	159.89	Ione
9	311.8	220 (per owner)	167	144.8	Ione and Valley Springs
10	390	NA	119.44	270.56	Valley Springs and Ione
11	204.0	200	29.22	174.78	Ione and Valley Springs
12	357.6	360	245.23	112.37	Valley Springs and Ione
13	1029.8	400	84.12	945.68	Basement and Valley Springs
14	462.5	600	142	320.5	Ione and Basement
15	350	NA	164.58	185.42	Ione and Basement
16	325	100 (per owner)	6.15	318.85	Basement
17	260	NA	114.66	145.34	Ione and Valley Springs
18	254.0	414	105.51	148.49	Valley Springs and Basement
19	337.7	370	186.88	150.82	Valley Springs and Basement
20	349.5	460	191	158.5	Valley Springs and Basement
21	310	178 (per owner)	24.29	285.71	NA
22	635.4	NA	NM	NA	Valley Spring and Ione
23	535.8	600	130.27	405.53	Ione and Basement
24	355	360	219.67	135.33	Valley Springs and Ione
25	392.4	246 (per owner)	217	175.4	Valley Springs and Ione
26	442.2	235	26.95	415.25	Valley Springs
27	290.1	NA	149.94	140.16	Valley Springs and Ione
28	252.7	320	130	122.7	Valley Springs and Ione

NA = Not available
NM = Not measured

level contour maps. Groundwater elevations for spring 1998, shown in Figure 2-5, show a groundwater cone of depression near the center of the basin, just to the east of Stockton. Although, these groundwater contours provide a good regional understanding of the groundwater levels, the contours do not extend into the Plan Area due to lack of data.

2.2.3.2 Plan Area Contours

In order to depict groundwater levels and determine groundwater flow directions for the Plan Area, contours were created from the data collected for the 28 CCWD monitoring wells sampled in spring of 2003. Figure 2-6 shows estimated groundwater contours for spring 2003 based on this well data. Groundwater levels in the Plan Area range from about 700 feet above msl in the eastern edge of the Plan Area to about 100 feet above msl near the San Joaquin/Calaveras County line.

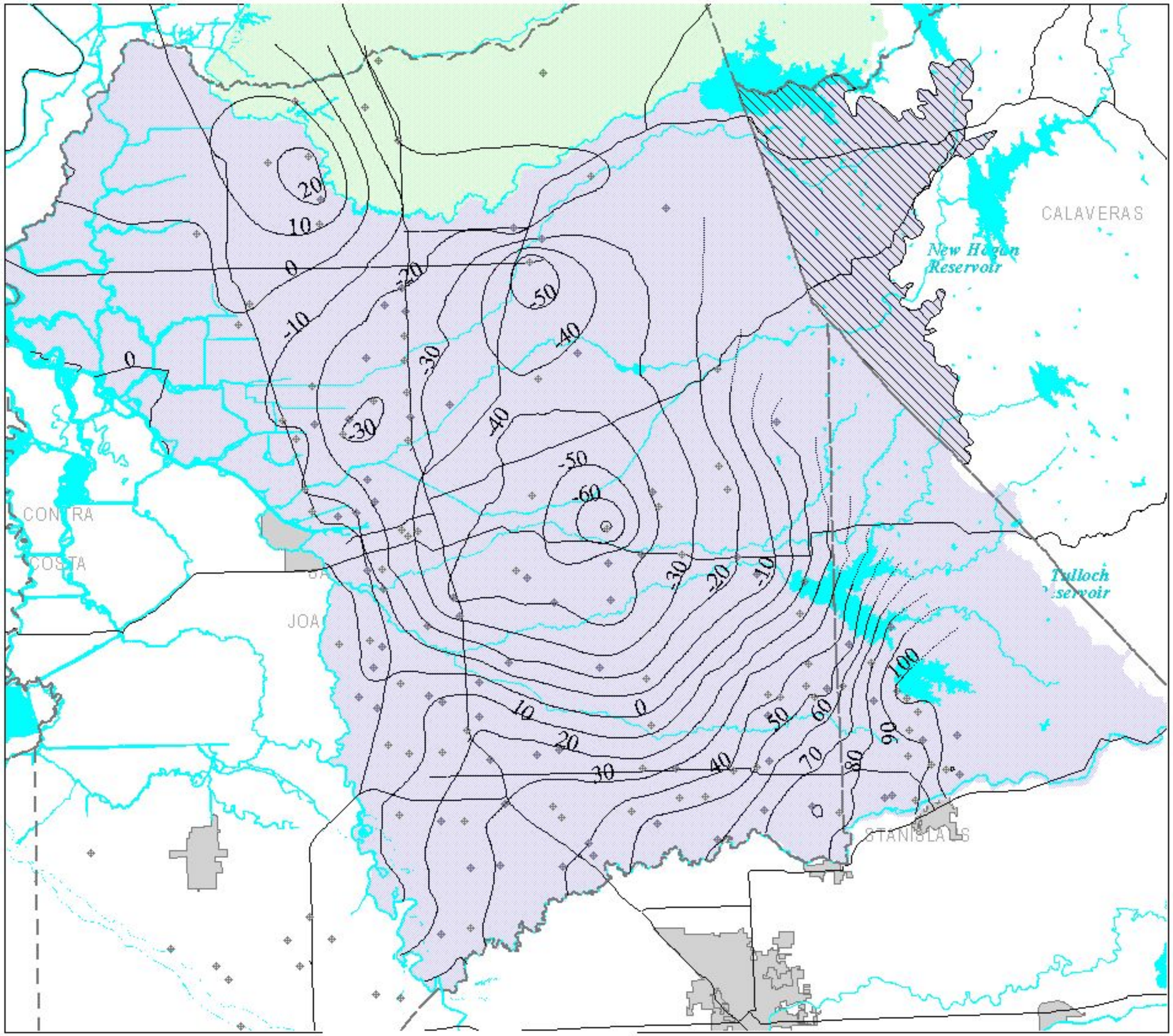
Groundwater beneath the Plan Area occurs in both the Valley Springs and Ione Formations (referred to as the alluvial aquifer) as well as in the fractured Sierra Nevada bedrock. Groundwater levels in the fractured bedrock can be highly variable and may not be hydraulically connected to the alluvial aquifer. Thus for producing groundwater contours for the alluvial aquifer, only the CCWD wells which had water level measurements representing the alluvial aquifer were used to create the contours. These selected wells are also shown in Figure 2-6.

2.2.4 GROUNDWATER LEVEL TRENDS

The Eastern San Joaquin groundwater sub-basin is in a state of overdraft according to Bulletin 118. Bulletin 118 estimates that groundwater levels are dropping at a fairly continuous rate of 1.7 feet per year on average across the basin; however, this value may not be representative of the Plan Area. This section provides further investigation into the groundwater level trends in the Plan Area.

Because the CCWD's groundwater level monitoring network described in Section 2.2.2 began collecting data in spring of 2003, historical trends within the Plan Area cannot be determined from this data. However, there are other limited sources of groundwater data in the area that can be used to determine the long term groundwater trends in the area.

East Bay Municipal Utilities District (EBMUD) has 14 monitoring wells in the northwestern part of the Plan Area south of Camanche Reservoir. Table 2-2 summarizes the location and data records for these wells. Although all of these wells have data starting in 1962, only two wells have data more recent than 1992. The data shows that groundwater levels are relatively stable up until 1992; however, it must be noted that much of the development in the Plan Area occurred after 1992. Therefore this historical data cannot be used to infer current groundwater level trends.



Eastern San Joaquin Groundwater Basin

FIGURE 2-5

Groundwater Management Plan Area

Eastern San Joaquin Subbasin

Cosumnes Subbasin

Roads

County Boundary

Lake

River

Cities

Spring 1998 Groundwater Elevation (ft above mean sea level; dashed where approximate)

N

0 4 8

MILES

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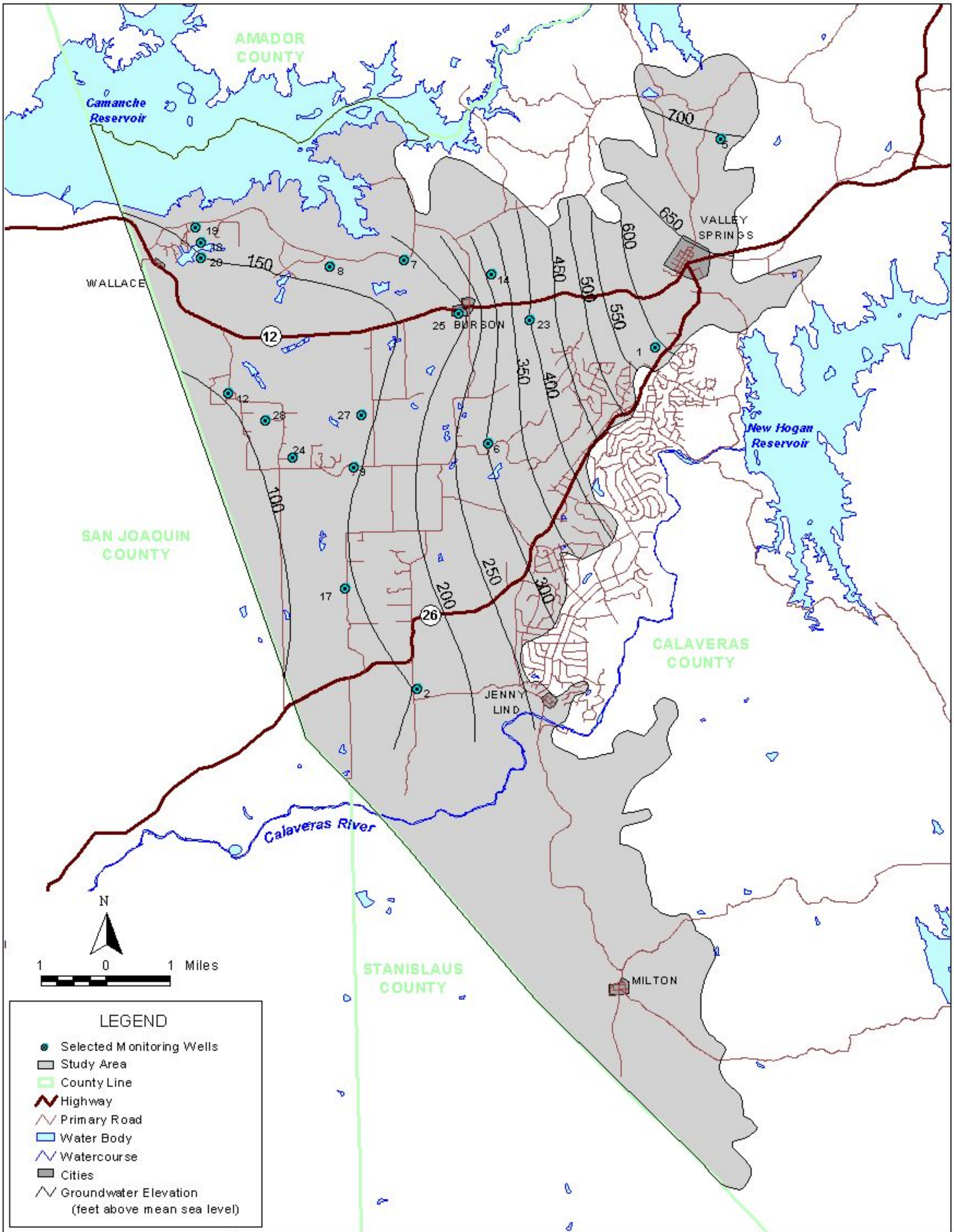

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Groundwater Contours for the Valley Springs and Ione Formations, Spring 2003

FIGURE 2-6

Table 2-2. Location and Data Records for Selected Wells

Well ID	X Coordinate (NAD 27 UTM Zone 10 meters)	Y Coordinate (NAD 27 UTM Zone 10 meters)	Earliest Data Record	Latest Data Record	Number of Records
Water Data Library Wells					
04N08E14K001M	669420	4229367	Mar-60	Sep-97	80
04N09E31M001M	671803	4224376	Mar-60	Mar-03	81
03N09E05D001M	674011	4223920	Mar-60	Oct-02	73
03N09E19N001M	671943	4217363	Feb-68	Nov-98	60
03N09E21D001M	675518	4218859	Jan-68	Mar-71	6
03N09E25R001M	681694	4216078	Nov-48	Mar-03	106
03N09E31G001M	672923	4215244	Oct-58	Mar-84	51
03N09E33J001M	676930	4214906	Mar-60	Oct-97	75
03N09E36G001M	681470	4215608	Nov-48	Mar-03	109
EBMUD Wells					
04N09E13L01M	680792	4229408	Oct-62	Nov-65	38
04N09E15D01M	676890	4230224	Oct-62	Oct-02	173
04N09E15M11M	676962	4229274	Oct-62	Sep-92	316
04N09E15N11M	677128	4229172	Oct-62	Jun-72	117
04N09E15P14M	677239	4229066	Oct-62	Jun-72	117
04N09E16A01M	676533	4230260	Feb-63	Oct-02	172
04N09E16A11M	676789	4230386	Oct-88	Oct-88	1
04N09E22J01M	678059	4227654	Oct-62	Jan-92	323
04N09E24E11M	680317	4228238	Oct-62	Jan-92	148
04N09E24K13M	681007	4227970	Oct-62	Sep-92	335
04N09E24N15M	680348	4227708	Oct-62	Jan-92	148
04N09E25C12M	680550	4227258	Oct-62	Dec-65	39
04N09E25L11M	680835	4226293	Oct-62	Apr-72	92
04N09E26F11M	679093	4226521	Oct-62	Jan-92	148

The two wells with data available until 2002 are 04N09E15D01M and 04N09E16A01M. Unfortunately these two wells are not representative of groundwater levels in the Plan Area due to influence of Camanche Reservoir. In addition, data from these two wells appears to have been compromised by measurement errors. The ground surface at these wells is roughly 30 feet below the full pool level in Camanche Reservoir.

The California Water Data Library (WDL) has 9 wells with long term data located within five miles of the Plan Area. Table 2-2 summarizes the location and data records for these wells. The groundwater level trends in these 9 wells are generally consistent with each other. Although these wells are outside of the Plan Area, it can be assumed that due to their proximity to the Plan Area that long term trends shown in these wells are consistent with the long term trends in the Plan Area.

Three wells 04N08E14K001M, 03N09E05D001M, and 03N09E25R001M were selected to produce hydrographs showing representative groundwater level trends. The selection was based on the geographic location of the wells. 04N08E14K001M is located near the Mokelumne River, 03N09E25R001M is located near the Calaveras River, and 03N09E05D001M is located between the two rivers.

Figure 2-7 shows the location of the WDL wells and the known EBMUD wells. The hydrographs in Figure 2-8 show a fairly consistent decline in groundwater levels of approximately 1.0 feet per year since the 1940s. This decline is somewhat less than the basin wide decline of 1.7 feet per year documented in Bulletin 118.

Additionally, there are reports from residents in some areas reporting seasonally dry domestic wells and the disappearance of springs in the Valley Springs area, suggesting that the groundwater levels in the Plan Area are declining.

2.2.5 GROUNDWATER QUALITY

A detailed water quality study was performed in spring 2003 as part of the Groundwater Monitoring Network described in Section 3.3.2. The results of this study were documented in the *Camanche/Valley Springs Area Groundwater Monitoring Report for Spring 2003*. Because there is insufficient historical data, long-term trends in water quality parameters are unknown at this time.

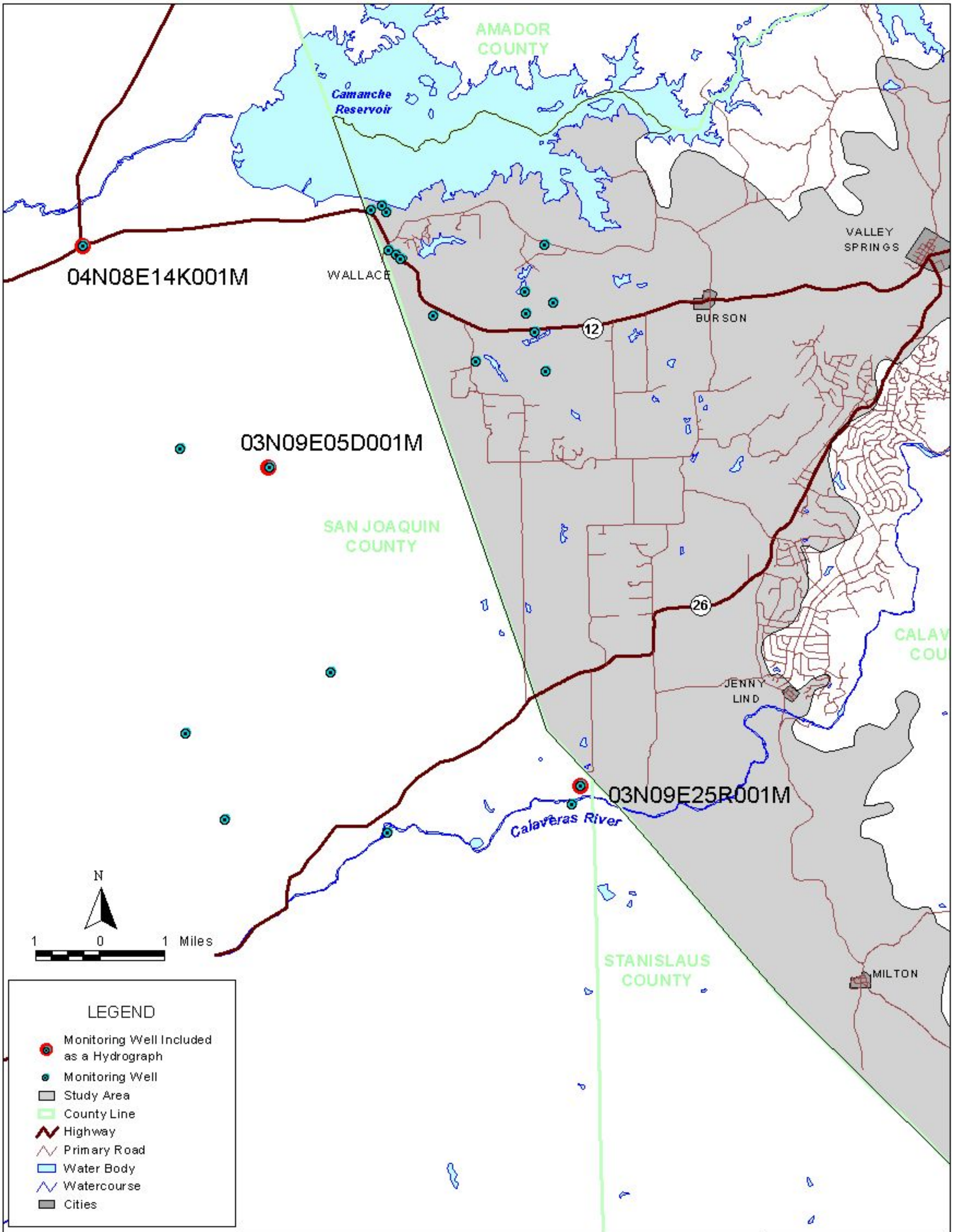
Based on anecdotal reports, groundwater in most of the area is of good quality as it is used for domestic and agricultural supply without substantial reports of contamination. However, locally there are some areas with poor quality water. Some wells east of Burson Road have produced poor quality water that may contain concentrations of salts and metals (such as boron). There are also a few wells along the western portion of the Plan Area known to produce water high in sodium.

2.3 HYDROLOGIC SETTING

2.3.1 RAINFALL

The climate across Calaveras County is highly variable. The Plan Area, which is situated in the western foothills, typically experiences warm, dry summers and temperate winters. Most of the precipitation in the Plan Area is in the form of rain.

There are several rainfall gages within or in very close proximity to the Plan Area as shown in Figure 2-9. Although the Camp Pardee rainfall gage is located just outside the Plan Area (elevation is 658 feet above msl), it has the longest period of record of the nearby stations. Monthly data has been collected at this gage for the period of 1926 to the present, as shown in



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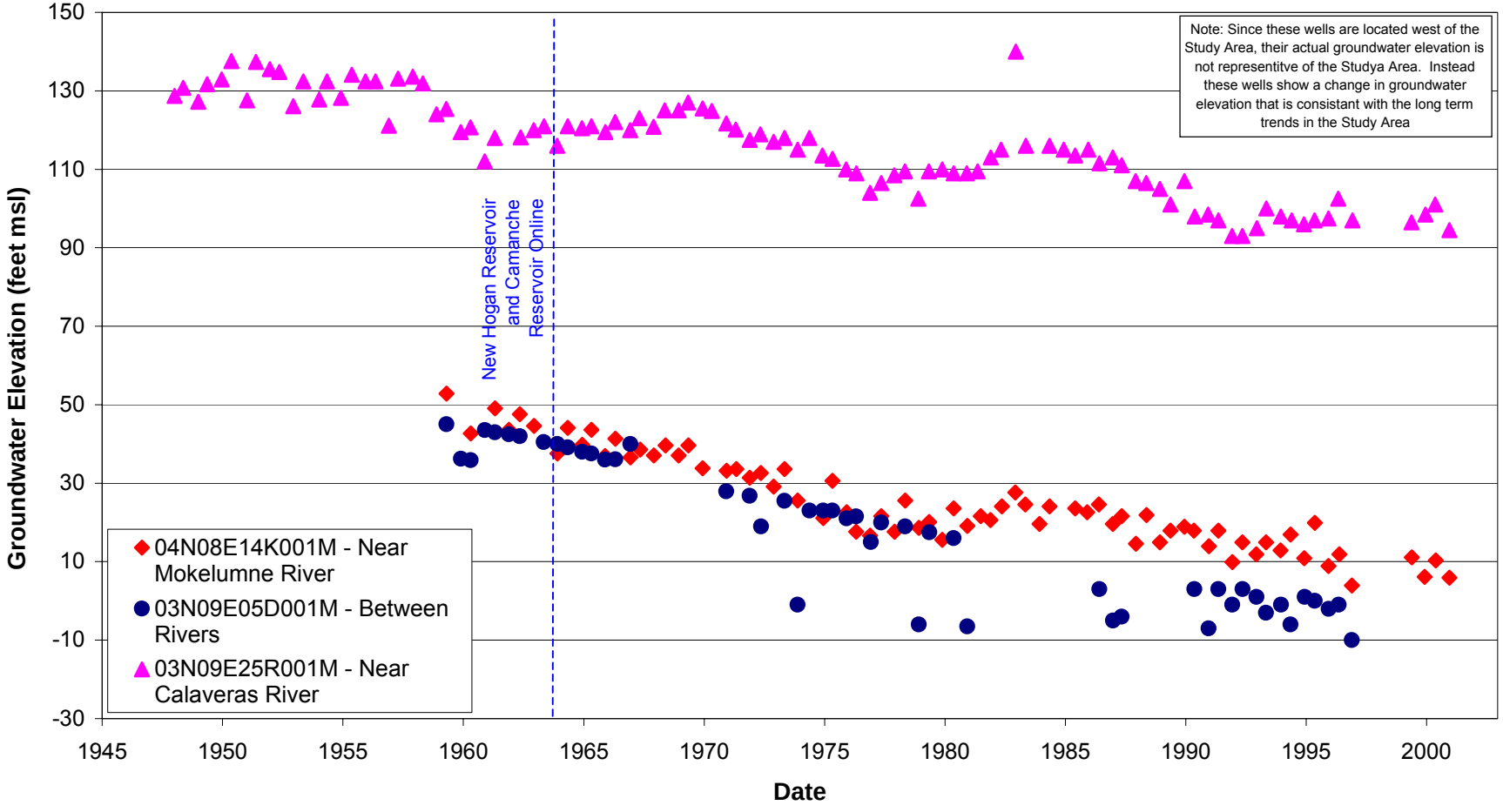
Calaveras County Water District Groundwater Management Plan

Program Monitoring Wells

FIGURE 2-7



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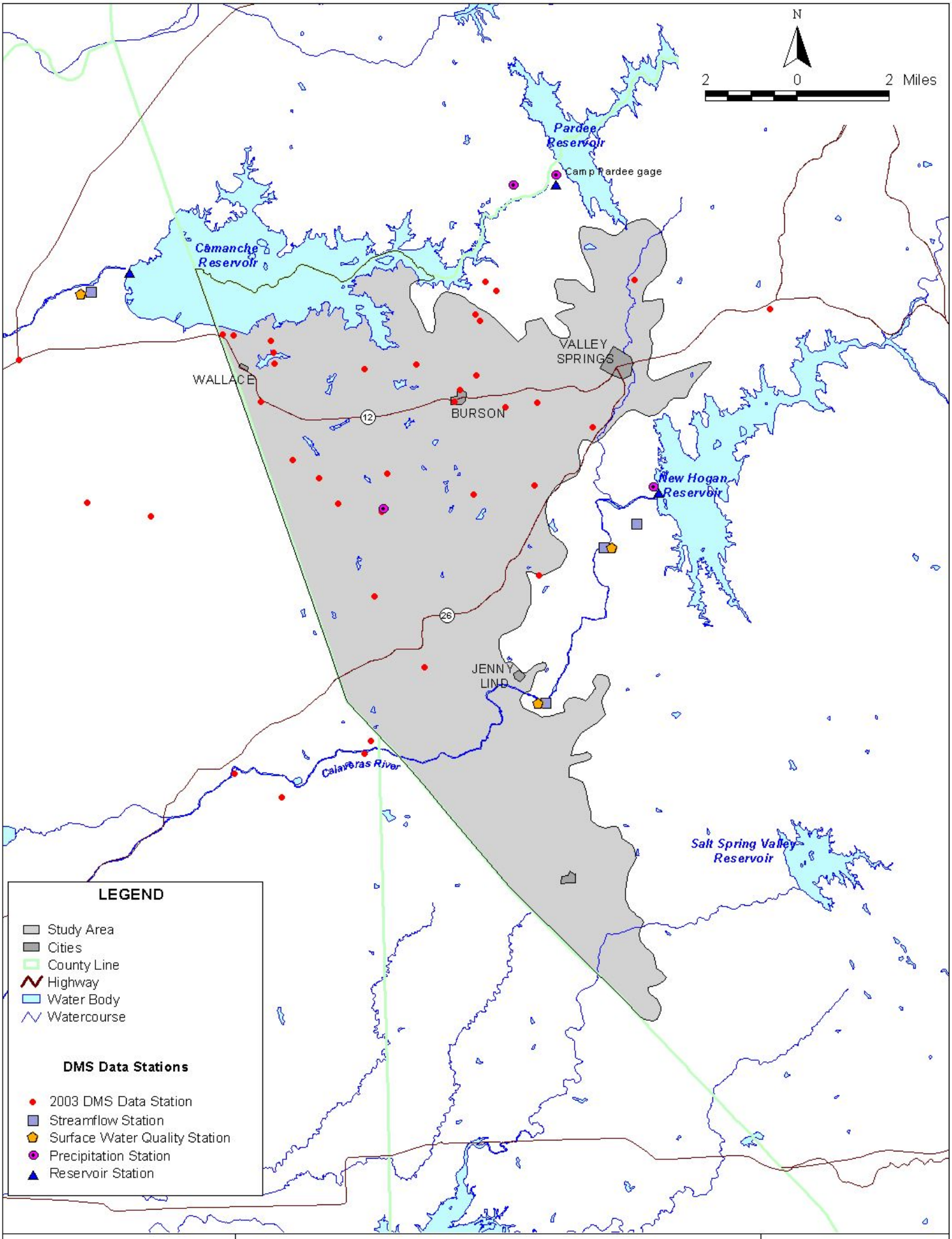
Calaveras County Water District Groundwater Management Plan

Groundwater Elevation Trend West of Study Area

FIGURE 2-8



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CALAVERAS COUNTY WATER DISTRICT GROUNDWATER MANAGEMENT PLAN

CCWD DMS Station Locations

FIGURE 2-9

Figure 2-10. The average annual rainfall at this location for the measured period is 21 inches. On average, most of precipitation is received from December through March as shown in Figure 2-11. The drought years of 1987 to 1991 recorded an average rainfall of about 12 inches, while the wet year of 1983 recorded 32.9 inches (No data was recorded in March, 1983).

2.3.2 SURFACE WATER

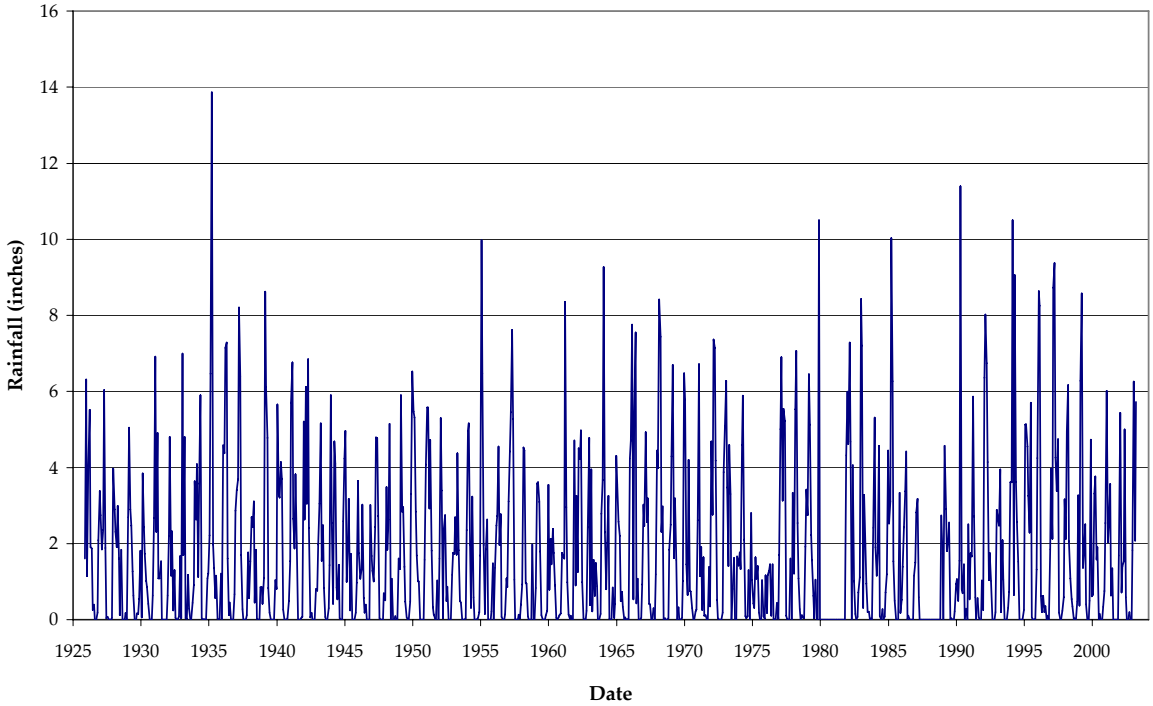
The primary sources of surface water for the Plan Area are the Calaveras and Mokelumne Rivers. Within the Plan Area, there are few smaller intermittent creeks, but these are not used for surface water consumptive use.

2.3.2.1 Calaveras River

The Calaveras River watershed covers 400 square miles. It extends from the Sierra Nevada at elevations up to 5,000 feet westward to the San Joaquin Valley where it is at an elevation near sea level at the confluence with the San Joaquin River. The Calaveras River is primarily a rain driven stream, with very little snow pack storage at higher elevation. New Hogan Dam began operations in 1964 and was built by the Corps of Engineers. CCWD holds rights to 30,928 acre-feet of water from the New Hogan Reservoir, of which CCWD uses about 3,500 acre-feet per year, the remainder of the CCWD rights from New Hogan have been used on assignment by San Joaquin County until such time as CCWD needs the water.

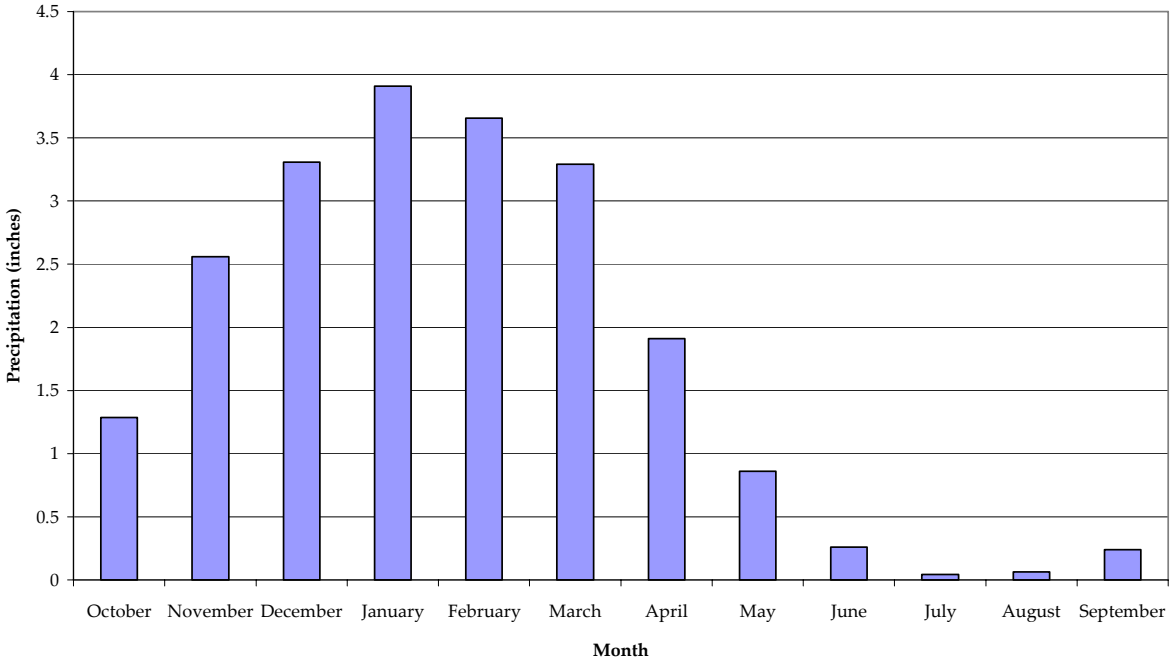
There are three stream gages along the Calaveras River below New Hogan Dam as shown on Figure 2-9. They are Calaveras River near Jenny Lind (USGS 11309500), Calaveras River below New Hogan (USGS 11308900), and Cosgrove Creek near Valley Springs (USGS 11309000). Daily streamflow data is available for the Calaveras River near Jenny Lind gage for the time period of 1907 to 1966 as shown in Figure 2-12. Additionally, water quality data is available for this gage for the time period of 1960 to 1966. The highest flows occur during the months of January through March as shown in Figure 2-13. Because New Hogan came on-line in 1964, these monthly averages reflect natural pre-dam flows along the Calaveras River. The highest flow occurred on January 31, 1911 with 31,400 cfs at the gage.

Daily streamflow data is available for the Calaveras River below New Hogan Dam for the time period of 1961 to 1992 as shown in Figure 2-14 and water quality data is available from 1964 to 1966. This gage is downstream from the previously discussed gage located below New Hogan. The majority of the flow data recorded at this gage reflects regulated outflow from New Hogan. The highest flows occur during the months January to March as shown in Figure 2-15. The highest flow occurred on January 21, 1980 with 7,860 cfs at the gage. Data available for New Hogan Reservoir (NHG) include outflow, inflow, and storage.



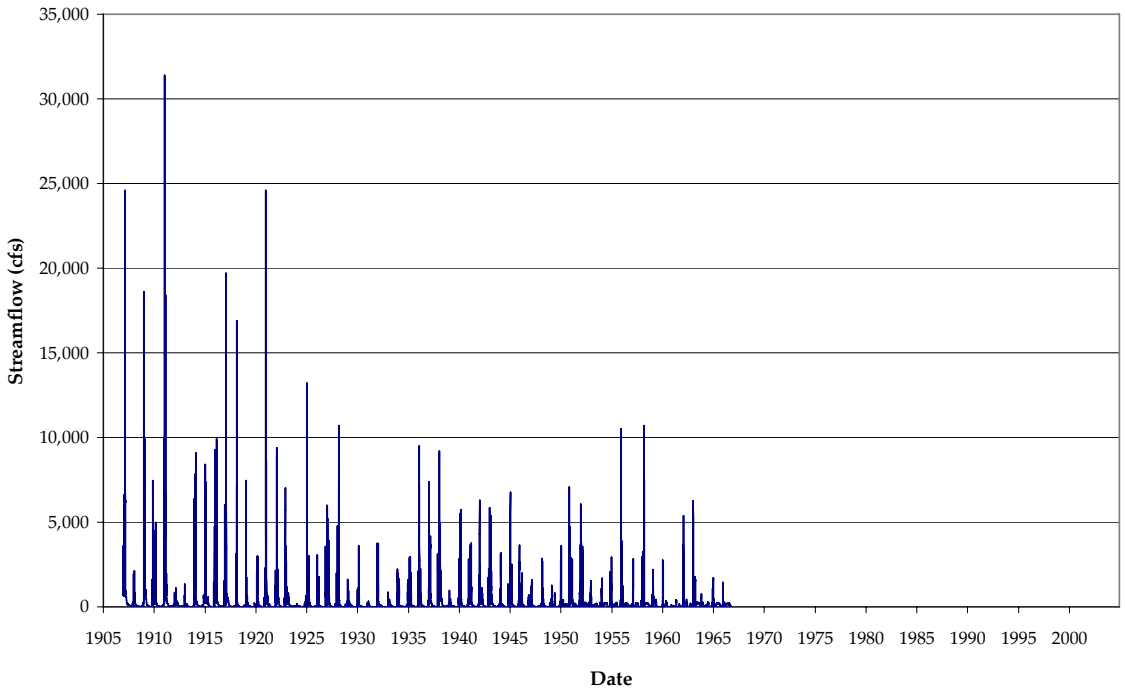
Source: California Data Exchange Center (www.cdec.water.ca.gov), Station CMP

Figure 2-10. Camp Pardee Monthly Precipitation



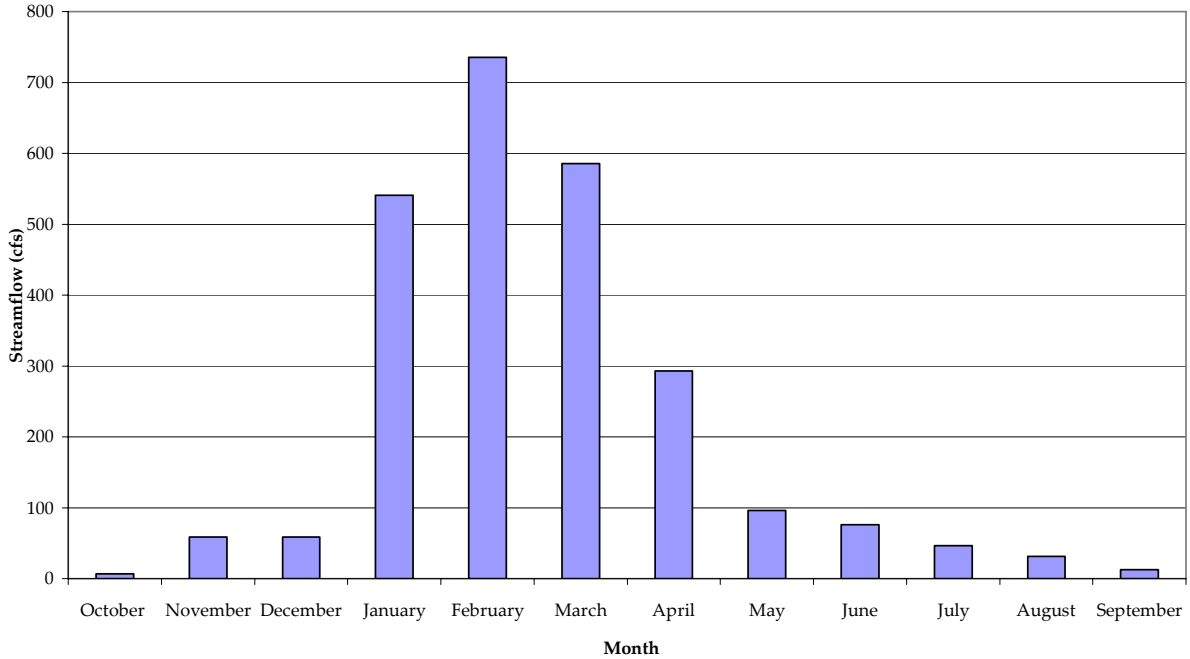
Source: California Data Exchange Center (www.cdec.water.ca.gov), Station CMP

Figure 2-11. Average Monthly Precipitation at Camp Pardee (1926 – 2004)



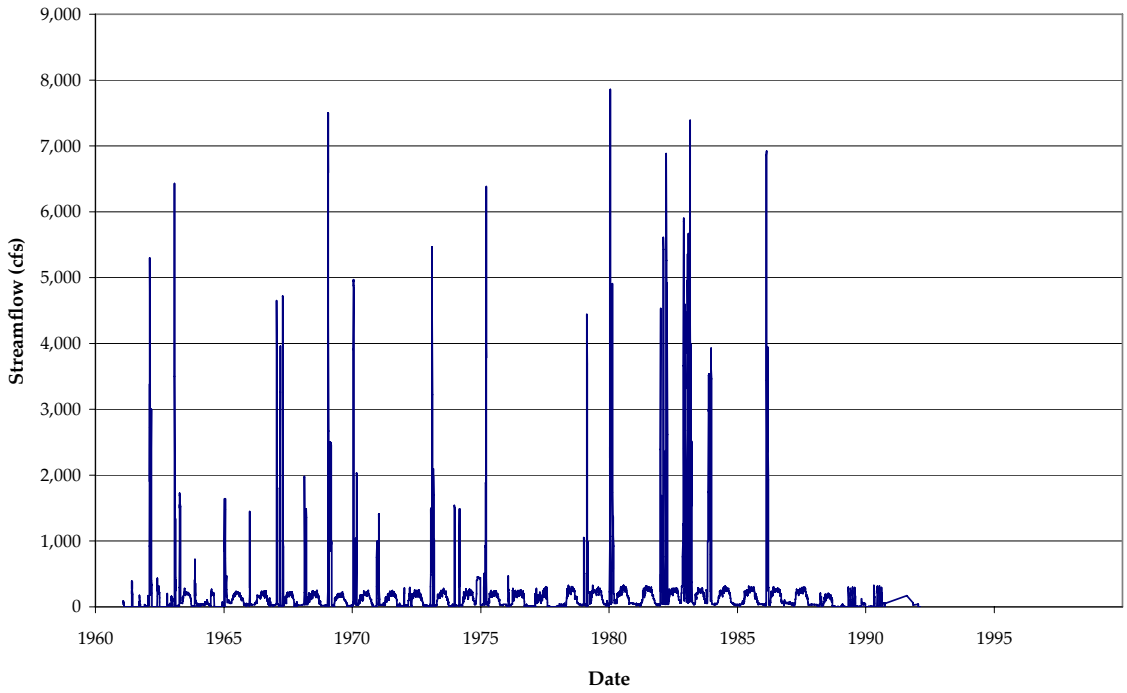
Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11309500

Figure 2-12. Daily Stream flow Calaveras River near Jenny Lind (11309500)



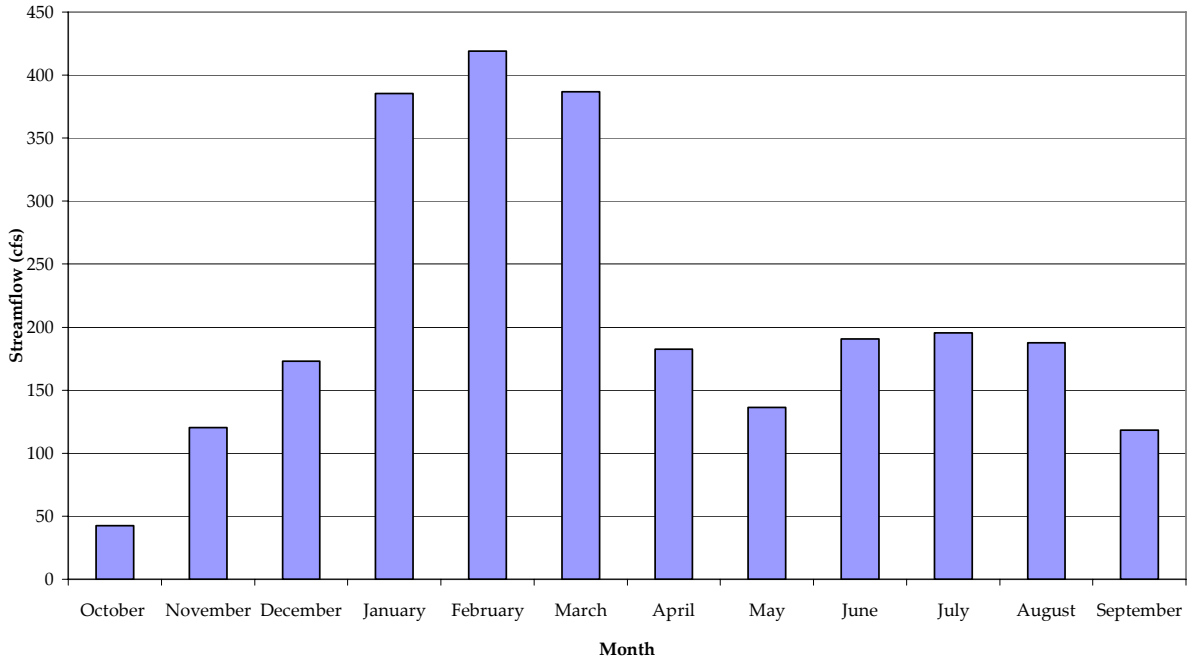
Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11309500

Figure 2-13. Average Monthly Stream flow Calaveras River near Jenny Lind (1907-1966)



Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11308900

Figure 2-14. Daily Stream flow Calaveras River below New Hogan



Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11308900

Figure 2-15. Average Monthly Stream flow Calaveras River below New Hogan (1961 – 1992)

2.3.2.2 Mokelumne River

The Mokelumne River watershed covers 661 square miles. In the Sierra Nevada, the eastern portion of the watershed approaches 10,000 feet in elevation, while along the western portion at the confluence of the Mokelumne River and the San Joaquin River, the elevations are near sea level. The Mokelumne River flow is predominantly from snowmelt in the Sierra Nevada, however precipitation runoff from winter and spring storm events also contributes significantly to the Mokelumne River flow. Camanche Dam and Pardee Dam, both partially located in the Plan Area, are the two primary regulatory facilities along the Mokelumne River. Both of these facilities are owned and operated by EBMUD.

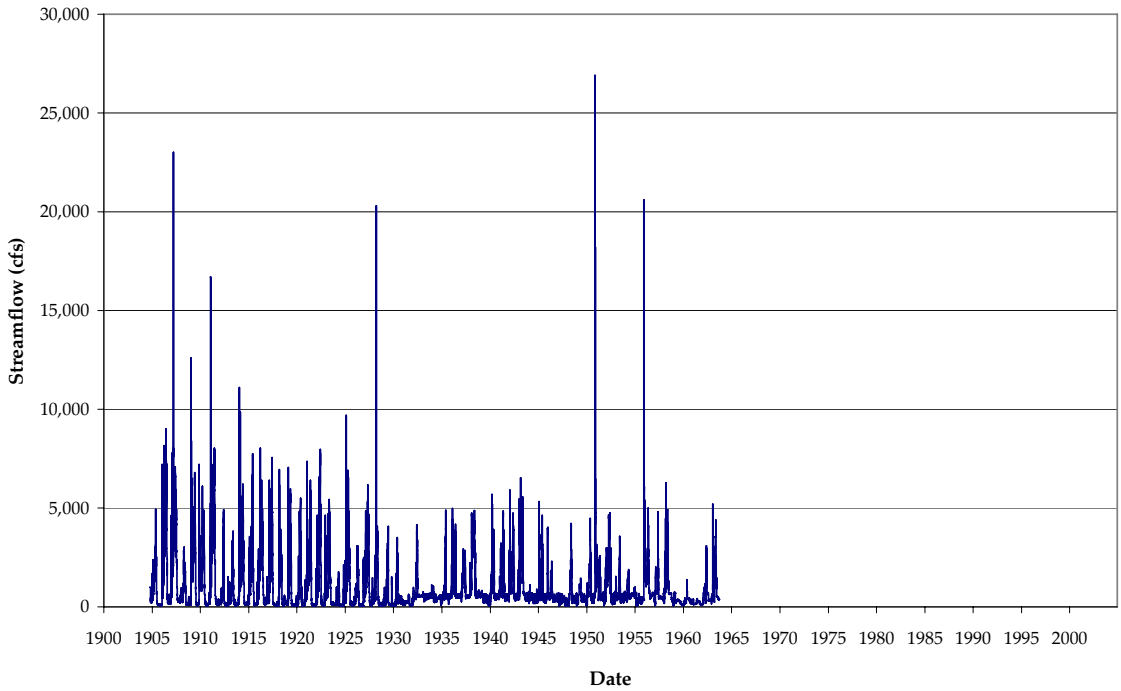
Pardee Dam forms Lake Pardee and provides water to the Mokelumne Aqueduct which services several cities in the San Francisco Bay Area. Camanche Dam is located downstream of Pardee Dam. This reservoir was completed in 1964. CCWD holds one permit for diversion from the Mokelumne River. The permit allows for 4.00 cfs to be diverted off of Bear Creek for the purposes of irrigation and stock-watering for the entire year.

There are two gages along the Mokelumne River below Camanche Dam. They are Mokelumne River below Camanche (USGS 11323500) and Mokelumne River at Woodbridge (USGS 11325500).

Daily streamflow data is available for the Mokelumne River below Camanche for the time period of 1904 to 2002 as shown in Figure 2-16. Additionally, water quality data is available at this gage from 1965 to 1970. This gage is located in close proximity to Camanche Dam, causing flows measured at this gage to reflect reservoir releases. The highest flows at this gage occur from April to June as shown in Figure 2-17. Both the highest and lowest flows for the Mokelumne River at this gage were recorded prior to the construction of Camanche Reservoir. The highest flow occurred on November 21, 1950 with 26,900 cfs at the gage. The lowest flow recorded at this gage occurred on several days in July and August of 1924 where a flow of 0 cfs was recorded.

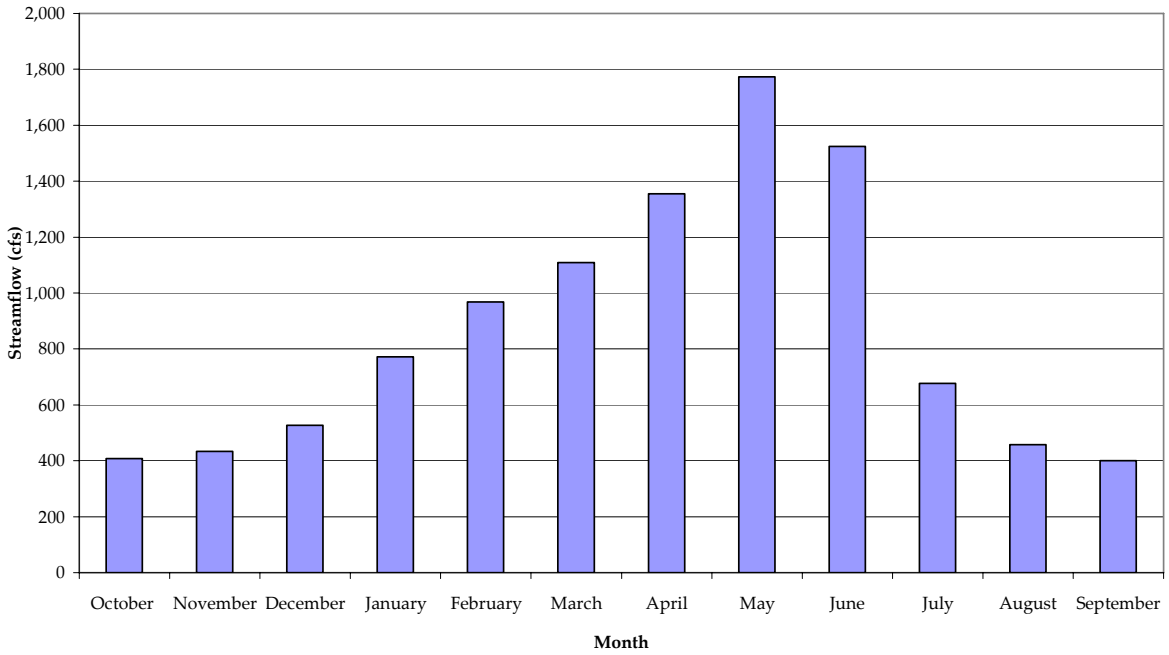
Daily streamflow data is available for the Mokelumne River at Woodbridge gage for the time period of 1924 to 2002 as shown in Figure 2-18. Additionally, water quality data is available at this gage from 1960 to 1994. Although far from Camanche Dam and located on the valley floor, the extensive period of record provides very useful data. The highest flows occur during the months of February through June as shown in Figure 2-19. The highest flow occurred on December 9, 1950 with 19,600 cfs at the gage, and the lowest occurred on November 15, 1977 with 0.23 cfs at the gage.

Data available for both Pardee Reservoir (PAR) and Camanche Reservoir (CMN) include outflow, inflow, and storage.



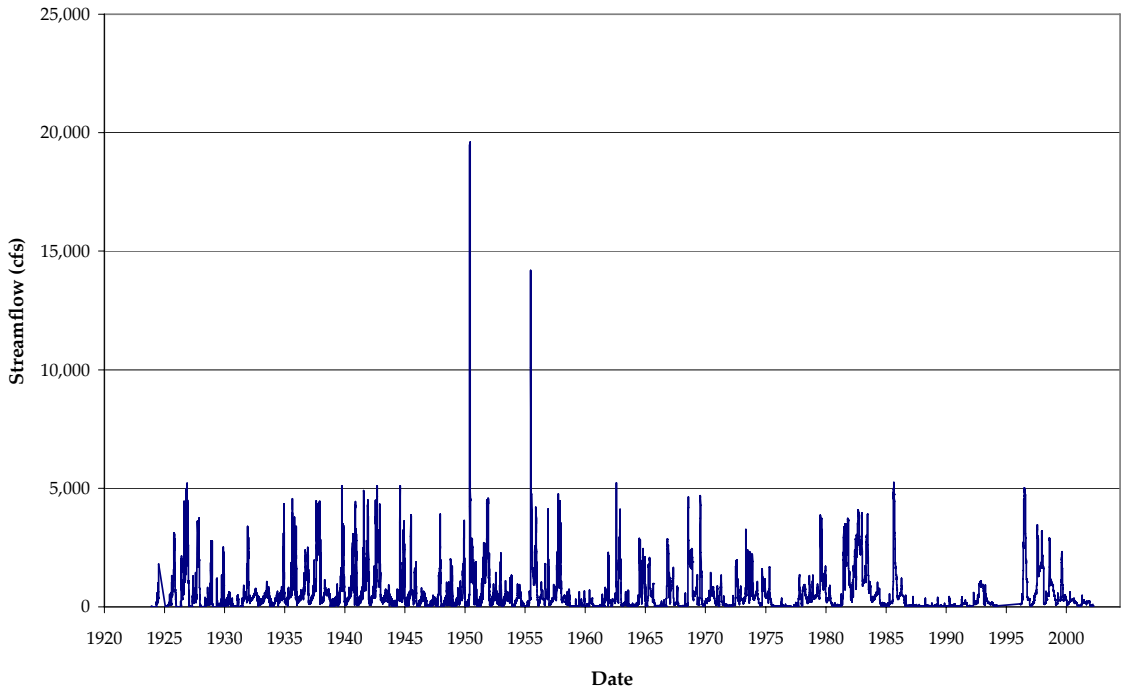
Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11323500

Figure 2-16. Daily Streamflow Mokelumne River below Camanche



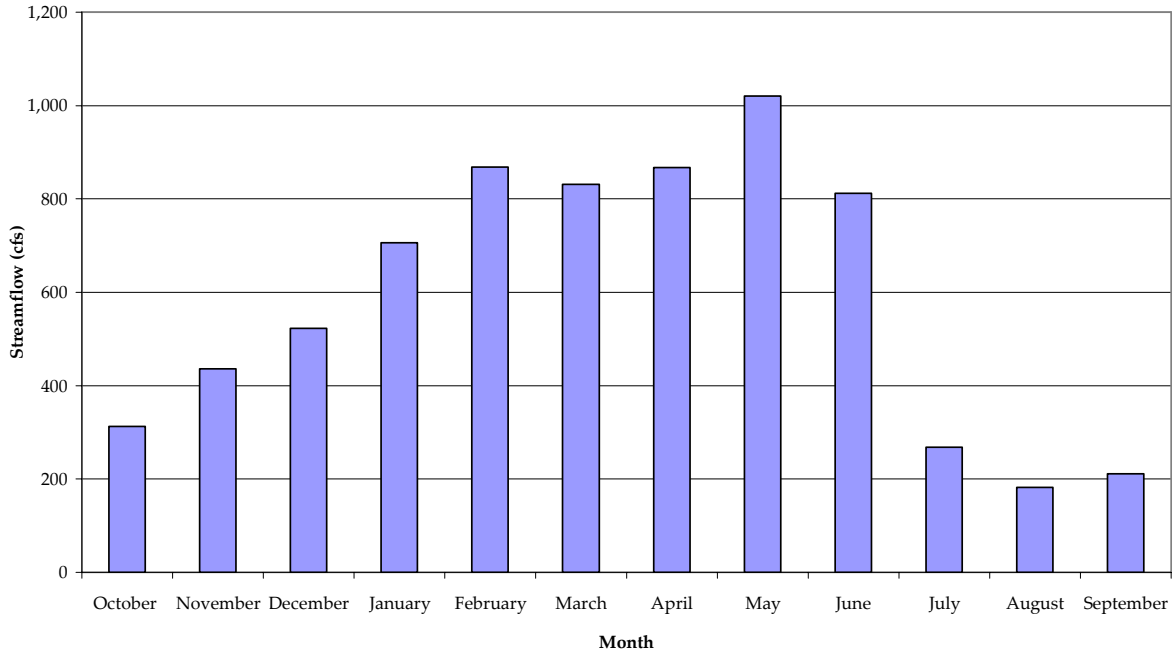
Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11323500

Figure 2-17. Average Monthly Streamflow Mokelumne River below Camanche (1904 - 2002)



Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11325500

Figure 2-18. Daily Streamflow Mokelumne River at Woodbridge



Source: U.S. Geological Survey (www.nwis.waterdata.usgs.gov), Station 11325500

Figure 2-19. Average Monthly Streamflow Mokelumne River at Woodbridge (1924 - 2002)

2.3.2.3 Other Supplies

Additional surface water supplies may come from:

- Imported water and contracts;
- Wastewater treatment and reuse; and
- Future facilities and operations.

2.4 LAND USE AND WATER DEMAND

This section summarizes the current land use and the current and projected water demands in the Plan Area. Although many water users in the Plan Area are served by water providers other than CCWD or obtain their own water supplies, this section only discusses water that is supplied by CCWD to the Plan Area. The data is obtained from the 2005 CCWD Urban Water Management Plan.

2.4.1 LAND USE

Current Land use for the Plan Area is available from the DWR Land Use survey for Calaveras County in 2000. Figure 2-20 shows the general land use in the Plan Area. It also includes delineation of the urban areas and their projected urban areas.

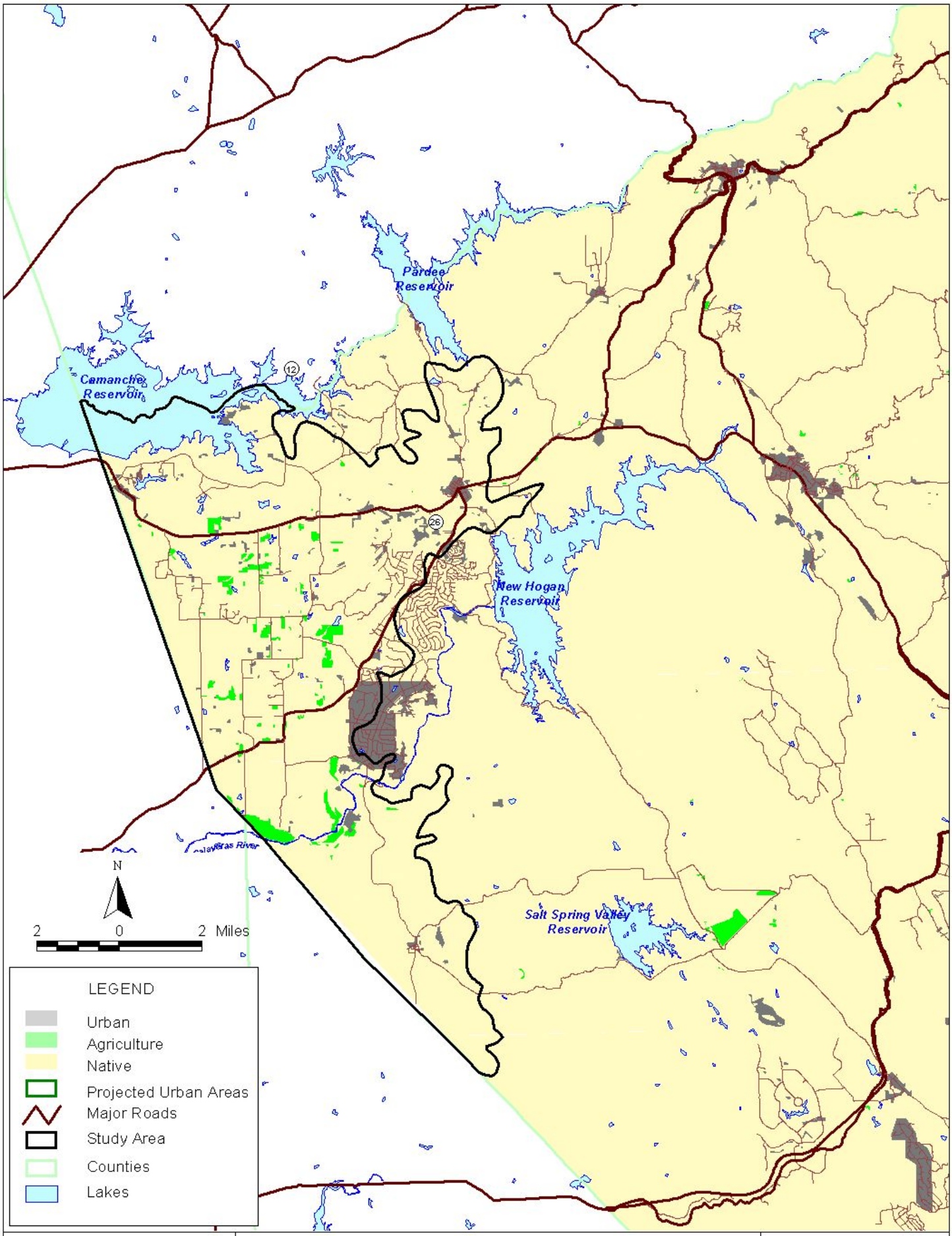
2.4.2 HISTORICAL WATER USE

In the Plan Area, CCWD provides treated water to the Jenny Lind and Valley Springs areas. It also provides raw water deliveries for agriculture water users and for La Contenta Golf Course.

The Jenny Lind system receives surface water from New Hogan Reservoir through a contract with the USBR. It provided water to approximately 9,500 people in 2005.

Agricultural customers along the Calaveras River between New Hogan Reservoir and the Calaveras/ San Joaquin County line use raw water diverted from the Calaveras River under riparian rights and through purchase from the CCWD. CCWD estimates a total agricultural diversion of 1,500 AFY with 675 AFY from riparian rights and 825 AFY delivered by CCWD.

La Contenta Golf Course in the Jenny Lind service area diverts water from New Hogan reservoir to supplement its recycled water irrigation supply. In the past, when establishing the golf course, approximately 120 acre feet per year of raw water was diverted to supplement recycled water supplies for golf course irrigation. CCWD expects a diversion of 30 acre-feet per year to continue in the future.



WRIME Water Resources & Information Management Engineering, Inc

CALAVERAS COUNTY WATER DISTRICT GROUNDWATER MANAGEMENT PLAN

2000 Land Use

FIGURE 2-20

2.4.3 UNIT WATER USE

The CCWD customer base is unique in that the majority of its customers are single-family residential customers. Many of the multi-family units served by CCWD are individually metered. CCWD currently serves no major commercial, industrial, or institutional customers. CCWD only tracks one kind of customer unit water demand at this time. This unit water demand is used to calculate customer usage and other evaluation metrics, and a single unit rate is used to project future water demands.

Connection unit demands are increasing as second homes are being converted from seasonal use to year-round residences and newer developments with higher landscape irrigation needs are built. Elevation differences, varying evapotranspiration factors, and landscape style also impact water demand factors. Historical and future planning unit water demand factors for each service are presented in Table 2-3. The values shown include unaccounted-for water and other non-residential customers, which contribute to higher than average demands. CCWD standardized its future unit water demand factors for planning purposes, with 0.75 acre-foot per year per connection (670 gallons per day).

Table 2-3. Historic and Projected Water Supply and Water Use Factors for CCWD Water Provided to the Plan Area

Year	Unit Surface Water Demand (AFY/ connection)	Treated Surface Water Supply (AFY)	Raw Surface Water for Ag (AFY)	Ag Diversions under Riparian Rights (AFY)	Raw Surface Water for golf course (AFY)	Recycled Water (AFY)	Total (AFY)
1985	0.51	411	825	675	0	0	1,911
1990	0.51	853	825	675	0	0	2,353
1995	0.51	1,283	825	675	120	0	2,903
2000	0.51	1,461	825	675	120	0	3,081
2005	0.51	2,240	825	675	154	108	4,002
2010	0.75	3,378	1,125	675	30	370	5,578
2015	0.75	4,144	2,625	675	30	390	7,864
2020	0.75	4,910	4,125	675	30	410	10,150
2025	0.75	5,676	5,625	675	30	450	12,456
2030	0.75	6,442	6,825	675	30	450	14,422
2035	0.75	7,207	6,825	675	30	450	15,187

2.4.4 PROJECTED WATER USE

Water demands are expected to increase throughout CCWD both from new connections and from increased demand on existing connections. Unit demands from older, existing

connections historically were low due to low irrigation demands and/or second home status. Now that many existing and most new homes are increasing irrigation demands and becoming full time residents, the unit water demands will increase to more normal industry levels, resulting in a non-linear, rapid demand increase. In addition, agriculture land and water use is growing in the area and potential agriculture customers are in discussion with CCWD regarding new infrastructure in order to serve their needs.

CCWD data shows that during historic droughts, demand sometimes increased, decreased, or remained the same, depending on the type and length of drought period. For planning purpose, the CCWD assumes that demands do not charge from the normal year demands during single or multiple dry year scenarios. The demands for all water year scenarios are projected through 2035. Projected normal year demands are based on estimated customer connections and unit water demands. Other water uses are projected based on estimates of continued raw water and recycled water demands.

Recycled water and raw water is used on the La Contenta Golf Course. Projections assume all available recycled water is used on the golf course, with any remaining demand met by raw water. Projections assume a minimum annual raw water use of 30 acre feet to account for recycled system outages or water quality and turf needs. The purposed agriculture demands of 2,000 acre-feet are expected to come on line in 2010 with 250 acres representing a demand of 750 acre-feet, and a straight-line projection to full demand in 2020.

Historical and projected water supplies from CCWD to the Plan Area discussed in this section are summarized in Table 2-3.

SECTION 3 GROUNDWATER MANAGEMENT PLAN MANDATORY COMPONENTS

This section identifies the mandatory components of the Groundwater Management Plan.

3.1 PUBLIC INVOLVEMENT

CCWD actively coordinates its groundwater management efforts with local agencies and groups. This section provides information on the groups that CCWD is working with in establishing this GWMP. In addition to working with these groups, CCWD held a public meeting prior to the development of this Plan on October 24, 2007. They held a forum style meeting on November 7, 2007 in Valley Springs with approximately 20 participants in attendance asking for public comments. On November 26, 2007, CCWD held a final public meeting for adoption of the GWMP. The Plan was adopted unanimously, with one verbal objection from the public, which was noted by the board. The Resolution of adoption is included in Appendix B. Announcements for all meetings were published on the CCWD web site and in the Calaveras Enterprise newspaper prior to the meetings, those announcements are located in Appendix B.

In addition, the Union Democrat News Published an article on November 27, 2007 to increase public knowledge about the current conditions in the Plan Area as well as CCWD's groundwater management efforts. This article is included in Appendix B of the GWMP.

3.1.1 CALAVERAS COUNTY ENVIRONMENTAL HEALTH DEPARTMENT (CCEHD)

Over the last several years, CCWD has begun interacting regularly with CCEHD. CCEHD has several groundwater management responsibilities and has developed many programs within the county. These programs include:

- Adoption and implementation of a County Water Well Construction Ordinance;
- Adoption and implementation of the County Proof of Groundwater Ordinance;
- Adoption and implementation of the Local Agency Groundwater Protection Program (County and Federal-EPA, Region IX Project);
- Adoption and implementation of a Groundwater Management Ordinance; and
- Geographic Information System Program (GIS Program).

3.1.2 BURSON WATER COMMITTEE

The Burson Water Committee is a group of interested citizens that primarily reside in the Camanche/Burson/Wallace area. These citizens are concerned about declining groundwater levels in the area and that the area appears to be subject to groundwater quality degradation. During dry periods, some of the residents of this area have to truck water to storage tanks at

their homes because their wells are dry. Residents with active production wells are concerned about how long they can continue producing potable water.

The Burson Water Committee has supported CCWD's Camanche/Valley Springs Groundwater Sampling and Analysis Plan, and members have shown their support by allowing sampling and measurement of their personal wells. During the initial well monitoring event, the head of the Burson Water Committee assisted CCWD staff in the data collection activities.

3.1.3 WALLACE COMMUNITY SERVICES DISTRICT

The Wallace Community Services District (WCSD) participated in Phase I and Phase II of the project. Since 2006, WCSD has done extensive work to collect groundwater data in their area. This data includes aquifer test results, lithologic logs, well construction details, water quality tests, pump and recovery tests, and water level monitoring. In addition, WCSD has performed detailed analysis on this data in order to better understand the groundwater aquifer system.

In October 2007, the WCSD board of directors voted to become actively involved in this GWMP process. A letter from WCSD to CCWD to this effect has been included in Appendix B.

3.2 GROUNDWATER MANAGEMENT PLAN GOAL AND BASIN MANAGEMENT OBJECTIVES

Groundwater management involves understanding the available groundwater resources in order to make informed decisions and meet existing and future water needs. Section 2 presented the current and historical conditions and documented the nature and extent of the groundwater issues in the Plan Area. This section defines the GWMP goals and objectives established to address the identified groundwater issues. Once the goal was established, qualitative Basin Management Objectives (BMOs) were set for the Plan Area.

3.2.1 GROUNDWATER MANAGEMENT PLAN GOAL

The GWMP goal is a statement of the intent and purpose established by CCWD through a public process involving local stakeholders. The overall goal of the GWMP is:

> *To protect and maintain a suitable, reliable, high-quality groundwater supply in the planning area for the long-term use of the groundwater resource.*

The BMO's and groundwater management components in the remainder of this document will identify the actions needed to meet this groundwater management goal.

3.2.2 BASIN MANAGEMENT OBJECTIVES

BMO's allow local water agencies and stakeholders determine the most important issues in meeting local resource needs and allow basin management to adapt to an area's political,

institutional, legal, and technical constraints and opportunities. DWR Bulletin 118 states that the purpose of the objectives should be "to support the goal of a sustainable supply for the beneficial use of the water in a particular area." BMOs may be entirely qualitative or strictly quantitative. Due to the lack of adequate and reliable groundwater data in the Plan Area, general qualitative BMOs are more appropriate at this time. It is imperative that the BMOs are flexible so that they may adapt as more is learned about managing resources within Calaveras County. The BMO's presented herein will assist in developing a long-term and reliable dataset for further development of quantitative BMO's in the future.

The general BMO's for the Plan Area are to:

1. Maintain groundwater elevations at or above current levels;
2. Maintain or improve groundwater quality, and
3. Increase water supply reliability.

Implementation of these BMOs is described in several sections of the GWMP. Table 3-1 lists the links between these three BMOs and the actions of the GWMP that will fulfill the BMOs.

Table 3-1. Link between BMOs and Actions of the GWMP

BMO	Section(s) of GWMP covering the implementation of the BMO
1. Maintain groundwater elevations at or above current levels	3.3.1, 3.5, 4.5, 4.6, 4.7
2. Maintain or improve groundwater quality	3.3.2, 3.4, 3.5, 4.2, 4.3, 4.4, 4.9
3. Increase water supply reliability	3.3.1, 3.3.4, 3.4, 3.5, 4.2, 4.3, 4.5, 4.6, 4.7, 4.9, 4.10, 4.11

3.2.2.1 BMO No. 1: Maintain Groundwater Elevations at or Above Current Levels

The maintenance of groundwater levels at or above current levels requires a systematic, repeatable and scientific approach. The first step in the achievement of this BMO is gaining the data required to accurately determine water elevations in the plan area for the development of a "baseline". The 2003 GWSAP set standards for the measurement and sampling of groundwater at 28 wells throughout the Plan Area. At this point in time, the results from implementation of the GWSAP have not yielded enough data for the development of a groundwater elevation baseline. Through the continued implementation of the GWSAP and semi-annual groundwater elevation measurements, a baseline will be developed and target groundwater elevations for wells in the monitoring network will be established. In the years from 2008 to 2010, additional wells will be added to the GWSAP network through the recruitment of existing wells and the installation of new wells. Increased spatial resolution will allow groundwater elevation in the county to be tracked in more detail. Increased spatial resolution of groundwater elevation trends also allows for spatial management of surface and groundwater actions that affect the

groundwater elevations. Groundwater elevation data collected as part of the GWSAP is uploaded into the CCWD Data Management System for tracking and reporting purposes.

3.2.2.2 BMO No. 2: Maintain or Improve Groundwater Quality

The maintenance of groundwater quality requires knowledge of the current quality of groundwater in the Plan Area. Through actions undertaken as part of the GWSAP, there was groundwater quality sampling in the Plan Area in the 2003. Continued groundwater quality sampling as part of the GWSAP will provide additional quality data on a tri-annual basis. There was no quality sampling in 2006 due to institutional challenges at the CCWD, however, groundwater quality sampling is planned for 2008. Water quality data collected as part of the GWSAP is uploaded into the CCWD Data Management System for tracking and reporting purposes.

3.2.2.3 BMO No. 3: Increase Water Supply Reliability

CCWD is actively exploring methods for increasing the reliability of its water supply. The protection of both the volume of groundwater and the quality of groundwater in the Plan Area is paramount to the reliability of water supply in Calaveras County. Through management actions to maintain groundwater elevation and quality, CCWD is ensuring that the residents of Calaveras County will have groundwater available for domestic and irrigation uses in the future.

The CCWD is currently exploring options for surface water delivery to areas that rely primarily on groundwater. By replacing groundwater use with surface water use, CCWD will effectively have a conjunctive use project in operation in a portion of the Plan Area. The implementation of a conjunctive use program in the Plan area is feasible due to the large volume of un-used surface water rights that CCWD holds on both the Mokelumne and Calaveras Rivers. The primary obstacle to the development of conjunctive use projects in the CCWD at this time is the financial burden of project development and the economic gap between groundwater and surface water on an individual level.

Groundwater demand reduction is another program that CCWD is exploring. Currently, a private golf course in the Plan area is using a portion of its wastewater for irrigation purposes. The current estimate is this has resulted in a demand reduction of roughly 30 AFY at this point in time. Additional demand reduction efforts would include public education and water conservation, implementation of water saving appliance programs and industrial water recycling programs where available.

3.3 GROUNDWATER MONITORING

3.3.1 MONITOR GROUNDWATER LEVELS

Groundwater level data are required to develop a basic understanding of the available groundwater resources of the Plan Area. The purpose of a groundwater level monitoring program is to develop information that will allow the available groundwater storage to be estimated and to track the changes in storage that result from seasonal and annual groundwater level fluctuations in the Plan Area.

In 2003, CCWD initiated a groundwater level monitoring program consistent with data collection and monitoring protocols outlined in the GWSAP. Over time, information gained from this program will allow CCWD to determine how the groundwater resources of the Plan Area are affected by seasonal and annual fluctuations in precipitation, groundwater pumping, and surface water use. As additional data are collected in the future, CCWD will better understand the groundwater resources in the Plan Area and will develop management strategies for the use of available surface water and groundwater resources.

In addition, in order to more accurately measure water levels at multiple aquifer zones, CCWD plans to install nested wells in the Wallace/Burson, Jenny Lind, and Valley Springs areas. Data from these wells will be used in order to understand the interaction between each aquifer layer in the Plan Area.

Additional monitoring may lead to identification of sub-basins within the Plan Area and improved information on the relationship between the alluvial aquifer and hard rock aquifer systems. CCWD will continue and expand the groundwater monitoring program to improve their understanding of the available groundwater resources.

3.3.2 GROUNDWATER QUALITY MONITORING

A groundwater quality monitoring protocol was developed as part of the GWSAP and documented in the *Camanche/Valley Springs Area Groundwater Sampling and Analysis Plan* (WRIME, 2003) this report established guidelines for the CCWD Groundwater Monitoring Program. The spring 2003 monitoring included sampling for groundwater quality. CCWD will continue to implement the Groundwater Monitoring Program outlined in the GWSAP. The groundwater quality monitoring program will be expanded as new wells are added to the monitoring program.

3.3.3 INELASTIC LAND SUBSIDENCE MONITORING

There is no existing information available to identify historical land subsidence in the Plan Area. The geologic setting of the Plan Area suggests that this area is not as susceptible to compaction of sediments resulting from groundwater withdrawal. Because land subsidence has not been an

issue in the Plan Area, there is no monitoring program to measure changes in the land surface resulting from the compaction of sediments. If land subsidence does become a concern in the Plan Area, CCWD will reevaluate the need for land subsidence monitoring.

3.3.4 SURFACE WATER-GROUNDWATER INTERACTION MONITORING

There is currently no formal program to monitor the surface water-groundwater interaction in the Plan Area. As the groundwater-monitoring program is expanded, CCWD may to include shallow wells along the Mokelumne and Calaveras Rivers to develop information about the surface water-groundwater interaction within the Plan Area.

3.3.5 DATA MANAGEMENT SYSTEM

CCWD has an existing Data Management System (DMS) that is currently used to store and analyze groundwater data collected from the current groundwater-monitoring program. CCWD will continue to update the DMS with biannual groundwater monitoring data collected as part of the Groundwater Monitoring Program. The DMS will be migrated to the Integrated Water Resource Information System (IWRIS) in the future to increase the utility of the system and allow for greater public and institutional involvement.

3.4 PLAN TO INVOLVE OTHER AGENCIES LOCATED IN THE GROUNDWATER BASIN

CCWD and CCEHD are working cooperatively on the implementation of this GWMP. Additionally, CCWD is also working on water management related projects with other agencies within and adjacent to the Plan Area. These projects and agencies include the following:

- CCWD and EBMUD have entered into a Memorandum of Understanding (MOU) to investigate Mokelumne River conjunctive use in the Camanche/Valley Springs area and have identified potential projects.
- CCWD and San Joaquin County Water Resources Coordinator are sharing data and coordinating efforts in local groundwater management.
- CCWD and CCEHD have entered into an MOU to work on the Geographic Information System, a cooperative project between public agencies in Calaveras County. The agencies involved include the County of Calaveras (including the Environmental Health Department), City of Angels Camp, Calaveras Council of Governments, and CCWD. This program is described in more detail in the Section 3.4.1.

CCWD and CCEHD will continue to involve and coordinate with other agencies and groups in the groundwater basin. In addition, CCWD plans to include San Joaquin County interests, which share the groundwater basin with CCWD. These interests may include the Northeastern San Joaquin County Groundwater Banking Authority and individual water purveyors.

In November 2006, CCWD was a partner in the preparation of the Mokelumne/Amador/ Calaveras Integrated Regional Water Management Plan. This Plan provides improved efficiency in coordinating the actions of CCWD with other agencies in the region.

3.4.1 GEOGRAPHIC INFORMATION SYSTEMS PROGRAM

In 2000, CCEHD began the development of a departmental Geographic Information System (GIS Program). This program tracks wells, small public water system sources, mines, abandoned excavations, failed septic systems, injection wells, underground storage tank facilities, solid waste sites, burn sites and hazardous waste sites. The GIS Program allows CCEHD to graphically display the above information and compile, organize, and analyze information related to the above topics. This program is particularly important to Calaveras County's groundwater management because it enables CCWD and CCEHD to track areas of potential groundwater contamination and the relative location of groundwater wells to these risks. Although this system is maintained and controlled primarily by CCEHD, the two agencies share access to the database.

Since 1998, CCEHD has been surveying newly drilled wells with a GPS device. CCEHD uses the GIS Program to store and organize this data. Additionally, CCEHD periodically updates DWR with new well locations.

3.5 ADOPTION OF MONITORING PROTOCOLS

Monitoring protocols were established as part of the initial monitoring program in 2002 completed as part of the Phase I work. These protocols are reported in the *Camanche/Valley Springs Area Groundwater Sampling and Analysis Plan*, (WRIME, 2003). CCWD will use the monitoring protocols developed in 2002 to select new wells and implement sampling plans. These protocols will also be used in the collection of data from the new nested wells that CCWD plans to install as part of this GWMP. These protocols are attached in Appendix A.

3.6 MAP OF THE GROUNDWATER BASIN

A map of the groundwater basin boundary, as delineated by DWR Bulletin 118, with agencies boundaries that are subject to GWMP is included in Figure 1-1.

3.7 AGENCIES NOT OVERLYING GROUNDWATER BASINS

A portion of CCWD overlies hard rock areas in the Sierra Nevada foothills. While this GWMP focuses primarily on groundwater resources of the alluvial aquifer system of the Camanche/Valley Springs Area, it is expected that future growth may occur in the areas just outside of the alluvial groundwater basin in the hard rock areas of the foothills. If these areas

experience significant growth in the next 20 years, much of the growth will be dependent upon groundwater for a water supply. Additional work is needed to collect information to identify and understand the hard rock aquifers and the relationship between the hard rock and alluvial aquifer systems.

SECTION 4 GROUNDWATER MANAGEMENT PLAN VOLUNTARY COMPONENTS

This section will discuss voluntary GWMP components.

4.1 CONTROL OF SALINE WATER INTRUSTION

Saline water can slowly degrade groundwater quality, limiting its range of potential beneficial uses. Six potential sources of saline intrusion include:

- Increase in salt content from dissolved materials;
- Lateral or upward migration of saline water;
- Downward seepage of sewage, agricultural, or industrial waste;
- Downward seepage of mineralized surface water; and
- Seawater intrusion.

Since groundwater elevation at its lowest point in the study is 100 ft above msl, seawater intrusion from the Pacific Ocean is not an issue. At this time, there is no documented evidence of saline intrusion in the Plan Area. Expansion of the groundwater monitoring program will allow CCWD to collect data on standard groundwater parameters including the presence of inorganic salts.

4.2 IDENTIFY AND MANAGE WELL PROTECTION AND RECHARGE AREAS

4.2.1 WELLHEAD PROTECTION PROGRAM

At this time CCWD does not serve groundwater in the Plan Area. CCEHD participates in the Wellhead Protection Program of the California Department of Public Health (CDPH). The Federal Wellhead Protection Program was established in 1986 as part of the Safe Drinking Water Act Amendments. The purpose of this program is to protect groundwater sources of public drinking water supplies from contamination, eliminating the need for costly water treatment to meet drinking water standards. It is a preventative approach to protecting groundwater quality. Under the Act, states are required to develop an EPA-approved Wellhead Protection Program (WHPP). To date, California has no formal state-mandated wellhead protection program, but instead relies on local agencies to plan and implement programs. The CCEHD participates in a WHPP with the CDPH.

4.2.2 RECHARGE AREA PROTECTION PROGRAM

CCWD does not have a formal recharge area protection program for the Plan Area at this time. To meet its groundwater goals and objectives of managing the groundwater resources in the Plan Area, CCWD may eventually need to develop a formal recharge program.

The 2003 Hydrogeologic Assessment includes an initial analysis to identify potential recharge areas based on land use, land use zoning, soils, and surficial geologic data. Information developed in the 2003 Hydrogeologic Assessment will be used to develop a program to manage and protect potential recharge areas. CCWD will have to coordinate land use planning activities with the appropriate Calaveras County agencies to protect potential recharge areas from development.

4.3 REGULATION OF THE MIGRATION OF CONTAMINATED GROUNDWATER

Section 10753.7c of the California Water Code addresses groundwater contaminants, which may originate from a number of sources such as leaking underground storage tanks or from the application of pesticides, fertilizers, and other industrial chemicals. Effective management and cleanup of contaminated groundwater requires coordination among all regulatory agencies involved.

Of particular importance in Calaveras County and the Plan Area is the potential for groundwater contamination by underground storage tanks and septic tanks. On-site septic systems are highly prevalent in this area, and mapping septic systems is of high priority when considering contaminant sources. Currently, CCEHD oversees the Underground Storage Tank Program for the county and provides oversight of remediation with soil contamination. Through the GIS Program, CCEHD maintains an inventory of residential, commercial, and industrial areas that use groundwater and an on-site sewage disposal method. Since 2000, CCEHD has recorded the parcel location of standard, engineered, and repaired on-site septic systems.

Agencies involved in mitigating groundwater contamination generally include the Regional Water Quality Control Board (RWQCB), Department of Toxic Substance Control and the United States Environmental Protection Agency (USEPA).

CCWD's role in protecting groundwater quality will be to support the appropriate agency's efforts in monitoring and cleaning up point-source contamination sites. CCEHD will continue to expand the GIS Program through collecting information on known and potential contaminant locations and identifying wells that may be at risk.

4.4 WELL ABANDONMENT AND DESTRUCTION PROGRAM

State regulations require that all unused wells be properly abandoned or destroyed. Wells that are abandoned and not properly destroyed may contribute to groundwater contamination, as:

1. Pollutants enter the well from the ground surface;
2. The well establishes vertical communication and allows poor quality water and pollutants to move from one aquifer to another; or
3. The well is used for illegal waste disposal.

It is the responsibility of the property owner or leasers to properly destroy their unused or abandoned wells. DWR Bulletins 74-81 and 74-90 provide the minimum standards for the destruction of wells, and Sections 13700 through 13806 of the California Water Code require proper destruction of wells. These standards apply to all water wells, cathodic protection wells, and monitoring wells.

If a local agency does not have its own well standards, it must enforce the State Water Resources Control Board (SWRCB) Model Well Ordinance (Resolution No. 89-98). Local agency requirements may exceed California standards.

CCEHD enforces the Calaveras County well construction and destruction ordinance. The ordinance was adopted by the Calaveras County Board of Supervisors in 1998 and fulfills the requirements outlined in the Department of Water Resources Bulletins 74-81 and 74-90. The purpose of the program is to regulate the construction, reconstruction, modification, abandonment, and destruction of water and agricultural wells, cathodic protection wells, industrial wells, geothermal heat exchange wells, monitoring and observation wells, test wells, test holes, and exploration holes in such a manner that the groundwater of the county will not be contaminated or polluted and that water obtained from wells will be suitable for beneficial use and will not jeopardize the health, safety or welfare of the people of the county. This is achieved through a permitting process established by the ordinance that states a "permit must be obtained from the CCEHD prior to development of any new well, or when 'work on a well' is to be performed within County boundaries."

The ordinance also grants authority to the director to designate areas where groundwater quality problems are known to exist and where a well will penetrate more than one aquifer. Well construction, reconstruction, or destruction work in designated areas may require special well seals and a report prepared by a registered geologist or civil engineer if the director deems necessary to prevent the migration or spread of poor quality groundwater.

Under the permitting process, CCEHD will continue to monitor well construction and destruction activities in the County. Through the GIS Program, CCEHD will continue locating active and abandoned wells in GIS to identify wells that may need to be destroyed.

4.5 CONTROL AND MITIGATE GROUNDWATER OVERDRAFT

Long-term uncontrolled groundwater overdraft or groundwater mining occurs when the groundwater extraction rate exceeds recharge. Continued overdraft may result in such problems as land subsidence, degradation of groundwater quality, well dewatering, and increased pumping costs. Also, with reduced groundwater storage, a basin may not be counted on as a potential water supply when surface water supplies are limited as in a prolonged drought.

Section 2.2.4 discussed the groundwater level trends and the possible occurrence of overdraft in the Plan Area. As CCWD continues to collect water level data, the state of the groundwater basin in the Plan Area can be analyzed further. At this time, there is also little known about the hard rock aquifer or the interaction of this aquifer with the alluvial aquifer in the Plan Area. Additional information is needed on groundwater levels in the hard rock aquifer system.

CCWD will expand the current groundwater monitoring program to better quantify the existing groundwater levels. This will include incorporating additional wells into the program to better understand the alluvial and hard rock aquifer systems and the interaction between the two.

This information will be used to further understand the state of the groundwater basin and to estimate the amount of overdraft if any. Groundwater management strategies will then be refined to control and mitigate the groundwater overdraft.

4.6 REPLACEMENT OF EXTRACTED GROUNDWATER

Groundwater flows from sources of recharge to areas of discharge, which includes wells. The physical replacement of groundwater extracted by wells can be an important management technique that may replenish the yield of the basin. Groundwater replenishment can be achieved through recharge of natural water supplies or imported water. Recharge can be maximized by delivering surface water to areas where it efficiently percolates to the groundwater basin. Groundwater replenishment may occur as:

- Natural percolation of surface water through the soil into the groundwater basin;
- Percolation of surface water in spreading grounds or basins that are maintained to maximize percolation;
- Injection of surface water into the groundwater basin through injection wells; and
- In lieu recharge.

CCWD currently has no formal program in place to replace extracted groundwater. However, since CCWD has available surface water rights that it does not use, future groundwater management is likely to include programs to replace extracted groundwater with surface water (in lieu recharge). The *Camanche/Valley Springs Area Hydrologic Assessment* (WRIME, 2003) characterizes the alluvial aquifer system and provides preliminary information needed to

identify potential recharge areas. However, additional information on the groundwater levels is needed to identify specific locations for groundwater recharge.

4.7 DEVELOP AND OPERATE CONJUNCTIVE USE PROJECTS

DWR Bulletin 118 defines the conjunctive operation of a groundwater basin as the "...operation of a groundwater basin in coordination with a surface water reservoir system. The basin is intentionally recharged in years of above average precipitation so groundwater can be extracted in years of below average precipitation when surface water supplies are below normal."

Operation of a conjunctive use program requires:

- A source of surface water during years with above normal streamflow;
- Conveyance facilities to transfer import water;
- Recharge facilities;
- Usable storage capacity in the aquifer;
- Extraction facilities; and
- Distribution facilities for surface water and groundwater.

At this time, there are no formal conjunctive use projects operating in the Plan Area. However, CCWD and EBMUD have entered into a MOU that advocates information sharing in order to explore conjunctive use projects. CCWD has developed a Mokelumne River Conjunctive Use Framework to investigate conjunctive use projects in the Camanche/Valley Springs Area.

CCWD is currently working with the Army Corps of Engineers to investigate the feasibility of conjunctive use programs in the Plan Area and other areas of Calaveras County. Potential projects include:

- Investigate the current groundwater shortage problems in the Wallace/Burson area (in progress);
- Determine the relationship between Camanche Reservoir and the adjacent groundwater basin in the Plan Area;
- Determine the availability of surface water supplies from the Mokelumne River for potential conjunctive use; and
- Identify suitable locations to recharge groundwater in the Mokelumne River Conjunctive Use Project Area.

Additionally, CCWD is involved in the Mokelumne River Forum (Forum). The Forum is a multi-agency group that is seeking better water management strategies in the Mokelumne River Basin and San Joaquin County in order to increase supply and yield for local agencies and EBMUD and to increase groundwater levels in the Eastern San Joaquin groundwater sub-basin. The Forum is currently investigating the development of an Inter-Regional Conjunctive Use Program, which CCWD is expecting to participate in.

4.8 IDENTIFY WELL CONSTRUCTION POLICIES

Improperly constructed wells can result in poor yields and may contribute to groundwater contamination by creating pathways for pollutants entering the aquifer from the ground surface. Poorly constructed wells may also provide communication between individual aquifers of varying quality, which may result in groundwater quality degradation.

The CCEHD's Water Well Construction Ordinance is used to enforce California's well construction standards in Calaveras County. These well construction ordinances ensure that well drillers comply with local ordinances and California State Law. Sections 13700 through 13806 of the California Water Code require proper construction of wells. In Bulletins 74-81 and 74-90, DWR specifies minimum well construction standards that apply to all water wells, cathodic protection wells, and monitoring wells.

4.9 GROUNDWATER CONTAMINATION CLEANUP, RECHARGE, STORAGE, CONSERVATION, WATER RECYCLING AND EXTRACTION PROJECTS

- CCWD does not have groundwater contamination cleanup program;
- CCWD is committed to the future development of groundwater recharge projects in the Plan area. These projects require substantial funding and will involve financial support and cooperation with agencies outside the Plan Area. These projects are in the early stages of feasibility scoping and are not available at this time;
- CCWD is attempting to partner with local landowners and developers to develop in-lieu groundwater storage projects. These projects are not yet ready for formal study;
- CCWD has have a water conservation element in its Urban Water Management Plan;
- In the Plan Area, there is a golf course that is working in conjunction with CCWD and recycles primary water for irrigation on the golf course. CCWD anticipates that this practice may expand in response to additional development near the golf course, and
- There are no groundwater extraction projects in the Plan Area.

4.10 RELATIONSHIPS WITH STATE AND FEDERAL AGENCIES

It is important for CCWD to establish and maintain an effective working relationship with state, federal, and local agencies. Currently, CCWD and CCEHD are working with the various state, federal, and local agencies by coordinating data collection and management efforts, completing studies, and establishing an effective communication strategy. Additional groundwater monitoring data will allow CCWD and CCEHD to document the state of the groundwater

basin. This information can be shared with state and federal agencies. Some of the agencies are listed below.

State Agencies - The SWRCB is the agency responsible for maintaining water quality standards and providing the framework and direction for California's groundwater protection efforts. The SWRCB management activities should also be coordinated with the DWR, the Department of Public Health, and the Department of Toxic Substance Control. Currently, CCEHD shares well location information with DWR via DWR's GIS Program.

Federal Agencies - The USEPA is the lead federal agency involved in groundwater protection. Other federal agencies that may be involved in groundwater management include the USGS and the USBR.

Local Agencies - CCWD, CCEHD, and Calaveras County are developing information that can be used to manage the groundwater resources in the Plan Area. Calaveras County, Wallace CSD, Valley Springs VSPUD, and CCEHD are supporting CCWD's continuing efforts to complete a GWMP. Also, Calaveras County, CCEHD, and CCWD have developed a Groundwater Management Ordinance to protect the groundwater resources of Calaveras County.

The California Water Code requires local agencies implementing an AB 3030 GWMP within the same groundwater basin to meet annually to coordinate groundwater management activities. In the Eastern San Joaquin groundwater sub-basin, the various agencies involved in groundwater management have formed several Joint Power Authorities (JPA) over the last decade. The most recent attempt at a JPA that CCWD is involved in is the Mokelumne River Forum. This group meets monthly and is working on the development of an Inter-Regional Conjunctive Use Project for the benefit of water users in the Eastern San Joaquin sub-basin, the foothills surrounding the Mokelumne River and its tributaries and the EBMUD.

4.11 LAND USE PLANNING

In California, land use planning decisions are generally made by city or county government agencies. These agencies may not have the authority to manage and protect the groundwater resources, which may result in land use activities that negatively impact both groundwater quality and quantity. The GWMP should be used in conjunction with local land use planners to develop a comprehensive plan that manages and protects the area's groundwater resources.

In 1999, the Calaveras County Board of Supervisors (CCBoS) passed Ordinance 2589 that adopts standards for groundwater impact analysis related to land development. Under this ordinance, the availability of adequate, safe and pure (potable) water supplies and treatment and proper disposal of liquid waste (sewage) must be demonstrated before permits are issued by CCEHD and the County. The CCEHD land use/land development program focuses on water and liquid

waste requirements as they apply to proposed subdivisions and includes investigation and review of county land applications.

In Calaveras County all land use decisions are made by the CCBoS based on the recommendations of the CCEHD and other agencies. CCWD monitors the projects that appear before the CCBoS and appears for the public hearings to make comments as they relate to water development and use. This is the current extent of CCWD's interaction with land use planning in Calaveras County.

SECTION 5 GROUNDWATER MANAGEMENT PLAN SUGGESTED COMPONENTS

This section presents the DWR Bulletin 118 suggested components for a GWMP. Many of these components were discussed previously in the GWMP. The following table lists the seven components with either a description or a reference to location within the GWMP where the component is covered in detail.

Table 5-1. DWR Bulletin 118 Suggested Components

Component	Description or a Reference
1. Manage with guidance of advisory committee	The Board of Directors for CCWD will oversee the management of the Plan Area.
2. Describe area to be managed under GWMP	Section 2 describes in detail the Plan Area.
3. Create links between BMOs and goals and actions of GWMP	Section 3.2 establishes these links.
4. Describe GWMP monitoring programs	Section 3.3.4 describes the monitoring programs
5. Describe integrated water–management planning efforts	In November 2006, CCWD was a partner in the preparation of the Mokelumne/Amador/ Calaveras IRWMP. This Plan provides improved efficiency in coordinating the actions of CCWD with other agencies in the region. The GWMP was prepared with the goals of the IRWMP in mind and meets three of the 6 goals in the IRWMP. The IRWMP also sets groundwork for continual communication between local agencies.
6. Report of implementation of GWMP	Section 6 discusses implementation of the GWMP.
7. Evaluate GWMP periodically	Section 6 discusses the periodic evaluation of the GWMP.

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6.1 IMPLEMENTATION PLAN

Implementation of the GWMP involves several actions from the CCWD, these actions are listed below:

1. **Groundwater level monitoring:** The CCWD will take groundwater elevation measurements in March and October of each year beginning in 2008 in order to get representation of the high and low groundwater elevations.
2. **Groundwater quality monitoring:** The CCWD will take water quality samples in October every 3 years, beginning in 2008.
3. **Groundwater monitoring efforts reporting:** The CCWD will post the results of monitoring on the DMS as well as on CCWD's website for public access. The CCWD will prepare annual groundwater reports in the first quarter of each year following groundwater level monitoring events. The results of the monitoring will be presented to the public in meetings held by the CCWD.
4. **Local conjunctive use project options:** The CCWD has been working with local agencies and developers to develop local conjunctive use projects. CCWD is in the preliminary stages of developing a feasibility study for the delivery of raw water to areas with high groundwater demands. This feasibility study will be started in summer of 2008 in conjunction with the Trinitas Development.
5. **Regional conjunctive use project options:** The CCWD has been working with the Mokelumne River Forum (Forum) in the exploration of an Inter-Regional Conjunctive Use Project (IRCUP). The Forum has recently completed work on defining water rights on the Mokelumne River in preparation for development of the IRCUP. The Forum is in the process of developing a Draft Work Plan for implementation of the IRCUP. The tasks identified in the Draft Work Plan are listed below with preliminary completion dates:
    a. Conceptual analysis of the IRCUP;
    b. Reconnaissance level analysis;
    c. Feasibility study;
    d. Environmental permitting; and
    e. Design and construction.

The schedule for implementation of these actions is presented in Table 6-1. This GWMP will be reviewed in 2011 with the anticipation that groundwater level and quality data will be of sufficient quality and quantity to revise the BMOs. At that time, if the BMOs can be revised into quantifiable objectives, trigger points for CCWD management actions may be developed. It is anticipated that the GWMP will be reviewed every four years thereafter in order to react to changing conditions in the Plan Area.

Table 6-1. CCWD GWMP Implementation Schedule

	2008				2009				2010	
Action	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.
1. Groundwater level monitoring		✓		✓		✓		✓		✓
2. Groundwater quality monitoring				✓						
3. Groundwater monitoring efforts reporting					✓				✓	
4. Local conjunctive use project options		←	—	—	—	→				
5. Regional conjunctive use project options		←	—	—	—	—	—	—	—	→
Conceptual analysis of the IRCUP		✓								
Reconnaissance level analysis				✓						
Feasibility study							✓			
Environmental permitting										✓
Design and construction					TBD					

6.2 DISPUTE RESOLUTION

Plan participants agree that they will resolve disputes as follows:

Informal Consultation. A participant with a disagreement pertaining to the substance of the Groundwater Management Plan shall timely consult with CCWD regarding the cause and current status of the disagreement, as well as strategies which may lead to a resolution of the problem. CCWD shall promptly respond and coordinate with that Participant, and both shall strive in good faith to resolve the disagreement.

To facilitate Informal Consultation, the Participant alleging disagreement ("**Initiating Participant**") shall provide a written statement to all other participants (**"Responding Participant(s)**") describing all relevant facts and a proposed resolution.

The Responding Participant(s) shall have thirty days from the date of the written statement to prepare a written response regarding the disagreement and serve that response on the Initiating Participant.

The Initiating Participant and Responding Participant(s) shall meet within thirty days of the date of the response to attempt to resolve the dispute amicably.

Mediation of Dispute. If the Initiating Participant(s) and the Responding Participant(s) cannot resolve the dispute within sixty days of the date of the written response, they shall engage a

mediator, experienced in groundwater and water-related disputes, to attempt to resolve the dispute. Each Participant that intends to advance a desired outcome shall ensure that it is represented at the mediation by a Director or Trustee. These representatives may consult with staff and/or technical consultants during the mediation and such staff and/or technical consultants may be present during the mediation. The costs of the mediator shall be divided evenly between all Participants in the mediation.

Binding Arbitration. In the event the Participants are unsuccessful in resolving any or all of the issues presented to the mediator, a limited scope arbitration shall be conducted promptly following the completion of the mediation.

The mediator shall provide to the arbitrating parties a list of available arbitrators. The Participants shall first attempt to agree on an arbitrator having some background or expertise in groundwater rights and quality law and, failing to do such, the mediator shall select an arbitrator with complex civil judicial experience.

The scope of the arbitration shall be limited to the issues presented to the arbitrator by the parties to the arbitration. The Participants shall meet and confer prior to the arbitration and provide to the arbitrator an agreed list of issues to be resolved. The arbitrator shall be instructed that the only issues for decision are those issues presented by the arbitrating parties, and that the arbitrator shall comply with California law, unless the subject matter specifically relates to a federal issue. It is specifically agreed that any decision of an arbitrator subjecting any of the Parties directly or indirectly to any regulatory or permitting requirement, including a waste discharge requirement, or to compel commitment of public funds, is outside the scope and authority of the arbitrator and shall be unenforceable and void. The arbitrator shall have no authority to award costs or attorneys' fees. Each Participant agrees that the costs of arbitration shall be shared equally by the Participants involved in the arbitration, and that each Participant shall bear its own attorneys' fees and preparation costs. Time shall be of the essence during the arbitration process.

The decision of the arbitrator shall be binding on all Participants as to those matters presented for determination. Any matters included in the decision of the arbitrator outside the issues presented for determination, including without limitation awards of costs and attorneys' fees, shall be unenforceable and not binding on the Participants. In the event an arbitrator attempts to include matters or issues outside the scope of the arbitration or any Participants fails to abide by the terms of this Agreement limiting the scope of the arbitration, any other Participants shall have the right to file an action for declaratory relief in any court of competent jurisdiction, seeking enforcement of the provisions of this Agreement limiting the scope of arbitration.

Reservation of Rights. Nothing in this section shall require a Participants to comply with the dispute resolution process contained herein and each Participants retains and may exercise at any time all legal and equitable rights and remedies it may have; provided, that prior to

commencing litigation, a Participant shall provide all Participants with at least ten business days' written notice of its intent to sue.

SECTION 7 REFERENCES

Bechtel Corporation. 1961. *Camanche Dam and Reservoir Geologic Report.*

Bechtel Corporation. 1964. *Camanche Reservoir Seepage Report: Mokelumne River Project.*

Bennett, George L V; Belitz, Kenneth; & Sawson, Barbara J. Milby. 2006. *California GAMA Program: Ground-Water Quality Data in the Northern San Joaquin Basin Study Unit, 2005.*

Bookman-Edmonston Engineering, Inc. 2001. *Technical Information to Support Development of AB3030 Groundwater Management Plan for the Camanche/Valley Springs Area.*

Calaveras County Water District. 2007. *Calaveras County Water District Urban Water Management Plan 2005 Update.*

California Division of Mines and Geology. *Geologic Map of the Sacramento Quadrangle*

California Division of Mines and Geology. *Geologic Map of the San Francisco-San Jose Quadrangle*

California Environmental Protection Agency (www.calepa.ca.gov/Publications/Reports AP2000B/water.htm).

Cowell, Wilmer L. Jr. 1974. *Soil Vegetation Maps of California.*

Dunham, Ray. 1961. *Report on Pollution of the Mokelumne River by the Penn Mine, Calaveras County, California.*

DWR. 1967. *San Joaquin County Groundwater Investigation: Bulletin 146.*

DWR. *1974. Evaluation of Groundwater Resources: Sacramento County, Bulletin 118-3*

DWR. 2003. *California's Groundwater: Bulletin 118.*

East Bay Municipal District. *Mokelumne River History.*

Finlayson, Brian J. & Rectenwald, Harry J. 1978. *Toxicity of Copper and Zinc from the Penn Mine Area on King Salmon and Stealhead trout in the Mokelumne River Basin, California.*

Fuller, W.P. 1989. *Groundwater Supply for the Lancha Plana District*

Hamlin, Scott N. & Alpers, Charles N. *1996. Hydrogeology of Acid Mine Drainage in Groundwater in the Vicinity of Penn Mine and Camanche Reservoir, Calaveras County, California.*

Olmsted, F.H. 1961. *Geologic Features and Groundwater Storage Capacity of the Sacramento Valley, California.*

Peterson , Jocelyn A. *1985. Geochemical Analysis of Rock Samples collected at the Penn Mine, Calaveras County, California.*

RMC Water and Environment. *2006. Mokelumne/Amador/Calaveras Integrated Regional Water Management Plan.*

Tudor Engineering Company. 1974. *Western Calaveras Irrigation District Water Supply and Conveyance System:Project Report and Draft Environmental Impact Report.*

USGS. 1939. *Geology and Groundwater Hydrology of the Mokelumne Area, California*

USGS. 1964. *Use of Groundwater Reservoirs for Storage of Surface Water in the San Joaquin Valley, California*.

WRIME, Inc. 2003. *Camanche/Valley Springs Area Groundwater Monitoring Report for Spring 2003.*

WRIME, Inc. 2003. *Camanche/Valley Springs Area Groundwater Sampling and Analysis Plan*.

WRIME, Inc. 2003. *Camanche/Valley Springs Area Hydrologic Assessment*.

Wrime, Inc. 2005. *Phase II Groundwater Management Study*.

APPENDIX A MONITORING PROTOCOLS

The following sections describe the monitoring protocols which were addresses in Section 4.5 of this document. The protocols include: sampling and monitoring frequency, field equipment, sample containers, sample collection methods and procedures, sample preservation, storage, chain of custody, analytical methods, and data archiving procedures, and laboratory procedures.

FREQUENCY

SEMIANNUAL MONITORING REQUIREMENTS

Groundwater levels and electrical conductivity (EC) will be measured semiannually.

THREE-YEAR MONITORING REQUIREMENTS

In addition to the semiannual monitoring, water quality samples shall be collected every three years, beginning in the spring of 2003. Subsequent water quality sampling shall also be conducted in the spring to obtain comparable data. The samples shall be analyzed in the field for pH and temperature. The laboratory shall analyze the samples for general minerals, general physical, and metals.

PREPARATION FOR FIELD WORK

Preparation for field work requires CCWD sampling personnel to notify the well owners and laboratory, prepare field forms, and obtain needed sampling equipment and supplies.

Well owners should be notified at least 1 to 2 days before field work commences. The well owners should be told that CCWD sampling personnel will be conducting groundwater monitoring in the area. Table A-1 provides the well owner contact information.

Before water quality sampling (every three years), the designated CCWD sampling personnel shall notify the laboratory when sampling is scheduled. The sample parameters, analyses, and sample bottles needed are shown in Table A-2. Arrangements will be made with the laboratory to deliver sample containers in clean ice chests to the location requested by CCWD at least two days before the sampling begins. Upon receipt of the sample bottles, the designated CCWD sampling personnel shall inventory the bottles to ensure that an adequate number and proper types of sample bottles have been provided.

Prior to collecting field measurements (semiannually), CCWD sampling personnel shall clean, maintain and test the water level sounder and calibrate the pH and EC meters using appropriate standards before going to the field.

Table A-1. Well Owner Contact Information

CCWD Groundwater Management Program

Site ID	Well Owner	Well Location	Telephone
1	Lee & Joan McNabb	126 Quail Oaks (Lot 62)	(209) 772-2020
2	Marion Roskie	9649 Almond Drive	(209) 786-6522
3	Bob Belmont	6516 Stabulis Rd	(209) 772-2686
4	Brian Chavez-Ohoa	3178 Crestview Dr	(209) 772-2981 or 772-3013
5	Diana Gigliotti	7794 Westhill Rd	(209) 772-1777
6	Scott & Kelly Kannel	4782 Hillvale Drive	(209) 772-9826
7	Calaveras County Water District	7600 Leslie Ct	(209) 754-3543
8	Steven Flaherty	10265 Quartz Drive	(209) 763-5898
9	Darryl Rusk	101 Melsher Ln	(209) 772-0225
10	Robert Herbst	5349 Campo Seco Rd	(209) 772-2308
11	Ronald Truman	7151 Highway 12	(209) 763-5088
12	Glen Rigsbee	# 50 Dante Ct, Lot 3 & 4	(209) 763-5403
13	Calaveras Unified School District	3304 Hwy 12	(209) 754-3504
14	Philip Fernandez	3910 Dickison Ct.	(209) 772-0180
15	Leo & Pam Breton	14219 Cobb Lane	(209) 772-1017
16	Pearl Regis	14237 Camanche Parkway	(209) 772-3670
17	Jesse Powers	8605 Warren Rd	(209) 887-3131
18	Wallace Estates	3 Wallace Lake Estates Unit 1	(209) 763-2883 (Gary)
19	Wallace Estates	2 Wallace Lake Estates Unit 1	(209) 763-2883 (Gary)
20	Wallace Estates	1 Wallace Lake Estates Unit 1	(209) 763-2883 (Gary)
21	Wesley Taylor	5635 Campo Seco Road	(209) 772-2831
22	Dave Snitchler	1788 Quail Oaks Ct	(209) 772-9170
23	Rick Gretsinger	190 Carmel Rd	(209) 327-2279
24	Tim Runion	7646 Ospital Ct.	(209) 763-5117
25	Richards Yard and Garden	3333 Hwy 12	(209) 772-1643 (Mojarro)
26	Phyllis Majerro	3340 Fitzgerald	(209) 772-1643
27	Earl Haynes	5699 Albert Ln	(209) 772-3131
28	CCWD: Southworth Sewer Plant	7600 Leslie Court	(209) 754-3543

Table A-2. Analytical Parameters, Test Methods, Holding Times, Sample Containers, Preservation and Approximate Detection Limits For CCWD Groundwater Management Program

Parameter	Analytical Testing Method	Maximum Holding Time	Sample Container		Preservation	Minimum Reporting Limit
			Bottle Type	Size/Set		
Major Minerals						
Calcium	SM 2340C or SM3500Ca-D	6 Months	Plastic	1 Liter	HNO3, cool to 4°C	1.0 mg/L
Magnesium	EPA 200.7 or SM3500Mg-E	6 Months	Plastic	1 Liter	HNO3, cool to 4°C	1.0 mg/L
Sodium	EPA 200.7 or SM3111B	6 Months	Plastic	1 Liter	HNO3, cool to 4°C	1.0 mg/L
Potassium	EPA 200.7	6 Months	Plastic	1 Liter	Cool to 4°C	1.0 mg/L
Bicarbonate	SM 2320-B	14 Days	Plastic or Glass	250 mL	Cool to 4°C	1.0 mg/L
Sulfate	EPA 300.0	28 Days	Plastic or Glass	250 mL	Cool to 4°C	0.50 mg/L
Chloride	EPA 300.0	28 Days	Plastic or Glass	250 mL	Cool to 4°C	1.0 mg/L
Hardness	SM 2340-C or EPA 130.2	6 Months	Plastic or Glass	250 mL	Cool to 4°C	2.0 mg/L
Alkalinity	SM 2320-B	14 Days	Plastic or Glass	250 mL	Cool to 4°C	1.0 mg/L
Fluoride	EPA 300.0	28 Days	Plastic or Glass	250 mL	Cool to 4°C	0.10 mg/L
Nutrients						
Nitrogen, Total Nitrate-N	EPA 300.0	48 Hours	Plastic or Glass	250 mL	Cool to 4°C	2.0 mg/L
Nitrogen, Nitrite-N	EPA 300.0 or EPA 353.2	48 Hours	Plastic or Glass	250 mL	Cool to 4°C	0.4 mg/L
Iron and Manganese						
Iron	EPA 200.7 or SM3111B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.1mg/L
Manganese	EPA 200.7 or SM3111B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.02 mg/L
Trace Metals (dissolved)						
Aluminum	EPA 200.7 or SM3111B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.05 mg/L
Antimony	SM 3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.0060 mg/L
Arsenic	SM 3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.002 mg/L
Barium	EPA 200.7	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.1 mg/L
Beryllium	SM 3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.001 mg/L
Boron	EPA 200.7	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.1 mg/L
Cadmium	SM 3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.0010 mg/L
Chromium (total)	SM 3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.01 mg/L
Chromium (hexavalent)	EPA 218.6	24 Hours	Plastic	500 mL	Cool to 4°C	0.0010 mg/L

Parameter	Analytical Testing Method	Maximum Holding Time	Sample Container		Preservation	Minimum Reporting Limit
			Bottle Type	Size/Set		
Copper	EPA 200.7 or SM311B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.050 mg/L
Lead	EPA 200.9 or SM3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.0050 mg/L
Mercury	EPA 245.1 or SM 3112B	28 Days	Plastic	500 mL	HNO3, cool to 4°C	0.0010 mg/L
Nickel	EPA 249.2 or SM3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.01 mg/L
Selenium	SM 3113-B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.0050 mg/L
Silver	EPA 200.7 or SM3111B	6 Months	Plastic	200 mL	HNO3, cool to 4°C	0.010 mg/L
Thallium	EPA 200.9	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.0010 mg/L
Zinc	EPA 200.7 or SM3111B	6 Months	Plastic	500 mL	HNO3, cool to 4°C	0.05 mg/L
Physical Properties						
pH	EPA 150.1	Immediate	Plastic	250 mL	None Required	None Required
Total Dissolved Solids	SM 2450-C	7 Days	Plastic	250 mL	Cool to 4°C	1.0 mg/L
Specific Conductance	SM 2510-B	28 Days	Plastic or Glass	250 mL	Cool to 4°C	10 umhos/cm
MBAS	SM 5540-C	48 Hours	Plastic	250 mL	Cool to 4°C	0.020 mg/L
Color	SM2120B	48 Hours	Plastic or Glass	100 mL	Cool	5NTU
Odor	SM2150B	24 Hours	Glass	200 mL	None Required	None Required
Turbidity	EPA180.1	48 Hours	Plastic or Glass	100 mL	Cool to 4°C, Dark	1 mg/L
Corrositity (Langlier Index)	Langlier Index	24 Hours	Plastic or Glass	100 mL	Cool to 4vC, Dark	None Required

The field parameter form for documenting semiannual field measurements is contained in Table A-3. The field forms needed for documenting water quality sampling are contained in Tables A-4 and A-5.

The designated CCWD sampling personnel will assemble field forms, sampling equipment and supplies, which may include (depending upon the type of sampling or monitoring to be conducted):

- Copy needed field measurement forms (Tables A-3, A-4, and A-5) and chain-of-custody form;
- Sample bottles and ice chest from the laboratory;
- Portable specific conductance meter, pH meter, electrical conductivity meter, and thermometer;
- pH and electrical conductance calibration standards;
- Watch or stopwatch;
- Waterproof marking pen;
- Latex or nitrile gloves;
- Paper towels;
- Electrical water level sounder;
- Garden hose;
- Steel measuring tape;
- Camera;
- Bucket or other container to estimate flow rates;
- Bleach;
- Ice;
- Spray bottles; and
- Distilled water.

SAMPLE CONTAINERS

Appropriately selected containers will be prepared by laboratory with both preservative and container type in accordance with the required analysis as presented in Table A-2. Sample containers shall be laboratory-cleaned prior to use, based on the analytes of interest, in accordance with standard USEPA protocol. Sample containers must be stored in a fashion that prevents the accumulation of dust or other contaminants. The laboratory will be responsible for verifying the cleanliness and integrity of the sample containers prior to shipment to CCWD pursuant to their sample container quality assurance and quality control procedures.

Each container will have a preprinted identification label clearly showing the constituent(s) to be analyzed. A laboratory sample number will be assigned by the laboratory upon delivery of the sample(s) to the laboratory for proper identification and tracking.

Table A-3. Semi-Annual Groundwater Sampling Form
Field Parameters
CCWD Groundwater Management Program

Site ID	Date	Time	Depth to Water (FT)	EC (umhos/cm)	Comments
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
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28					

COMMENTS:

Table A-4
Three-Year Groundwater Sampling Form
Well Volume and Purge Time Calculations
CCWD Groundwater Management Program

1. WELL SITE ID NO.: _____
2. DATE: _____
3. YEAR WELL CONSTRUCTED-INSTALLED:_____
4. CASING MATERIAL:_____
5. WELL DIAMETER: _____ inches (in)
6. WELL DEPTH: _____ feet (ft)
7. DEPTH TO WATER: _____ (ft)
8. COLUMN OF WATER (line 7 - line 6):_____ (ft)

TIME: _____
FIELD TECH(S): _____
WEATHER CONDITIONS: _____ (eg. hot, cold, clear, etc)
REFERENCE POINT (R.P) _____ (ft)
DESCRIPTION:_____ (eg. top of casing)

PH METER (TYPE AND MODEL NO.)_____
CALIBRATED (yes/no)_____DATE:_____
FIELD CALIBRATED (yes/no)_____DATE:_____

EC METER (TYPE AND MODEL NO.)_____
CALIBRATED (yes/no)_____DATE:_____
FIELD CALIBRATED (yes/no)_____DATE:_____

WELL VOLUME CALCULATION

9. ONE WELL VOLUME (**V**) = Enter Line 5 (in) = _____ / 24=(_____)^2= _____x 3.1416=_____ x line 8=_____ft^3
10. ONE WELL VOLUME (**V** in gallons) = $V_{(line\ 9)}$ x 7.48 = _____ gal
11. THREE WELL VOLUMES (in gallons) = $V_{(line\ 10)}$ x 3 = _____ gal
12. FIVE WELL VOLUMES (in gallons) = $V_{(line\ 10)}$ x 5 = _____ gal

WELL PURGE TIME CALCULATION

13. WELL DISCHARGE RATE (**Q**) (with 5-gallon bucket) = 5 gal / ____ seconds x 60 sec/min = _____ gallons per minute (gpm)
14. WELL PURGE TIME (ONE WELL VOLUME) = $\mathbf{V}_{(line\ 10)}$ / $\mathbf{Q}_{(line\ 13)}$ = _____ min
15. WELL PURGE TIME (THREE WELL VOLUMES) = $\mathbf{V}_{(line\ 11)}$ / $\mathbf{Q}_{(line\ 13)}$ = _____ min
16. WELL PURGE TIME (FIVE WELL VOLUMES) = $\mathbf{V}_{(line\ 12)}$ / $\mathbf{Q}_{(line\ 13)}$ = _____ min

ADDITIONAL FIELD NOTES

17. TIME PUMP TURNED "ON": _____
18. TIME PUMP TURNED "OFF": _____
19. ELAPSED PURGE TIME: _____ (min)

COMMENTS

Table A-5
Three-Year Groundwater Sampling Form
Field Parameters
CCWD Groundwater Management Program

CCWD WELL SITE ID NO.: _____

DATE: _____

FIELD TECH(S): _____

TIME PUMP TURNED "ON": _____

TIME PUMP TURNED "OFF": _____

WEATHER CONDITIONS: _____

FIELD CHEMICAL TESTING SUMMARY[(a)]

TIME MEASURED	pH	TEMPERATURE (^{o}F or ^{o}C)	ELECTRICAL CONDUCTANCE (umhos/cm)	COMMENTS

NOTES: (a) The number of measurements to be obtained for each chemical parameter shall be based on the amount of time it takes to perform a particular test and shall be no less than three per purge cycle to adequately estimate chemical parameter stabilization prior to sampling.

CALIBRATION OF FIELD EQUIPMENT

The frequency and nature of pH and electrical conductivity meter calibration shall be consistent with the manufacturer's recommendations. At a minimum, the meters shall be calibrated once per day. The meters shall also be calibrated when significant changes in climatic conditions occur (e.g., when air temperature changes by more than 30°F). The meter type, its manufacturer, model and identification numbers, and calibration information shall be documented in the field notes.

GROUND WATER LEVEL MEASUREMENTS

Each well has been assigned a unique identification number, based upon the initial monitoring event. This number shall be used to identify each groundwater level measurement. The numbers for each well are listed in Table A-1.

Prior to obtaining the water level measurement at each well and between each well site, the electric sounder cable shall be rinsed with a solution of sodium hypochlorite (liquid bleach) and distilled water. The solution shall consist of bleach and distilled water in a one-tablespoon-to-one-quart ratio (a concentration of about 200 parts per million chlorine is desirable). The sounder shall then be rinsed again thoroughly (three times) with distilled water and allowed to air-dry. Thorough cleaning of equipment is necessary to avoid any possibility of cross-contamination.

Prior to purging and sampling, the depth to static groundwater level will be obtained at each well, using an electric water level sounder with a cable graduated in increments of 0.01 foot.

The height of the reference point, the point from which the groundwater level is measured (e.g., the top of casing), shall be measured using a retractable, graduated, stainless-steel tape with increments of 0.01 foot. The measuring point height (e.g., 1.23 feet above ground surface) and its description (e.g., top of casing) shall be documented on the sampling form.

To obtain a depth to water measurement, the electric sounder cable will be lowered slowly into the well through the access port until the sounder indicates submergence by either a beeping sound or light depending on the type of signal installed for that particular model. At this point, the CCWD personnel will note the depth to water (to the nearest 0.01 foot) from the reference point. The depth shall be confirmed by lifting the sounder about 2 to 3 feet, then remeasuring the depth. If the depth remains constant, the depth-to-water shall be recorded on the sampling form (Table A-3). If the depth changes, CCWD personnel shall indicate that on the form, the variable nature of the measurement, and its possible cause (e.g., bouncing, recovering water levels).

WELL PURGING AND DISCHARGE

The purging and discharge requirements vary greatly between the wells. Some wells are capable of producing 100 to 300 gpm while others wells can be pumped dry within a few minutes. The purging recommendations contained in this GWSAP are based upon the assumption that water is a precious commodity for these well owners and should not and cannot be wasted. The purging of the well shall not leave a well owner without water. The following purge procedures have been modified from Environmental Protection Agency recommended practices to fit the conditions present in Calaveras County and at each well. Approximate purge time and rates are provided in Appendix A on each Well Identification Sheet. At all times, efforts should be made to utilize the purge water effectively. The purge water should be pumped to the owner's water storage tank(s) or to livestock watering troughs or used for irrigation.

If a hydrocarbon odor is detected at any time during purging, purging shall be immediately stopped and the well owner and appropriate local environmental agencies notified.

The main purpose of the semiannual monitoring is to identify significant changes in groundwater quality by collecting electrical conductivity measurements. Therefore, purging of the well does not need to be as extensive as when water quality samples are collected. For semiannual monitoring, pumping each well for about 5 minutes is sufficient before measuring the electrical conductivity.

Prior to water quality sampling (three-year sampling events), each well will, to the extent possible, be pumped (purged) for a sufficient period of time to evacuate standing water in the well and to move "fresh" groundwater into the well. The determination of "fresh" groundwater is when physical field parameters such as pH, EC, and temperature have stabilized. Generally, well purging will continue until field parameters have stabilized or at least three well volumes (unless otherwise specified) have been purged. Field measurements made during well purging will be entered in the designated spaces shown on the well purging field chemical testing form in Table A-5. CCWD personnel will complete this form in the field at each well site before proceeding to the next well.

SAMPLE IDENTIFICATION AND LABELING

Each well has been assigned a unique identification number, based upon the initial sampling event. This number shall be marked on each sample bottle.

All sample containers will be pre-labeled, to the extent possible, prior to each sampling event to facilitate sampling activities. Sample containers provided by laboratory will contain waterproof labels and contain the following pre-marked information: analyte and laboratory identification number. To the extent possible, the designated CCWD sampling personnel will inscribe the

sample identification, sampler(s) name or initials, and date on the labels under dry conditions using a waterproof marker pen during purging of each well. Immediately prior to collection of water samples, the CCWD personnel will inscribe on the sample bottle label the time the sample was collected.

SAMPLE COLLECTION

Groundwater samples shall be collected from the designated sampling port as described on each Well Identification Sheet contained in Appendix A.

Designated sampling personnel should exercise extreme care at all times during the handling of acid-preserved sample containers to minimize spillage, damage and/or injury to the sampler(s) or the field equipment. In addition to latex or nitrile sampling gloves, the designated sampling personnel should wear safety glasses or goggles to minimize potential eye injury.

Designated CCWD sampling personnel will use "clean sampling techniques" to minimize potential contamination of water samples. Prior to the collection of samples, sampling personnel will rinse their hands and don sterilized latex or nitrile gloves. Sample containers and lids will not touch the ground, the sampling personnel's clothing, or any other potential sources of contamination. Sample container lids will not be removed from a particular container until that container is to be filled. Sample containers shall be rinsed three times with the sample prior to collection unless the container contains a preservative. The sample container shall be filled to the top of the rim to minimize air space between the liquid level and the lid. The lid shall be tightened securely to the container immediately after sample collection is completed.

SAMPLE PRESERVATION AND STORAGE

Chemical preservatives and refrigeration shall be used to maintain sample integrity prior to analysis. Immediately after the sample has been collected, the sample shall be placed in clean ice chests containing commercially prepared ice packs in order to maintain cool conditions in the ice chest between 2°C and 6°C until the samples have been delivered to the laboratory. The ice packs will be double bagged in order to prevent leakage of ice melt water from touching the sample containers. Samples must be returned to the laboratory with 22 hours of sampling in order to meet analytical holding time requirements.

RECORD KEEPING AND CHAIN-OF-CUSTODY

CCWD personnel will maintain a logbook with field forms (Tables A-3, A-4, and A-5) showing the dates and times of sample collections. A chain-of-custody form indicating the sampling site, sampler's name, date and time sampled, and any special observations shall be filled out by the

CCWD sampling personnel and placed in a sealed plastic bag (e.g., Ziploc) with the sample(s) in the ice chest. The samples shall remain in the control and custody of a designated sampling team member at all times. When the samples are delivered to the laboratory by CCWD, the laboratory will sign for custody of the samples and provide a copy of the completed chain-of-custody form to the designated CCWD sampling personnel.

QUALITY CONTROL SAMPLES

The sampling plan does not require collection of any field quality control samples because the parameters being collected are stabile and no volatile samples are being collected.

REVISIONS TO THE SAMPLING AND ANALYSIS PLAN

The development of this groundwater management program should evolve and change as new information and wells become available. As the program evolves, additional wells may be added and other wells may be removed. Preferably all wells for monitoring purposes should have well construction details. The figures, tables and text should be updated annually to reflect the changes incorporated into the groundwater management program.

LABORATORY PROCEDURES AND REPORTING OF RESULTS

The laboratory will select the appropriate sampling containers for the chemical, physical and/or biological constituents to be analyzed (Table A-2) and to meet their internal quality control requirements for duplicate and spike analyses.

RECORD KEEPING

The laboratory will keep appropriate records to indicate the following for each sample:

- Date, location, and time of sampling.
- Name(s) of individuals who performed the water sampling.
- Date and time samples were received by the laboratory.
- Temperature of the ice chest interior upon receipt by the laboratory.
- Date(s) analyses were made.
- Analytical testing methods used and detection limits.
- Analytical results.

QUALITY ASSURANCE

The laboratory will adhere to a quality assurance program that follows accepted USEPA protocols. It must maintain state certification for drinking water analyses and perform routine analyses including known, commercially available standards. These quality assurance/quality

control procedures are described in the laboratory's Quality Assurance and Quality Control Manual. The laboratory shall submit to the CCWD a report that describes quality assurance results, spike recovery, any problems discovered or identified for the analytical period covered at the laboratory, and any subcontract laboratories used.

All analysts must be certified or approved to perform the required analyses or have the necessary training. A copy of the certification and training records shall be available to the CCWD upon request.

ANALYTICAL METHODS

The laboratory (including any subcontractor laboratory it may use) must use accepted laboratory analytical methods as specified in Table A-2 where appropriate. USEPA limits on holding times must also be observed.

The laboratory (and any subcontractor laboratory it may use) must be certified by the State of California for the analytical methods used. Written test procedures including quality control practices shall be followed for each analytical method used to measure the parameters listed in Table A-2.

Detection limits must be equal to or less than the detention limits for reporting purposes or State Action Levels for drinking water set forth by the California Department of Health Services. Table A-2 lists the detention limits for each monitoring parameter.

LABORATORY REPORTING OF RESULTS

The laboratory will use a standard reporting form for all water sources listing date(s) of analysis, name(s) of person who analyzed the samples, analytical method(s) used, name of parameter analyzed, detection limit, units of measurement, and results of the analysis. Any analytical result less than detectable shall be reported as less than the method detection limit. All inorganic constituents analyzed shall be designated as how reported as the ion or as calcium carbonate.

Paper and electronic copies of laboratory results and written reports shall be submitted by the laboratory to the CCWD within 30 calendar days of receipt of the samples. Unusual spikes, questionable results, or detection of chemicals not on the list of required constituents will be promptly reported to the designated CCWD sampling personnel. For at least three years from the date the analytical reports were submitted to the designated CCWD sampling personnel, the laboratory will maintain records that show the calibration of equipment used in the various analyses.

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APPENDIX B PUBLIC INVOLVEMENT

PUBLIC NOTICE

NOTICE IS HEREBY GIVEN that the Calaveras County Water District (CCWD) is preparing a Groundwater Management Plan Update (Plan) per AB 3030/SB 1938 requirements for the Camanche/Valley Springs area, pursuant to Sections 10750 et seq. of the California Water Code. CCWD intends to adopt a Resolution of Intention to draft and implement the Plan at the Public Hearing to be held at the Board of Directors meeting on Wednesday, October 24, 2007, starting at 9:00 a.m. at 423 E. St. Charles Street, San Andreas.

THE PUBLIC is invited to attend an evening meeting on Wednesday, November 7, 2007 at 6:30 p.m. at the Jenny Lind Veterans Memorial District hall, 189 Pine Street, Valley Springs. Comments and questions are welcomed at this informational meeting.

The draft Resolution, a 2003 Hydrogeologic Assessment, and a 2001 Groundwater Management Plan are available on CCWD's web site at http://www.ccwd.org/pages/facilities.htm. The draft Plan Update will be available on CCWD's website immediately following the Public Hearing on October 24, 2007. Please direct questions or comments to Ed Pattison, Water Resources Manager, at (209) 754-3543 Ext 29, via E-mail at edwinp@ccwd.org, or in writing at the Calaveras County Water District, Attn: Ed Pattison, P.O. Box 846, San Andreas, CA 95249.

PUBLIC NOTICE

CHANGE OF MEETING LOCATION

NOTICE IS HEREBY GIVEN that the Calaveras County Water District (CCWD) is preparing a Groundwater Management Plan Update (Plan) per AB 3030/SB 1938 requirements for the Camanche/Valley Springs area, pursuant to Sections 10750 et seq. of the California Water Code. The CCWD Board of Directors adopted a Resolution of Intention to draft and implement the Plan at the October 24, 2007, Public Hearing.

THE PUBLIC is invited to attend an evening meeting on Wednesday, November 7, 2007 at 6:30 p.m. at the Valley Springs Elementary School Gymnasium, 240 Pine Street, Valley Springs. Comments and questions are welcomed at this informational meeting.

A draft groundwater management plan update, as well as additional groundwater reports, are available on CCWD's web site at http://www.ccwd.org/pages/facilities.htm. Please direct questions or comments to Ed Pattison, Water Resources Manager, at (209) 754-3543 Ext 29, via E-mail at edwinp@ccwd.org, or in writing to Calaveras County Water District, Attn: Ed Pattison, P.O. Box 846, San Andreas, CA 95249.

PUBLIC NOTICE

NOTICE IS HEREBY GIVEN that the Calaveras County Water District (CCWD) will hold a hearing to adopt a Groundwater Management Plan Update (Plan) per AB 3030/SB 1938 requirements for the Camanche/Valley Springs area of Calaveras County, pursuant to Sections 10750 et seq. of the California Water Code. CCWD intends to adopt a Resolution to Adopt and Implement the Plan at the Public Hearing to be held at the Board of Directors meeting on Monday, November 26, 2007, starting at 9:00 a.m. at 423 E. St. Charles Street, San Andreas. Comments and questions are welcome at the hearing.

The draft Plan, a 2003 Hydrogeologic Assessment, and a 2001 Groundwater Management Plan are available at the front desk of CCWD and on CCWD's web site at http://www.ccwd.org/pages/facilities.htm. Please direct questions or comments to Ed Pattison, Water Resources Manager, at (209) 754-3543 Ext 29, via E-mail at edwinp@ccwd.org, or in writing at the Calaveras County Water District, Attn: Ed Pattison, P.O. Box 846, San Andreas, CA 95249.

RESOLUTION NO 2007 – 105

A RESOLUTION OF THE BOARD OF DIRECTORS OF CALAVERAS COUNTY WATER DISTRICT TO ADOPT AN UPDATE OF THE CALAVERAS COUNTY WATER DISTRICT'S AB 3030 GROUNDWATER MANAGEMENT PLAN CONSISTENT WITH SB 1938 REQUIREMENTS

WHEREAS, the Board of Directors of CALAVERAS COUNTY WATER DISTRICT (CCWD) has prepared a Groundwater Management Plan Update (GMP Update) per AB 3030 / SB 1938 requirements for the Camanche / Valley Springs area, pursuant to Sections 10750 et seq. of the California Water Code; and

WHEREAS, the Board of Directors adopted a Resolution of Intent to Prepare a Groundwater Management Plan Update, adopted October 24, 2007, by Resolution 2007– 92; and

WHEREAS, District staff made the GMP Update available to the public via the District's web site and at the District's office, as well as providing public notices in the local newspaper and an evening meeting in Valley Springs held November 7, 2007; and

WHEREAS, the Camanche / Valley Springs groundwater basin is identified as part of the eastern San Joaquin Groundwater Basin according to California Department of Water Resources (CA DWR) Bulletin 118; and

WHEREAS, the eastern San Joaquin Groundwater Basin continues to decline and is recognized in a state of critical overdraft by the CA DWR; and

WHEREAS, CCWD adopted an AB 3030 GMP in 2001 for the Camanche / Valley Springs area, pursuant to Sections 10750 et seq. of the California Water Code; and

WHEREAS, CCWD was awarded an AB 303 grant in 2003 to develop a hydrogeologic assessment and groundwater monitoring program for the Camanche / Valley Springs area; and

WHEREAS, the CCWD staff has maintained a minimum groundwater monitoring program, which is insufficient to adequately analyze conditions in the Camanche / Valley Springs area; and

WHEREAS, the Camanche / Valley Springs area is experiencing increasing agricultural and municipal water demands that require continued monitoring of the groundwater conditions in the basin,

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of CALAVERAS COUNTY WATER DISTRICT to adopt and implement the Groundwater Management

Plan Update per AB 3030 / SB 1938 requirements for the Camanche / Valley Springs area, pursuant to Section 10750 et seq. of the California Water Code.

BE IT FURTHER RESOLVED, that the General Manager is hereby authorized to submit the Plan Update and such other documentation as may be necessary to the California Department of Water Resources for their acceptance.

PASSED AND ADOPTED this 26th day of November 2007 by the following vote:

AYES: Directors Davidson, Hebrard, Underhill and Dean

NOES: None

ABSTAIN: None

ABSENT: Director Rich

CALAVERAS COUNTY WATER DISTRICT

Bertha E. Underhill

Bertha E. Underhill
Board President

ATTEST:

Mona Walker

Mona Walker
Clerk to the Board

CERTIFIED A TRUE COPY
Mona Walker
BOARD CLERK
CALAVERAS COUNTY WATER DISTRICT