

CALIFORNIA DROUGHT AN UPDATE: JUNE 2009



Cover photo of Mount Shasta in September, 2008
courtesy of Jack Trout, <http://www.jacktrout.com>

FOREWORD

This status report was prepared in response to a commitment to Governor Schwarzenegger that the Department of Water Resources (DWR) will monitor and report on water supply conditions and drought impacts.

Following a dry 2007 and 2008, California is now in its third year of a drought. These years also mark a period of unprecedented restrictions in State Water Project and federal Central Valley Project (CVP) diversions from the Sacramento-San Joaquin Delta to protect listed fish species. Together, these factors are having a significant impact on the ability to meet the state's water supply needs.

Drought impacts from this year's water shortages are most severe in the west side of the San Joaquin Valley. CVP deliveries for that area are at 10 percent of contractors' allocations this year, following deliveries of 40 percent in 2008 and 50 percent in 2007. The resulting water shortages are causing major economic impacts to agriculture and communities that depend on agriculture for employment. Demands for social services – food banks and unemployment assistance programs – have stretched the ability of local agencies to respond, as described in the Governor's recent request for a presidential declaration of major disaster in Fresno County.

One conclusion that is evident from this review of year-to-date conditions is the importance of preparing for the possibility of a dry 2010. DWR will continue to monitor water supply conditions and drought impacts to identify any necessary supplemental response actions this year and will move aggressively forward to plan for a potentially dry 2010 in coordination with other state, federal and local agencies and the water community.



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ACRONYMS

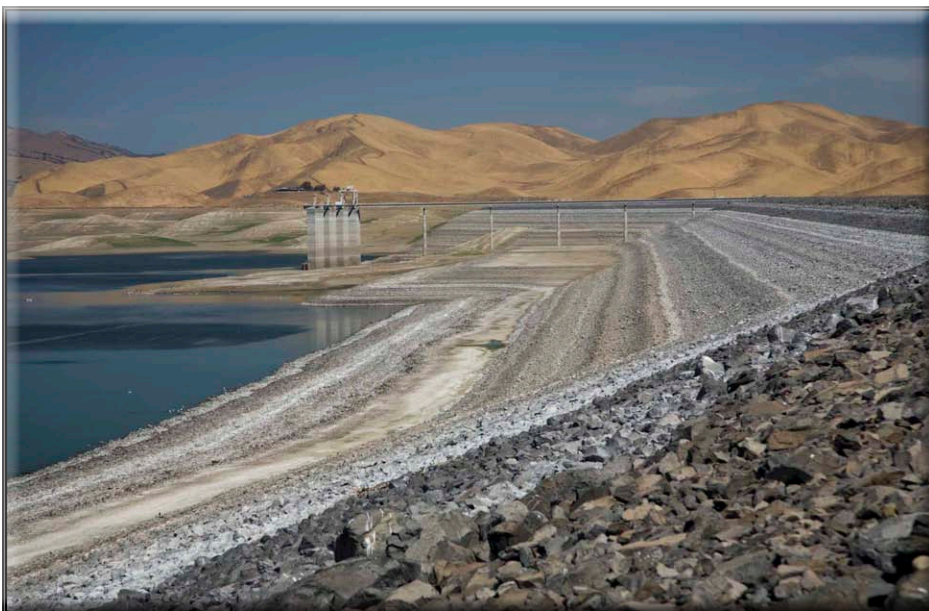
ACWA	Association of California Water Agencies
AF	acre-feet
Bay-Delta	San Francisco Bay-Sacramento-San Joaquin River Delta
BLM	U.S. Bureau of Land Management
CAL FIRE	California Department of Forestry and Fire Protection
CALEMA	California Emergency Management Agency
CALFED	California-federal Bay Delta Authority
CDPH	California Department of Public Health
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
Delta	Sacramento-San Joaquin River Delta
ENSO	El Niño-Southern Oscillation
FERC	Federal Energy Regulatory Commission
GRACE	NASA's Gravity Recovery and Climate Experiment
MAF	million acre-feet
MWD	Metropolitan Water District
NMFS	National Marine Fisheries Service
NWS	National Weather Service
SCWA	Sonoma County Water Agency
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan

CHAPTER 1. INTRODUCTION

The purpose of this report is to assess 2009 mid-year drought conditions and status, in response to a commitment made to the Governor's Office as part of implementation of the February 27, 2009, proclamation of a state of emergency for statewide water shortage. The focus of this report is on water supply conditions and related information for the year to date, together with initial review of drought impacts, where that information is available. A subsequent report will cover impacts through the end of the year and provide further detail for the entire year. Certain impacts of a third consecutive dry year will not be apparent until a late fall timeframe; year-end 2009 statistics for many sectoral impacts will not be available until 2010.

Water year 2007 was dry statewide, following a wet 2006. Water years 2008 and 2009 have continued the dry trend. Water years 2007-09 represent the 12th driest three-year period in the state's measured hydrologic record, based on the 8-station precipitation index discussed with figure 1. Water years 2007-09 also mark a period of unprecedented restrictions in State Water Project (SWP) and federal Central Valley Project (CVP) diversions from the Sacramento-San Joaquin River Delta (Delta) to protect listed fish species, a regulatory circumstance that significantly exacerbates the impacts of hydrologic drought for customers of those water projects.

The impacts of a single dry year such as 2007 on water supplies are normally minimal from a statewide perspective (see CDWR, 2008). However, the devastating wildfires that laid siege to Southern California that year—characterized as some of the costliest and most damaging in



Low San Luis Reservoir levels in summer 2008 reflect the use of stored water to compensate for reduced ability to export water from the Delta

U.S. history—were a reminder that vulnerability to drought extends beyond impacts to developed water supplies. Subsequently, a dry 2008 combined with restrictions in SWP and CVP diversions from the Delta in response to court-mandated implementation of an interim remedy to protect Delta smelt, led to the issuance of Executive Order S-06-08 and a Governor’s emergency proclamation for selected Central Valley counties (see Appendix) in June 2008.

In addition, a new U.S. Fish and Wildlife Service (USFWS) biological opinion for Delta smelt released in December 2008 called for measures that would result in an estimated 20 to 30 percent reduction in SWP and CVP Delta diversions on average. Observed precipitation in January 2009 was only about one-third of average, indicating that the threat of a third dry year was already a possibility. These conditions, coupled with statewide reservoir storage approximately 65 percent of average, led to the Governor’s proclamation of a statewide water shortage state of emergency in February 2009 (see Appendix). Among other things, the proclamation directed the Department of Water Resources (the Department) to provide the Governor with an updated report on the state’s drought conditions and water availability by March 30, 2009, to allow the Governor to determine if additional orders should be issued to mitigate emergency conditions. In its March report to the Governor, the Department found that improved hydrologic conditions obviated the need for additional orders at that time, but the Department committed to preparing additional evaluations—such as this 2009 mid-year status report—to monitor the need for further mitigation of emergency conditions.

When is a Shortage of Water a Drought?

Drought is a gradual phenomenon. There is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most dependent on annual rainfall—ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable water source. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in ground water basins decline. Hydrologic impacts of drought may be exacerbated by regulatory or administrative requirements that place restrictions on a water purveyor’s operations to protect environmental resources or to satisfy the rights of senior water rights holders.

Defining when drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users in a different part of the state or with a different water supply. California’s extensive system of water supply infrastructure—its reservoirs, managed groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term (e.g. single year) dry periods. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, decline in groundwater levels, or expected supply from a water wholesaler to define their water supply conditions. Criteria used to identify statewide drought conditions—such as statewide runoff and reservoir storage—do not address these localized impacts.

CHAPTER 2. HYDROLOGIC CONDITIONS AND WATER SUPPLIES

Climate Background

Calendar years 2007, 2008, and 2009 to date have been characterized by relatively warm and dry conditions. During this time period, El Niño-Southern Oscillation (ENSO) conditions in the equatorial Pacific Ocean have been alternating between La Niña and neutral status. ENSO is the only climate phenomenon identified to date that offers predictive capabilities (although limited) for precipitation in California, with strongest events yielding the best signal. La Niña conditions tend to favor a drier outlook for Southern California, but do not typically show significant correlation with water year type for Northern and Central California. The most recent La Niña event, which ended in spring 2009, was not a strong event.

At the global level, the past decade has been characterized by above-average warmth (**Table 1**). California maximum temperatures, averaged over the three-year period of 2006-08, ranked 13th out of 112 years of data; mean temperatures ranked 12th; and minimum temperatures ranked 11th. Five of California's top dozen three-year temperature averages have occurred since the 2000-02 period. These warmer conditions have significant hydrologic, water use, and ecological implications, affecting factors such as timing of spring snowmelt runoff, crop water use, and water temperature suitability for fish spawning.

Weather

Most of California's moisture originates in the Pacific Ocean. During the wet season, the atmospheric high pressure belt that sits off western North America shifts southward, allowing Pacific storms to bring moisture to California. On average, 75 percent of the state's average annual precipitation occurs between November and March, with half of it occurring between December and February. A few major storms more or less shift the balance between a wet year and a dry one. A persistent high pressure zone over California during the peak winter water production months—as occurred in January 2009—predisposes the water year to be dry.

Figure 1 illustrates the importance of a relatively small number of storms to the water year's outcome, showing the top ten storm periods for water year 2009 and their incoming storm tracks off the Pacific. These ten periods represent 86 percent of the total accumulated precipitation averaged over eight representative Northern Sierra locations in California (Mt. Shasta City, Shasta Dam, Mineral, Brush Creek, Quincy, Sierraville, Pacific House, and Blue Canyon) whose collective average annual precipitation is 50 inches. Two

Table 1. Global-Level Top 10 Warmest Years Since 1880

1.	2005
2.	1998
3.	2002
4.	2003
5.	2007
6.	2006
7.	2004
8.	2001, 2008 (tie)
9.	1997
10.	2008
Source: National Climate Data Center	

Figure 1. Significant Storms in Water Year 2009



of the largest four storm periods were outside the normal peak of the season: between October 31 and November 4, 2008, 5.71 inches fell, and a powerful late-season storm struck between May 2-5, 2009, producing 5.41 inches. The season's storms ran the gamut from northerly Gulf of Alaska tracks to tropical southwesterly patterns. Runoff is currently estimated to be 71 percent of average. Although total precipitation for the Sierra was close to average, the reduced snowpack due to a dry January led to this spring's lower than average runoff.

Water year 2009 was notable in that January, normally the single wettest month, was extremely dry. A strong ridge of high pressure prevented storms from entering the state at the usual frequency, influenced by a warm Northern Pacific and cooler than normal conditions over the tropical Pacific and Pacific Northwest. January 2009 was the 8th driest on record for the state, and 11th driest for the Northern Sierra, the source of much of the state's water supply. Storms that occur in January are typically colder, and would usually result in snowpack accumulation. Warm spring storms were unable to compensate for the low January snowpack (even if adding total precipitation). Consequently, spring refill of snowmelt-fed reservoirs with larger watersheds, such as Lakes Oroville and Shasta, was adversely affected.

Precipitation, Snowpack, and Runoff

Following a rather dry start to the rainy season and an exceptionally dry January, statewide precipitation conditions improved in February and March, with an unusually wet storm sequence in early May providing a final boost to increasing seasonal totals. **Table 2** shows precipitation observed at selected cities through June 1st, and provides annual totals for 2007 and 2008. **Figure 2** shows precipitation for the same time periods expressed as percent of average for the state's major hydrologic regions.

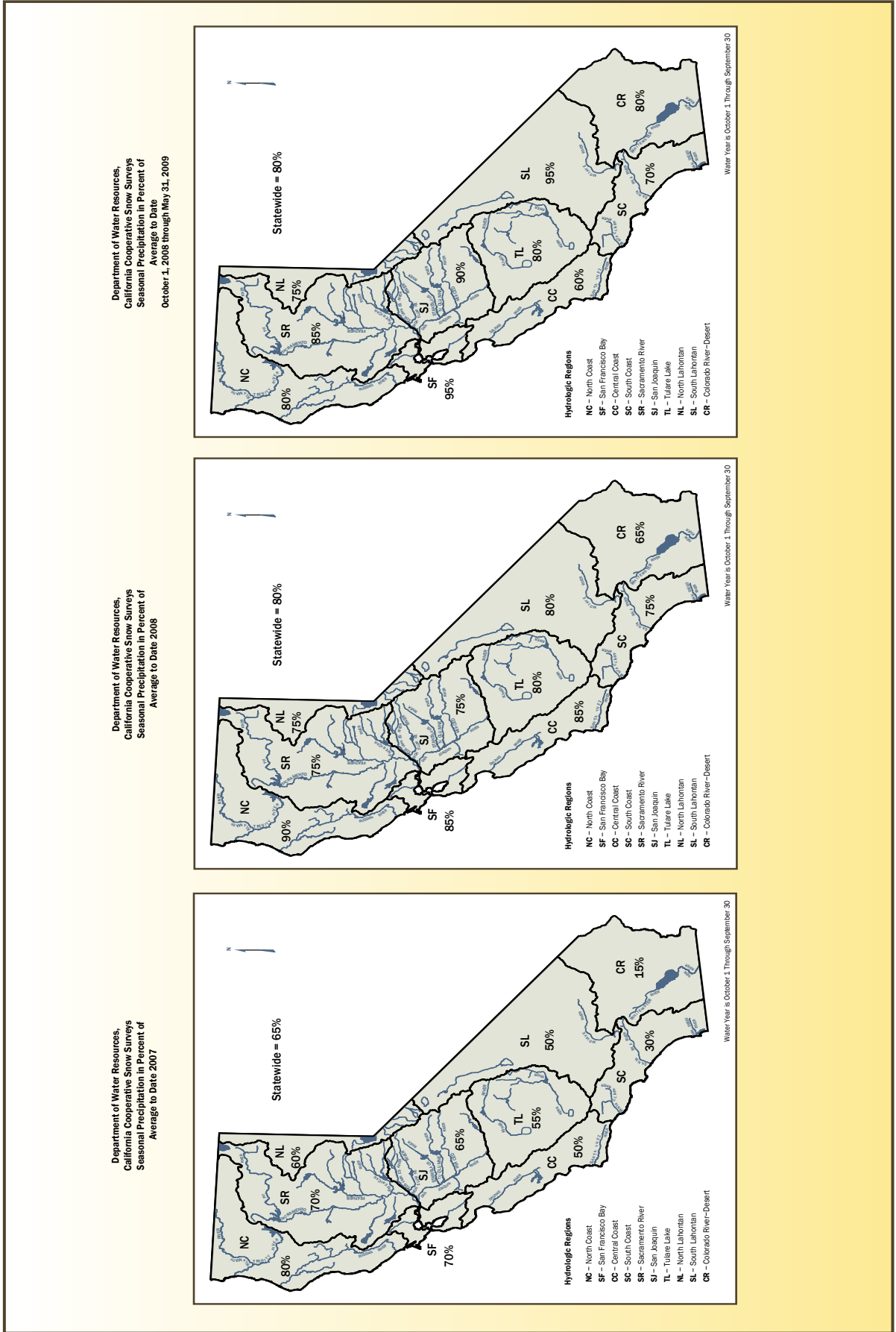
Table 2. Precipitation at Selected Cities

City	2007	2008	2009	Average
Eureka	35.48	33.95	29.57	37.30
Redding	22.73	24.00	21.43	32.80
SF	16.89	15.55	15.19	19.93
Sacto	15.00	13.71	15.77	18.00
Fresno	6.03	8.40	7.57	10.88
Salinas	8.43	10.53	11.43	12.91
Bakersfield	3.06	2.38	4.89	6.43
Santa Barbara	5.97	15.33	10.12	16.93
LA	3.21	10.29	7.98	13.00
Riverside	1.67	5.39	6.67	10.21
San Diego	3.85	7.23	9.12	10.63

The Water Year

Agencies such as the Department or the U.S. Geological Survey (USGS) report hydrologic data on a water year basis. The water year extends from October 1 through September 30. Water year 2009, for example, spans from October 1, 2008 through September 30, 2009. The (water year) 1987-92 drought corresponds to the calendar period of fall 1986 through summer 1992. Hydrologic data contained in this report are presented in terms of water years. Water project delivery data (e.g. State Water Project deliveries) are presented on a calendar year basis. Precipitation data are reported by the National Weather Service (NWS) based on an annual season of July 1 to June 30. When this report refers to annual precipitation amounts, it is implicit that the data are based on the NWS reporting season.

Figure 2. Precipitation by Hydrologic Region





Mount Shasta in September, 2008. Photo taken from Mount Shasta City looking east. Photo courtesy of Jack Trout, <http://www.jacktrout.com>

2009 Sacramento River hydrologic region snowpack stood at 80 percent of average on April 1, considered the historical time of maximum snowpack accumulation.

Sierra Nevada snowpack makes an important contribution to much of California's developed water supplies. On April 1st—the date historically considered as the peak of snowpack accumulation and the beginning of the snowmelt season—water year 2009 Sierran snowpack was at 85 percent of average. **Figure 3** shows the June 1st runoff projection for river basins where snowmelt forecasts are issued, and provides a comparison with actual runoff for 2007 and 2008. **Figure 4** shows projected statewide runoff for the present year in comparison to previous years.



Lake Tahoe Dam is operated by the U.S. Bureau of Reclamation as part of its Newlands Project to supply water for uses in Nevada. The upper 6.1 feet of Lake Tahoe amounts to a usable storage capacity of 744,600 acre-feet (AF).

Figure 3. Forecasted Runoff by Hydrologic Region

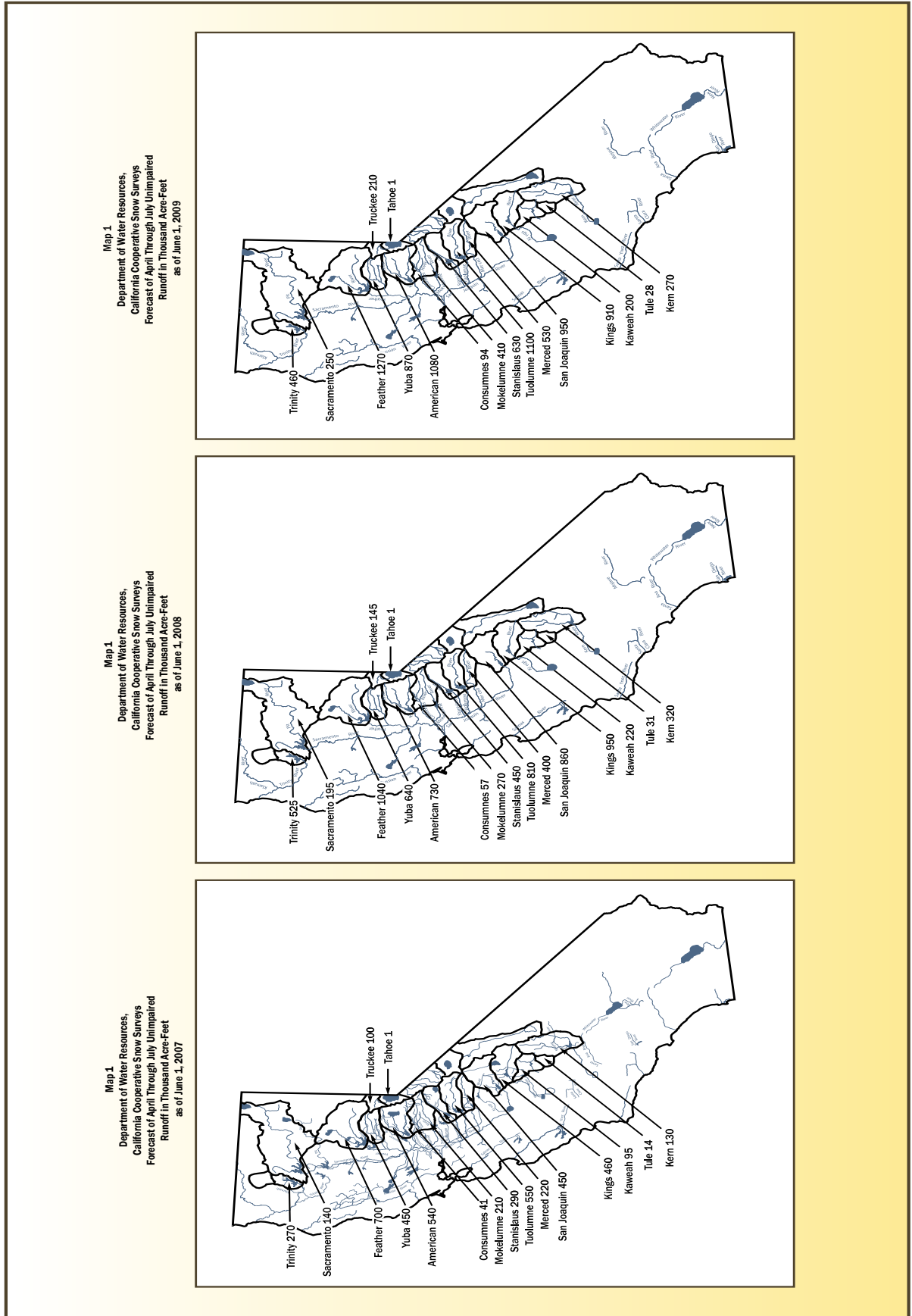
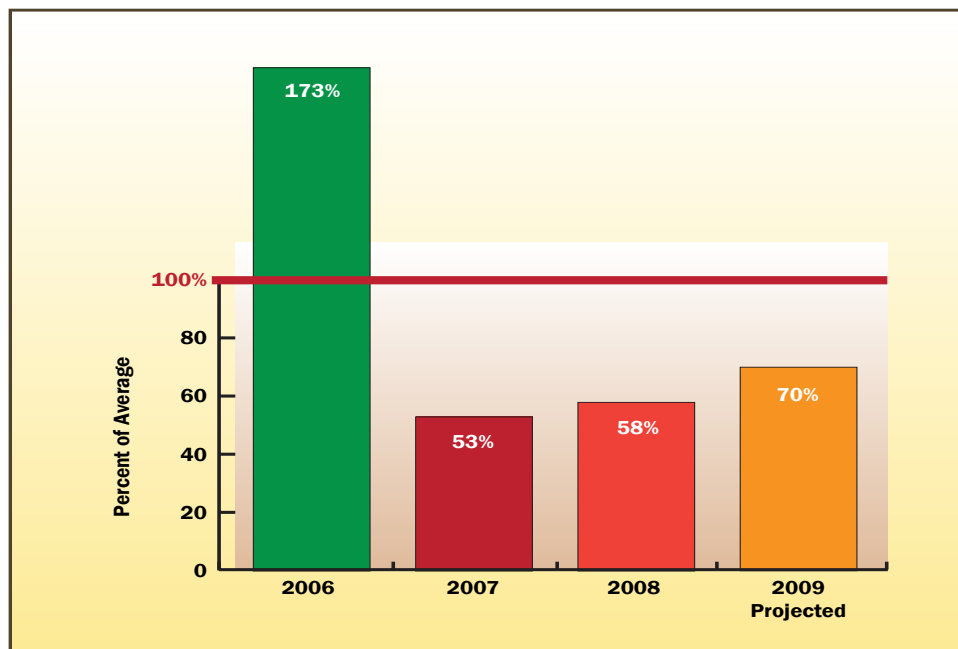


Figure 4. Statewide Runoff Comparison



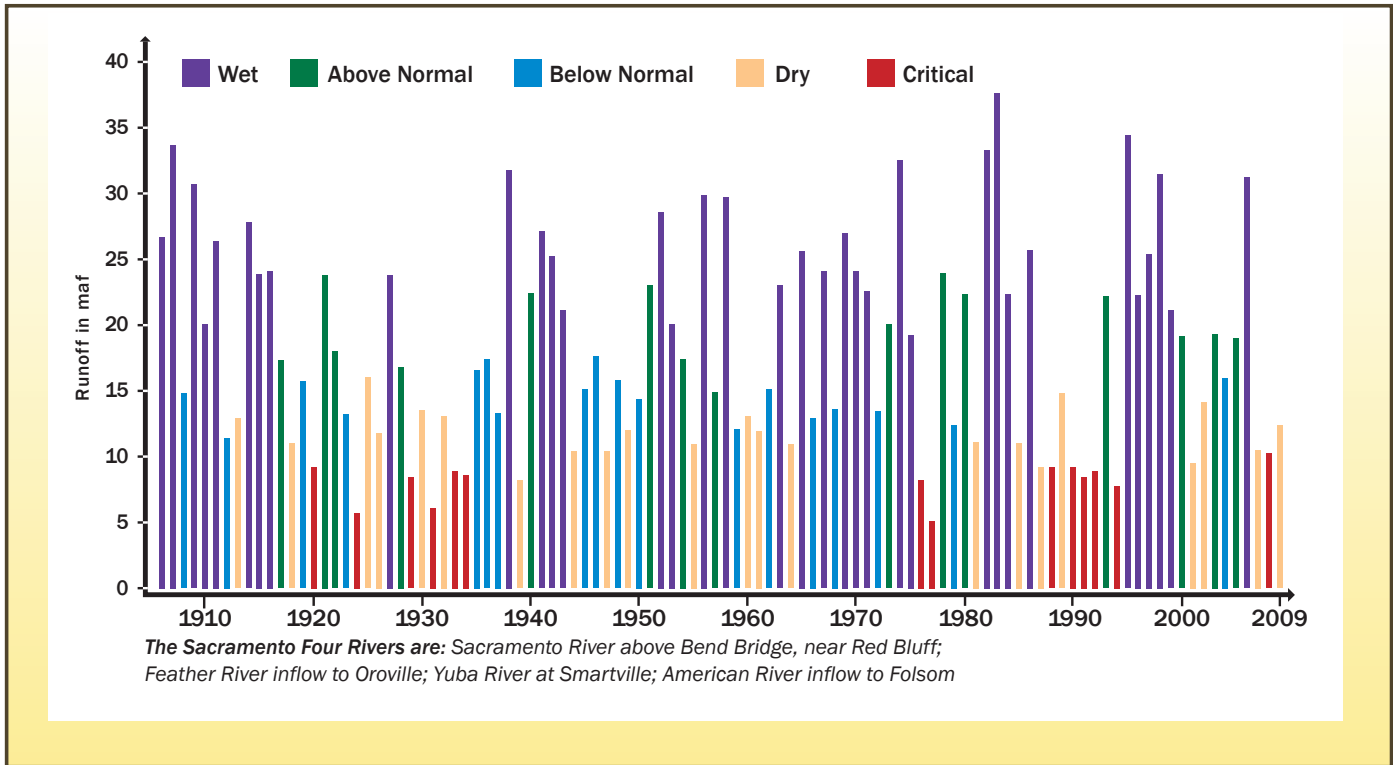
Figures 5 and 6 show historical values of the Sacramento and San Joaquin River Basin water year types, which are used as general indicators of surface water supply availability from watersheds draining the west slope of the Sierra Nevada. The May 1st projection is that both basins will end water year 2009 with a “dry” classification, which is an improvement over last year’s classification of “critical” for both basins.

Reservoir Storage

As of June 1, 2009, statewide reservoir storage stood at 85 percent of average for that date. Table 3 provides an overview of storage conditions by river basin. Of interest, the low storage conditions for the Truckee River Basin reflect conditions at Lake Tahoe, the upper portion of which is controlled by a small dam. As has occurred during past droughts, Lake Tahoe is forecasted to drop slightly below its natural rim this fall.

Locations of California’s larger water facilities are shown in Figure 7. Figure 8 graphically shows reservoir storage at a few selected facilities. Table 4 provides data for additional facilities. As can be inferred from the figure, storage at some larger CVP and SWP reservoirs—particularly Shasta Lake, Lake Oroville, and San Luis Reservoir—has not recovered from the impacts of the two previous dry years. Low storage amounts in San Luis Reservoir and in Metropolitan Water District’s (MWD’s) Diamond Valley Lake, both of which rely on water exported from the Delta for filling, reflect the impacts of regulatory restrictions on SWP Delta pumping.

**Figure 5
Sacramento Four Rivers Unimpaired Runoff**



**Figure 6
San Joaquin Four Rivers Unimpaired Runoff**

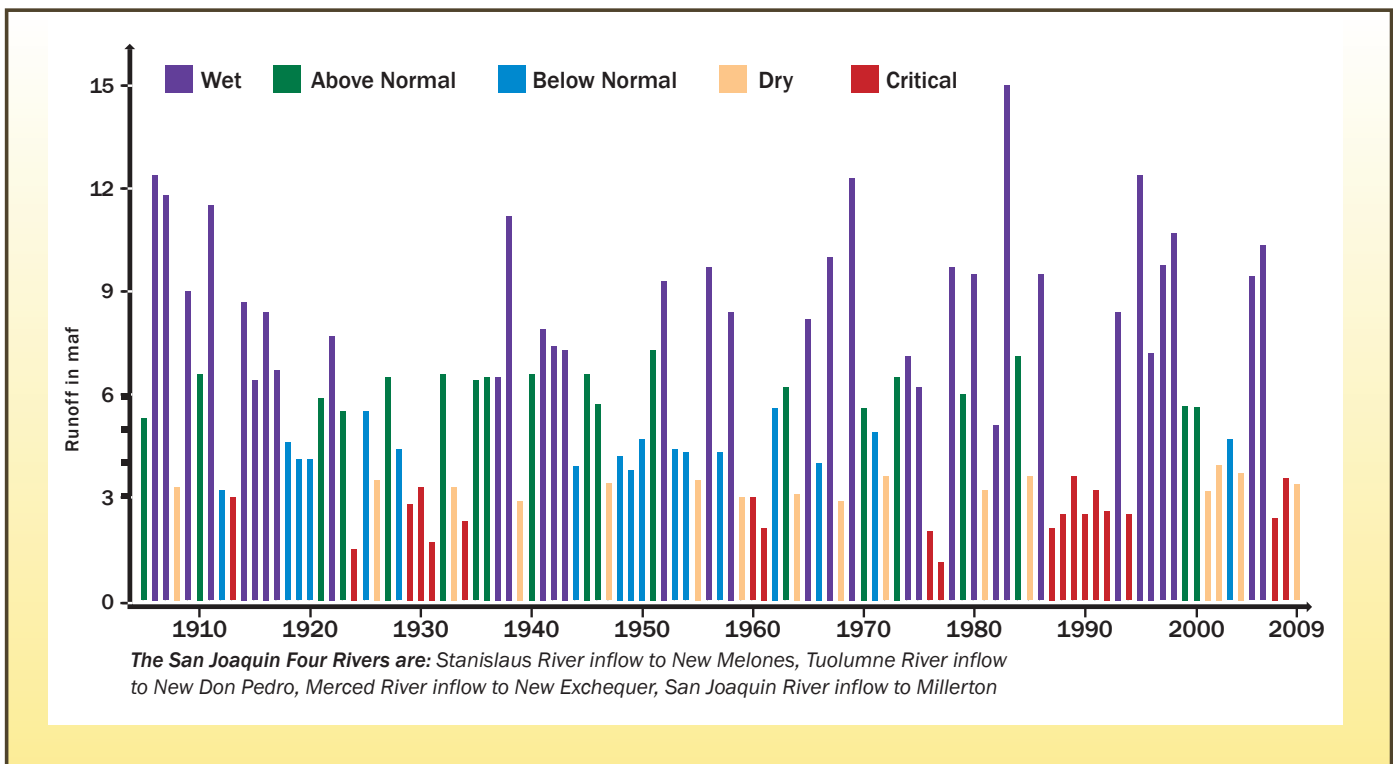


Table 3. Reservoir Storage Summary by River Basin

STORAGE AS OF MAY 31							
Summary By River Basin							
Basin	Number of Reservoirs	Total Capacity 1000 AF	Hist Ave 1000 AF	2008 1000 AF	2009 1000 AF	% Ave	% Cap
KLAMATH R	3	1107.9	819.3	672.7	570.8	70	52
SHASTA R	1	50.0	33.8	18.1	10.4	31	21
TRINITY R	2	2462.4	2168.0	1678.5	1304.9	60	53
EEL R	1	80.5	78.5	60.5	67.9	86	84
RUSSIAN R	2	503.4	310.7	302.8	281.3	91	56
NORTH BAY	5	105.8	91.8	89.5	87.1	95	82
SOUTH/EAST BAY	6	357.3	225.8	218.2	204.4	91	57
PENINSULA	2	77.4	65.6	62.3	74.9	114	97
SALINAS R	3	730.9	481.0	447.1	302.1	63	41
SANTA YNEZ R	2	198.7	177.2	198.5	167.1	94	84
OLD CR	1	40.7	35.1	30.2	24.3	69	60
VENTURA R/S CLARA R	5	834.2	724.0	753.8	672.5	93	81
S GABRIEL R/S ANA R	8	505.2	391.2	383.7	311.1	80	62
S MRGRTA/S LUIS REY	3	147.6	85.4	83.2	76.6	90	52
S DGTO R/S DIEGO R	8	296.1	179.3	180.6	145.0	81	49
SWTWTR R/OTAY R/CTWD	5	190.7	134.6	102.4	93.4	69	49
SACRAMENTO R	8	4967.4	4345.9	3179.9	3511.4	81	71
FEATHER R	11	5264.1	4460.3	3064.1	3667.7	82	70
YUBA R/BEAR R	9	1550.7	1358.3	1265.7	1471.7	108	95
AMERICAN R	9	1768.0	1480.7	1267.4	1681.0	114	95
STONY CR	3	236.9	185.4	177.9	173.5	94	73
CACHE CR	2	614.0	442.3	316.6	203.1	46	33
PUTAH CR	1	1600.0	1379.6	1325.8	1208.9	88	76
EAST CONTRA COSTA	1	104.8	77.3	84.1	71.8	93	69
MOKELUMNE/COSUMNES R	5	850.0	681.5	564.3	747.5	110	88
CALAVERAS R	1	317.1	174.6	139.3	107.1	61	34
STANISLAUS R	7	2873.0	1873.7	1682.7	1763.3	94	61
TUOLUMNE R	6	2762.5	2079.6	1976.2	2408.2	116	87
MERCED R	1	1024.6	713.6	450.2	674.4	95	66
CHOWCHILLA R/FRESNO R	2	240.0	144.3	67.4	62.1	43	26
SAN JOAQUIN R	8	1137.9	823.3	850.1	1035.3	126	91
SAN LUIS CR	3	2130.0	1735.7	1174.3	774.2	45	36
KINGS R	3	1251.5	892.0	700.4	960.4	108	77
KERN R	1	568.0	293.7	251.9	249.2	85	44
KAWEAH R/TULE R	2	267.9	171.7	200.9	221.9	129	83
TRUCKEE R	4	1029.4	636.2	500.0	369.6	58	36
E WALKER R	1	42.6	26.4	19.3	19.3	73	45
MONO LAKE	3	75.9	38.3	40.7	35.6	93	47
OWENS R	4	253.6	161.7	145.6	173.2	107	68
MOJAVE R	1	73.0	67.8	71.6	71.0	105	97
COLORADO R (1)	4	52910.4	41723.6	27265.1	28298.2	68	53
TOTAL	157	91602.1	71968.8	52063.6	54353.4	76	59

Explanation of notes:

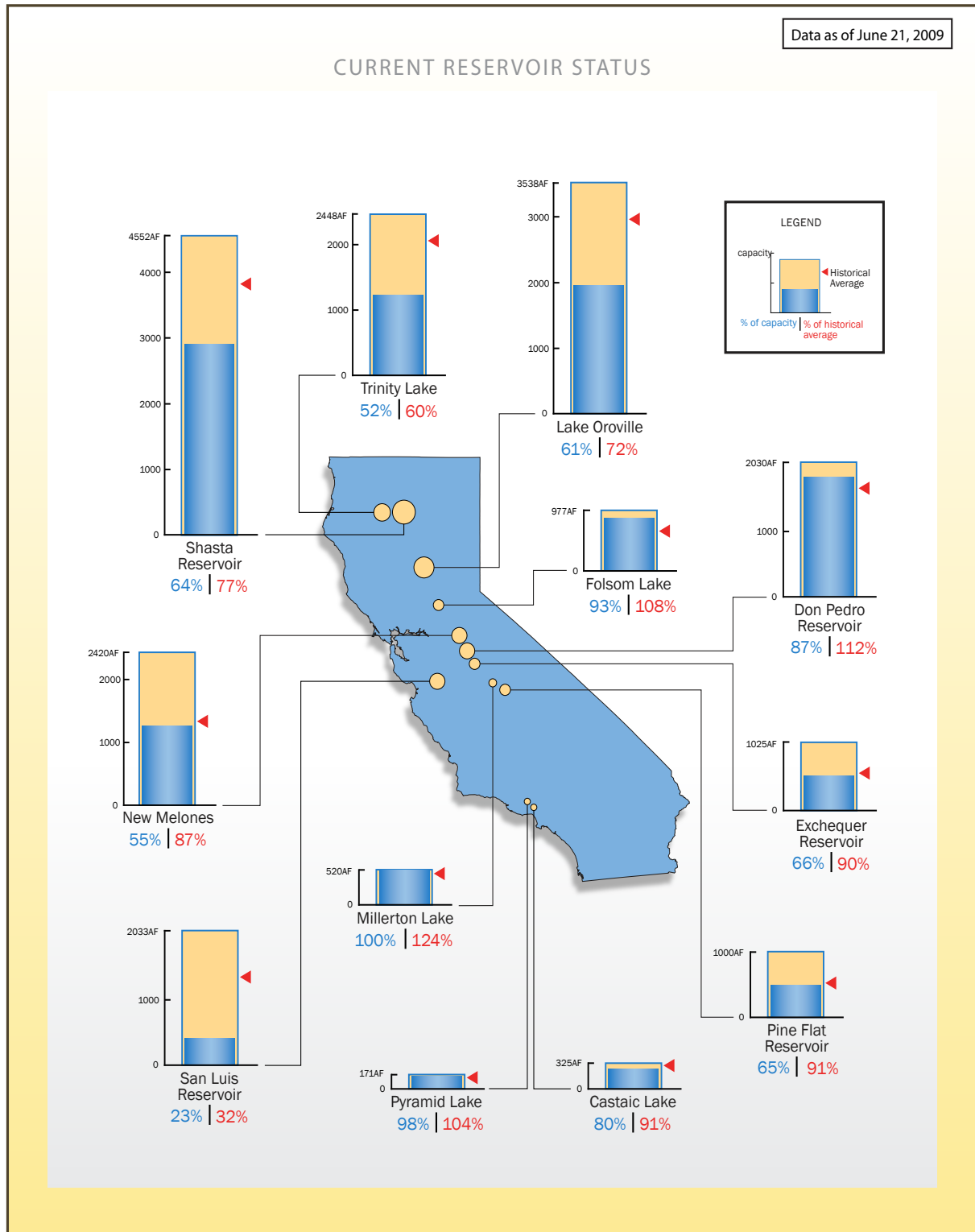
1 - Includes Lake Powell and Lake Mead

2 - Missing data in this basin area

Figure 7. California's Major Water Projects



Figure 8. Reservoir Storage at Selected Facilities



**Table 4. Reservoir Storage for Selected Water Projects
(data as of June 1, 2009)**

RESERVOIR	CAPACITY 1,000 AF	AVERAGE STORAGE 1,000 AF	2008 1,000 AF	2009 1,000 AF	PERCENT AVERAGE	PERCENT CAPACITY
STATE WATER PROJECT						
Lake Oroville	3538	3043	1766	2282	75%	65%
San Luis Reservoir (SWP)	1062	893	728	497	56%	47%
Lake Del Valle	77	40	41	39	98%	51%
Lake Silverwood	73	68	72	71	105%	97%
Pyramid Lake	171	163	160	169	103%	99%
Castaic Lake	325	283	298	256	91%	79%
Perris lake	132	116	70	62	54%	47%
CENTRAL VALLEY PROJECT						
Trinity Lake	2448	2154	1664	1291	60%	53%
Lake Shasta	4552	3960	2807	3119	79%	69%
Whiskeytown Lake	241	237	238	239	101%	99%
Folsom Lake	977	835	617	933	112%	96%
New Melones Reservoir	2420	1500	1351	1333	89%	55%
Millerton Lake	520	407	403	518	127%	100%
San Luis Reservoir (CVP)	971	777	376	214	28%	22%
COLORADO RIVER BASIN						
Lake Mead	26159	19991	12132	11217	56%	43%
Lake Powell	24322	19407	12812	14751	76%	61%
Lake Mohave	1810	1725	1725	1736	101%	96%
Lake Havasu	619	601	596	594	99%	96%
EAST BAY MUNICIPAL UTILITY DISTRICT						
Pardee Res	198	189	190	199	105%	100%
Camanche Reservoir	417	285	176	318	112%	76%
East Bay (4 res.)	148	132	113	127	96%	86%
CITY AND COUNTY OF SAN FRANCISCO						
Hetch-Hetchy Reservoir	360	272	315	349	128%	97%
Cherry Lake	268	203	243	274	135%	102%
Lake Eleanor	26	21	27	28	129%	106%
South Bay/Peninsula (4 res)	225	173	153	166	96%	74%
CITY OF LOS ANGELES (D.W.P.)						
Lake Crowley	183	123	116	131	106%	71%
Grant Lake	48	28	24	20	72%	42%

Groundwater Conditions

The Department has historically monitored groundwater levels in wells located in predominantly rural areas, particularly in the Central Valley. **Figure 9** shows the locations of wells presently in this monitoring program. (Budget limitations have precluded the Department from collecting water level data in urbanized areas where larger local agencies have the capability to conduct their own long-term monitoring programs. Thus, as seen on the figure, the Department does no water level monitoring in Southern California.) Data from the Department's monitoring program and from cooperating local agencies was used to generate **Figure 10**, a preliminary effort to illustrate the influence of drought conditions on water levels. The figure characterizes spring 2009 water level information in selected wells in terms of water levels during previous statewide droughts. Not unexpectedly, groundwater levels are declining in many of the wells monitored, as is typical during drought conditions (CDWR, 2000).

The Governor's February 2009 water shortage emergency proclamation provided that *DWR shall continue to monitor the state's groundwater conditions, and shall collect groundwater-level data and other relevant information from water agencies, counties, and cities. It is requested that water agencies, counties and cities cooperate with DWR by providing the information needed to comply with this Proclamation.* The Department has been collecting and compiling groundwater-level data from local agencies in response to this mandate, and is integrating this information with existing monitoring data. An expanded review of the influence of drought on statewide groundwater levels is planned for the year-end drought status report.

Reliance on groundwater increases during droughts when water users with reduced surface supplies turn to groundwater to help mitigate shortages; the increased groundwater usage is typically reflected by decreased groundwater levels. **Figure 11** shows typical annual fluctuations in groundwater levels and longer-term trends associated with drought—a pattern of water level drawdown during dry conditions and recovery during wet conditions—for sample wells from the Department's monitoring program in the Sacramento and San Joaquin Valleys. (The long-term overall decline in water levels for the San Joaquin Valley well is indicative of overdraft conditions.) An increase in the number of new wells being drilled or existing wells being deepened is also typical during droughts. The year-end update of this report will include an annual tabulation of well construction/modification reports received by the Department.

Another way to illustrate drought impacts is with information from advanced remote sensing techniques. **Figure 12** shows information from NASA's

Figure 9. Location of Groundwater Wells Having Monitoring Data

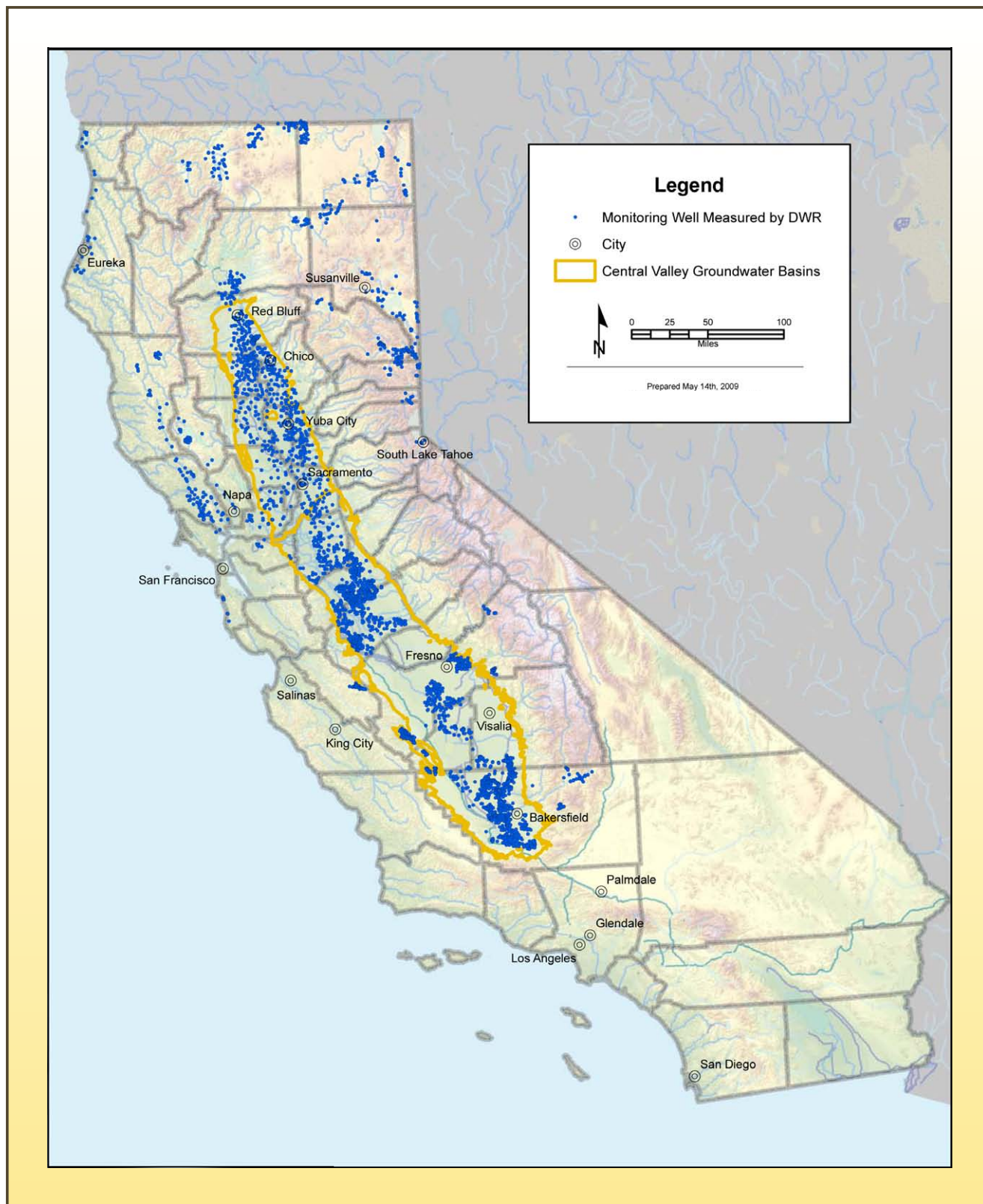
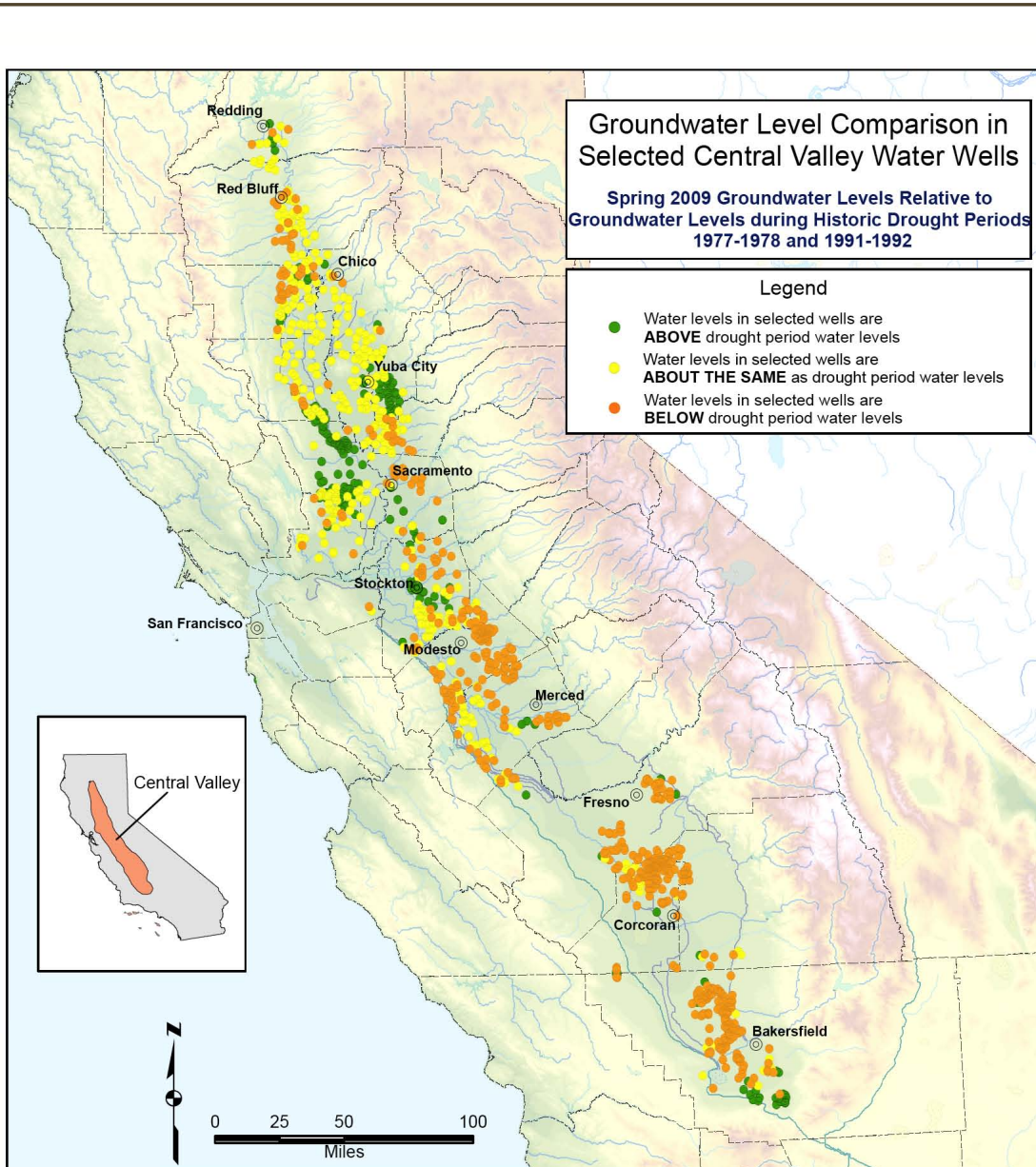


Figure 10. Impacts of Drought on Groundwater Levels



Map Explanation:

This map compares spring 2009 groundwater elevations with two recent drought periods; 1977-1978 and 1991-1992. Dots are located at selected water well sites where groundwater level data is available for spring 2009, spring 1977 or spring 1978, and spring 1991 or spring 1992.

The dot color indicates a difference between groundwater levels in the current drought period compared to historic drought periods. Dots are colored as follows: **green** indicates where spring 2009 groundwater levels are more than five feet above historic drought period water levels; **yellow** indicates where spring 2009 groundwater levels are within five feet (plus or minus) of historic drought period water levels; and **orange** indicates where spring 2009 groundwater levels are more than five feet below historic drought period water levels.

Where groundwater level comparisons differ between individual historic drought periods, the lower water level was selected. For example, if a well shows that the spring 2009 water level is within five feet of the water level in 1991 and more than five feet below the water level in 1977, then an orange dot is placed on the map.

Data Source: California Department of Water Resources Water Data Library, Groundwater Module (wdl.water.ca.gov)

Revised: June 18, 2009

Figure 11. Sample Hydrographs of Wells in the San Joaquin and Sacramento Valleys

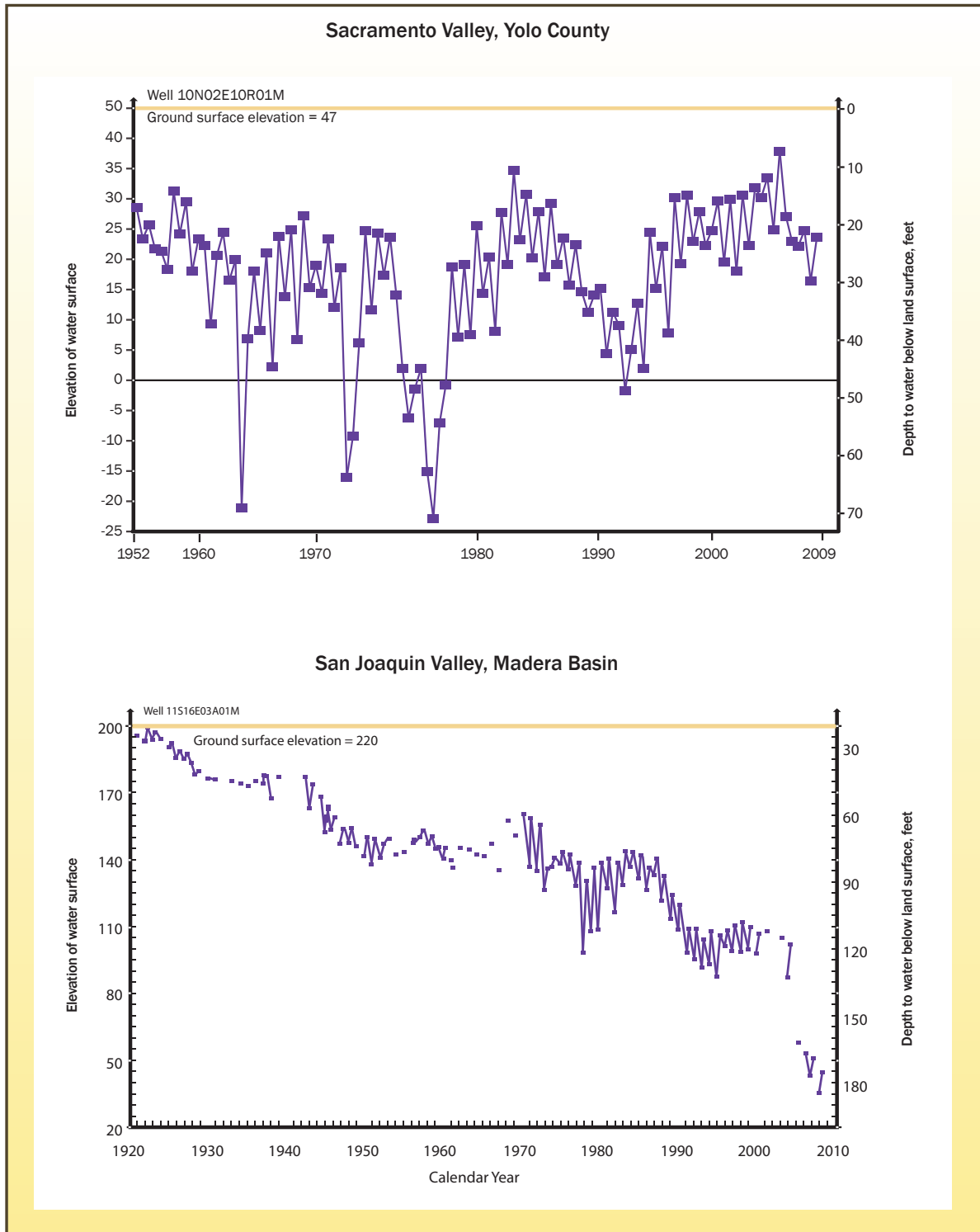
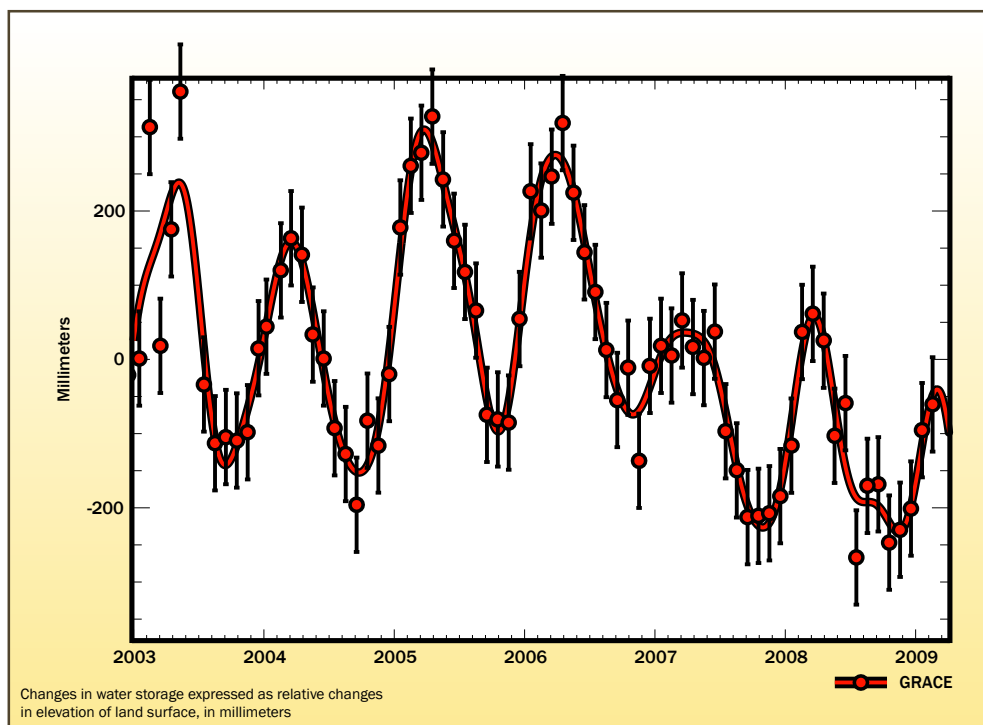


Figure 12. GRACE Observation of Changes in Central Valley Water Storage



Gravity Recovery and Climate Experiment (GRACE) mission, in which space-based observations can be used to assess the change in terrestrial water storage (water in biomass, soil moisture, surface water storage, and groundwater). GRACE information is able to provide this integration of changes in terrestrial water storage only over large-scale areas, such as the scale of a major river basin, via highly sensitive calculations of gravitational changes. In the figure, these calculations integrated over the Sacramento and San Joaquin River Basins show not only seasonal fluctuation (winter-summer) in storage but also the influence of recent dry conditions.

Supplies from Major Water Projects

Central Valley Project and State Water Project. Tables 5 and 6 show 2009 allocations for the CVP and SWP in recent years. The largest reductions in CVP water deliveries went to contractors for project water (as opposed to the water rights settlement and exchange contractors) located south of the Delta. Prior to the current drought, the only comparable water delivery reductions to south-of-Delta CVP contractors occurred during 1977 (the single driest year of the state's hydrologic record) when all project water agricultural contractors received 25 percent supplies. South-of-Delta project contractors had no subsequent water delivery deficiencies until 1990 and

Table 5. Central Valley Project Water Supply Allocations – Long-Term Contractors

Year	Percent Supply						
	North of Agricultural	Delta Urban	South of Agricultural	Delta Urban	Friant Class 1	Friant Class 2	East Side
1998	100	100	100	100	100	10	32
1999	100	95	70	95	100	20	39
2000	100	100	65	90	100	17	58
2001	60	85	49	77	100	5	22
2002	100	100	70	95	100	8	8
2003	100	100	75	100	100	5	6
2004	100	100	70	95	100	8	0
2005	100	100	85	100	100	uncontrolled season	28
2006	100	100	100	100	100	uncontrolled season	100
2007	100	100	50	75	65	0	29
2008	40	75	40	75	100	5	23
2009 to date	40	75-100	10	60	100	18	12
Notes:							
1. USBR may adjust allocations as the year progresses, in response to changes in hydrologic conditions. Values shown are the final allocations for the year.							
2. In all years shown, Sacramento River water rights contractors, San Joaquin River Exchange contractors, and wildlife refuges received 100 percent allocations (Level 2 supplies).							

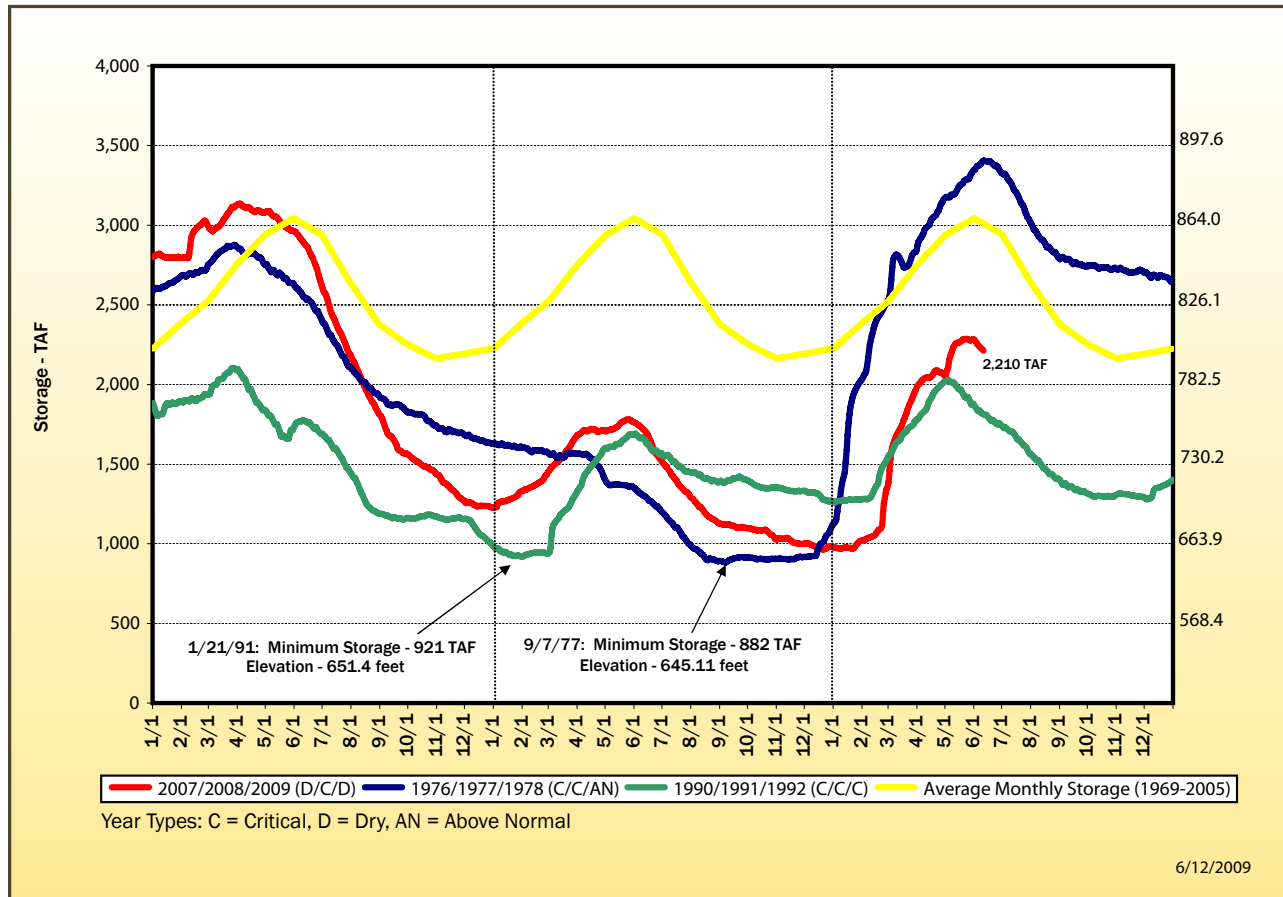
1991 (the fifth and sixth years of the 1987-92 drought) when they received 50 percent and 25 percent deliveries, respectively.

The 2009 SWP allocation of 40 percent is only slightly better than its 1991 allocation of 30 percent urban and zero agricultural, which represents the project’s lowest historical percentage of requested deliveries. **Figure 13** shows how the present three-year drought compares to other three-year dry cycles in terms of Lake Oroville storage. However, direct comparison of SWP and CVP delivery capabilities under present hydrologic conditions to deliveries during historical drought events does not reflect the substantial changes in statutory (the Central Valley Project Improvement Act of 1992), administrative, and judicial requirements for protection of

Table 6. State Water Project Allocations

Year	Allocation (% of requested contractual Table A quantity)
1998	100
1999	100
2000	90
2001	39
2002	70
2003	90
2004	65
2005	90
2006	100
2007	60
2008	35
2009	40

Figure 13. Comparison of Lake Oroville Storage during Three-Year Dry Periods



fish species migrating through or residing in the Delta, and for meeting other environmental goals that have been put in place since prior droughts. Within the present three-year dry period, for example, the federal District Court decision in *Natural Resources Defense Council v. Kempthorne*, No. 05-1207 (E.D. Cal. May 25, 2007) to require implementation of an interim remedy to protect Delta smelt, and the subsequent December 2008 issuance of a new USFWS biological opinion for Delta smelt, have significantly curtailed both projects' export capability.

Colorado River. Table 7 shows unregulated inflow into Lake Powell (used as an indicator of water supply conditions) in recent years. As indicated in the table, inflow into Lake Powell has been below average in all but two years from 2000 onward. According to the U.S. Bureau of Reclamation (USBR), provisional calculations for natural flow of the Colorado River at the Lees Ferry Compact point show that the average natural flow since calendar year 2000 (2000-2008 inclusive) is the lowest nine-year average in the river's historical record (USBR, 2009).

2005

2008



Among California's major Sierran reservoirs, DWR's Lake Oroville has been particularly hard-hit by drought.

The Colorado River has historically been a highly reliable water supply. The river basin is distinguished from many others in the West by its reservoir storage capacity—equivalent to about four times the river's average annual flow of 15 million acre-feet (MAF). Users of river water in the United States and Mexico have not experienced shortages during the ongoing drought thanks to this storage capacity. Total reservoir system storage in the basin dropped to as low as 52 percent of capacity in 2004; total system storage at the end of water year 2008 was at 57 percent of capacity. No shortages are forecast for the coming year.

USBR's recent adoption of interim (through 2025) guidelines for reservoir management will help reduce the frequency/severity of potential future shortages. However, as illustrated in **Figures 14 and 15**, taken from USBR's final environmental impact statement for Colorado River interim guidelines for Lower Basin shortages and coordinated operations of Lakes Mead and Powell (USBR, 2007), the probability of Lower Basin (California, Arizona, Nevada) shortages does become increasingly likely in the future. But, the probability of shortage to California during the interim period covered in the guidelines is low, owing to the relative seniority of water rights in California.

Table 7. Unregulated Inflow to Lake Powell (percent of 30-year average)

Water Year	Percent
2000	62
2001	59
2002	25
2003	51
2004	49
2005	105
2006	71
2007	69
2008	102
2009*	87
*forecasted	

Supplies from Other Water Projects and Water Transfers

Drought impacts on water project supplies throughout the state are not uniform; impacts vary with factors such as reservoir size and refill rate, elevation and size of watershed areas, and location of watershed areas with respect to storm tracks. Supplies from California's largest intrastate water projects—the CVP and the SWP—have been particularly affected by the cumulative impacts of three years of dry hydrologic conditions, while some smaller projects have not seen similar impacts. The bullets below highlight a

Figure 14. Involuntary and Voluntary Lower Basin Shortages, Comparison of Action

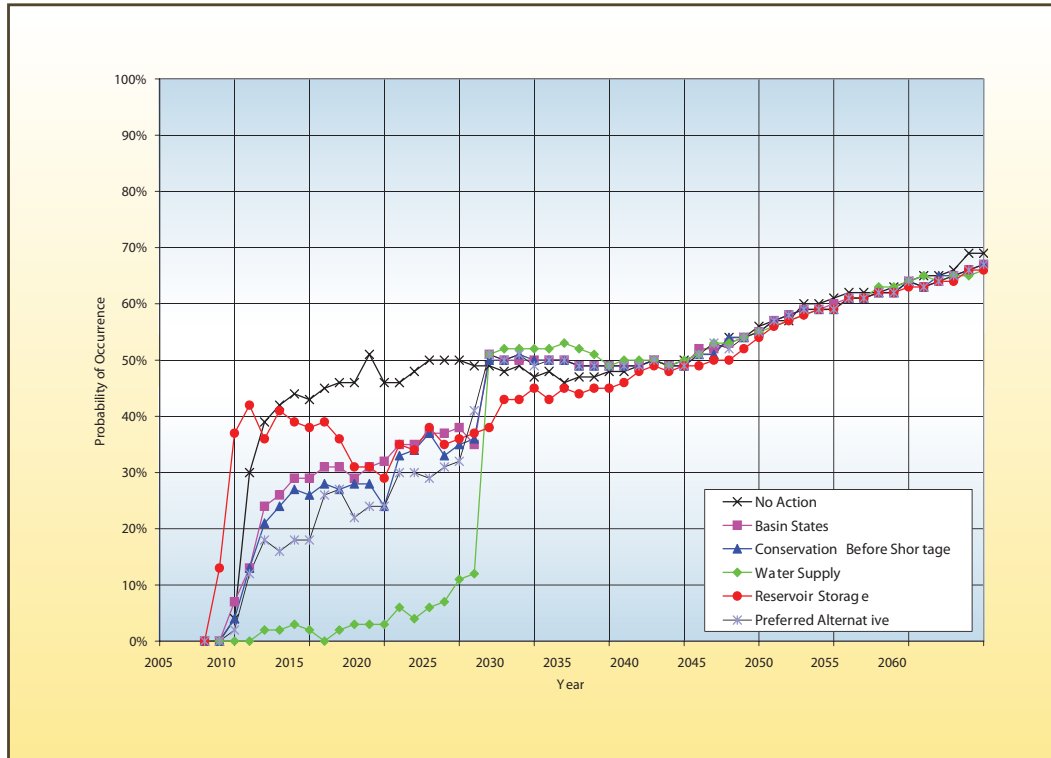
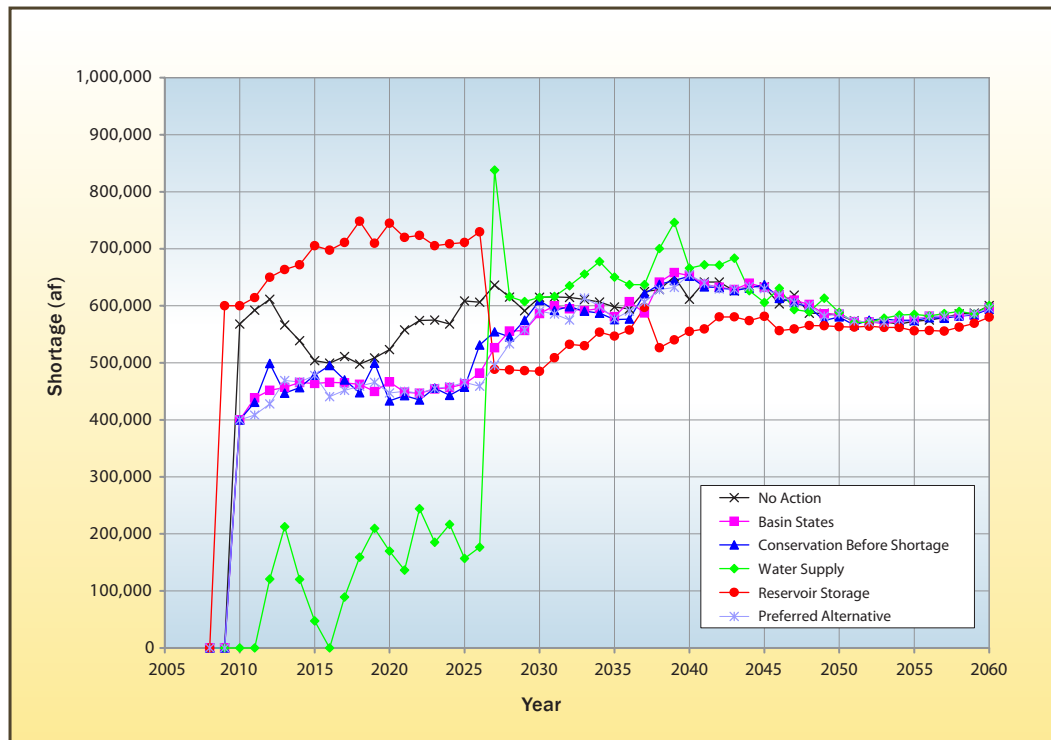


Figure 15. Involuntary and Voluntary Lower Basin Shortages, Comparison of Action Alternatives to No Action Alternative, Average Shortage Volumes



Figures 14 and 15 are from USBR's final environmental impact statement for Colorado River interim guidelines for Lower Basin shortages and coordinated operations of Lakes Mead and Powell (USBR, 2007)

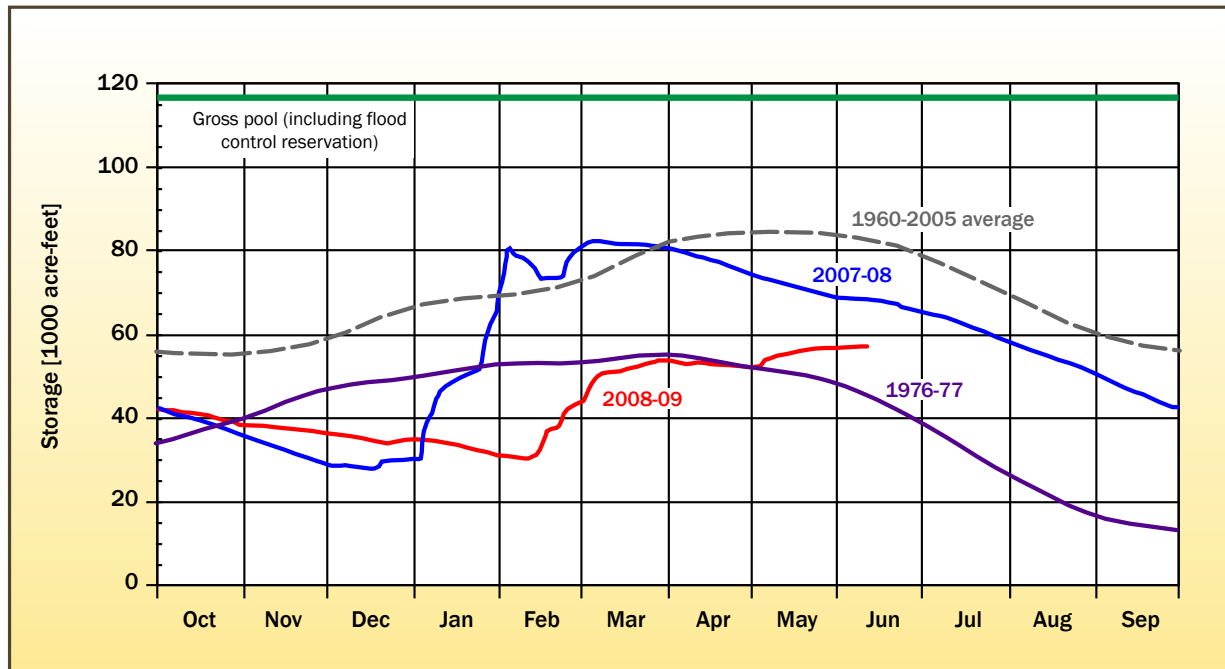
few water projects where drought impacts on water supplies are of particular interest, and also include a brief review of water transfer activity.

- The Klamath Project on the California-Oregon border was the site of a 2001 drought emergency declaration when dry hydrologic conditions and USBR's compliance with USFWS and National Marine Fisheries Service (NMFS) biological opinions for three listed fish species resulted in no irrigation deliveries for lands supplied from Upper Klamath Lake. Although 2009 is classed as a below-normal year for the project, deliveries to water users in 2007 and 2008 were within the normal historical range—399 thousand acre-feet (TAF) and 398 TAF, respectively.
- The Russian River system—the U.S. Army Corps of Engineers' (USACE) Russian River Project (Lakes Mendocino and Sonoma on the Russian River) and PG&E's Potter Valley Project diversion of Eel River water into the Russian—supplies parts of Sonoma, Mendocino, and Marin Counties. Availability of Russian River water has been significantly affected by a combination of drought and regulatory actions. Although storage in Lake Mendocino has improved thanks to late spring runoff (**Figure 16**), water supplies are significantly constrained by a revised Federal Energy Regulatory Commission (FERC) license for the Potter Valley Project that reduces Eel River imports, by a 2008 NMFS biological opinion for salmon, and by the 1986 State Water Resources Control Board (SWRCB) Decision 1610 setting instream flow requirements. (The SWRCB decision was based on assumed Eel River imports which are not now possible under the revised FERC license.)

Sonoma County Water Agency (SCWA), the largest contractor for Russian River water and the wholesaler for Santa Rosa and nearby municipalities, submitted a petition to SWRCB in April 2009 to reduce the required in-stream flows in the Russian River below Lake Mendocino. The petition included a projection showing the potential dewatering of Lake Mendocino this September. SWRCB approved the petition, held a workshop to receive comments, and issued an amended order on May 28, 2009. The order includes conditions requiring a 25% reduction in SCWA summer diversions, restrictions on commercial turf irrigation, a plan for Russian River water users to reach water conservation goals of 50% in Mendocino County and 25% in Sonoma County, and increased monitoring.

- The City of Los Angeles' Owens River Aqueduct is the smallest of the three sources of imported supply for urban Southern California. As with Southern California's imported SWP supplies, deliveries from the

Figure 16. Lake Mendocino Storage



Owens River system have been affected by both environmental regulatory requirements and dry hydrologic conditions. Availability of Owens River system water for export to Los Angeles has been reduced by two requirements not in effect during the prior droughts—provision of water for shallow flooding for dust control on parts of the dry Owens Lake bed beginning in the early 2000s, and provision of a 40 cubic foot per second permanent baseflow for the lower river beginning in early 2007. Eastern Sierra snowpack (**Figure 17**) and runoff are below average for the present dry period. According to the Los Angeles Department of Water and Power, Owens Valley runoff was 60 percent of normal in its 2007-08 runoff year (April-March) and 74 percent of normal in 2008-09. Forecasted Owens Valley runoff for its 2009-10 runoff year is expected to be 71 percent of normal, representing 23 percent of the city's projected 2009-10 total demand. Los Angeles compensates for reduced Owens River supplies by purchasing a greater proportion of its supplies from MWD.

- Water transfers are a common tool for responding to drought impacts. The 2008 drought executive order directed the Department to operate a 2009 drought water bank, if conditions were dry, to assist water users experiencing critical needs. The Department solicited interest in bank

Figure 17. Historical Comparison of Mammoth Lake Snowpack

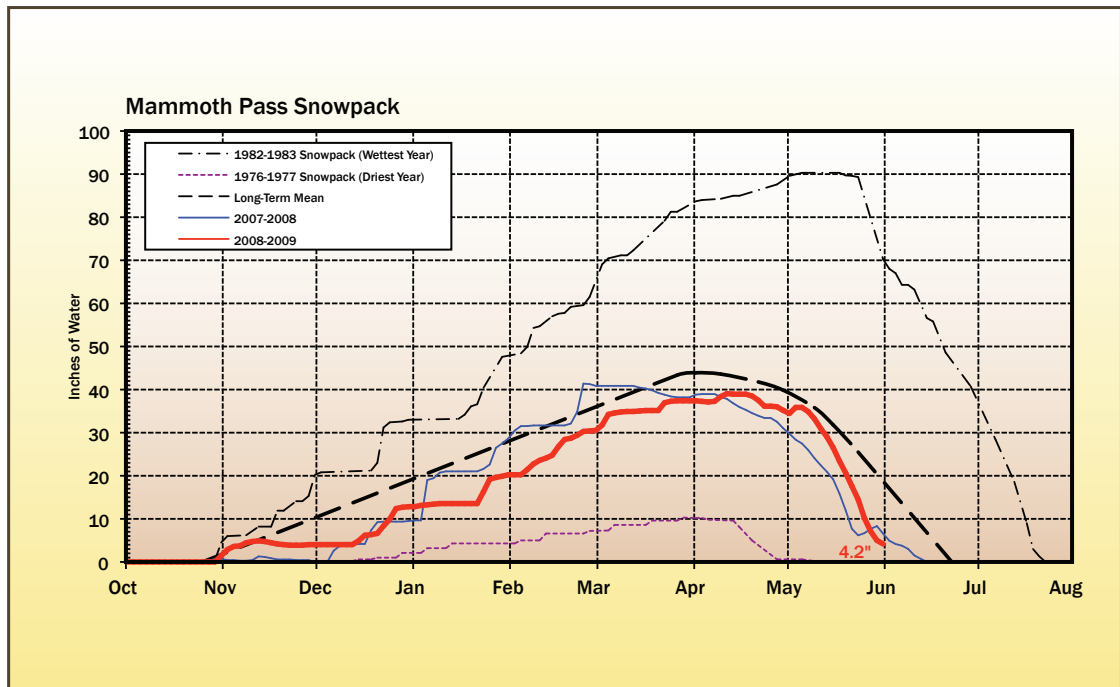


Figure courtesy of Los Angeles Department of Water and Power

participation from potential buyers and sellers, receiving significantly greater interest in purchasing water from the bank than could be supported through the quantity of water offered for sale. Limiting factors in water bank participation include relatively high prices for rice in the Sacramento Valley, which makes sales of water to the bank less economically attractive to growers, and constraints on being able to move purchased water across the Delta. The Department is purchasing the water from sellers at \$275/AF; entities buying the water from the Department pay this amount plus administrative and transportation costs, and are responsible for carriage and other losses associated with conveying the water to the place of use. The majority of the water being purchased is being made available through groundwater substitution.

The drought water bank achieved environmental compliance through use of existing CALFED Environmental Water Account documentation with a Notice of Exemption based on the 2009 emergency proclamation being filed with the State Clearinghouse on March 5, 2009. The Department additionally committed to \$10 million of special studies related to the listed giant garter snake for USFWS. Deliveries of water to buyers will occur as allowed by Delta fishery regulatory requirements, expected to happen July through September. The Department expects to provide about 82 TAF through the water bank. Operation of the bank was

facilitated by SWRCB issuance of Order WR 2009-0033, which allows DWR and USBR to more efficiently use the operational flexibility of the SWP and CVP to facilitate bank transfers. Specifically, the order facilitates transfer of up to 16 TAF of bank water.

The CVP and SWP are also involved in conveyance of water for other transfers initiated by local water agencies, and in approval of internal exchanges or transfers among project contractors. Based on information obtained in these processes, it appears that these other transfers in 2009 will amount to approximately 250 TAF of water being moved from sellers upstream of the Delta to buyers in the San Joaquin Valley and Southern California, and to approximately 93 TAF of water being reallocated in transfers within the Sacramento Valley, with the water being purchased by the Tehama-Colusa Canal Authority.

CHAPTER 3. DROUGHT IMPACTS

Wildfires

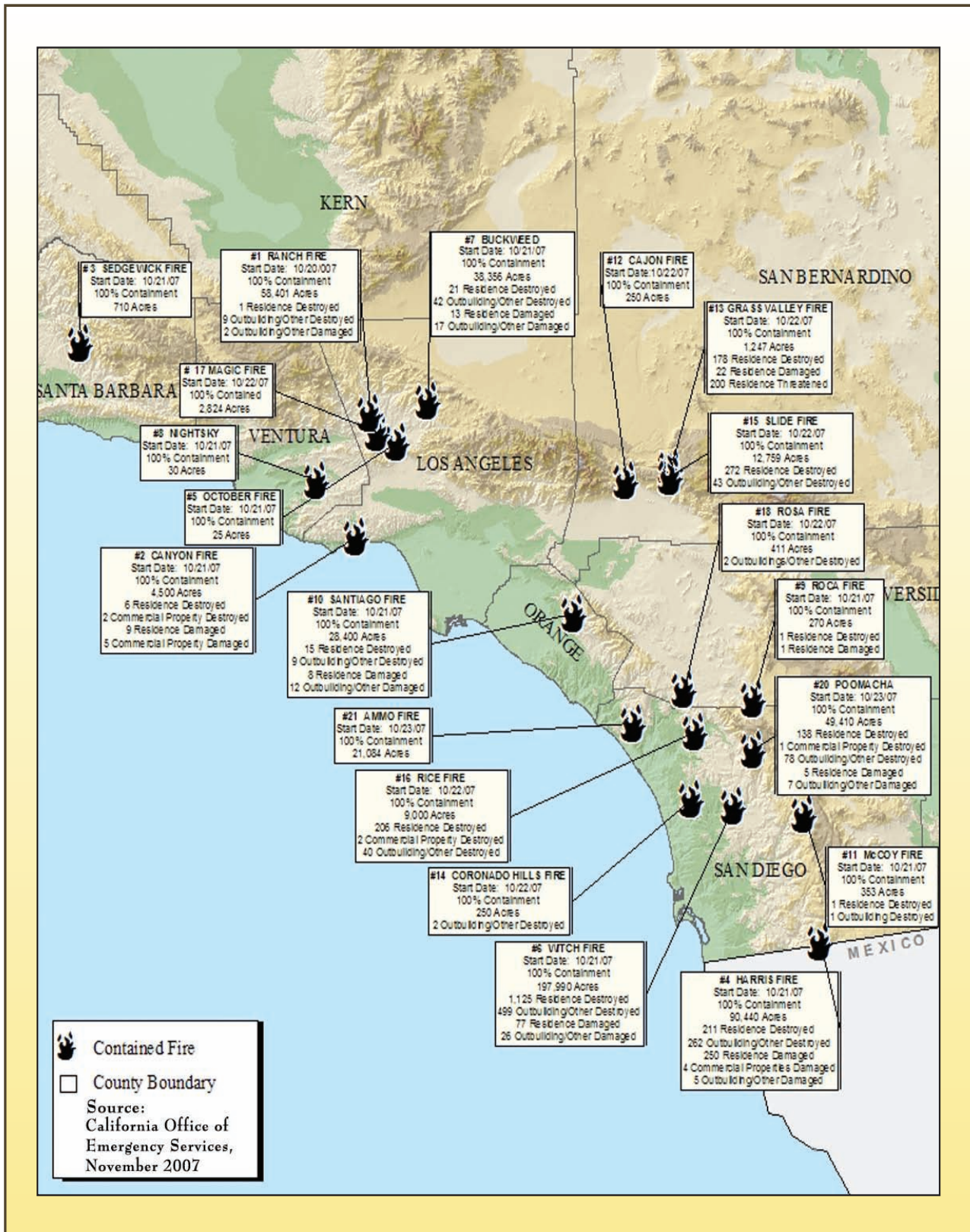
Damages associated with wildfires and loss of timber resources can be one of the largest economic impacts of drought. California faces an increasing risk of damages from wildfires as urban development encroaches on the urban/wildland interface. A joint position adopted by the League of California Cities and the California State Association of Counties following Southern California’s devastating wildfires in 2003 notes that: “Catastrophic wildfires are one of the most significant threats to communities, forests, and wildlands in California today” (LCC, CSAC 2004). The devastating Southern California wildfires of 2003—reported to be the then-costliest in U.S. history, and which followed a multi-year regional drought in Southern California—were mirrored in October 2007, when a combination of dry vegetation and Santa Ana winds created conditions favorable for another massive outbreak of fires in Southern California (**Figure 18**). Earlier that same year, dry conditions in Northern California had facilitated the spread of another damaging fire—the Angora Fire near Lake Tahoe, estimated by the California Department of Forestry and Fire Protection (CAL FIRE) to incur more than \$11 million in fire fighting costs.

Table 8 provides CAL FIRE information on estimated damages and fire suppression costs for recent years. Dry conditions, combined with warmer than average annual temperatures over much of the past decade, are leading to an almost year-round wildfire risk in Southern California—which

**Table 8. Estimated Wildfire Damages
CAL FIRE Wildland Fire Summary Data**

Fire Season	CAL FIRE Fire Suppression Cost Estimate (\$M)	Damage Cost Estimate (\$M)	Structures Destroyed
2000	124	30	130
2001	109	87	389
2002	135	174	327
2003	253	974	5394
2004	166	127	1016
2005	105	49	102
2006	206	60	431
2007	298	254	3079
Notes:			
1. CAL FIRE fire suppression costs are reported on its seasonal, not calendar year, basis.			
2. Damage cost estimates and structures destroyed are only for CAL FIRE jurisdictional area (wildlands)			

Figure 18. 2007 Southern California Wildfires





Costs of fighting the May 2009 Jesusita Fire in the Santa Barbara area are estimated at \$20 million to date.

experienced a regional drought in water years 1999-2002 in addition to the 2007-09 dry conditions. This year, for example, a major fire occurred as early as May in the Santa Barbara area. The coming summer and fall present an elevated risk for catastrophic fires, reflecting the cumulative impacts of a third successive dry year. The Governor's Executive Order S-05-09, issued in May 2009, directed CALFIRE to mobilize additional fire fighting resources in expectation of an early and potentially severe wildfire season.

Urban Areas

Urban water suppliers, particularly those serving larger metropolitan areas, normally provide highly reliable supplies for their customers, as they have the resources and the revenue base to prepare for and respond to drought impacts. The majority of serious water supply problems during droughts (e.g. inability to maintain fire flows, need for truck haulage of water) are experienced by small water systems, discussed below. The urban water management plans (UWMPs) that Water Code Sections 10601 *et seq* require urban suppliers prepare and update every five years serve as a drought preparedness planning tool for the state's larger water systems.

The statutory requirement for UWMP preparation applies to public water systems (both retailers and wholesalers) providing water for municipal purposes to more than 3,000 customers or serving more than 3,000 AF annually. As part of UWMP preparation, systems must provide a water shortage contingency analysis that addresses how they would respond to supply reductions of up to 50%, and must estimate supplies available to their systems in a single dry year and in multiple dry years. UWMPs must also address systems' responses to catastrophic interruptions of their supplies,

such as those caused by earthquakes or power outages. The plans also provide information for water supply assessments required in Water Code Sections 10613 *et seq* and for written verifications of water supply called for in Water Code Section 66473.7. Eligibility for receiving certain types of State financial assistance is conditioned upon water suppliers submitting complete UWMPs to the Department. Moreover, legislation enacted in 2007 requires, beginning in 2008, that urban water suppliers implement the demand management measures described in their UWMPs in order to be eligible for specified state financial assistance.

The latest updates of Urban Water Management Plans (UWMPs) were due to the Department in 2005. The Department estimates that 453 suppliers were required to file plans in 2005; 409 plans have been received to date. The next set of updates is due in 2010. Beginning in 2007, the Department has held 18 UWMP workshops in response to the current drought, to encourage water systems to review and update their water shortage contingency plans, and additionally has funded preparation of an updated urban drought guidebook in coordination with USBR and the California Urban Water Conservation Council (CDWR 2008b).

Implementing enhanced water conservation programs and calling for customers to achieve either voluntary or mandatory water use reduction targets are common urban agency drought response actions. Increases in customers' water rates—either to encourage conservation or to react to increased costs associated with acquiring supplemental water sources or implementing conservation programs—are another common drought outcome, and rate increases appear to be widespread in 2009. In Southern California, for example, MWD imposed mandatory reductions on its member agencies for the first time in 18 years, together with a rate increase of 8.8 percent in the base wholesale rate and a \$69/AF Delta surcharge. **Table A-1** in the Appendix, compiled from information collected by the Association of California Water Agencies (ACWA), summarizes conservation actions and water use reduction targets of its member agencies. Locations of agencies for which information has been compiled are shown in **Figure 19**.

Many of the local agency water conservation campaigns are targeting reductions in outdoor water use; in a parallel effort, the Department is nearing completion of a model water efficient landscape ordinance. Also out for public review is the proposed “20X2020” urban water conservation plan developed by SWRCB, with assistance from the Department, in response to the Governor’s challenge that California residents permanently reduce their per-capita water use by 20 percent by 2020. The “Save Our Water” public education campaign was launched in April as a joint effort of the Department and the ACWA; it offers consumer-oriented information for

Figure 19. Locations of Local Agencies with Conservation Program Information.



Data courtesy of: Association of California Water Agencies

Figure 20. MWD In-Service Area Storage

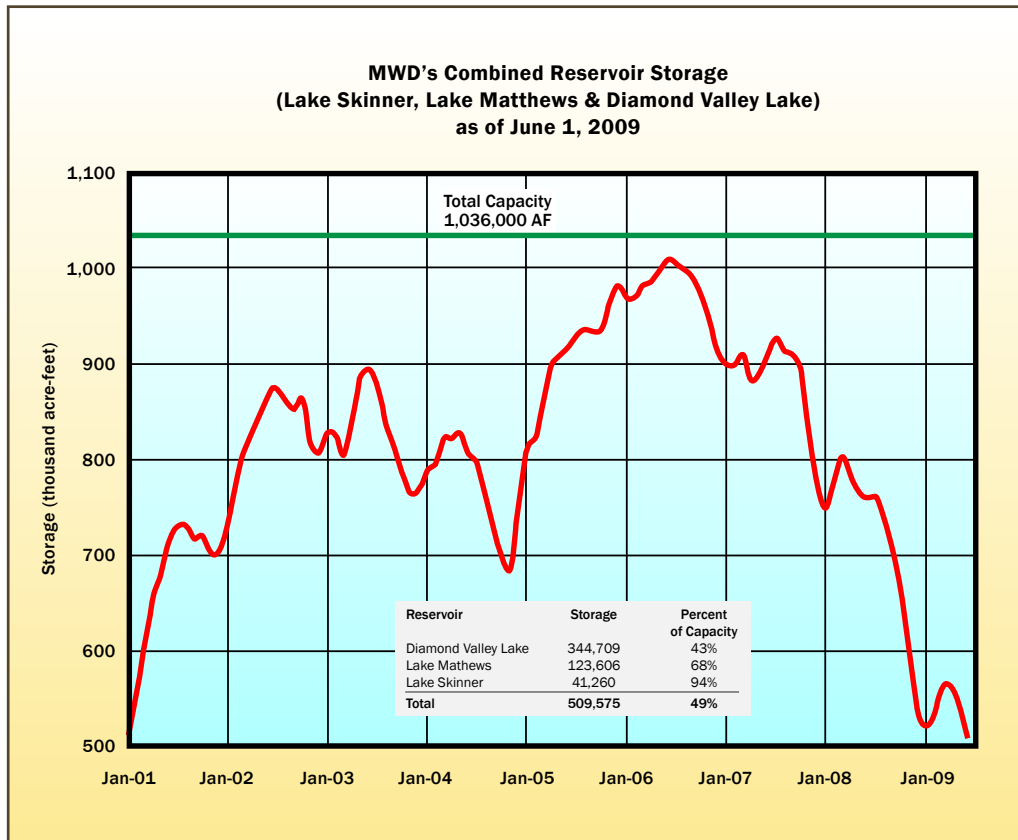


Figure courtesy of Metropolitan Water District of Southern California

understanding long-term issues facing the state’s water systems and tips for reducing indoor and outdoor water use.

Reductions in imported supplies from the SWP and from the Owens Valley Aqueduct to urban Southern California have led to water operations impacts, especially with regard to water storage reserves. Southern California—where about half of the state’s population lives within the MWD service area—is highly dependent on imported supplies. Historically, about 60 percent of annual service area needs have been met with imports, with more than half of that amount coming from the Colorado River. Surface water storage capacity within Southern California is limited compared to the northern part of the state; one reason for the construction of MWD’s Diamond Valley Lake in the late 1990s was to provide in-service area emergency storage. MWD’s in-service area reserves have been drawn down to compensate for reduced imports, as illustrated in **Figure 20**. It is expected that Diamond Valley will reach the emergency reserve level by the end of this year, at which time the reservoir would no longer be used to make up reductions in imported supplies.

Water quality impacts of reductions in imported Sierra Nevada water to urbanized Southern California are another consequence of drought. Sierran water is used within the MWD service area to balance the relatively saltier Colorado River imported supplies. Consequences of increased salt loading in the region include economic impacts, long-term salt build-up in the region's groundwater basins, and complications for water reuse and recycling programs. (Recognition of the need to manage salinity on a regional basis in Southern California led to creation of the Southern California Salinity Coalition in 2002 to help coordinate salinity management activities among Southern California water and wastewater agencies.) Specific information about Southern California salinity impacts will be provided in the year-end update of this report.

Small Water Systems and Private Well Owners

Small water systems have historically experienced the bulk of health and safety impacts, as well as the majority of water shortage emergencies—regardless of water year type. **Table 9** shows recent emergency response grants made by the California Department of Public Health (CDPH) to water systems, all of which are small systems. Although small systems serve a low percentage of California's total population, they constitute the majority of the state's public water systems, as illustrated in **Table 10**. Small systems tend to be located outside the state's major metropolitan areas, often in lightly populated rural areas where opportunities for interconnections with another system or water transfers are nonexistent. Small systems also have limited financial resources and rate bases that constrain their ability to undertake major capital improvements.

Most small system drought problems stem from dependence on an unreliable water source, commonly groundwater in fractured rock systems or in small coastal terrace groundwater basins. The Department has not observed an unusual number of small system water shortage problems in 2009 to date, but drought impacts in these settings typically become most apparent in late summer/early fall, when groundwater resources are depleted. Historically, particularly at-risk geographic areas have been foothills of the Sierra Nevada and Coast Range and inland Southern California, and the North and Central Coast regions. The Department is presently working with one small system in Mendocino County (Redwood Valley Water District) that is experiencing drought impacts to its surface water supply.

The Department and CDPH have been taking actions to help improve small system drought response and preparedness. The Department held a 2007 small system drought preparedness workshop to raise awareness of the need for developing drought assistance programs targeted to small systems. In 2008, as part of response to the executive order's provision calling for

Table 9. CDPH Proposition 84 Emergency Grants

System	Description	Date Approved	Amount
County of Lake (Mt. Hannah)	Storage tank failure	11/26/2007	250,000.00
Tooleville Mutual Water Assn.	Main well pump failure	6/25/2007	10,592.57
Ducor Community SD	Mechanical problems with main well pump	7/19/2007	16,524.86
Inyo County	Storage tank damaged by wildfire	7/11/2007	5,000.00
PureSource	Tank failure	8/21/2007	25,787.15
Rosamond CSD (William Fisher)	Main well pump failure	10/5/2007	93,500.00
Lanare CSD	New well piping required to bring online	11/6/2007	5,000.00
West Goshen MWC	Mechanical problems with main well pump	11/13/2007	48,312.88
PureSource	Tank failure	4/4/2008	220,000.00
Verderame Castlewood LLC	High levels of methane	4/15/2008	143,200.00
Feather River Canyon CSD	Fire damage to pipelines.	7/16/2008	8,525.81
Esalen Institute	Fire damage to pipelines.	8/1/2008	7,505.27
Coastlands MWC	Fire damage to intake and transmission lines.	8/1/2008	6,770.94
Partington MWC	Fire damage to pipelines.	8/13/2008	10,000.00
Latrobe Elementary School	Water outage	8/13/2008	10,000.00
Rainbird Valley MWC	Pump failure	9/24/2008	28,181.00
Madera County Maintenance District No. 85 - Valeta	Water outage	9/12/2008	20,000.00
Verderame Castlewood LLC / Castlewood Mobile Home Park	High levels of methane	10/6/2008	50,700.00
Total			959,600.48

Table 10. Size Distribution of California Public Water Systems

Number of Systems	System Type & Size (by number of connections)
CWS, LARGE(3300+/WHOLESALE)	405
CWS, LARGE (1000-3300)	278
CWS, LARGE (500-999)	157
CWS, SMALL (100-499)	609
CWS, SMALL (25-99)	1043
CWS, SMALL (<25)	613
NON-TRANSIENT NCWS	1529
TRANSIENT NCWS	3184
TOTAL	7818
Note: Information from CDPH as of May 2009	
Key:	
CWS = Community Water System	
Non-transient NCWS = serves 25 or more of the same non-resident individuals, at least 6-month out of the year; e.g. schools, places of employment, etc.	
Transient NCWS = serves 25 or transient individuals per day, for any 60-days out of the year; e.g rest stops, camp-grounds, etc.	

expediting disbursement of available financial assistance, the Department awarded Proposition 50 grants totaling \$984,800 to the California Rural Water Association for leak detection training and onsite technical assistance, drought preparedness training, and water conservation assistance for small systems. CDPH has completed a statewide evaluation to identify water systems vulnerable to drought, developing a list dominated by small systems. CDPH additionally sent a letter (see Appendix) to all public water systems, although targeted especially for small systems, urging them to prepare for water shortages. The sheer number of small water systems and their dispersed locations in rural areas mean that improving their water supply reliability and compliance with Safe Drinking Water Act requirements will be a long-term challenge.

It is estimated that perhaps one million people in California rely on self-supplied groundwater (e.g. private residential wells). Significant increases in the number of rural residents reporting problems with their wells are typical during drought conditions, especially in areas such as the Sierra Nevada foothills that rely on fractured rock groundwater sources. The majority of new water supply well construction or deepening of existing wells during droughts is for private residential wells. The Department has received anecdotal information of limited areas in the Sierra foothills where private residential wells are beginning to experience problems this year, but the majority of such impacts normally are not seen until late summer/early fall.

Agricultural Areas

The agricultural sector clearly demonstrates the site-specific nature of drought impacts. Agricultural drought impacts are normally felt earliest by those relying on unmanaged water supplies—entities carrying out dryland grazing and non-irrigated crop production (usually grain crops). Impacts to irrigated agriculture depend on the source and nature of the irrigation water supply—local groundwater, local surface water, or imported surface water—and any water rights or contractual provisions that may be associated with the source. The extent to which producers may mitigate water shortage impacts depends on multiple factors, but is heavily influenced by economic considerations. Factors involved in making decisions about mitigating irrigation water shortages include availability and costs of pumping groundwater, price of alternative surface water sources, capital investments associated with maintaining permanent plantings, and status of international crop markets.

Impacts of drought on dryland grazing are difficult to capture due to the absence of standardized metrics that provide comparable information across differing agency jurisdictions (e.g. county agricultural commissioners, U.S. Forest Service, U.S. Bureau of Land Management (BLM) and industry

USDA Disaster Assistance

USDA's Farm Services Agency administers an emergency farm loan program that helps farmers and ranchers recover from losses due to drought, floods, other natural disasters, and quarantines. To be eligible for the emergency loans, applicants' operations must be located in a county declared by the President or designated by the Secretary of Agriculture as a disaster area. Criteria for a secretarial designation include a finding that a minimum 30 percent production loss of at least one crop has occurred in the designated county. The timeframe USDA uses for making designations is typically brief from a water management viewpoint—often just a few months. This brevity reflects both the importance of seasonal rainfall to activities such as livestock grazing on non-irrigated rangeland and the emergency loan program's intent of providing farmers and ranchers with operational capital. As described in USDA's 2007 fact sheet (USDA, 2007) for its emergency designation and declaration process: ***Agricultural-related disasters are quite common. One-half to two-thirds of the counties in the United States have been designated as disaster areas in each of the past several years.*** Figure 21 shows that USDA disaster declarations—for drought, wildfire, freezing temperatures, hot temperatures, and wind—are in effect for almost all of California's counties. Such declarations can be a prerequisite for other USDA financial assistance programs in addition to its emergency farm loan program. In summer 2008, for example, agricultural producers in 53 of California's 58 counties were eligible for assistance under USDA's Supplemental Revenue Assistance Payments program, based on disaster declarations then in effect.

Figure 21. California Counties with USDA Disaster Designations as of June 1, 2009



Information courtesy of USDA/Federal Emergency Management Agency

Table 11. Statewide Harvested Acreage by DWR Crop Type

Crop type	2005	2006	2007
Grain	1,592,291	1,620,887	1,637,559
Rice	556,963	550,540	575,998
Cotton	754,732	603,064	470,661
Sugar beets	46,997	43,244	37,724
Corn	619,620	598,797	694,886
Dry beans	80,455	92,973	70,210
Safflower	53,813	51,913	47,934
Other field	399,215	297,845	273,709
Alfalfa	1,118,415	1,202,640	1,119,032
Pasture	998,543	989,397	907,184
Processing tomatoes	309,283	320,506	326,159
Fresh market tomatoes	35,782	39,085	34,317
CUCURBITS	89,103	85,067	76,978
Onion, garlic	81,163	80,563	77,780
Potatoes	40,290	46,392	35,857
Other truck	890,093	920,975	850,709
Almond, pistachio	727,072	763,705	841,483
Other deciduous	613,413	594,758	582,353
Subtropical	378,564	370,642	370,522
Vineyards	833,644	816,911	815,465
Total	10,219,451	10,089,904	9,846,520
Notes: 1. Data from Department of Food and Agriculture, compiled from County Agricultural Commissioner information, and grouped by DWR into major crop types			
2. 2008 data not yet available			
3. Harvested acreage includes both irrigated and non-irrigated lands.			

programs. The California State Office of the BLM estimates that animal unit months (an indirect measure of forage) on lands under its jurisdiction dropped about eight percent from 2006 to 2008, although drought may be only one of several reasons for the decline. (Current economic conditions, for example, could result in permittees stocking less than the maximum number of allowed livestock). Indirect information on drought impacts to rangeland may be inferred from (i.e., proxied by) county-level requests for U.S. Department of Agriculture (USDA) disaster declarations used to authorize provision of financial assistance (see sidebar); however, many counties are presently still in the process of compiling 2009 impact information for consideration by USDA. A table of county-level disaster declarations and estimated damages will be included in the year-end update of this report, by which time information on designations made in response to spring and summer conditions will be available.

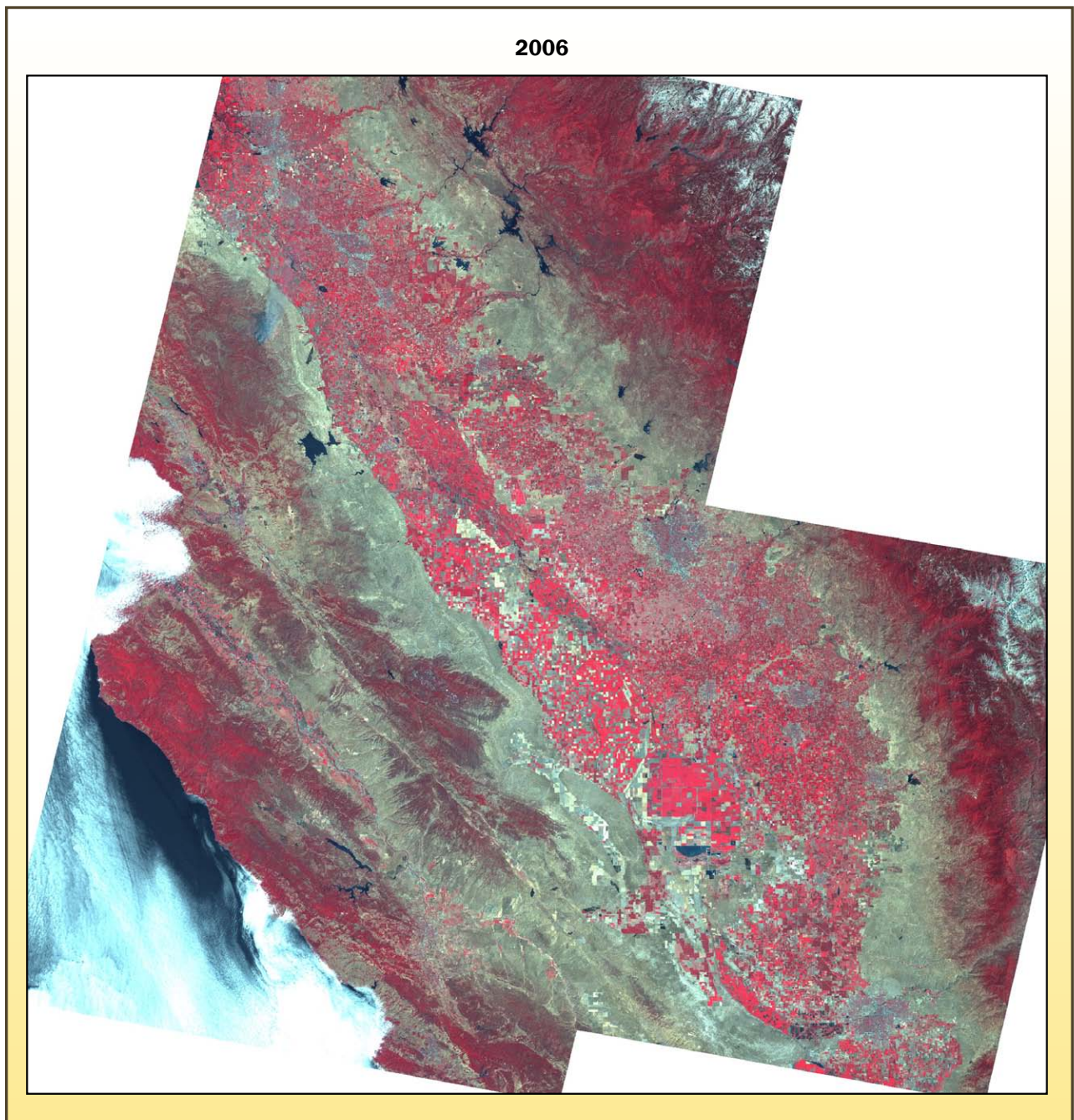
With respect to irrigated agriculture, drought impacts vary with location and water source. Some areas of the state have essentially full supplies—whether

from groundwater, surface water, or a combination of the two—while others have been affected by reduced availability of surface water supplies. The SWRCB sent out a notice in February 2009 (see Appendix) warning surface water diverters statewide that the full supplies allowed in their permits or licenses might not be available this year. **Table 11** shows statewide harvested acreage data through 2007, the latest date for which information is presently available. Since the available data reflect only the first year of the current drought and since harvested acreage is influenced by multiple variables (with crop markets being one of the most important ones), the statewide-level information in this table is not a particularly useful tool for showing localized drought impacts. Harvested acreage data will be updated for the year-end version of this report, by which time 2008 information will be available.

Areas of the state experiencing the greatest irrigation water shortages or drought-related impacts are currently the west side of the San Joaquin Valley and the San Diego/Riverside County avocado/citrus growing area. Lesser impacts or drought-related water use issues have also been occurring in the Russian River service area (vineyard water supplies) and the Tehama-Colusa Canal service area on the west side of the Sacramento Valley (reduced CVP deliveries). Reduced CVP Delta exports have resulted in deliveries to the San Joaquin Valley's west side being only a fraction of contractual allocations—50 percent in 2007, 40 percent in 2008, and 10 percent in 2009 to date. The availability of groundwater in this area to make up these shortfalls is limited, with water quality (too saline) being a significant constraint on availability. Water transfers, discussed in the previous chapter, are being used to provide limited supplemental supplies. Finding sufficient water to protect capital investments in permanent plantings (orchards and vineyards) has been a priority for growers on the Westside. Based on Westlands Water District 2008 crop acreage report, roughly 125,000 acres of its 568,627 cropped acres were in permanent plantings.

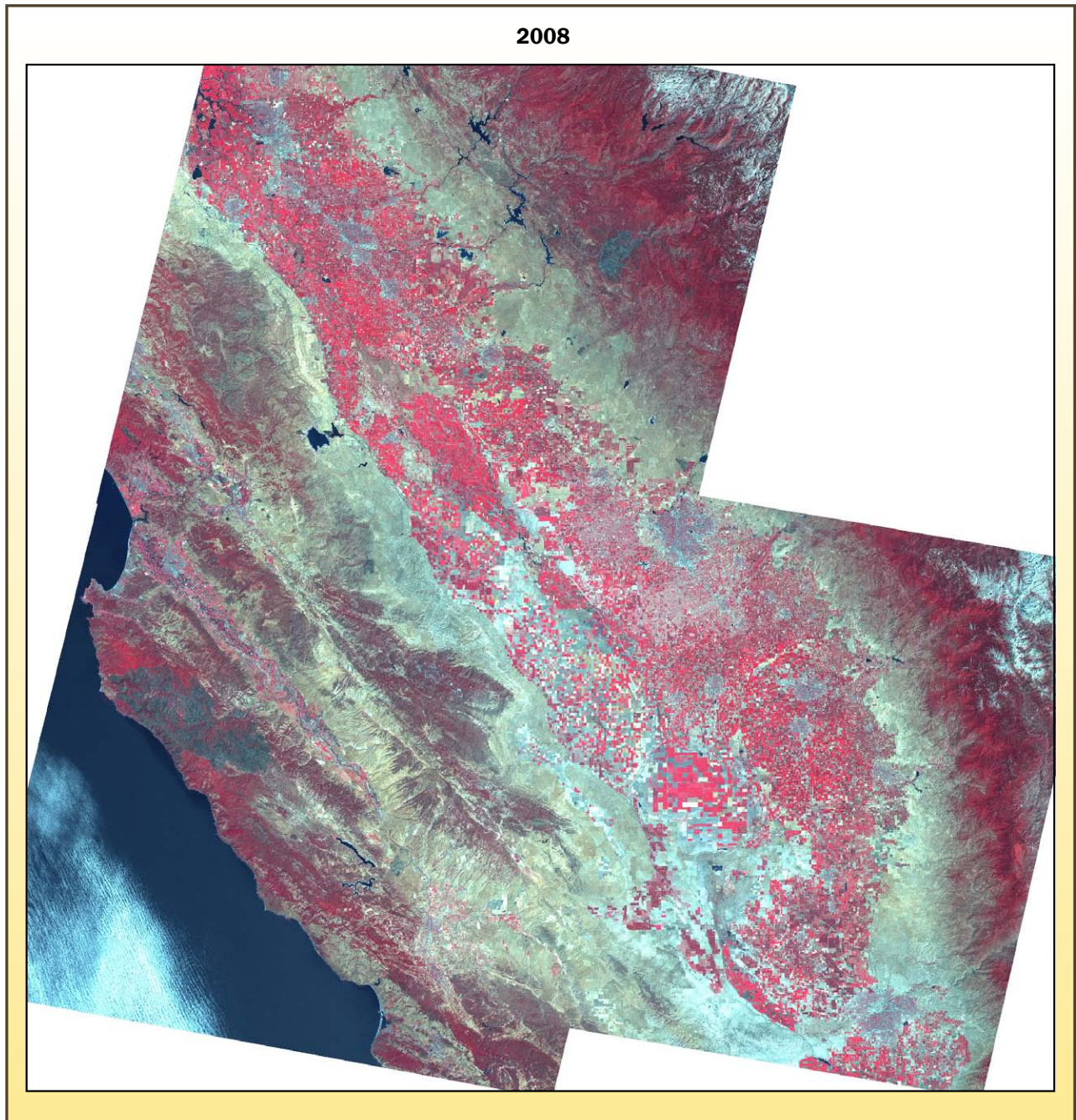
Expected widespread agricultural impacts of substantially reduced diversions from the Delta last year led to the June 2008 Central Valley emergency proclamation. **Figure 22** provides an overview of the contrast in San Joaquin Valley irrigated acreage in 2006 and 2008, while **Figure 23** shows a close-up of that information for the CVP south-of-Delta export area, where widespread land fallowing is evident. The Department, in collaboration with the University of California, Davis, has performed preliminary economic modeling to estimate water shortage impacts to Central Valley irrigated agriculture (Howitt et al., 2009). It is estimated that between 31,200 and 35,300 jobs will be lost in the Central Valley in 2009, with income loss to crop production and related businesses estimated at between \$848 and \$959 million. These impacts include both direct on-farm impacts and indirect off-farm multiplied impacts. Additionally, groundwater pumping costs are

Figure 22a. Landsat images of the San Joaquin Valley in Summer 2006.



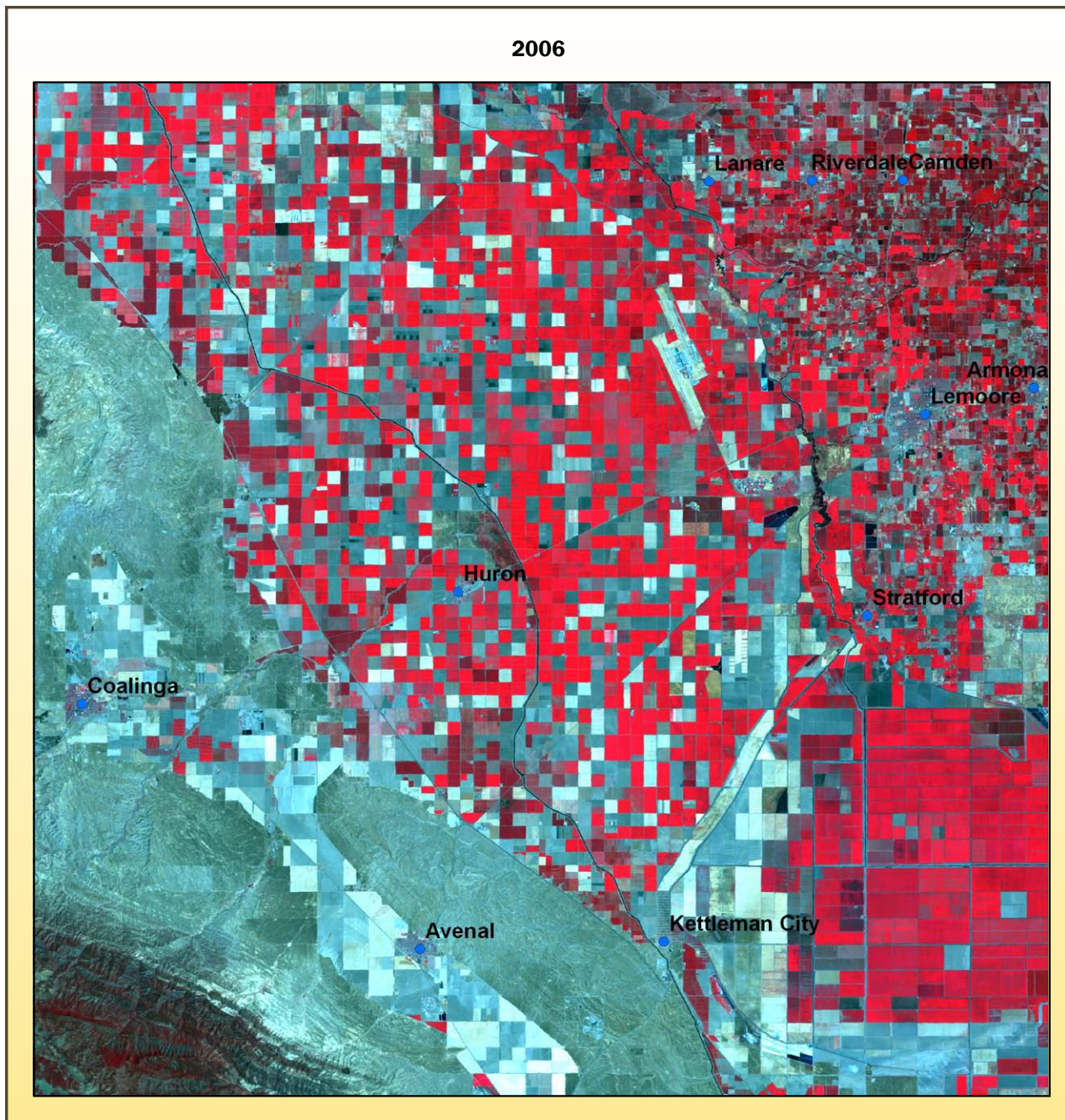
USGS Landsat Image. False-color infrared, irrigated areas in red

Figure 22b. Landsat images of the San Joaquin Valley in Summer 2008.



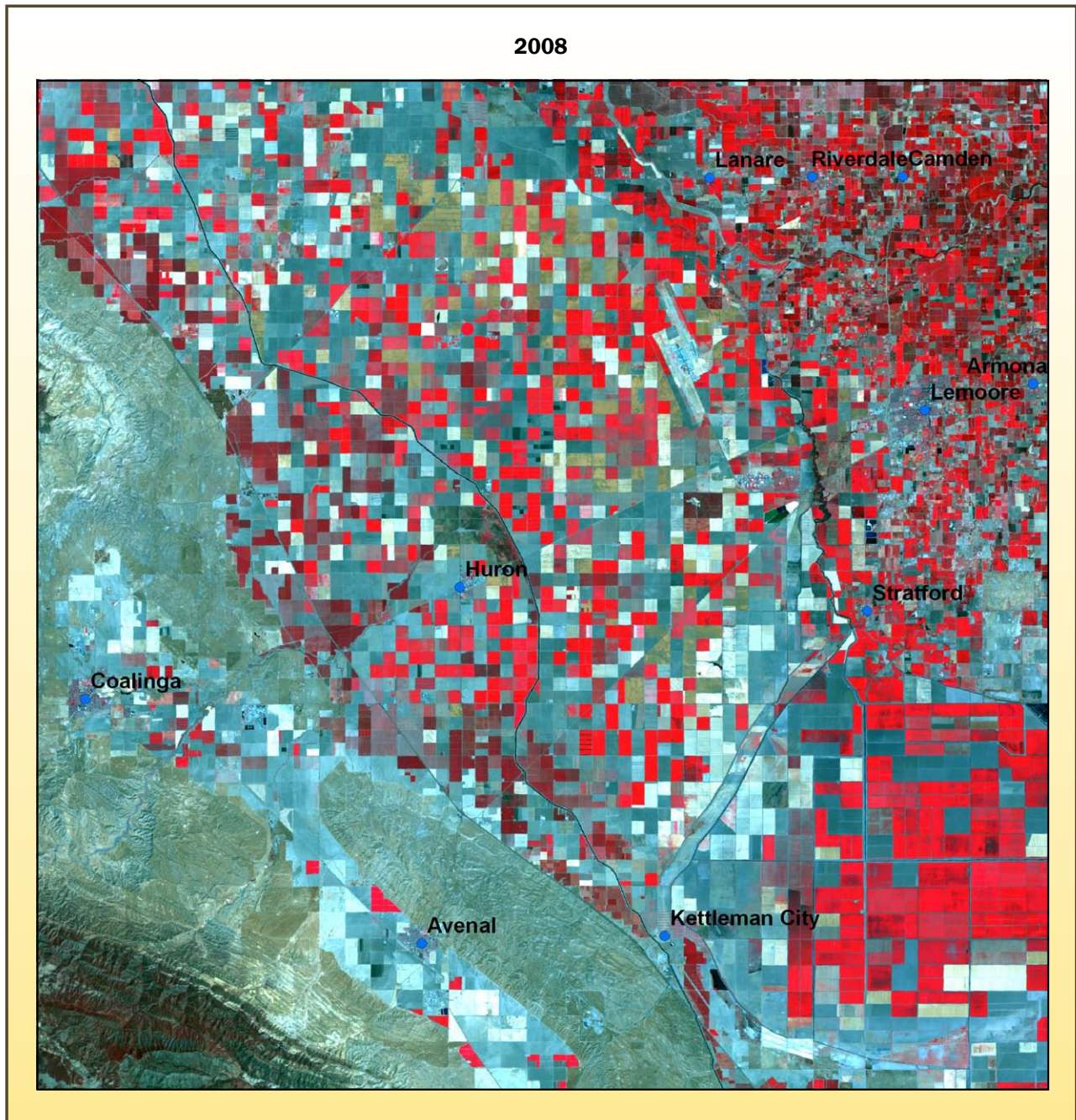
USGS Landsat Image. False-color infrared, irrigated areas in red

Figure 23a. Landsat images of the west side of the San Joaquin Valley in Summer 2006.



USGS Landsat Image. False-color infrared, irrigated areas in red

Figure 23b. Landsat images of the west side of the San Joaquin Valley in Summer 2008.



USGS Landsat Image. False-color infrared, irrigated areas in red

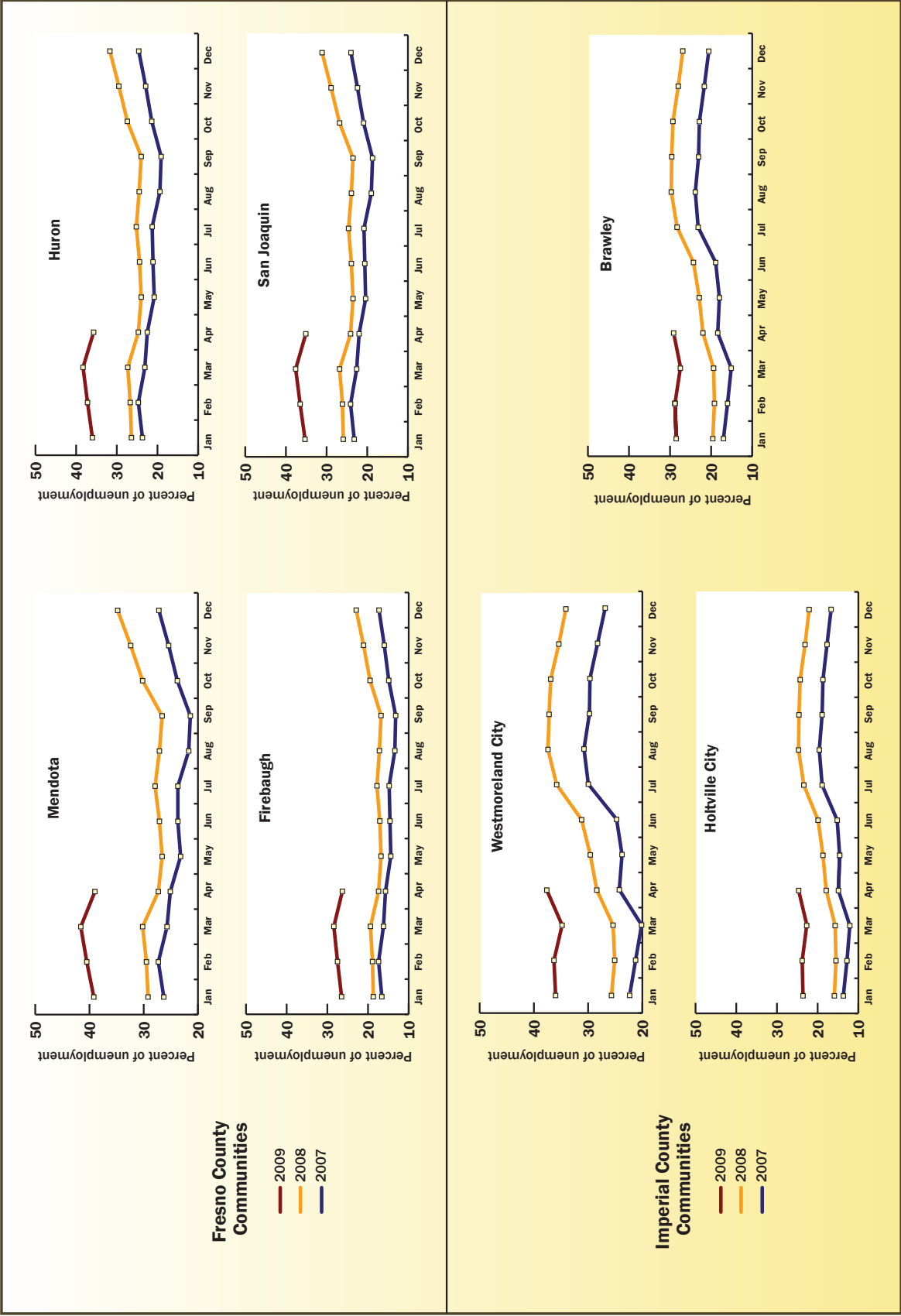
Some avocado growers in San Diego County have stumped orchards as a short-term measure to reduce water use while keeping the trees alive, in hopes of improved future water supplies.



estimated to increase between \$139 million and \$147 million as producers substitute groundwater for surface supplies. (These estimates were made using mid-April SWP and CVP delivery allocations, and are expected to be updated for the year-end version of this report).

Socioeconomic impacts of water shortages on the west side of the San Joaquin valley are exacerbated by the region's high dependence on agriculture for employment. **Figure 24** contrasts unemployment data for selected communities in western Fresno County, in the area affected by reduced CVP south-of-Delta exports, with unemployment information for communities in similarly agriculturally-dominated Imperial County, where there have been no shortages in Colorado River agricultural supplies. Social services agencies on the west side of the San Joaquin Valley have experienced dramatic increases in requests for assistance, leading Fresno County to proclaim a local state of emergency in April 2009 for drought-related unemployment food crisis. The County described its situation in that proclamation as: *...the demand on the local Community Food Bank continues to increase, where, they have provided food to residents on multiple occasions, only to run short each time. Thousands of people have been turned away during giveaways as supplies are not ample enough to meet the local need. During the Community Food bank's most recent neighborhood market distribution in the City of Mendota on February 2, 2009, 3,248 people were served.* The Governor's Executive Order S-11-09, issued in June 2009, called for providing temporary supplemental assistance to local governments and non-profit organizations that provide

Figure 24. Unemployment Data for Selected Fresno County Communities



food and other aid, in recognition of the continuing need for drought-related social services assistance, especially in the San Joaquin Valley.

In Southern California, the most locally significant agricultural impacts have occurred in the avocado/citrus growing region in northern San Diego/southern Riverside counties, where producers participating in MWD's interim agricultural water program were subjected to a 30 percent reduction in deliveries beginning in January 2008. (Producers participating in the program, in effect since 1994, received imported supplies at discounted rates in exchange for supply interruptions during times of shortages.) MWD's Board of Directors subsequently voted in October 2008 to phase out the interim agricultural program over a period of five years; no discounted water would be available after December 2012. In San Diego County, the top-ranked U.S. county for avocado production, it is estimated that approximately 26,064 acres of avocados have been reduced by as much as 5,000 acres in response to the current cutbacks. Phase-out of the interim agricultural water program, combined with the area's high water costs and increasing urbanization, suggest that further reductions in the county's avocado acreage are likely.

Locally Declared Emergencies and Emergency Management Provisions

The California Emergency Services Act, Government Code Sections 8550 *et seq.*, establishes how conditions of emergency are declared and describes the authorities of public agencies to prepare for and respond to emergencies. Pursuant to this Act, a state of emergency may be proclaimed by the Governor or by a city or county. The governing body of a city or county proclaims a local emergency when the conditions of disaster or extreme peril exist. The proclamation enables the city or county to use emergency funds, resources, and powers, and to promulgate emergency orders and regulations. A local proclamation is normally a prerequisite to requesting a gubernatorial proclamation of emergency. The Director of the California Emergency Management Agency (CALEMA) may issue a letter of concurrence to a city or county declaration of local emergency. CALEMA concurrence makes financial assistance available for repair or restoration of damaged public property pursuant to the state's Natural Disaster Assistance Act. The Governor proclaims a state of emergency when local resources are insufficient to control the disaster or emergency, typically in response to a local proclamation of emergency. The Governor's proclamation makes mutual aid from other cities and counties and state agencies mandatory, permits suspension of state statutes or regulations, allows for state reimbursement (on a matching basis) of city and county response costs associated with the emergency, and allows property tax relief for damaged private property.

Figure 25 shows counties that have submitted drought-related emergency proclamations in 2007-08 and 2009 to date. Impacts related to agricultural water shortages are a common theme among the majority of the proclamations. Additional impacts mentioned in the proclamations include the Fresno County unemployment food crisis described above, potential water shortages for the community of Redwood Valley in Mendocino County due to the low level of Lake Mendocino on the Russian River, and wildfire risks.

In addition to broad emergency powers provided under the Emergency Services Act, local water agencies have authority to ban new connections and manage water demands under emergency or shortage conditions. These authorities are in use now by some agencies in response to the current dry conditions. Water Code Sections 350 *et seq* (see Appendix) define the condition of a water shortage emergency, providing that the governing body of a public water supply (whether publicly or privately owned) may declare a water shortage emergency condition in its service area whenever it finds that *the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection*. This declaration allows the water supplier to adopt regulations covering measures to stretch its supplies, such as mandatory rationing or connection bans. Further, Water Code Sections 71640 *et seq.* (see Appendix) provide authority for water agencies to restrict the usage of water during drought or water shortages.

Special districts often have specific powers in their enabling acts to adopt water rationing and other demand reduction measures. Municipal water districts, for example, have specific authority to adopt a drought ordinance restricting use of water, including the authority to restrict use of water for any purpose other than household use. Additionally, CDPH has the authority to impose terms and conditions on permits for public water systems to assure that sufficient water is available, including the authority to require a supplier to continue a moratorium on new connections adopted pursuant to Water Code Sections 350 *et seq.* The year-end update of this report will include an evaluation of connection bans in areas with drought impacts.

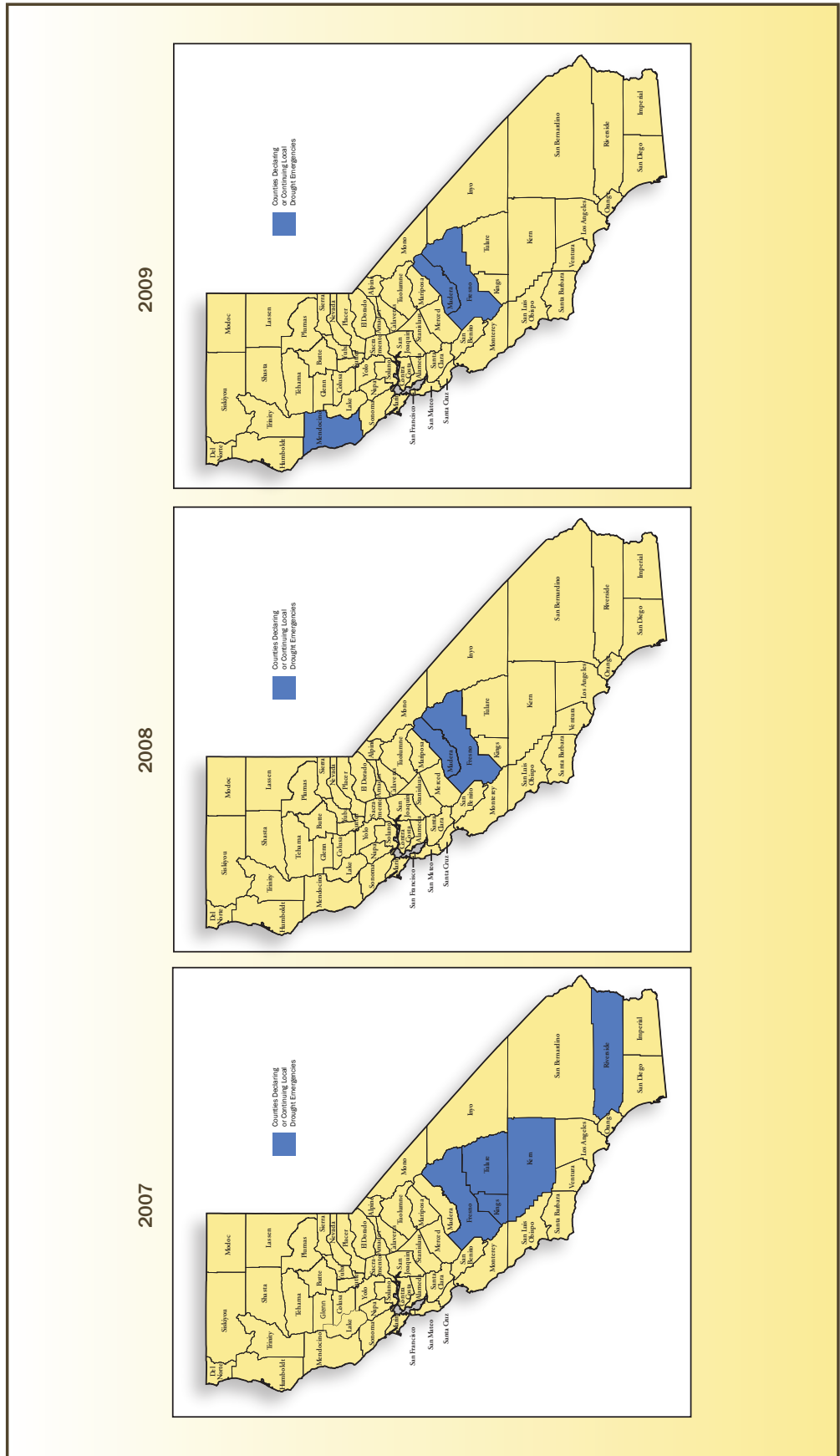
Other impacts

Hydroelectric Power Generation. **Table 12** illustrates the role played by in-state hydroelectric power generation in relation to total in-state electricity generation. Hydropower is particularly valued for its peaking capability, as compared to the operation of thermal power plants for base loads. Large water supply projects such as the CVP and SWP are also large generators of electric power, although power generation is an incidental purpose to

Table 12. Hydroelectric Power Generation in California, Expressed as a Percentage of Total Generation

Year	Percent
2000	15.0
2001	9.4
2002	11.5
2003	13.0
2004	11.9
2005	13.9
2006	16.6
2007	8.9
2008	8.7
Source: California Energy Commission	
2008 data are preliminary	

Figure 25. Counties with Emergency Proclamations, 2007-2009





In response to falling lake levels in 2008, boaters at Folsom Lake Marina at Brown's Ravine were required to remove their boats from the marina in early July. (However, access to the lake then was still available via boat launch ramps.)

operation of the projects for water supply. Drought impacts on CVP and SWP power generation are illustrated in **Table 13**.

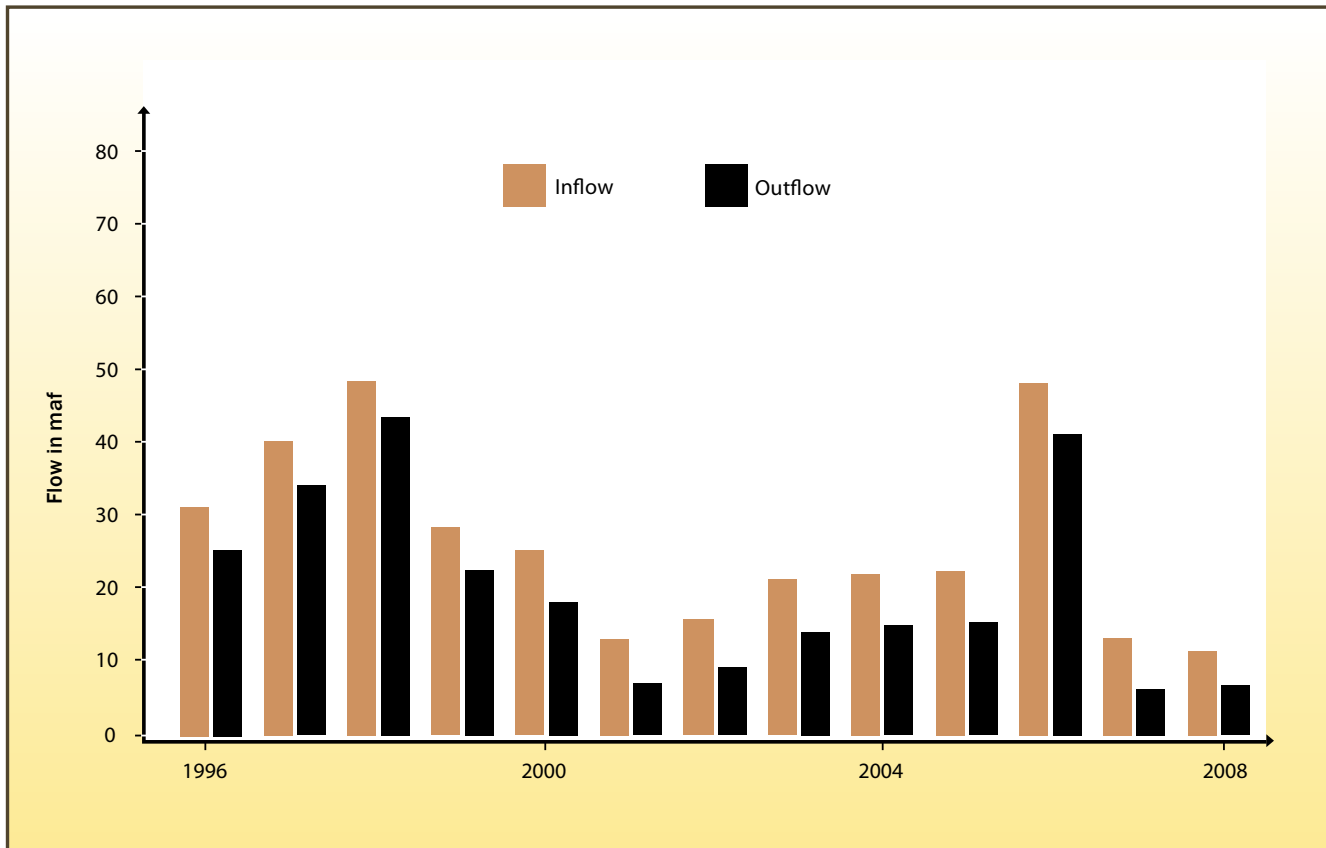
Fisheries and Wildlife Refuges. Information on specific fishery impacts—such as fish kills or fish stranding—directly attributable to present dry conditions is sparse and anecdotal. Drought-related impacts have been reported for the Russian River system, where several fish kills in spring 2008 and 2009 that included Endangered Species Act-listed species (coho salmon and steelhead) were attributed to wine grape growers' water use for grapevine frost protection. The National Marine Fisheries Service formed a frost protection task force in 2008, and in February 2009 requested emergency regulations from the State Water Control Board (SWRCB). SWRCB held an informational workshop in April 2009 on water use for frost protection; follow-up action will be determined.

Drought is more commonly an additional stressor for fish populations that may already be experiencing long-term declines for multiple reasons including loss of habitat, competition from introduced species, and water quality degradation. In 2008 and 2009, for example, the Pacific Fishery Management Council banned commercial salmon fishing off the coast of California, in reaction to depleted salmon stocks attributed primarily to unfavorable ocean temperature and food availability conditions. Similarly, the status of, and factors affecting, declines in fish populations migrating through or resident in the Delta are being extensively discussed in several forums; review of this subject is beyond the limited scope of this report. **Figure 26** summarizes annual Delta inflow and outflow in recent years, to provide an illustration of hydrologic variability experienced in the estuary.

Table 13. CVP and SWP Hydroelectric Power Generation in MWh

Year	CVP	SWP
2006	7,447,017	5,659,120
2007	4,535,719	4,246,441
2008	3,522,371	2,556,768

Figure 26. Annual Delta Inflow and Outflow.



Central Valley state and federal wildlife refuges included in the Central Valley Project Improvement Act (CVPIA) have received full supplies (100 percent of the amounts USBR identifies as Level 2 refuge supplies, the water dedicated from CVP yield for refuges) from the CVP in 2007-2009. CVPIA further directed USBR to purchase additional supplemental water for wildlife refuges (the amounts USBR identifies as Level 4 refuge supplies). It is presently too soon to determine how much Level 4 refuge water USBR will be able to acquire in 2009; this information will be included in the end-of-year update of this report. If no Level 4 refuge water supplies were purchased, full Level 2 supplies would represent about 71 percent of the amount of water USBR believes is needed pursuant to CVPIA.

Recreation. Impacts of the present drought on recreation are not readily discernable at the statewide level, especially when considering the confounding impacts of current economic conditions and recent high gasoline prices. (Poor economic conditions may actually increase attendance at local facilities such as reservoirs, when people choose to curtail longer trips in favor of nearby recreational destinations.) Recreational sectors that may be

impacted by drought include ski resorts, reservoir-based activities, and river-based activities (e.g. rafting). Some recreational facilities within these sectors are able to take adaptive measures such as snowmaking, relocating floating boat docks, extending boat ramps, or changing rafting locations to mitigate drought impacts.

Drought impacts on water-based recreation are highly localized, depending not only upon the adaptive capacity of recreational facilities, but also upon the magnitude of site-specific impacts. Taking reservoir-based recreation as an example, only some of the Sierran reservoirs popular with boaters have experienced significantly lower water elevations. At sites such as USBR's Folsom Lake—where low water levels forced restrictions on boat operations and early curtailment of marina operations in 2007 and 2008—the reservoir's proximity to a major urban area still results in high levels of visitor usage for other activities at the site. **Table 14** shows attendance data at sample state recreation areas that feature reservoir-based or river-based activities. Many factors influence attendance at these facilities, but drought does not stand out as a causal factor.

Table 14. Visitor Attendance at Selected State Recreation Areas

Year	Facility													
	Auburn	Benbow Lake	Bethany Reservoir	Brannan Island	Folsom Lake	Kings Beach	Lake Oroville	Lake Perris	Millerton Lake	Picacho	San Luis Reservoir	Silverwood Lake	Tahoe	Woodson Bridge
2000	1,081,390	37,195	28,326	132,620	1,738,324	63,449	438,587	1,050,672	412,051	67,605	835,187	379,416	14,113	80,920
2001	998,931	36,874	15,392	142,013	1,578,402	25,744	711,386	1,115,996	711,215	68,920	560,264	426,571	13,244	88,962
2002	1,066,077	27,283	24,845	153,458	1,410,347	33,239	1,346,056	1,296,118	594,087	73,916	628,308	512,693	9,737	79,680
2003	867,515	39,404	31,570	125,838	1,182,383	30,986	1,251,810	1,206,149	593,425	68,222	613,925	441,987	5,990	85,006
2004	1,076,845	40,319	27,684	114,771	1,004,602	53,541	1,268,470	1,175,599	328,492	74,352	531,981	243,620	11,077	72,067
2005	679,640	15,305	26,761	105,763	998,194	44,338	1,277,995	1,020,739	424,534	57,295	428,597	245,690	8,798	19,676
2006	601,470	23,695	25,963	92,756	1,214,500	67,357	934,434	649,122	319,994	77,367	465,575	306,354	8,400	18,143
2007	518,406	39,720	44,801	114,371	1,062,452	64,202	973,060	678,886	280,750	102,319	471,566	436,733	9,115	27,366
2008	709,420	26,853	25,612	127,943	813,888	53,602	786,318	623,393	309,230	111,919	407,522	357,986	6,961	35,047
Data Source: Department of Parks and Recreation														
Note: Water storage in Lake Perris was reduced in fall 2005 due to seismic safety improvements to Perris Dam. Although boat launch ramps remain open, the lake's surface area was reduced by about 20 percent.														

CHAPTER 4. CONCLUSIONS

The 2008 and 2009 drought executive order and emergency proclamations directed the Department, together with other state agencies, to take specified actions to respond to drought conditions. The February 2009 emergency proclamation specifically required the preparation of a March 2009 status report to the Governor's Office, (available at: <http://www.water.ca.gov/news/newsreleases/2009/040209drought-rpt-gov.pdf>), which, among other things, was intended to identify any need for additional orders to mitigate emergency conditions. The March 2009 status report did not identify a need for additional emergency measures, but committed the Department to continued review of the status of drought conditions. The Department's continued review of drought conditions described in this mid-year report likewise does not identify a need for additional emergency measures at this time.

A major finding of the review is the importance of preparing for the possibility of a potentially dry 2010. Impacts being experienced in the present three-year drought are relatively more severe than those experienced during prior dry conditions—such as the first three years of the 1987-92 drought. The increased severity is directly related to increased regulatory restrictions to protect listed fish species that limit the ability to convey water across the Delta. The increased severity further reflects the addition of nine million people to California since 1990, as well as the expanded acreage of permanent plantings on the west side of the San Joaquin Valley, an area of now-chronic agricultural water shortages. As part of preparing for a dry 2010, the Department will continue to carry out actions described in the March 2009 status report to the Governor's Office, including incorporation of long-term drought contingency planning in the California Water Plan 5-year update process. Outreach and education are key elements of drought response; the Department will continue to seek opportunities for incorporating these elements into planning for 2010.

In the longer term, drought preparedness for California must include a solution to the problems confronting the San Francisco Bay-Sacramento-San Joaquin River Delta (Bay-Delta). Sustainability—for water users and for the ecosystem—is a necessity. One of California's major strengths in responding to droughts is its extensive system of water infrastructure that affords great flexibility in moving water to areas of critical need; this is a capability unmatched in any other state. The Delta lies at the hub of this water distribution system, and finding a solution there is central to maintaining operational flexibility during droughts and other emergencies.

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EXECUTIVE ORDER S-06-08 06/04/2008

WHEREAS Statewide rainfall has been below normal in 2007 and 2008, with many Southern California communities receiving only 20 percent of normal rainfall in 2007, and Northern California this year experiencing the driest spring on record with most communities receiving less than 20 percent of normal rainfall from March through May; and

WHEREAS California is experiencing critically dry water conditions in the Sacramento and San Joaquin River basins and the statewide runoff forecast for 2008 is estimated to be 41 percent below average; and

WHEREAS water storage in many of the state's major reservoirs is far below normal including Lake Oroville, which supplies the State Water Project, at 50 percent of capacity, Lake Shasta at 61 percent of capacity and Folsom Lake at 63 percent of capacity; and

WHEREAS the Colorado River Basin has just experienced a record eight-year drought resulting in current reservoir storage throughout the river system reduced to just over 50 percent of total storage capacity; and

WHEREAS climate change will increasingly impact California's hydrology and is expected to reduce snowpack, alter the timing of runoff and increase the intensity and frequency of droughts in the western United States; and

WHEREAS diversions from the Sacramento-San Joaquin River Delta for the State Water Project (SWP) and federal Central Valley Project (CVP) are being greatly restricted due to various factors including federal court actions to protect fish species, resulting in estimated SWP deliveries of only 35 percent, and CVP deliveries of only 40 percent, of local agencies' requested amounts for 2008; and

WHEREAS dry conditions have created a situation of extreme fire danger in California, and these conditions resulted in devastating fires last year, resulting in proclamations of emergency for the counties of El Dorado, Los Angeles, Orange, Ventura, Santa Barbara, Riverside, San Bernardino, Santa Clara, Santa Cruz and San Diego, with wildfires there causing millions of dollars in damages; and

WHEREAS on May 9, 2008, I signed an Executive Order directing various agencies and departments within my administration to respond to these dry conditions and prepare for another potentially severe wildfire season; and

WHEREAS the current drought conditions are harming urban and rural economies, and the state's overall economic prosperity; and

WHEREAS some communities are restricting new development and mandating water conservation and rationing, and some farmers have idled permanent crops and are not planting seasonal crops this year, because of unreliable or uncertain water supplies; and

WHEREAS recent supply reductions have jeopardized agricultural production in the San Joaquin Valley; an

WHEREAS it is not possible to predict the duration of present drought conditions; and

WHEREAS while communities throughout the state have worked to significantly improve their drought preparedness, the readiness to cope with current and future drought conditions varies widely; and

WHEREAS immediate water conservation measures are needed this year to address current conditions and prepare for a dry 2009; and

WHEREAS the State of California is committed to enhancing drought response and drought preparedness and to protecting the state's economy and its environment

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of California, do hereby proclaim a condition of statewide drought, and in accordance with the authority vested in me by the Constitution and statutes of the State of California, do hereby issue the following orders to become effective immediately

IT IS HEREBY ORDERED that the Department of Water Resources (DWR) shall take immediate action to address the serious drought conditions and water delivery limitations that currently exist in California, and that are anticipated in the future, by taking the following actions:

1. Expedite existing grant programs for local water districts and agencies for new or ongoing water conservation and water use reduction programs and projects that are capable of timely implementation to ease drought conditions in 2008 or 2009.
2. Facilitate water transfers in 2008 to timely respond to potential emergency water shortages and water quality degradation, and prepare to operate a dry year water purchasing program in 2009.
3. In cooperation with local water agencies and other water-related organizations, conduct an aggressive water conservation and outreach campaign.
4. Immediately convene the Climate Variability Advisory Committee to prioritize and expedite drought-related climate research that will assist

in responding to current drought conditions and help prepare for a potentially dry 2009.

5. Provide technical assistance for drought response to local water agencies and districts for improving landscape and agricultural irrigation efficiencies, leak detection and other measures as appropriate.
6. Review the water shortage contingency elements of Urban Water Management Plans and work cooperatively with water suppliers to implement improvements.
7. Coordinate and implement State Water Project operations and water exchanges to alleviate critical impacts to San Joaquin Valley agriculture.
8. Implement additional actions to facilitate drought response, preparedness and promote water conservation in 2008 and 2009, and which will contribute to achieving long term reductions in water use.

IT IS FURTHER ORDERED that DWR and the Department of Public Health (DPH) prioritize processing of loan and grant contracts for water suppliers and public water systems demonstrating drought-related hardships.

IT IS FURTHER ORDERED that DWR and DPH coordinate with the State Office of Emergency Services and local offices of emergency services to identify public water systems at risk of experiencing health and safety impacts due to drought conditions and water delivery limitations, and to mitigate such impacts.

IT IS FURTHER ORDERED that DWR and DPH work with local water districts to evaluate system interconnections among the state's large water purveyors, review the status or availability of mutual aid agreements among those large water purveyors, and work with the parties to those mutual aid agreements to correct any deficiencies that restrict the movement of water in an emergency situation

IT IS FURTHER ORDERED that DWR coordinate with the California Public Utilities Commission to identify investor-owned water utility systems at risk of experiencing health and safety impacts due to drought conditions and water delivery limitations, and to mitigate such impacts.

IT IS FURTHER ORDERED that DWR work with the Department of Food and Agriculture (CDFA), the United States Department of Agriculture and the United States Bureau of Reclamation to identify potential federal funding for local water agencies and farmers to facilitate the rapid installation of best available irrigation management and conservation systems.

IT IS FURTHER ORDERED that the CDFA work with county Agricultural Commissioners and others as necessary to identify and gather data on crop losses and other adverse economic impacts caused by the drought and, when necessary, transmit that information to the appropriate federal and state agencies.

IT IS FURTHER STRONGLY ENCOURAGED that local water agencies and districts work cooperatively on the regional and state level to take aggressive, immediate action to reduce water consumption locally and regionally for the remainder of 2008 and prepare for potential worsening water conditions in 2009.

This Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this Executive Order be filed in the Office of the Secretary of State and that widespread publicity and notice be given to this Executive Order.



IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 4th day of June 2008.

ARNOLD SCHWARZENEGGER
Governor of California

ATTEST

DEBRA BOWEN
Secretary of State

EMERGENCY PROCLAMATION – CENTRAL VALLEY

06/12/2008

State of Emergency - Central Valley Region

PROCLAMATION

by the
Governor of the State of California

WHEREAS on June 4, 2008, I issued an Executive Order proclaiming a statewide drought; and

WHEREAS in my June 4 Executive Order, I called on all Californians to conserve water, and I directed state agencies and departments to take immediate action to address the serious drought conditions and water delivery reductions that exist in California; and

WHEREAS in issuing my June 4 Executive Order, I said that I would proclaim a state of emergency in any county where emergency conditions exist due to the drought, in an effort to protect the people and property of California, including the businesses, workers and communities that depend on water deliveries for their livelihood and survival; and

WHEREAS since issuing my June 4 Executive Order, I have determined that emergency conditions exist in Central Valley counties caused by the continuing drought conditions in California and the reductions in water deliveries; and

WHEREAS statewide rainfall has been below normal in 2007 and 2008, with many Southern California communities receiving only 20 percent of normal rainfall in 2007, and Northern California this year experiencing the driest spring on record with most communities receiving less than 20 percent of normal rainfall from March through May; and

WHEREAS California is experiencing critically dry water conditions in the Sacramento and San Joaquin River basins and the statewide runoff forecast for 2008 is estimated to be 41 percent below average; and

WHEREAS water storage in many of the reservoirs serving the Central Valley are far below normal including San Luis reservoir which is at 53 percent of capacity, Lake Shasta at 61 percent of capacity and Lake Oroville at just 50 percent of capacity; and

WHEREAS diversions from the Sacramento-San Joaquin River Delta for the State Water Project (SWP) and federal Central Valley Project (CVP) are being greatly restricted due to various factors including federal court actions to protect fish species, resulting in estimated SWP deliveries of only 35 percent, and CVP deliveries of only 40 percent, of local agencies' requested amounts for 2008; and

WHEREAS the United States Bureau of Reclamation (USBR) recently announced an unexpected reduction in its water supply allocations to Central Valley Project (CVP) contractors within the San Luis Delta Mendota Water Agency Service Area from 45 percent to 40 percent; and

WHEREAS this unanticipated reduction will result in crop loss, increased unemployment and other direct and indirect economic impacts to Central Valley counties; and

WHEREAS water rationing has been ordered by the City of Long Beach, the City of Roseville, and the East Bay Municipal Utility District, which serves 1.3 million people in Alameda and Contra Costa counties; and

WHEREAS on June 10, 2008, the Metropolitan Water District of Southern California, which supplies water for 26 cities and water agencies serving 18 million people in six southern California counties, declared a water supply alert in an effort to sustain their water reserves; and

WHEREAS some communities are also restricting new residential and commercial development because of unreliable or uncertain water supplies, and this is causing harm to the economy; and

WHEREAS dry conditions have created a situation of extreme fire danger in California, and these conditions resulted in devastating fires last year, with wildfires causing millions of dollars in damages; and

WHEREAS San Joaquin Valley agriculture constitutes a \$20 billion industry, and serves as an essential part of California's economy; and

WHEREAS the lack of water will cause devastating harm to the communities that rely on this important industry, as growers lack sufficient water to finish the growing season, are forced to abandon planted crops, and are forced to dismiss workers; and

WHEREAS the lack of water is causing agricultural workers in the Central Valley to lose their jobs, resulting in a loss of livelihood, an inability to provide for their families, and increased negative social and economic impacts on the communities that depend on them; and

WHEREAS San Joaquin Valley agricultural production and processing industries account for almost 40 percent of regional employment, and every dollar produced on the farm generates more than three dollars in the local and regional economies, and the loss of these dollars is devastating communities; and

WHEREAS almost 20 percent of San Joaquin Valley residents already live in poverty, and it consistently ranks as the top region in the nation in foreclosures; and

WHEREAS as workers lose their jobs because of the lack of water, they often move their families away from the communities, resulting in further harm to local economies, lower enrollments in local schools and reduced funding for schools; and

WHEREAS the city of Fresno received only 54 percent of normal rainfall in 2007 and 76 percent of normal in 2008, and had its fourth driest spring on record; and

WHEREAS on June 11, 2008, the Fresno County Board of Supervisors passed a resolution declaring a local state of emergency due to the severe drought conditions, stating among other things that the lack of water has resulted in water rationing by Fresno County water districts; that these reductions are causing abandonment of current planted seasonal crops and permanent crops; that the cumulative crop reductions will result in job losses in Fresno County communities; that the loss of revenue has negatively impacted Fresno County businesses and Fresno County government tax revenue; and that there will be a substantial negative economic impact to the community; and

WHEREAS the Fresno County Board of Supervisors also requested that I declare a state of emergency due to the drought conditions; and

WHEREAS the Central Valley cities of Bakersfield, Modesto, Stockton, and Sacramento experienced their driest spring on record in 2008, and additional Central Valley counties are experiencing similar emergency conditions caused by drought and lack of water deliveries; and

WHEREAS to date, almost \$65 million in losses have been reported by 19 counties due to reduced rangeland grasses that are used to graze livestock, and those reductions have been caused by drought; and

WHEREAS statewide and local conditions collectively have led to the rationing of water by affected water districts to their member farmers and these further reductions are resulting in abandonment of current planted seasonal crops and permanent crops; and

WHEREAS the crop losses will cause increased food prices, which will negatively impact families and economies throughout California and beyond our borders; and

WHEREAS the lack of water deliveries has forced local communities to draw water from their emergency water reserves, putting communities at risk of further catastrophe if emergency reserves are depleted or cut off; and

WHEREAS the circumstances of the severe drought conditions, by reason of their magnitude, are beyond the control of the services, personnel, equipment and facilities of any single county, city and county, or city and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the California Government Code, I find that conditions of extreme peril to the safety of persons and property exist within the counties of Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern, caused by the current and continuing severe drought conditions.

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of California, in accordance with the authority vested in me by the California Constitution and the California Emergency Services Act, and in particular, section 8625 of the California Government Code, HEREBY PROCLAIM A STATE OF EMERGENCY to exist within the counties of Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare and Kern.

IT IS HEREBY ORDERED that all agencies of the state government utilize and employ state personnel, equipment and facilities for the performance of any and all activities consistent with the direction of my Office of Emergency Services (OES) and the State Emergency Plan, and that OES provide local government assistance under the authority of the California Disaster Assistance Act, and that the emergency exemptions in sections 21080(b) (3) and 21172 of the Public Resources Code shall apply to all activities and projects ordered and directed under this proclamation, to the fullest extent allowed by law.

I FURTHER DIRECT THAT:

OES shall provide assistance under the authority of the California Disaster Assistance Act, by assisting public water agencies with drilling of groundwater wells or the improvement of existing wells and water delivery systems for human consumption, sanitation, and emergency protective measures, such as fire fighting.

The Department of Water Resources (DWR) shall transfer groundwater of appropriate quality through the use of the California Aqueduct to benefit farmers in the San Joaquin Valley

DWR and the State Water Resources Control Board (SWRCB) shall expedite the processing of water transfer requests.

DWR, in cooperation with USBR, shall make operational changes to State Water Project facilities, including the San Luis Reservoir and Southern California reservoirs, that will permit additional water deliveries to the San Joaquin Valley.

DWR shall prepare and file necessary water right urgency change petitions to facilitate surface water transfers and the use of joint point of diversion by the SWP and Central Valley Project.

SWRCB shall expedite the processing and consideration of water rights urgency change petitions filed by DWR and other water agencies to facilitate water transfers to the San Joaquin Valley.

I FURTHER DIRECT that as soon as hereafter possible, this proclamation be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this proclamation.



IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 12th day of June, 2008.

ARNOLD SCHWARZENEGGER
Governor of California

ATTEST:

DEBRA BOWEN
Secretary of State

EMERGENCY PROCLAMATION – WATER SHORTAGE

02/27/2009

State of Emergency - Water Shortage

PROCLAMATION

by the Governor of the State of California

WHEREAS the State of California is now in its third consecutive year of drought; and

WHEREAS in each year of the current drought, annual rainfall and the water content in the Sierra snowpack have been significantly below the amounts needed to fill California's reservoir system; and

WHEREAS the rainfall and snowpack deficits in each year of the current drought have put California further and further behind in meeting its essential water needs; and

WHEREAS statewide, 2008 was the driest spring and summer on record, with rainfall 76 percent below average; and

WHEREAS the Sacramento and San Joaquin River systems, which provide much of the state's reservoir inflow, were classified as Critically Dry for the 2008 water year; and

WHEREAS in the second year of this continuous drought, on June 4, 2008, I issued an Executive Order proclaiming a statewide drought, and I ordered my administration to begin taking action to address the water shortage; and

WHEREAS because emergency conditions existed in the Central Valley in the second year of the drought, I issued an Emergency Proclamation on June 12, 2008, finding that conditions of extreme peril to the safety of persons and property existed in the counties of Sacramento, San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern caused by severe drought conditions, and I ordered my administration to take emergency action to assist the Central Valley; and

WHEREAS the drought conditions and water delivery limitations identified in my prior Executive Order and Emergency Proclamation still exist, and have become worse in this third year of drought, creating emergency conditions not just in the Central Valley, but throughout the State of California, as the adverse environmental, economic, and social impacts of the drought cause widespread harm to people, businesses, property, communities, wildlife and recreation; and

WHEREAS despite the recent rain and snow, the three year cumulative water deficit is so large there is only a 15 percent chance that California will replenish its water supply this year; and

WHEREAS in the time since the state's last major drought in 1991, California added 9 million new residents, experienced a significant increase in the planting of permanent, high-value crops not subject to fallowing, and was subjected to new biological opinions that reduced the flexibility of water operations throughout the year; and

WHEREAS because there is no way to know when the drought will end, further urgent action is needed to address the water shortage and protect the people and property in California; and

WHEREAS rainfall levels statewide for the 2008-2009 water year are 24 percent below average as of the February 1, 2009 measurement; and

WHEREAS the second snow pack survey of the 2009 winter season indicated that snow pack water content is 39 percent below normal; and

WHEREAS as of February 23, 2009, storage in the state's reservoir system is at a historic low, with Lake Oroville 70 percent below capacity, Shasta Lake 66 percent below capacity, Folsom Lake 72 percent below capacity, and San Luis Reservoir 64 percent below capacity; and

WHEREAS low water levels in the state's reservoir system have significantly reduced the ability to generate hydropower, including a 62 percent reduction in hydropower generation at Lake Oroville from October 1, 2008 to January 31, 2009; and

WHEREAS a biological opinion issued by the United States Fish and Wildlife Service on December 15, 2008, imposed a 30 percent restriction on water deliveries from the State Water Project and the Central Valley Project to protect Delta Smelt; and

WHEREAS State Water Project water allocations have now been reduced to 15 percent of requested deliveries, matching 1991 as the lowest water allocation year in State Water Project history, and Central Valley Project water allocations for agricultural users have now been reduced to zero; and

WHEREAS the lack of water has forced California farmers to abandon or leave unplanted more than 100,000 acres of agricultural land; and

WHEREAS California farmers provide nearly half of the fresh fruits, nuts and vegetables consumed by Americans, and the crop losses caused by the drought will increase food prices, which will further adversely impact families and economies throughout California and beyond our borders; and

WHEREAS agricultural revenue losses exceed \$300 million to date and could exceed \$2 billion in the coming season, with a total economic loss of nearly \$3 billion in 2009; and

WHEREAS it is expected that State Water Project and Central Valley Project water delivery reductions will cause more than 80,000 lost jobs; and

WHEREAS the income and job losses will adversely impact entire communities and diverse sectors of the economy supported by those jobs and income, including the housing market and commercial business; and

WHEREAS these conditions are causing a loss of livelihood for many thousands of people, an inability to provide for families, and increased harm to the communities that depend on them; and

WHEREAS this loss of income and jobs will increase the number of defaults, foreclosures and bankruptcies, and will cause a loss of businesses and property at a time when Californians are already struggling with a nationwide and worldwide economic downturn; and

WHEREAS the Central Valley town of Mendota, as one example, already reports an unemployment rate of more than 40 percent and lines of a thousand or more for food distribution; and

WHEREAS when jobs, property and businesses are lost, some families will move away from their communities, causing further harm to local economies, lower enrollments in local schools and reduced funding for schools; and

WHEREAS at least 18 local water agencies throughout the state have already implemented mandatory water conservation measures, and 57 agencies have implemented other water conservation programs or restrictions on water deliveries, with many agencies considering additional rationing and water supply reductions in 2009; and

WHEREAS the lack of water has forced local communities to draw water from their emergency water reserves, putting communities at risk of further catastrophe if emergency reserves are depleted or cut off; and

WHEREAS the state recently endured one of its worst wildfire seasons in history and the continuing drought conditions increase the risk of devastating fires and reduced water supplies for fire suppression; and

WHEREAS on February 26, 2009, the United States Department of Agriculture and the United States Department of Interior created a Federal Drought Action Team to assist California to minimize the social, economic, and environmental impacts of the current drought; and

WHEREAS the circumstances of the severe drought conditions, by reason of their magnitude, are beyond the control of the services, personnel, equipment and facilities of any single county, city and county, or city and require the combined forces of a mutual aid region or regions to combat; and

WHEREAS under the provisions of section 8558(b) of the California Government Code, I find that conditions of extreme peril to the safety of persons and property exist in California caused by the current and continuing severe drought conditions and water delivery restrictions.

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of California, in accordance with the authority vested in me by the California Constitution and the California Emergency Services Act, and in particular California Government Code sections 8625 and 8571, HEREBY PROCLAIM A STATE OF EMERGENCY to exist in California.

IT IS HEREBY ORDERED that all agencies of the state government utilize and employ state personnel, equipment and facilities for the performance of any and all activities consistent with the direction of the California Emergency Management Agency (CalEMA) and the State Emergency Plan.

I FURTHER DIRECT THAT:

9. The California Department of Water Resources (DWR) shall, in partnership with other appropriate agencies, launch a statewide water conservation campaign calling for all Californians to immediately decrease their water use.
10. DWR shall implement the relevant mitigation measures identified in the Environmental Water Account Environmental Impact Report, Environmental Impact Statement, Supplement, and Addendums for the water transfers made through the 2009 Drought Water Bank. In addition, the California Air Resources Board shall, in cooperation with DWR and other agencies, expedite permitting and development of mitigation measures related to air quality impacts which may result from groundwater substitution transfers.
11. DWR and the State Water Resources Control Board (SWRCB) shall expedite the processing of water transfers and related efforts by water users and suppliers that cannot participate in the 2009 Drought Water Bank, provided the water users and suppliers can demonstrate that the transfer will not injure other legal users of water or cause unreasonable effects on fish and wildlife.
12. The SWRCB shall expedite the processing and consideration of the request by DWR for approval of the consolidation of the places of use

and points of diversion for the State Water Project and federal Central Valley Project to allow flexibility among the projects and to facilitate water transfers and exchanges.

13. DWR shall implement short-term efforts to protect water quality or water supply, such as the installation of temporary barriers in the Delta or temporary water supply connections.
14. The SWRCB shall expedite the processing and consideration of requests by DWR to address water quality standards in the Delta to help preserve cold water pools in upstream reservoirs for salmon preservation and water supply.
15. To the extent allowed by applicable law, state agencies within my administration shall prioritize and streamline permitting and regulatory compliance actions for desalination, water conservation and recycling projects that provide drought relief.
16. The Department of General Services shall, in cooperation with other state agencies, immediately implement a water use reduction plan for all state agencies and facilities. The plan shall include immediate water conservation actions and retrofit programs for state facilities. A moratorium shall be placed on all new landscaping projects at state facilities and on state highways and roads except for those that use water efficient irrigation, drought tolerant plants or non-irrigated erosion control.
17. As a condition to receiving state drought financial assistance or water transfers provided in response to this emergency, urban water suppliers in the state shall be required to implement a water shortage contingency analysis, as required by California Water Code section 10632. DWR shall offer workshops and technical assistance to any agency that has not yet prepared or implemented the water shortage contingency analysis required by California law.
18. DWR shall offer technical assistance to agricultural water suppliers and agricultural water users, including information on managing water supplies to minimize economic impacts, implementing efficient water management practices, and using technology such as the California Irrigation Management Information System (CIMIS) to get the greatest benefit from available water supplies.
19. The Department of Public Health shall evaluate the adequacy of emergency interconnections among the state's public water systems, and provide technical assistance and continued financial assistance from existing resources to improve or add interconnections.

20. DWR shall continue to monitor the state's groundwater conditions, and shall collect groundwater-level data and other relevant information from water agencies, counties, and cities. It is requested that water agencies, counties and cities cooperate with DWR by providing the information needed to comply with this Proclamation.
21. DWR and the Department of Food and Agriculture shall recommend, within 30 days from the date of this Proclamation, measures to reduce the economic impacts of the drought, including but not limited to, water transfers, through-Delta emergency transfers, water conservation measures, efficient irrigation practices, and improvements to CIMIS.
22. The Department of Boating and Waterways shall recommend, within 30 days from the date of this Proclamation, and in cooperation with the Department of Parks and Recreation, measures to reduce the impacts of the drought conditions to water-based recreation, including but not limited to, the relocation or extension of boat ramps and assistance to marina owners.
23. The Labor and Workforce Development Agency shall recommend, within 30 days from the date of this Proclamation, measures to address the impact of the drought conditions on California's labor market, including but not limited to, identifying impacted areas, providing one-stop service, assisting employers and workers facing layoffs, and providing job training and financial assistance.
24. DWR and the Department of Food and Agriculture shall be the lead agencies in working with the Federal Drought Action Team to coordinate federal and state drought response activities.
25. The emergency exemptions in Public Resources Code sections 21080(b)(3), 21080(b)(4) and 21172, and in California Code of Regulations, title 14, section 15269(c), shall apply to all actions or efforts consistent with this Proclamation that are taken to mitigate or respond to this emergency. In addition, Water Code section 13247 is suspended to allow expedited responses to this emergency that are consistent with this Proclamation. The Secretary for the California Environmental Protection Agency and the Secretary for the California Natural Resources Agency shall determine which efforts fall within these exemptions and suspension, ensuring that these exemptions and suspension serve the purposes of this Proclamation while protecting the public and the environment. The Secretaries shall maintain on their web sites a list of the actions taken in reliance on these exemptions and suspension.
26. By March 30, 2009, DWR shall provide me with an updated report on the state's drought conditions and water availability. If the emergency

conditions have not been sufficiently mitigated, I will consider issuing additional orders, which may include orders pertaining to the following:

- (a) institution of mandatory water rationing and mandatory reductions in water use;
- (a) reoperation of major reservoirs in the state to minimize impacts of the drought;
- (a) additional regulatory relief or permit streamlining as allowed under the Emergency Services Act; and
- (a) other actions necessary to prevent, remedy or mitigate the effects of the extreme drought conditions.

I FURTHER REQUEST THAT:

- 19. All urban water users immediately increase their water conservation activities in an effort to reduce their individual water use by 20 percent.
- 20. All agricultural water suppliers and agricultural water users continue to implement, and seek additional opportunities to immediately implement, appropriate efficient water management practices in order to minimize economic impacts to agriculture and make the best use of available water supplies.
- 21. Federal and local agencies also implement water use reduction plans for facilities within their control, including immediate water conservation efforts.

I FURTHER DIRECT that as soon as hereafter possible, this proclamation be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this proclamation.



IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 27th day of February, 2009.

ARNOLD SCHWARZENEGGER
Governor of California

ATTEST:
DEBRA BOWEN
Secretary of State

CALIFORNIA WATER CODE EMERGENCY PROVISIONS

Water Code Sections 350 et seq

350. The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, may declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

351. Excepting in event of a breakage or failure of a dam, pump, pipe line or conduit causing an immediate emergency, the declaration shall be made only after a public hearing at which consumers of such water supply shall have an opportunity to be heard to protest against the declaration and to present their respective needs to said governing board.

352. Notice of the time and place of hearing shall be published pursuant to Section 6061 of the Government Code at least seven days prior to the date of hearing in a newspaper printed, published, and circulated within the area in which the water supply is distributed, or if there is no such newspaper, in any newspaper printed, published, and circulated in the county in which the area is located.

353. When the governing body has so determined and declared the existence of an emergency condition of water shortage within its service area, it shall thereupon adopt such regulations and restrictions on the delivery of water and the consumption within said area of water supplied for public use as will in the sound discretion of such governing body conserve the water supply for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection.

354. After allocating and setting aside the amount of water which in the opinion of the governing body will be necessary to supply water needed for domestic use, sanitation, and fire protection, the regulations may establish priorities in the use of water for other purposes and provide for the allocation, distribution, and delivery of water for such other purposes, without discrimination between consumers using water for the same purpose or purposes.

355. The regulations and restrictions shall thereafter be and remain in full force and effect during the period of the emergency and until the supply of water available for distribution within such area has been replenished or augmented.

356. The regulations and restrictions may include the right to deny applications for new or additional service connections, and provision for their enforcement by discontinuing service to consumers wilfully violating the regulations and restrictions.

357. If the regulations and restrictions on delivery and consumption of water adopted pursuant to this chapter conflict with any law establishing the rights of individual consumers to receive either specific or proportionate amounts of the water supply available for distribution within such service area, the regulations and restrictions adopted pursuant to this chapter shall prevail over the provisions of such laws relating to water rights for the duration of the period of emergency; provided, however, that any distributor of water which is subject to regulation by the State Public Utilities Commission shall before making such regulations and restrictions effective secure the approval thereof by the Public Utilities Commission.

358. Nothing in this chapter shall be construed to prohibit or prevent review by any court of competent jurisdiction of any finding or determination by a governing board of the existence of an emergency or of regulations or restrictions adopted by such board, pursuant to this chapter, on the ground that any such action is fraudulent, arbitrary, or capricious.

359. (a) Notwithstanding any other provision of law that requires an election for the purpose of authorizing a contract with the United States, or for incurring the obligation to repay loans from the United States, and except as otherwise limited or prohibited by the California Constitution, a public water agency, as an alternative procedure to submitting the proposal to an election, upon affirmative vote of four-fifths of the members of the governing body thereof, may apply for, accept, provide for the repayment together with interest thereon, and use funds made available by the federal government pursuant to Public Law 95-18, pursuant to any other federal act subsequently enacted during 1977 that specifically provides emergency drought relief financing, or pursuant to existing federal relief programs receiving budget augmentations in 1977 for drought assistance, and may enter into contracts that are required to obtain those federal funds pursuant to the provisions of those federal acts if the following conditions exist: (1) The project is undertaken by a state, regional, or local governmental agency. (2) As a result of the severe drought now existing in many parts of the state, the agency has insufficient water supply needed to meet necessary agricultural, domestic, industrial, recreational, and fish and wildlife needs within the service area or area of jurisdiction of the agency. (3) The project will develop or conserve water before October 31, 1978, and will assist in mitigating the impacts of the drought. (4) The agency affirms that it will comply, if applicable, with Sections 1602, 1603, and 1605 of the Fish and Game Code. (5) The project

will be completed on or before the completion date, if any, required under the federal act providing the funding, but not later than March 1, 1978.

(b) Any obligation to repay loans shall be expressly limited to revenues of the system improved by the proceeds of the contract. (c) No application for federal funds pursuant to this section shall be made on or after March 1, 1978. (d) Notwithstanding the provisions of this section, a public agency shall not be exempt from any provision of law that requires the submission of a proposal to an election if a petition requesting such an election signed by 10 percent of the registered voters within the public agency is presented to the governing board within 30 days following the submission of an application for federal funds.

(e) Notwithstanding the provisions of this section, a public water agency that applied for federal funds for a project before January 1, 1978, may make application to the Director of the Drought Emergency Task Force for extension of the required completion date specified in paragraph (5) of subdivision (b). Following receipt of an application for extension, the Director of the Drought Emergency Task Force may extend the required completion date specified in paragraph (5) of subdivision (b) to a date not later than September 30, 1978, if the director finds that the project has been delayed by factors not controllable by the public water agency. If the Drought Emergency Task Force is dissolved, the Director of Water Resources shall exercise the authority vested in the Director of the Drought Emergency Task Force pursuant to this section.

(f) For the purposes of this section, “public water agency” means a city, district, agency, authority, or any other political subdivision of the state, except the state, that distributes water to the inhabitants thereof, is otherwise authorized by law to enter into contracts or agreements with the federal government for a water supply or for financing facilities for a water supply, and is otherwise required by law to submit those agreements or contracts or any other project involving long-term debt to an election within that public water agency.

Water Code Sections 71640 et seq.

71640. A district may restrict the use of district water during any emergency caused by drought, or other threatened or existing water shortage, and may prohibit the wastage of district water or the use of district water during such periods for any purpose other than household uses or such other restricted uses as the district determines to be necessary. A district may also prohibit use of district water during such periods for specific uses which it finds to be nonessential.

71641. A district may prescribe and define by ordinance the restrictions, prohibitions, and exclusions referred to in Section 71640. Such an ordinance is effective upon adoption; but, within 10 days after its adoption, the ordinance shall be published pursuant to Section 6061 of the Government Code in full in a newspaper of general circulation which is printed, published, and circulated in the district. If there is no such newspaper the ordinance shall be posted within 10 days after its adoption in three public places within the district.

71642. A finding by the board upon the existence, threat, or duration of an emergency or shortage, or upon the matter of necessity or of any other matter or condition referred to in Section 71640, shall be made by resolution or ordinance. The finding is prima facie evidence of the fact or matter so found, and such fact or matter shall be presumed to continue unchanged unless and until a contrary finding is made by the board by resolution or ordinance.

71643. The finding made by the board pursuant to Section 71642 shall be received in evidence in any civil or criminal proceeding in which it may be offered, and shall be proof and evidence of the fact or matter found until rebutted or overcome by other sufficient evidence received in such proceeding. A copy of any resolution or ordinance setting forth such finding shall, when certified by the secretary of the district, be evidence that the finding was made by the district as shown by the resolution or ordinance and certification.

71644. From and after the publication or posting of any ordinance pursuant to Section 71641, and until the ordinance has been repealed or the emergency or threatened emergency has ceased, it is a misdemeanor for any person to use or apply water received from the district contrary to or in violation of any restriction or prohibition specified in the ordinance. Upon conviction thereof such person shall be punished by imprisonment in the county jail for not more than 30 days, or by fine not exceeding six hundred dollars (\$600), or by both.

SWRCB NOTICE OF SURFACE WATER SHORTAGE FOR 2009



Linda S. Adams
Secretary for
Environmental Protection

State Water Resources Control Board



Arnold Schwarzenegger
Governor

February 26, 2009

To: Diverters of Surface Water

NOTICE OF SURFACE WATER SHORTAGE FOR 2009

After experiencing two years of drought, California's water reserves are extremely low in many parts of the state. The California water rights system is designed to provide for the orderly allocation of water supplies in the event that there is not enough water to satisfy everyone's needs. As a result, every water right holder has a priority, relative to every other water right holder. When there is insufficient water for all, water diversions must be curtailed in order of water right priority.

Current hydrologic data indicates that this year will be a dry year in your hydrologic area. In view of the current situation, the State Water Resources Control Board (State Water Board) considers it important and prudent to assume that there will **not** be sufficient surface water available during the year for those who hold water right permits, licenses, and registrations issued by the State Water Board. If water supply conditions do not improve, permit, license and registration holders may be curtailed. It may even become necessary this year in some parts of the state to curtail more senior water rights, such as riparian rights or pre-1914 rights.

If you plan to grow crops that will need water beyond the limited supply available, you may find yourself in a very serious dilemma. There is a strong possibility that your water right will be curtailed due to a lack of surface water or a low priority of right. Consequently, you should look into acquiring a firm alternate source of water, such as a well pumping from groundwater that does not require a water right permit, purchase water from someone that pumps groundwater or has a storage reservoir, or recycled wastewater. You may also be able to contract for water deliveries from a water supplier, such as the U.S. Bureau of Reclamation, the State Department of Water Resources, or a local water or irrigation district, provided that the water supplier has water to deliver to you. In view of the current situation, the State Water Board strongly encourages your immediate implementation of the enclosed conservation guidelines. Additional guidance is available for agricultural water users at the Agricultural Water Management Council's website at <http://www.agwatercouncil.org>.

If you hold a water right for domestic or municipal use, you may also need to reduce water use and seek alternate supplies. If there are no alternate supplies available, you may be required to reduce water use down to what is necessary for health and safety purposes. Guidance for urban water users is available at the California Urban Water Conservation Council's website at <http://www.cuwcc.org>.

Unless sufficient additional precipitation occurs this rainy season, no water will be available for many water diverters. It is our intent to contact you again in the near future if there is expected to be no water available for you at your water right priority. State Water Board staff is available to answer your questions at (916) 341-5300.

Sincerely,

Victoria A. Whitney
Deputy Director for Water Rights

Enclosure

California Environmental Protection Agency



Water Conservation in Irrigation: Guidelines for a Dry Year

Here are some of the conservation practices in irrigation that you can implement to cope with water shortages this year.

1. Be realistic. Adjust the planted acreage to the projected water supply, both as to its quality and quantity.
2. Be efficient. Runoff from the lower end of an irrigated field is usually reusable because its quality is only slightly degraded. If the irrigation water is usable, the runoff water should be usable. Tailwater return flow systems will allow recovery of runoff for increased efficiency of irrigation.
3. Careful land grading or smoothing of irrigation checks aids in uniform water application, thus preventing percolation losses below the root zone.
4. Long irrigation runs may cause excessive water application at the upper end and runoff at the lower end. Water can be spread more rapidly and evenly by maintaining and constructing short and narrow irrigation checks and short furrows, combined with return flow systems.
5. Plug leaks in canals, ditches, pipelines, distribution systems, etc. Replace worn orifices in nozzles or sprinkler heads.
6. If present irrigation system is inefficient, consider advantages of upgrading the present system, or changing to a more efficient system.
7. Better uniformity of distribution can be obtained when irrigating by sprinklers if high wind conditions are avoided. In some locations, this can be accomplished by irrigating during night hours.
8. Be especially careful at critical germination period on annual crops. Pre-plant irrigation is probably more essential in a dry year to reduce salinity in the seed area and store water for later use by crops than in more normal years. But, do not overdo pre-plant irrigations. Use a soil auger or other moisture meter to check for soil water supply and depth of wetting after an irrigation.
9. Match water applications closely to crop needs. Find out the amount of water to be applied to refill the soil just to the depth of rooting. In some areas, potential evapotranspiration data will be available. These can be used to estimate the rate of water use by any particular crop. Also, the soil capacity for water storage can be estimated. Then, a simplified budget procedure can be followed to determine approximate time of irrigation and amount to be applied without wasting water. Consult your Farm Advisor for specific information on your crop and soil.
10. Control weeds and cover crops. Weeds use water, too, but don't add to income or efficiency of water use.
11. Keep leaching for salinity control to the minimum dictated by crop tolerance and a realistic yield expectation for the supply of water available. Seldom does average soil salinity of a root zone build up to damaging concentrations during a one- or even two-year period.

12. Select crops and growing seasons that use less water, where possible. By combining planting dates with selected varieties, it is possible to save some water by shortening the growing season and/or avoiding high evaporative demand periods. Small grains and, to some extent, safflower will use significantly less water than summer season field crops.
13. Most crops, if supplied with less than full evapotranspiration requirements will produce less than maximum yields, although in some crops the reduction in yield is less marked than in others. Cotton, sorghum, olives, and wine or raisin grapes are crops relatively insensitive to reduced water supply. Alfalfa, corn, and pasture are examples of crops sensitive to water deficiency.
14. On tree crops and deep-rooted annuals, start the growing season with a fully wet root zone, if at all possible. Use the remaining water supply as needed to maintain crop until the supply is exhausted.
15. Plant the best land. Do not plant marginal land. If future abandonment or pulling of permanent crop acreage is being considered, perhaps now is the time to make the change.

CDPH LETTER TO PUBLIC WATER SYSTEMS

Letter to Water Systems – Drought Preparedness and Water Conservation

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TO ALL WATER SYSTEMS

Restrictions on the State Project operations, below average participation and ground water recharge year, together with an unseasonably dry spring may all contribute to a limited the yield from your ground and/or surface water supply sources. As a result you could experience difficulties in meeting normal system demands resulting in water shortages or low pressure during peak demand periods, such as those that normally occur in the late summer and early fall months.

Therefore, it is important that you closely evaluate your water supply situation and develop a contingency plan designed to mitigate any water supply problems that you may experience due to the current conditions. The following elements should be included in evaluating your system and in developing a drought contingency plan:

1. An accurate determination of the system source capacity, including ground water levels, well yields, well pumping capacities and pump bowl settings (depth to the pump's intake). The information you will need should include the following:
 - a. The depth to ground water in your wells under both pumping and non-pumping conditions: Information on the depth to ground water is a very good indicator of well capacity. Too often, water systems do not collect information on ground water depth and instead rely solely on the well's pumping capacity. As such, these systems may not be aware of impending problems due to a depletion of the ground water table over time. Systems that do not monitor the groundwater levels over their pump bowls also run the chance of ruining good pumping equipment if excessive draw down in the groundwater table results in air entering the pumping equipment. **Should water levels drop below you pump bowl settings, significant damage to pump impellers, bearings and motors is likely to result! This could result in your system being without water until a new pump can be installed and result in significant equipment and labor costs to replace "burned-out" pumps and motors!**
 - b. Well pumping capacity: If your well(s) are not currently metered, we strongly recommend that you install a totalizing flow meter as soon as possible and read and record this data on a regular basis. This can help you monitor usage and identify your degree of water loss or "unaccounted for water". Unaccounted for water is the difference between the water you produce from your sources and the amount actually delivered to customers.
 - c. Record the water levels in the system storage tanks during the various high demand periods of the day: We recommend that you monitor and record the level of the water in your storage tanks at the same time each day.

This will help you identify increasing system demand or reduced source capacity conditions that can lead to major supply problems.

- d. Repair any obvious leaks in your storage tanks and distribution system, before summer arrives! If your distribution system is over 25 years in age, consider starting a leak detection program to identify and repair leaks in your distribution system that may not be obvious, particularly unaccounted for water losses. Water that is not wasted through un-repaired leaks is water that will be available to customers when it is needed and saves the system money by lowering power consumption to pump water that is being wasted.
2. Review your past water use data during summer months and anticipated demands this summer and plan appropriately for anticipated shortages.
 3. The contingency plan suggested above should as a minimum include:
 - a. Serious water conservation measures that will help mitigate water shortage problems: If water shortages were experienced in your system last year and additional source capacity has not been brought on-line, it is imperative that conservation efforts begin immediately. Outside watering and other non-essential water use should be curtailed or restricted. Appended to this letter is an excerpt from the California Water Code, which outlines measures that can and should be taken by a utility facing water shortage problems.
 - b. A temporary or permanent interconnection to a neighboring utility that has excess production capacity: Such an interconnection should be discussed with the Department before the interconnection is made.
 - c. The development and use of emergency sources of supply with conditional approval from our Department: The ability to use surface water from a canal, lake or stream through portable treatment facilities must be evaluated. If adequate treatment cannot be provided, our Department must be contacted to help develop appropriate mitigation measures. In some cases unsafe water sources may be used provided that proper notification to all users is given advising them of the water quality being delivered and steps they can take to address the current water supply and water quality situation. This may include need to use bottled water or to adequately boil their water before drinking.

It is important that even those systems using groundwater wells that have never experienced an outage, take steps to verify water table depth and well pump settings as indicated above. If you believe your utility will be facing water shortage problems, we recommend that you issue a “Declaration of Water Shortage Emergency”, as outlined in the Water Code and notify our Department of your Contingency Plan. In the event that

Letter to Water Systems – Drought Preparedness and Water Conservation

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your system experiences a significant and prolonged water outage, you will need to contact your local County Office of Emergency Services for assistance. Assistance from either the State or Federal Emergency Services Offices can only be provided after the local Emergency Services' resources have been expended.

If you have any questions regarding this letter, please contact our office at (xxx) xxx-xxxx.

Sincerely,

District Engineer:

Table A-1 Conservation Actions and Water Use Reduction Targets of Association of California Water Agencies

Agency	Location	Voluntary Conservation	Mandatory Conservation	Drought Response ^(A)
Bella Vista WD	Redding	✓		1, 3
Browns Valley ID	Browns Valley	✓		1, 4
Calaveras County WD	San Andreas	✓		1, 3, 4, 5
California American Water Company	Sacramento	✓ (10%)		1
Calleguas MWD	Thousand Oaks	✓		1
Carlsbad	Carlsbad	✓		1, 4
Carmichael WD	Carmichael	✓		1, 4
Central Basin MWD	Commerce	✓		1, 6, 7, 8
Citrus Heights WD	Citrus Heights	✓ (5-10%)		1
City of Alhambra	Alhambra	✓		1, 3
City of Antioch	Antioch		✓ (15%)	2
City of Burbank	Burbank	✓		1, 3, 4, 5
City of Calistoga	Calistoga	✓		1
City of Carlsbad	Carlsbad		✓ (8%)	2, 4
City of Chino Hills	Chino Hills		✓	2
City of Cotati	Cotati	✓ (10%)		1
City of Delano	Delano		✓	2, 4
City of Escondido	Escondido		✓	2, 4
City of Folsom	City of Folsom	✓		1, 4
City of Fresno Water Division	Fresno		✓ (20%)	2, 4
City of Glendale	Glendale	✓		1, 3, 4
City of Glendora Water Division	Glendora		✓	2, 4
City of Healdsburg	Healdsburg	✓ (20%)		1
City of Imperial Beach	Imperial Beach	✓ (10%)		1, 3, 5
City of Long Beach Water Dept	Long Beach		✓	2, 3, 4, 5, 6, 7, 8
City of Marina Del Rey	Marina Del Rey		✓ (15%)	2, 4
City of Oceanside-Water Util. Dept	Oceanside		✓	2, 4
City of Ontario	Ontario		✓	2, 4
City of Pittsburgh	Pittsburgh		✓ (15%)	2, 3, 4, 6, 7, 8
City of Pleasant Hill	Pleasant Hill		✓	2, 4
City of Poway	Poway	✓		1, 4
City of Roseville	Roseville		✓	2, 4
City of Sacramento Utilities Dept	Sacramento	✓		1, 4
City of San Diego Water Dept	San Diego		✓	2, 3, 4, 5, 6, 7, 8
City of Santa Ana	Santa Ana	✓		1, 4
City of Santa Cruz Water Dept	Santa Cruz		✓	2, 4
City of Santa Rosa - Utilities Dept	Santa Rosa	✓ (15%)		1, 4
City of Simi Valley	Simi Valley		✓	2, 4
City of St. Helena	St. Helena	✓		1, 4
City of Stockton, Muni. Util. Distr.	Stockton	✓		1, 3, 4
City of Thousand Oaks	Thousand Oaks		✓	2, 4
City of Wasco	Wasco	✓		1, 4
City of Westminster	Westminster	✓ (10%)		1
City of Windsor	Windsor	✓ (15%)		1, 4
Coachella Valley WD	Coachella Valley	✓		1, 5, 6, 7, 8
Contra Costa WD	Concord	✓ (15%)		1, 3, 4, 6, 7, 8
Crescenta Valley WD	La Crescenta		✓	2, 4, 5
Cucamonga Valley WD	Rancho Cucamonga	✓ (5%)		1, 4, 5, 6, 7, 8
Del Paso Manor WD	Del Paso	✓		1, 5
Dublin San Ramon Services District	Dublin	✓		1, 5
East Bay MUD	Oakland		✓	2, 3, 5, 6, 7, 8
Eastern MWD	Perris	✓		1, 3, 4, 5, 6, 7, 8
El Dorado ID	Placerville	✓ (15%)		1, 6, 7, 8
El Toro WD	Laguna Hills		✓	2, 4
Elsinore Valley MWD	Lake Elsinore	✓		1, 3, 5, 6, 7, 8

Source: Association of California Water Agencies, acwa.com (as of June 23, 2009)

(A) Drought Response of Agencies:

1. Urging voluntary conservation
 2. Mandatory conservation / rationing in effect
 3. Drought surcharges / rate increases
 4. Restrictions on outdoor residential water use
 5. Tiered rate structure adopted
 6. Public conservation outreach campaign
 7. Updating / adopting drought ordinance
 8. Local water emergency / water supply shortage declared
- (B) Agricultural agency experiencing shortages

Table A-1 Conservation Actions and Water Use Reduction Targets of Association of California Water Agencies (continued)

Agency	Location	Voluntary Conservation	Mandatory Conservation	Drought Response ^(A)
Fair Oaks WD	Fair Oaks	✓		1
Fallbrook PUD	Fallbrook		✓	2, 3, 4
Helix WD	La Mesa		✓	2, 3, 4, 5, 6, 7, 8
Imperial ID	Imperial		✓	2
Inland Empire Utilities Agency	Chino Hills	✓		1, 4, 6, 7, 8
Kern County WA	Bakersfield		✓	2
Kings County WD	Hanford	✓		1
Lakeside WD	Lakeside		✓	2, 4
Las Virgenes MWD	Calabasas		✓	2, 4
Lincoln Avenue Water Co.	Altadena	✓		1
Los Angeles Co. Waterworks District	Alhambra		✓	2, 4, 6, 7, 8
Los Angeles DWP	Los Angeles		✓	2, 3, 4, 5, 6, 7, 8
Marin MWD	Corte Madera	✓		1, 6, 7, 8
Metropolitan WD of Southern Cal	Los Angeles		✓	2, 3, 6, 7, 8
Mojave WA	Apple Valley	✓		1, 6, 7, 8
Monte Vista	Montclair		✓	2, 4
Moulton Niguel WD	Laguna Niguel		✓	2, 4
Municipal WD of Orange County	Fountain Valley		✓ (10%)	2
Nevada ID	Grass Valley	✓		1
North Marin WD	Novato		✓ (25%)	2, 4
Olivenhain WD	Encinitas		✓	2, 3, 4, 5, 6, 7, 8
Orange County WD	Fountain Valley	✓		1, 3, 6, 7, 8
Orangevale Water Company	Orangevale	✓ (5-10%)		1
Otay WD	Spring Valley	✓		1, 3, 4
Padre Dam MWD	Santee		✓	2, 3, 4, 5
Rainbow MWD	Fallbrook		✓	2, 4
Ramona MWD	Ramona		✓	2, 3, 4, 6, 7, 8
Rancho California WD	Temecula		✓	2, 4, 5, 6, 7, 8,
Redwood Valley CWD	Redwood Valley		✓ (50%)	2, 4
Regional Water Authority	Citrus Heights	✓		1
Rincon del Diablo MWD	Escondido		✓	2, 4
Rio Linda/Elverta Community WD	Rio Linda	✓		1
Sacramento County Water Agency	Sacramento	✓ (10%)		1
Sacramento Suburban WD	Sacramento	✓		1, 4
San Diego County Water Authority	San Diego		✓	2, 4, 6, 7, 8
San Dieguito MWD	Encinitas		✓	2, 4, 6, 7, 8
San Francisco PUC	San Francisco	✓		1, 6, 7, 8
San Juan WD	Granite Bay	✓		1, 4
Santa Clara Valley WD	San Jose		✓ (15%)	2, 6, 7, 8
Santa Fe ID	Rancho Santa Fe		✓	2, 4
Santa Margarita WD	Mission Viejo	✓		1
Sonoma County WA	Santa Rosa	✓		1, 6, 7, 8
Soquel Creek WD	Capitola	✓ (15%)		1, 4
Sweetwater Authority	Chula Vista	✓ (10%)		1, 3, 4, 5, 6, 7, 8
Triunfo Sanitation District	Ventura	✓		1, 6, 7, 8
Vallecitos WD	San Marcos		✓	2, 4
Valley Center WD	Valley Center		✓	2, 4
Ventura Co. Watershed Prot. District	Ventura		✓	-----
Vista ID	Vista		✓	2, 4
Walnut Valley WD	Walnut	✓		1, 6, 7, 8
West Basin MWD	Carson		✓	2, 3, 5, 6, 7, 8
West Valley WD	Rialto	✓		1
Western MWD	Riverside	✓		1, 4, 6, 7, 8
Westlands	Fresno	See Footnote B		3
Yuima MWD	Pauma Valley	✓		1, 4
Zone 7 Water Agency	Livermore	✓ (10%)		1, 6, 7, 8

Source: Association of California Water Agencies, acwa.com (as of June 23, 2009)

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CALIFORNIA DEPARTMENT OF WATER RESOURCES
1416 Ninth Street, Sacramento, CA 95814

<http://www.water.ca.gov/drought/>