California Climate Watch

A monthly newsletter monitoring California climate

June 2004
http://www.calclim.dri.edu

Summary of the Month

by Bill Mork
California Department of Water Resources

The recent trend of warmer than normal months in California was interrupted in June 2004 when the mean upper level trough of low pressure near the West Coast brought an incessant onshore flow of marine air to coastal areas and kept average temperatures near to below normal in much of the State. Preliminary data show the statewide average temperature in June to be 68.7 degrees, 0.3 degree above normal. Coolest average temperatures were in the Central Coast with 0.4 degree below normal, the South Coast at 0.3 degree below normal, and the San Joaquin Valley at near normal levels. Some cities with significant departures from normal average temperatures in June include Porterville with minus 4.0 degrees, Santa Barbara Airport with minus 2.5 degrees, and San Jose with minus 2.0 degrees.

***WEATHER** continued on page 2.*

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San Diego May Grey / June Gloom

By Larry Riddle & Mary Tyree

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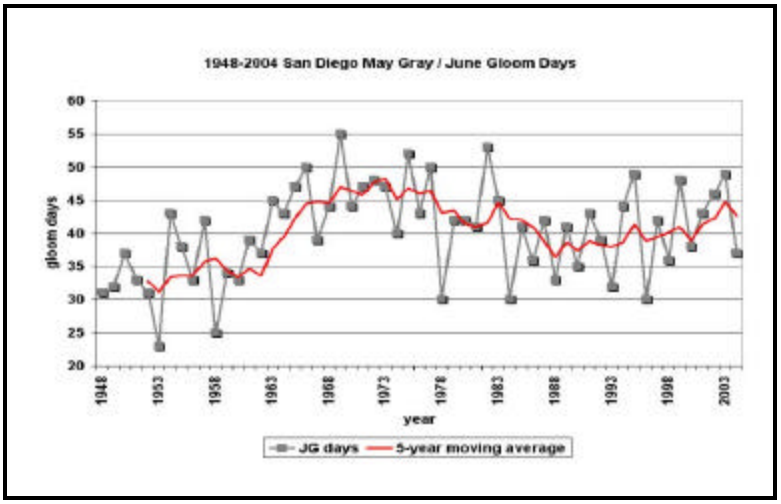
The sun-seeking know to avoid southern California beaches in the late spring and early summer. A period known to the locals as May Gray / June Gloom (hereafter referred to as JG) often darkens the coastal skies of sunny southern California with a layer of marine stratus. The cold California Current and upwelling produce a cool moist marine layer that can be drawn inland by warm air rising to the east. During JG, the coastal clouds may remain all day but often give way to some hazy afternoon sunshine.

Recently, the authors and Dan Cayan, director of the Climate Research Division at Scripps Institution of Oceanography, sought a definition for JG in San Diego. Using hourly observations from San Diego's Lindburgh Field, the mid-morning to mid-afternoon hours were examined. Since JG is a human perception phenomenon, we only looked at the daytime weather (if it is night time, nobody cares if the skies are grey). Between the hours of 8am to 3pm, a JG day was often characterized by a low ceiling of broken or overcast skies, with occasional periods of drizzle or light rain. It was determined that a JG day was one in which at least 2 of the 8 hourly observations were broken or overcast at or below 5000 feet.

The number of days during May and June that qualify as a JG day varies from year to year. The graph below shows the number of JG days for each of the years 1948 to 2004. A 5-year moving average of the number of JG days shows slightly fewer gloom days in recent years as compared to the late 1960s and early 1970s, but not as few as observed in the 1950s.



In San Diego the 2004 JG took a while to kick in. The first gloom day was May 10, but with 13 gloom days in May, more than half of the rest of the month was grey. June contributed 24 gloom days to the total, coming in at 80 percent gloom days, 20 percent more than the San Diego average of around 60 percent.

***GLOOM** continued on page 2.*

INSIDE THIS ISSUE: ENSO & Drought Outlooks, Monthly Station Data & Climate Maps

WEATHER (continued from page 1):

Much of the South Coast experienced classic "June Gloom"conditions with night and morning low clouds and only partial afternoon clearing during the month. Downtown Los Angeles had an average monthly temperature of 69.3 degrees, 1.2 degrees below normal, and had 18 days with below normal temperatures. Areas with average temps about 2 degrees above normal include the Northeast Interior and Sacramento Drainage. Cities with greatest average temperature departures from normal include plus 3.8 degrees at Burney, plus 3.7 degrees at Idyllwild, plus 3.5 degrees at Lancaster, and plus 3.0 degrees at Redding. Unusual for June was the absence of 100-degree temperatures at Riverside and San Bernardino and only one day with a high temperature of 100 degrees in Sacramento (June 15). One of the strongest marine intrusions of the month followed the heat of June 15 with wind gusts to 47 mph reported at Travis AFB near midnight on June 15.

Precipitation in June 2004 was spotty and mostly light. Statewide precipitation average was 0.1 inch, about 10 percent of normal. The only significant precipitation was from scattered showers and thunderstorms associated with upper level low pressure areas on June 8 - 9 and June 28 - 29. The first upper low brought a few inches of snow to the high Sierra with scattered showers and isolated thunderstorms in the Napa Valley and Sierra. Some Northern California totals on June 8 – 9 include 0.43 inch at Quincy, 0.37 inch at Mineral, 0.23 inch at Yreka, 0.15 inch at Napa, and 0.08 inch at Redding. In association with the second upper level low on June 28, the National Weather service reported severe thunderstorms near Bald Mountain and Red Rock in Mendocino County. Radar estimates include up to 3 inches of rain and 1.5-inch diameter hail in that area. The largest remote sensor total was 1.60 inches at Clear Creek, west of Redding, on June 28. Shasta Dam had 0.60 inch of rain on June 28. Most low elevation cities in Central and Southern California had a rainless June.

In our initial search, the only location in California with above normal precipitation in June was Susanville 2 SW with 0.54 inch, 120 percent of normal. The Northern Sierra 8-Station Precipitation Index in June picked up 0.23 inch, 23 percent of normal. At the end of the month, the Index stood at 46.8 inches, 96 percent of normal to date for the water year ending September 30. This represents 94 percent of the water year normal of 50 inches. Contrast this to Southern California which has seasonal precipitation of only 50 percent of normal. The snowpack had almost completely melted at all snow sensor sites by early June. In many basins, runoff and snowmelt were about one month ahead of average conditions. As of June 30, unimpaired water year runoff ranged from about 90 percent on the North Coast to about 30 percent of average on the South Coast. State reservoir storage peaked in May and by June 30 had dropped to 90 percent of average, about 15 percent less than a year ago.

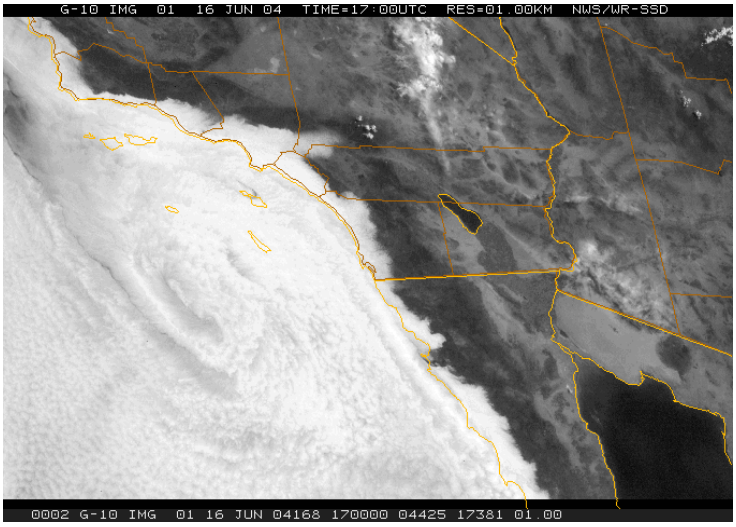
On June 3, a levee on Upper Jones Tract in the Delta broke, flooding an island. Water shipments to Southern California were temporarily curtailed, in hopes of preventing seawater intrusion toward the State and Federal pumping plants in the Delta. In addition, releases were increased at Shasta and Oroville reservoirs, sending more fresh water to the Delta in order to control salinity. High astronomical tides at the beginning of the month, along with windy conditions in the Delta, contributed to the problem by putting additional pressure on the levees. High astronomical tides were expected to occur at the beginning of July, making it even more urgent that the breach be closed quickly. The breach was closed on June 30.

Thanks to Matt Winston for contributing the last paragraph concerning the levee break.

GLOOM (continued from page 1):

Cooler ocean temperatures (La Nina conditions) usually foretell a gloomier period. Jerome Namais (1978) found feedback mechanisms between extratropical sea surface temperature anomalies (SSTAs) and the climate of the North American west coast, including influences on atmospheric flow and storm tracks. More recent studies have examined the relationships between tropical Pacific SSTAs and west coast climate. For example, Yarnal and Diaz (1986) found some correlation between El Nino Southern Oscillation extreme values and coastal California stations.

On a typical JG day, the visible satellite imagery will show marine stratus hugging the coast of southern California. June 16, 2004, was such a day and the image from 10am local time is shown below.



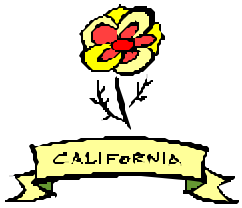
Satellite visible image, 16 June 2004 at 1700 UTC.

JG is not bad news for everyone. Resorts in Palm Springs welcome those fleeing the gray skies. Alex Willow of the Hyatt in Palm Springs says, "Customers coming out that are expecting sunny beaches and they get to southern California and find fog and coastal fog and rain can hop in a car and two hours later be in beautiful sunny Palm Springs."

References:

1. Namias, J., 1978. Persistence of U.S. seasonal temperatures up to one year. Monthly Weather Review, **106**, 1557-1567.

2. Yarnal, B. and H.F. Diaz, 1986. Relationships between extremes of the Southern Oscillation and the winter climate of the Anglo-American Pacific coast. Journal of Climatology, **6**, 197-219.



Climate Forecasts & Outlooks

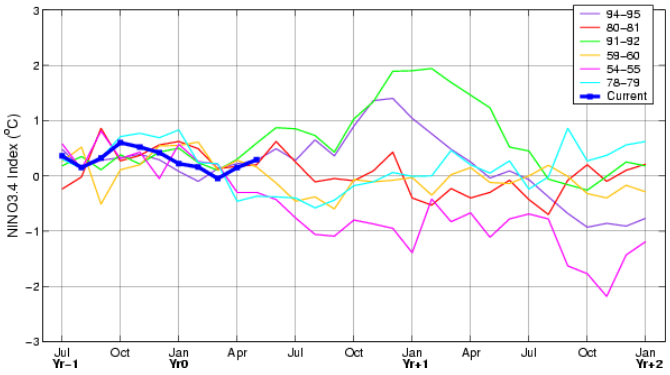
ENSO July forecast:

Near-neutral ENSO conditions are prevailing in the tropical Pacific. Forecasts call for continued neutral conditions for the rest of the year.

Summary of June 2004 ENSO Forecast

Forecast Period:	Oct. 2004 – Dec. 2004
Probability of El Niño	0 – 50 – 100 (low – medium – high)
Probability of La Niña	0 – 50 – 100 (low – medium – high)
Probable Magnitude of Event	(not applicable)

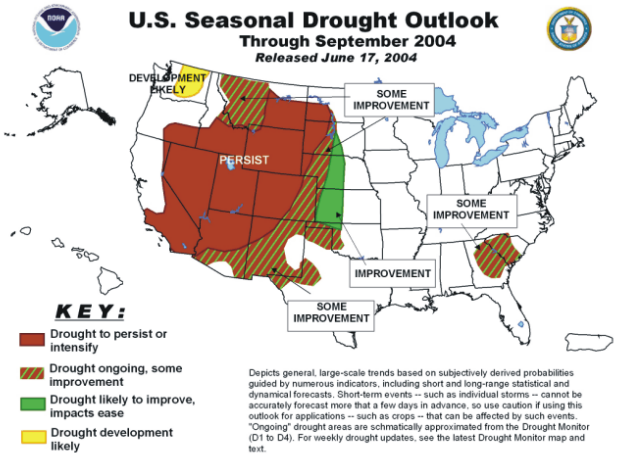
Current Condition vs. Similar Conditions



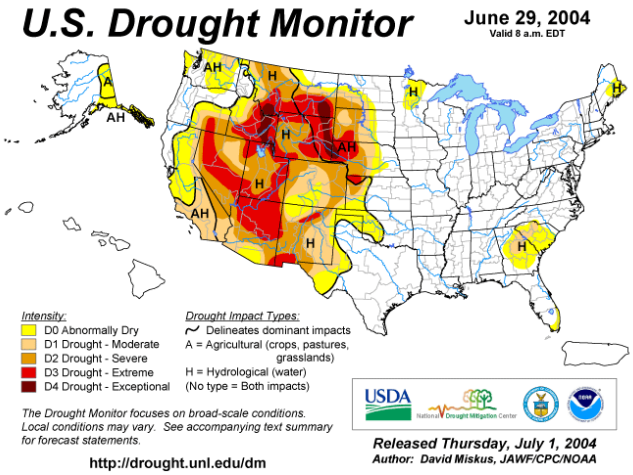
Credit: IRI/Columbia Univ.
http://iri.columbia.edu/climate/ENSO/currentinfo/QuickLook.html

Drought conditions:

Drought conditions are persisting in southern regions, now classified as "moderate" in the *Drought Monitor*. The dry pattern is forecast to continue through September.



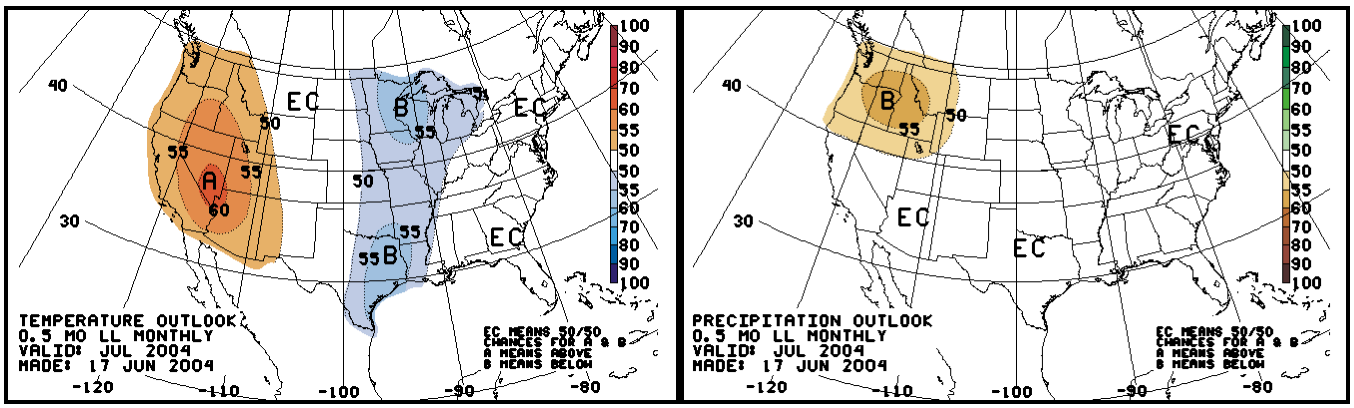
Credit: CPC/NCEP



http://www.drought.unl.edu/dm/monitor.html

Temperature and Precipitation Outlooks:

The Climate Prediction Center's July monthly forecast predicts above normal temperatures across the Golden State, with the highest probabilities in the eastern and southeastern regions. Precipitation is expected to be near normal for California, with the exception of the northern tier. Below normal precipitation is anticipated in this area.



Credit: Climate Prediction Center, http://www.cpc.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html

June Station Data

All data is provisional and subject to change.

Station Name/ Climate Division	TA	DA	TX	DX	MGX	TN	DN	MGN	PMO	PDP	PCT	MGP
North Coast	**64.3**	**0.4**	**77.6**	**0.5**	**1.0**	**51.0**	**0.4**	**1.0**	**0.1**	**-0.3**	**26.5**	**0.6**
Eureka	58.1	1.8	64.3	2.5	2	51.8	1.1	2	0.06	-0.59	9	0
Kentfield	64.6	-2.3	76.7	-5.1	0	52.5	0.5	0	0.00	-0.24	0	0
Napa State Hosp	66.8	0.3	80.1	-0.4	0	53.6	1.0	0	0.15	-0.01	94	0
Santa Rosa	65.8	-0.2	81.7	1.8	1	49.9	-2.2	1	0.01	-0.18	5	1
Yreka	66.4	2.6	85.4	3.9	2	47.4	1.4	2	0.23	-0.72	24	2
Sacram. Drainage	**68.3**	**1.9**	**84.0**	**1.7**	**1.6**	**52.5**	**2.2**	**1.6**	**0.2**	**-0.5**	**21.5**	**1.6**
Alturas	61.2	2.0	79.9	1.3	1	42.4	2.6	1	0.23	-0.56	29	1
Adin Ranger Stn	62.1	1.6	79.8	3.4	1	44.4	-0.2	1	0.60	-0.40	60	1
Blue Canyon	63.1	2.3	70.2	0.5	0	56.0	4.0	0	0.00	-0.88	0	0
Burney	63.5	3.8	82.2	1.9	6	44.9	5.7	6	0.13	-0.63	17	6
Dunsmuir Treatme	67.6	2.8	85.0	2.8	3	50.1	2.7	3	0.24	-0.75	24	3
Marysville	74.6	-0.3	90.6	-0.1	0	58.5	-0.5	0	0.00	-0.25	0	0
Mineral	56.8	1.7	74.3	2.9	7	39.3	0.4	7	0.37	-1.12	25	7
Mt. Shasta	63.0	2.8	78.3	2.8	0	47.6	2.7	0	0.12	-0.87	12	0
Quincy	64.5	1.9	83.6	0.2	2	45.4	3.7	2	0.44	-0.27	62	2
Redding	78.2	3.0	92.9	2.2	0	63.6	4.0	0	0.11	-0.58	16	0
Red Bluff FSS	77.4	1.3	92.0	1.3	0	62.8	1.4	0	0.00	-0.44	0	0
Sacramento AP	72.4	0.9	88.0	0.6	0	56.9	1.4	0	0.00	-0.20	0	0
Sacramento City	74.4	0.8	89.6	0.8	0	59.2	0.8	0	0.00	-0.18	0	0
Shasta Dam	77.0	2.6	89.6	3.1	2	64.3	2.1	2	0.70	-0.55	56	2
Northeast Interior	**58.4**	**2.0**	**76.9**	**2.2**	**4.0**	**39.9**	**1.7**	**4.0**	**0.4**	**-0.2**	**79.4**	**2.0**
Bodie	52.4	2.3	73.1	3.5	5	31.7	1.0	5	0.31	-0.49	39	0
Susanville 2 SW	64.3	1.6	80.6	0.9	3	48.1	2.4	3	0.54	0.09	120	4
Central Coast	**64.1**	**-0.4**	**75.2**	**-1.5**	**0.7**	**53.1**	**0.6**	**0.7**	**0.0**	**-0.1**	**0.0**	**0.2**
Gilroy	68.8	-0.3	83.3	-0.9	0	54.4	0.4	0	0.00	-0.10	0	0
Hollister	63.8	-0.6	78.2	-0.5	0	49.4	-0.7	0	0.00	-0.05	0	0
King City	66.1	-0.5	82.5	-0.5	2	49.8	-0.5	2	0.00	-0.07	0	1
Oakland Museum	62.4	-1.3	69.9	-1.7	3	54.8	-0.9	3	0.00	-0.11	0	0
Paso Robles AP	69.5	0.1	87.7	-1.1	0	51.2	1.2	0	0.00	-0.02	0	0
Redwood City	64.6	-1.1	74.9	-3.8	3	54.4	1.7	3	0.00	-0.10	0	0
Richmond	63.5	1.4	72.0	1.3	0	55.1	1.5	0	0.00	-0.17	0	0
Salinas AP	61.7	0.0	69.3	-1.2	0	54.0	1.2	0	0.00	-0.09	0	0
San Fran MD	59.3	-1.1	65.5	-2.2	0	53.2	0.0	0	0.00	-0.13	0	0
San Francisco AP	61.7	0.3	68.9	-1.0	0	54.4	1.5	0	0.00	-0.11	0	0
San Jose	66.6	-2.0	77.3	-4.5	0	55.8	0.4	0	0.00	-0.10	0	0
San Luis Obispo	63.8	-0.3	76.1	-1.5	1	51.5	0.9	1	0.00	-0.09	0	1
Santa Cruz	61.8	-0.4	71.7	-2.3	0	51.9	1.5	0	0.00	-0.18	0	0
San Joaquin	**70.8**	**0.0**	**86.8**	**0.3**	**2.2**	**54.7**	**-0.2**	**2.2**	**0.0**	**-0.3**	**1.4**	**2.3**
Bakersfield	77.2	-0.4	90.6	-1.0	0	63.9	0.2	0	0.00	-0.12	0	0
Fresno	77.2	1.1	92.1	1.2	0	62.2	1.0	0	0.03	-0.20	13	0
Glennville	64.9	1.5	82.7	0.0	2	47.1	3.1	2	0.00	-0.14	0	4
Hanford 1 S	75.5	0.5	91.3	0.6	2	59.7	0.5	2	0.00	-0.08	0	2
Lodgepole	55.5	2.1	70.0	1.8	2	41.0	2.4	2	0.00	-0.66	0	2
Madera	73.5	-1.2	91.2	0.2	2	55.7	-2.8	2	0.00	-0.11	0	2
Porterville	73.8	-4.0	90.2	-3.0	2	57.2	-5.1	2	0.00	-0.11	0	2
Stockton WSO	72.4	-0.8	89.0	0.1	0	55.9	-1.6	0	0.00	-0.09	0	0
Yosemite	67.0	1.3	84.0	2.4	10	50.0	0.2	10	0.00	-0.79	0	9

Station Name/ Climate Division	TA	DA	TX	DX	MGX	TN	DN	MGN	PMO	PDP	PCT	MGP
South Coast	**66.5**	**-0.3**	**76.0**	**-1.9**	**2.3**	**57.1**	**1.2**	**2.3**	**0.0**	**-0.1**	**4.9**	**2.3**
Alpine	67.7	-1.6	79.6	-3.4	7	55.9	0.3	7	0.00	-0.20	0	7
Anaheim	69.9	0.5	77.4	-1.6	1	62.4	2.6	1	0.00	-0.09	0	1
Big Bear Lake	60.9	2.5	79.2	3.6	7	42.6	1.5	7	0.05	-0.13	28	7
Burbank	69.5	-1.3	78.4	-4.8	0	60.6	2.3	0	0.00	-0.12	0	0
Campo	63.7	-2.3	83.1	-4.2	2	44.2	-0.5	2	0.00	-0.09	0	2
Culver City	67.5	-0.5	73.3	-3.8	3	61.7	2.9	3	0.00	-0.04	0	3
El Cajon	69.0	-1.2	78.9	-3.1	9	59.1	0.6	9	0.00	-0.06	0	9
Escondido 2	68.9	-1.8	79.7	-3.9	9	58.1	0.2	9	0.00	-0.11	0	9
Idyllwild Fire D	64.5	3.7	81.1	3.3	6	47.9	4.2	6	0.00	-0.23	0	6
Lompoc	61.1	-1.5	69.4	-4.3	0	52.9	1.4	0	0.00	-0.04	0	0
Long Beach AP	68.5	-1.3	74.5	-3.8	0	62.5	1.2	0	0.00	-0.08	0	0
Los Angeles/USC	69.3	-1.2	76.3	-3.2	0	62.3	0.9	0	0.00	-0.06	0	0
Los Angeles AP	66.8	0.4	71.7	-0.9	0	61.9	1.8	0	0.00	-0.08	0	0
Mt Wilson No 2	68.0	1.2	78.2	1.2	0	57.8	1.1	0	0.00	-0.26	0	0
Riverside Citrus	71.8	-0.2	85.6	-1.7	0	58.1	1.2	0	0.00	-0.10	0	0
Newport Beach Ha	65.4	1.1	68.2	-0.2	0	62.6	2.4	0	0.00	-0.08	0	0
San Diego AP	67.7	0.3	71.0	-1.2	0	64.4	1.8	0	0.00	-0.09	0	0
Sandberg WSMO	66.5	-0.5	77.3	-0.4	0	55.8	-0.5	0	0.00	-0.07	0	0
Santa Ana Fire S	69.1	-0.2	77.4	-1.3	1	60.8	0.9	1	0.00	-0.11	0	0
Santa Barbara AP	61.7	-2.5	69.9	-4.5	0	53.4	-0.5	0	0.03	-0.02	60	0
Santa Maria AP	60.3	-0.6	70.0	-1.4	0	50.6	0.2	0	0.01	-0.04	20	0
UCLA	65.6	-0.7	71.4	-1.8	6	59.8	0.5	6	0.00	-0.11	0	6
Southeast Desert	**83.6**	**0.5**	**100.4**	**0.4**	**0.3**	**66.8**	**0.5**	**0.3**	**0.0**	**0.0**	**6.5**	**0.4**
Bishop	72.4	1.3	93.4	1.9	0	51.3	0.6	0	0.11	-0.10	52	1
Blythe	88.0	-0.4	103.8	-0.3	0	72.1	-0.5	0	0.00	-0.01	0	0
Daggett AP	84.9	2.9	100.5	1.8	0	69.2	3.9	0	0.00	-0.11	0	0
Imperial	85.3	0.3	102.6	0.8	0	68.0	-0.2	0	0.00	0.00	n/a	0
Lancaster	78.3	3.5	92.9	3.8	0	63.7	3.3	0	0.00	-0.05	0	0
Needles AP	91.1	0.8	104.6	-0.2	0	77.5	1.7	0	0.00	-0.04	0	0
Palm Springs	86.4	-0.4	101.5	-2.5	3	71.4	1.8	3	0.00	-0.05	0	3
Thermal AP	84.8	-1.9	101.5	-2.8	0	68.1	-1.0	0	0.00	-0.02	0	0
Twentynine Palms	81.5	-1.7	102.8	1.5	0	60.3	-4.8	0	0.00	-0.01	0	0
Statewide	**68.7**	**0.3**	**81.8**	**-0.3**	**1.6**	**55.5**	**1.0**	**1.6**	**0.1**	**-0.2**	**10.5**	**1.4**

All data is provisional and subject to change.

Normal period is 1971-2000.

KEY:

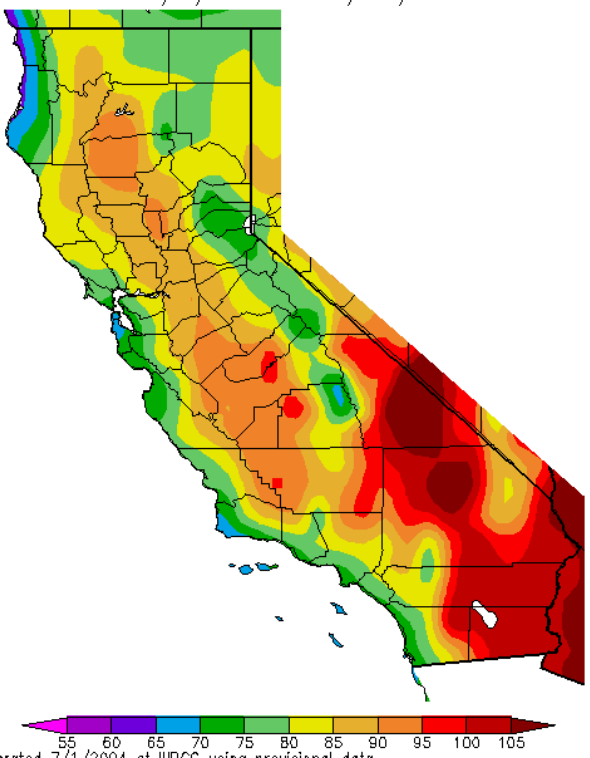
TA = average temperature in Fahrenheit
DA = average temperature departure from normal in Fahrenheit
TX = average maximum temperature in Fahrenheit
DX = average maximum temperature departure in Fahrenheit
MGX = number of missing daily max temperature values
TN = average minimum temperature in Fahrenheit
DN = average minimum temperature departure in Fahrenheit
MGN = number of missing daily min temperature values
MGP = number of missing daily precipitation values
PMO = total monthly precipitation in inches
PDP = monthly precipitation departure from normal in inches
PCT = monthly precipitation percent of normal

Fire Forecast

With continuing long-term drought in southern California, fire risk is "high" with lower than normal fuel moisture. Available fuels from timber and brush mortality are also above normal. Warm temperatures and the typical lack of precipitation in July will keep fire risk at "high" levels for the month. Conditions are more favorable in inland areas for fire than coastal areas. The fire forecast for northern California calls for normal to above normal fire potential. The dry and hot weather that traditionally occurs in the month of July will increase fire risk in the region. The Geographic Area Coordination Center expects about 277 fires in July. During the current fire season so far there have been 1197 fires that burned 4749 acres in the region.

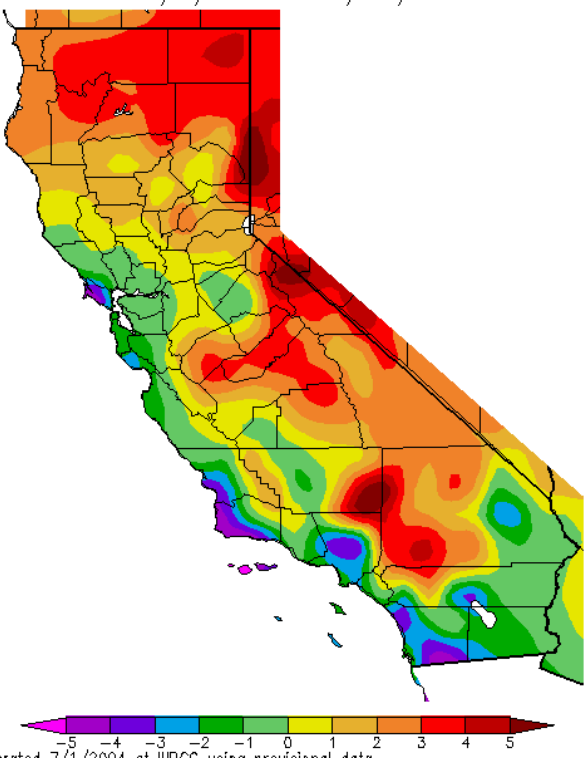
Climate Maps for June

Av. Max. Temperature (deg. F)
6/1/2004 – 6/30/2004



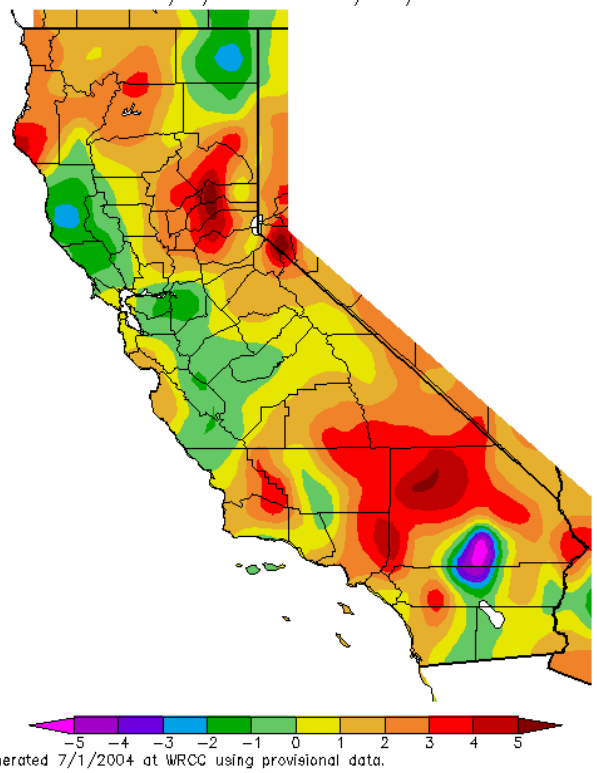
Generated 7/1/2004 at WRCC using provisional data.
NOAA Regional Climate Centers

Av. Max. Temperature dep from Ave (deg F)
6/1/2004 – 6/30/2004



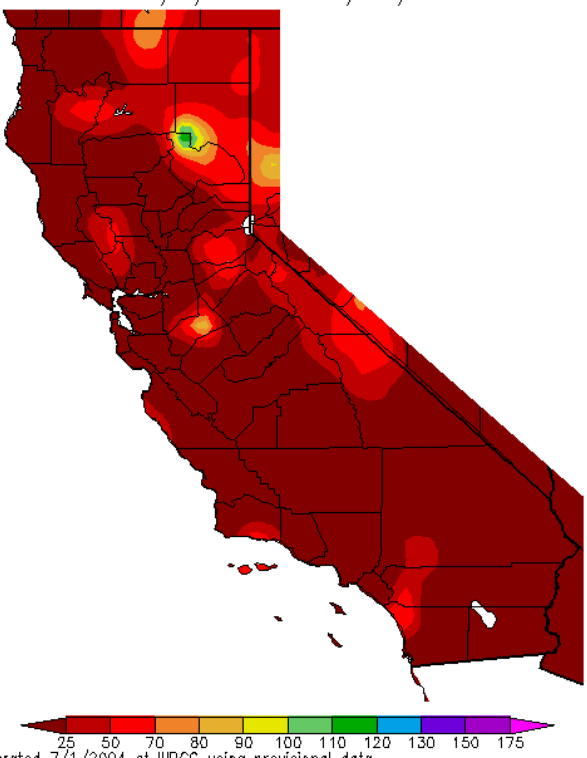
Generated 7/1/2004 at WRCC using provisional data.
NOAA Regional Climate Centers

Av. Min. Temperature dep from Ave (deg. F)
6/1/2004 – 6/30/2004



Generated 7/1/2004 at WRCC using provisional data.
NOAA Regional Climate Centers

Percent of Average Precipitation (%)
6/1/2004 – 6/30/2004



Generated 7/1/2004 at WRCC using provisional data.
NOAA Regional Climate Centers