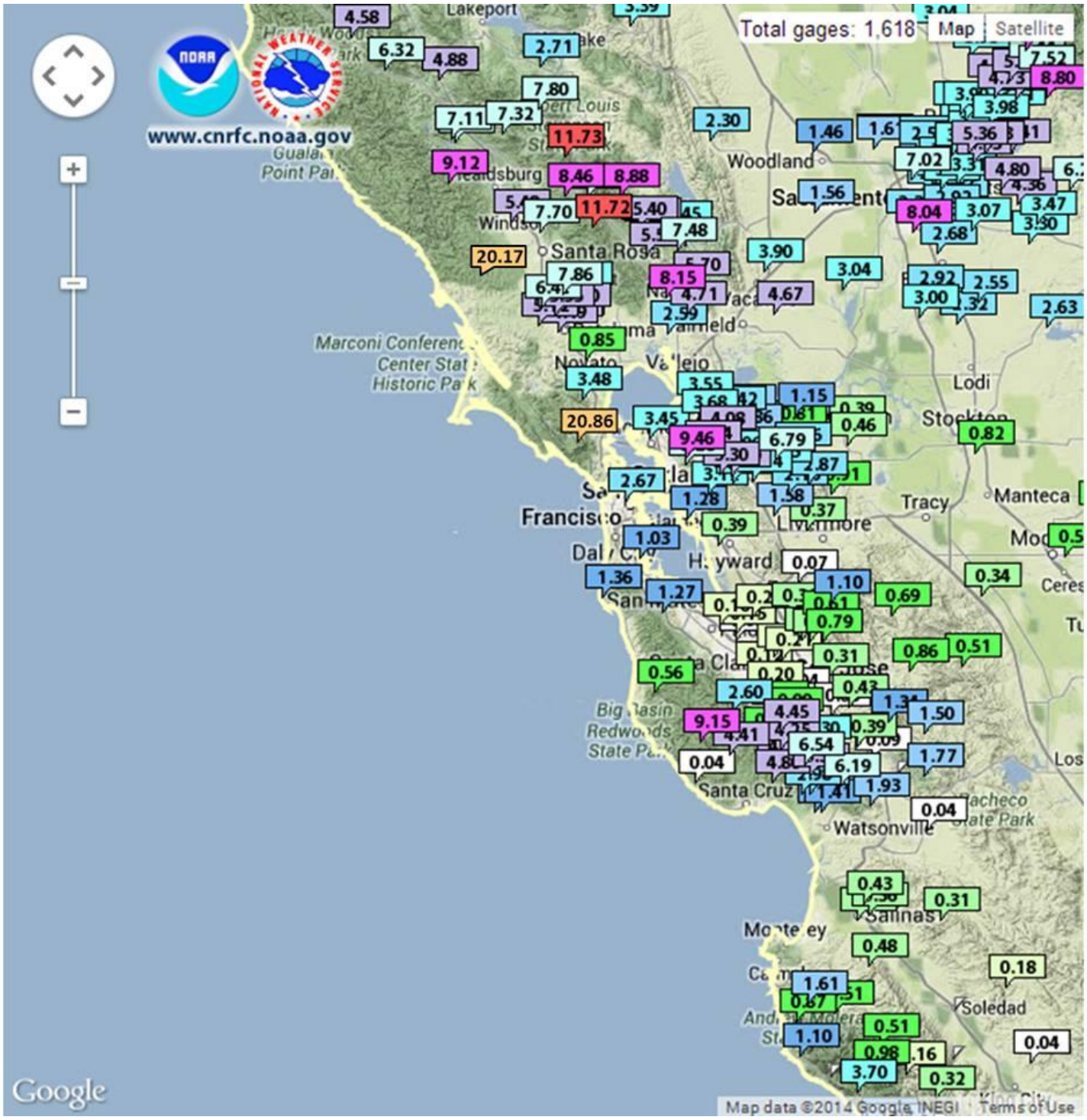
February 2014 Regional Climate Summary

For the San Francisco Bay Area and Monterey Bay Area

Much needed rainfall occurred across the San Francisco Bay Area and Monterey Bay area during February 2014. Prior to February, California had endured several consecutive months of dry weather with much below normal rainfall. By the end of January, season-to-date rainfall totals (since July 1st) across the San Francisco and Monterey Bay Areas were as low as 10 percent of normal and drought conditions were classified as either "extreme" or "exceptional" across the entire region. A relatively wet February provided relief to parched California farms and cities, and marginally eased drought conditions. Rain fell on several days during February with measurable rainfall occurring on anywhere from 10 to 13 days at climate stations throughout the region. But the bulk of the precipitation occurred during two storm events, the first from February 6 to 9 and the second from February 26 to March 1.

The first rainfall of February occurred on Sunday February 2 (Groundhog Day). Rainfall with this storm system was light to moderate with most locations picking up between 0.25 and 0.75 inches. Local rainfall amounts of up to 1 inch or greater were observed, mainly in the coastal hills.

The first major rain event of the month occurred from February 6 through 9. This event actually consisted of two individual storm systems. The first rolled through the area from north to south on Thursday February 6 and dropped relatively uniform rainfall amounts across the region. Rain totals on the 6th generally ranged from one-half inch to one inch, with lesser amounts in some of the sheltered inland valleys and greater amounts in the coastal hills. Big Sur Station picked up the most rainfall with 2.14 inches. The second, and much wetter, storm system produced impressive rainfall totals from Friday evening February 7 through Sunday March 9, primarily across the North Bay. One of the key reasons this storm produced locally very high rainfall amounts is that it tapped into a plume of very moist air from the subtropics called an atmospheric river (also known as a "Pineapple Express"). Local rain totals in excess of 20 inches were observed in the North Bay during this event. The graphic below shows rainfall totals from Friday through Sunday morning.



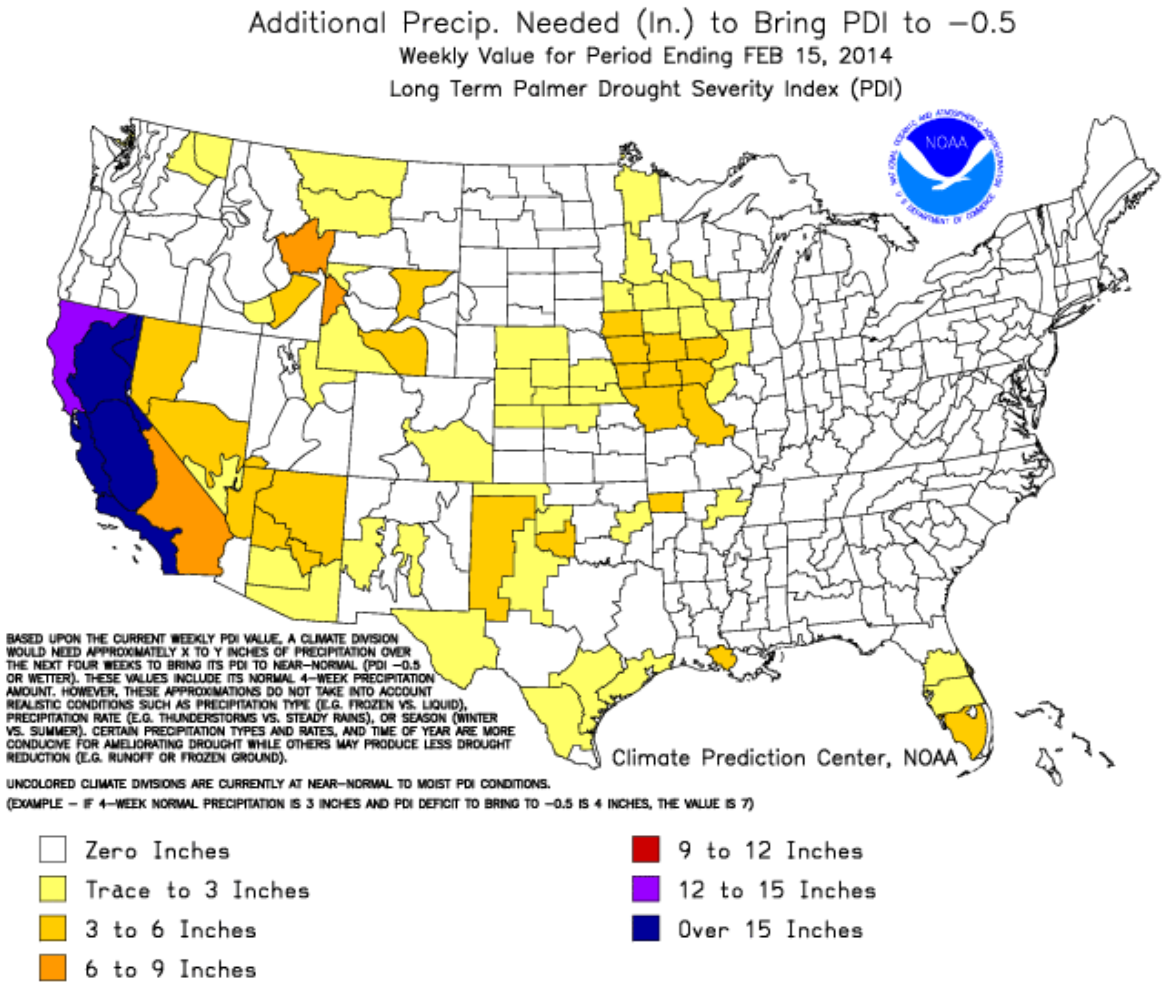
Rainfall totals from Friday, February 7 through Sunday, February 9.

A complete summary for the February 6-9 rain event can be found at the following link:

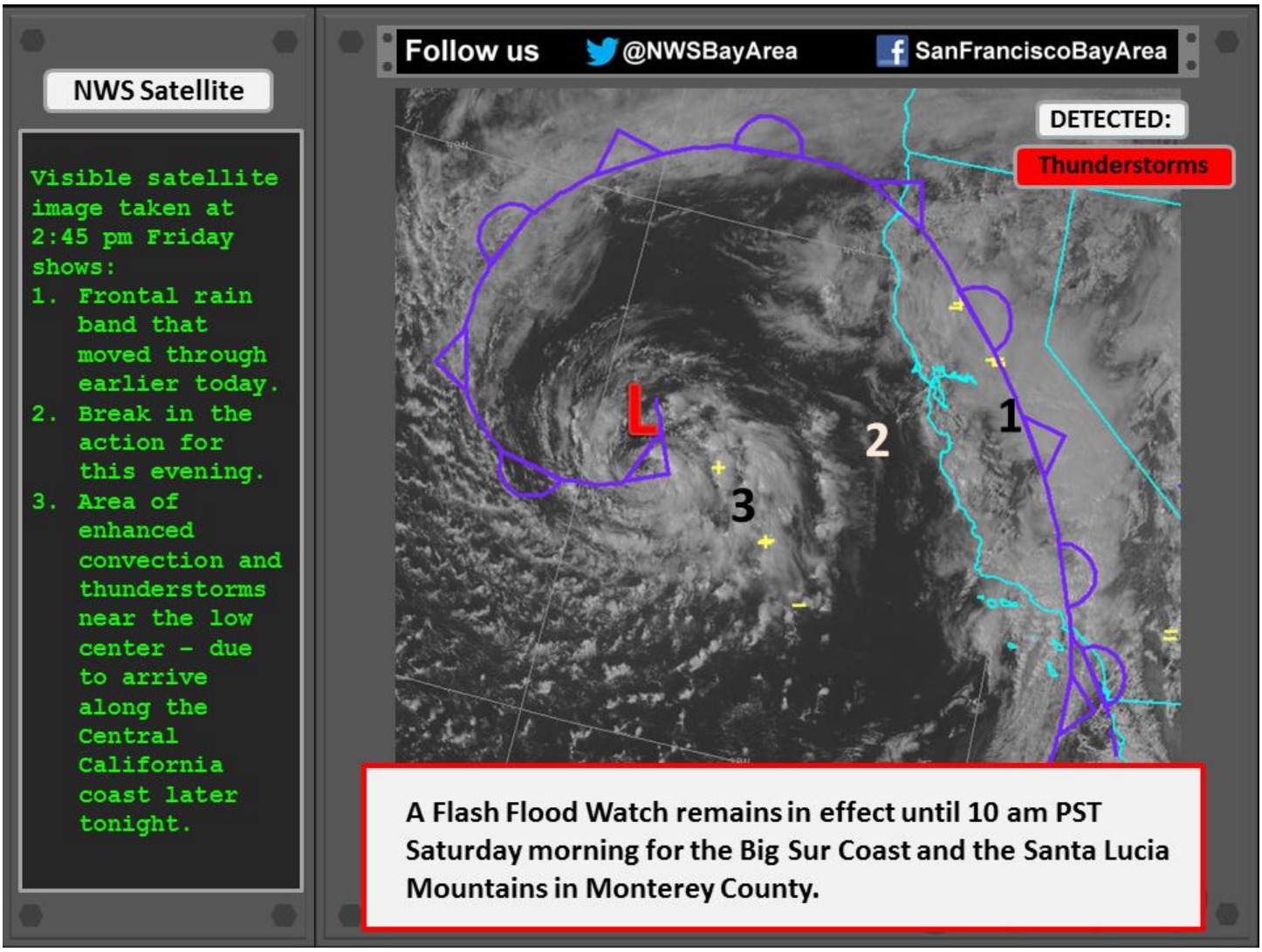
http://www.wrh.noaa.gov/mtr/stormSummary/Rain_2_6-9_2014/rain_06_8_14.php

A couple of weak weather systems brought very light rain amounts to the region around the middle of the month, but for the most part the period of time between the February 11 and 25 was dry with above normal temperatures.

Heavy rain across the northern portion of our area early in the month provided some drought relief. On February 11, the US Drought Monitor update showed an easing of drought conditions across the North Bay, with the drought classification there improving from category D3 (extreme) to D2 (severe). However, on February 15, the Climate Prediction Center (CPC) released a graphic which showed just how precipitation deficient California remained. The graphic (shown below) shows how much rainfall would have been needed over the next four weeks to bring the Palmer Drought Severity Index (PDI) back to near normal. According to this graphic, the North Bay would need 12 to 15 inches, while the rest of the region would require more than 15 inches of rain in four weeks just to reach near normal PDI values.

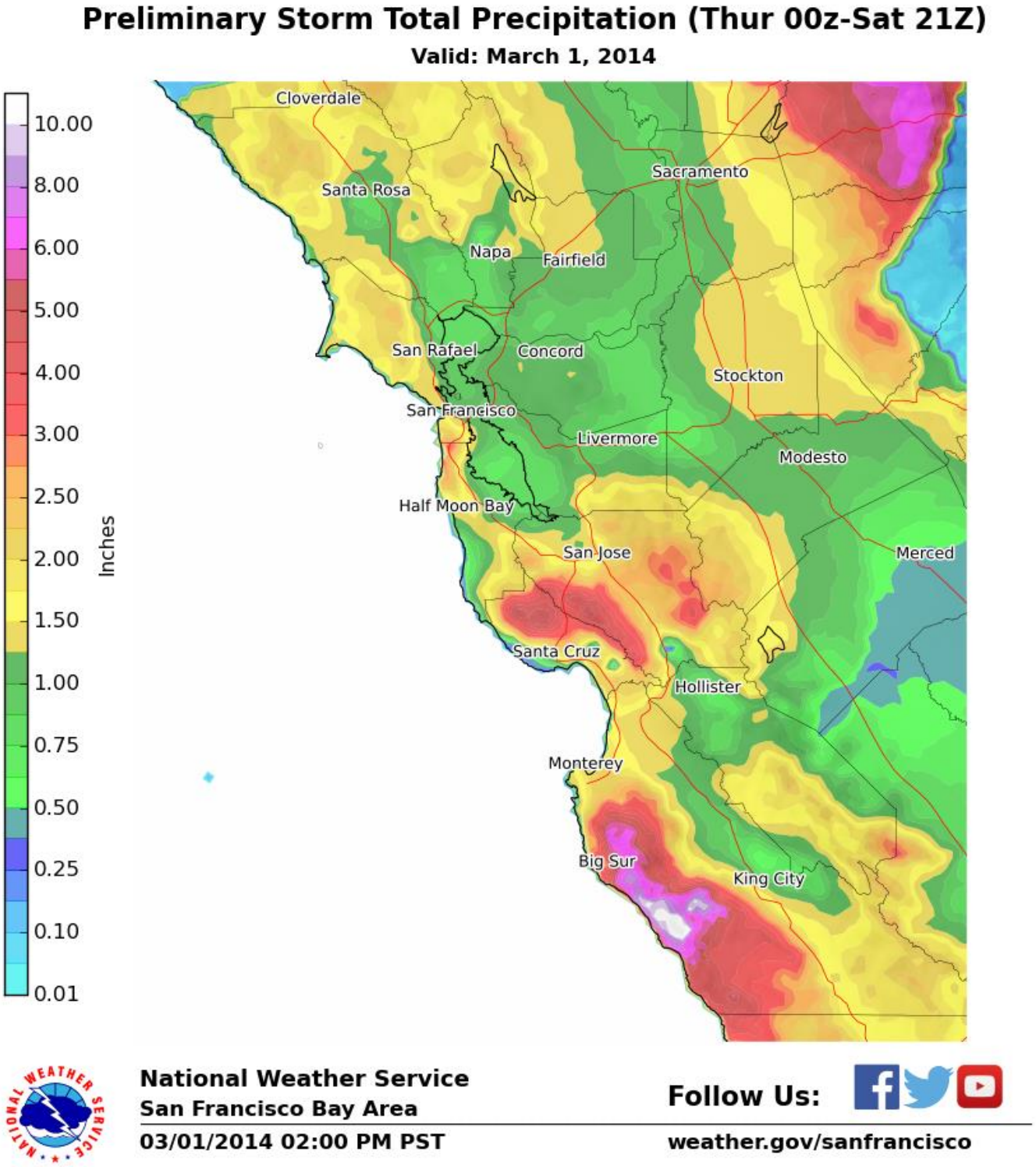


A portion of the continuing large rainfall deficiency was made up late in the month. An intense cyclone, or low pressure system, developed off the California coast late in February, and produced periods of heavy rain, flooding, thunderstorms, damaging winds, small hail and high surf across the region from Wednesday February 26 through Sunday, March 1. Several beautiful satellite images of this storm system circulated online during the event, including a visible satellite image that was part of a social media posting by the NWS San Francisco Bay Area Forecast Office on the afternoon of Friday, February 28. That Facebook posting is included below:



Social media graphic posted on the afternoon of Friday, February 28

Unlike the big rain event in early February which was mostly focused across the North Bay, the rain event at the end of the month produced the heaviest rainfall totals across the southern part of our forecast area. As much as ten inches of rain was observed across portions of the Santa Lucia Mountains in Monterey County. The image below depicts rainfall totals across the region from Wednesday afternoon (February 26) through midday Saturday (March 1):



A complete storm summary for the February 26 – March 1 storm event can be found at the following link:

http://www.wrh.noaa.gov/mtr/stormSummary/Rain_2_28_2014/rain_2_28_2014.php

Rainfall totals for the entire month of February were mostly above normal. The North Bay fared the best with all locations receiving above normal rainfall and some picking up more than twice their average February total. The remainder of the San Francisco Bay Area was a mixed bag, with some locations accumulating slightly higher than normal rainfall totals for the month, and some slightly less than normal. Those locations with below normal February rainfall are all located south of the Bay Bridge. Rainfall totals at climate stations in the Monterey Bay area either matched or exceeded their February normals.

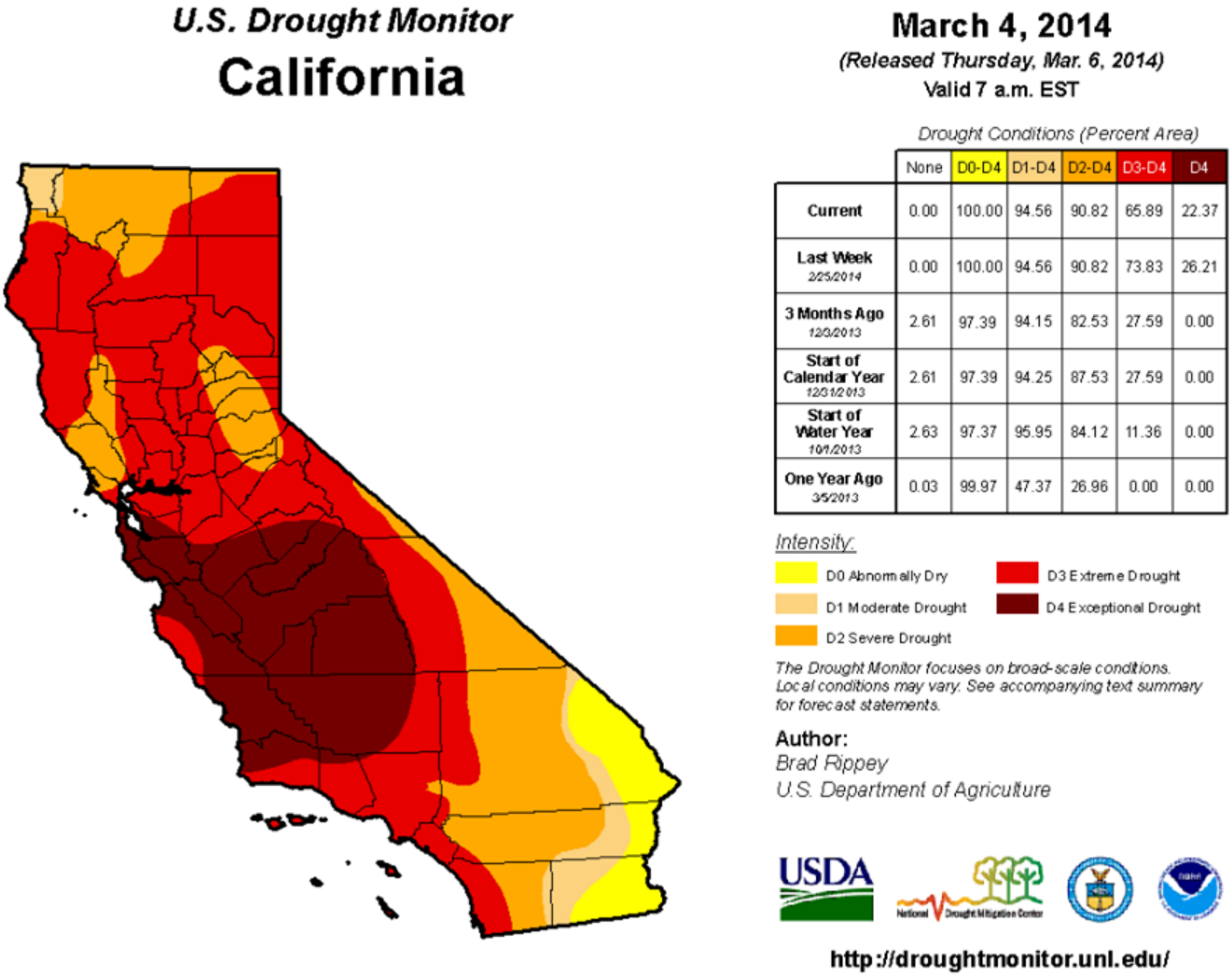
By February 28, year-to-date (YTD) rain totals for the rain year that began on July 1, 2013, were generally 30 to 50 percent of normal, and as high 65 percent of normal in the North Bay. This was a significant improvement over YTD totals at the end of January when most climate stations were only 10 to 20 percent of normal.

February Regional Precipitation Summary:

Location	February Rainfall	Normal Feb Rainfall	Percent of Normal
North Bay			
Angwin	13.36	7.75	172
Calistoga	10.12	7.79	130
Cloverdale	11.84	7.80	152
Kentfield	16.41	9.12	180
Muir Woods	14.27	7.06	202
Napa	10.91	5.35	204
Napa Airport	4.68	3.79	123
Occidental	21.18	9.95	213
Petaluma Airport	9.60	5.32	180
San Rafael	9.22	7.10	130
Sonoma County Airport	9.34	6.40	146
Sonoma	8.90	5.95	150
San Francisco Peninsula			
Half Moon Bay	3.36	5.19	65
Redwood City	3.59	3.96	91
San Francisco Airport	3.76	4.06	93
San Francisco Downtown	5.82	4.46	130
Woodside	6.65	6.03	110
East Bay			
Concord	4.58	3.70	124
Concord Airport	4.49	3.34	134
Fremont	2.51	3.17	79
Hayward Airport	2.37	3.47	68
Livermore	2.58	2.88	90
Livermore Airport	2.54	3.03	84
Martinez	4.99	3.91	128
Mount Diablo Junction	6.55	4.62	142
Newark	2.75	2.92	94
Oakland	4.64	4.50	103
Oakland Airport	3.66	3.95	93
Richmond	5.79	4.80	121

South Bay & Santa Cruz County			
Ben Lomond	12.51	9.90	126
Gilroy	4.45	4.13	108
Moffett Federal Airfield	2.76	3.07	90
Mount Hamilton	4.68	4.46	105
San Jose	2.65	3.11	85
Santa Cruz	7.19	6.24	115
Watsonville	4.74	4.68	101
Watsonville Airport	4.70	4.24	111
Monterey and San Benito Counties			
Carmel Valley	4.48	3.89	115
King City	2.82	2.51	112
Monterey	3.92	3.92	100
Monterey Airport	3.73	3.07	121
Pinnacles National Park	3.39	3.38	100
Salinas	4.18	2.98	140
Salinas Airport	3.08	2.49	124

By early March, an update to the U.S. Drought Monitor showed slight improvement across western Monterey county, where the drought classification went from D4 (exceptional) to D3 (severe). See graphic below:



Temperatures for the month of February were slightly above normal at most climate stations, mostly due to the period of mild weather from the 13th through the 24th. Average nighttime low temperatures were above normal across the board, due to several nights with cloud cover.

February Regional Temperature Summary

Location	Average High	Normal High	Departure from Normal	Average Low	Normal Low	Departure from Normal
North Bay						
Angwin	56.2	56.2	0.0	41.6	39.8	1.8
Calistoga	62.6	62.9	-0.3	41.1	39.0	2.1
Cloverdale	64.5	62.2	2.3	43.0	41.2	1.8
Kentfield	62.0	59.9	2.1	44.5	43.2	1.3
Napa	63.9	62.2	1.7	44.4	41.9	2.5
Napa Airport	60.8	59.6	1.2	41.9	38.6	3.3
Occidental	58.3	57.7	0.6	43.0	42.8	0.2
Petaluma Airport	62.0	61.6	0.4	43.2	40.9	2.3
Saint Helena		62.0			40.8	
San Rafael	64.0	58.8	5.2	47.5	43.8	3.7
Sonoma County Airport	61.4	60.5	0.9	42.1	39.1	3.0
Sonoma	62.4	61.5	0.9	41.4	39.9	1.5
San Francisco Peninsula						
Half Moon Bay	58.4	60.0	-1.6	44.3	42.2	2.1
Redwood City	62.1	61.6	0.5	44.7	42.7	2.0
San Francisco Airport	60.9	59.5	1.4	48.9	46.3	2.6
San Francisco Downtown	59.5	60.2	-0.7	49.4	47.5	1.9
Woodside	65.8	64.3	1.5	41.7	39.3	2.4
East Bay						
Concord	63.8	62.1	1.7	46.7	43.8	2.9
Concord Airport	62.6	61.0	1.6	44.4	42.8	1.6
Fremont	62.6	61.6	1.0	46.1	44.3	1.8
Hayward Airport	60.6	60.2	0.4	46.4	45.3	1.1
Livermore	63.8	61.0	2.8	42.6	41.5	1.1
Livermore Airport	64.7	60.4	4.3	43.1	40.4	2.7
Martinez	61.8	60.9	0.9	42.5	38.1	4.4
Mount Diablo Junction	56.0	56.6	-0.6	44.0	40.3	3.7
Newark	61.5	61.1	0.4	47.2	45.2	2.0
Oakland	62.8	61.6	1.2	48.4	46.8	1.6
Oakland Airport	61.2	59.9	1.3	46.3	44.2	2.1
South Bay and Santa Cruz County						
Gilroy	66.2	64.3	3.6	43.0	40.9	2.1
Los Gatos	62.6	61.5	1.1	42.2	41.0	1.2
Moffett Federal Airfield	63.4	61.8	1.6	47.5	45.3	2.2
Mount Hamilton	51.4	48.1	3.3	40.4	37.5	2.9
San Jose	62.6	61.9	0.7	45.9	44.7	1.2

Santa Cruz	63.6	64.2	-0.6	45.4	43.3	2.1
Watsonville	63.5	62.7	0.8	43.9	42.1	1.8
Watsonville Airport	62.4	61.4	1.0	44.5	42.3	2.2
Monterey and San Benito Counties						
Carmel Valley	65.5	63.5	2.0	41.8	40.8	1.0
Hollister	64.8	62.8	2.0	44.9	41.1	3.8
King City	67.3	66.0	1.3	41.1	40.2	0.9
Monterey	59.8	59.6	0.2	46.7	44.7	2.0
Monterey Airport	61.1	60.7	0.4	46.8	44.7	2.1
Pinnacles National Park	66.9	63.0	3.9	38.5	35.6	2.7
Salinas	64.1	63.9	0.2	43.5	41.5	2.0
Salinas Airport	64.3	62.8	1.5	45.0	43.2	1.8

Miscellaneous December Climate Information:

Daily High Temperature Records for February 2014			
Date	**Location**	**Record Max Temp**	**Previous Record and Year**
2/21	San Rafael	74	73 in 1995
2/24	Gilroy	80	75 in 1985

Monthly Ranks for Downtown San Francisco		
Average High Temperature	59.5 deg	60th warmest February out of 140 years
Average Low Temperature	49.4 deg	35th warmest February out of 140 years
Precipitation	5.82 in	34th wettest February out of 165 years

Monthly Extremes for Select Locations			
Location	Max Temp: Warmest Day(s)	Min Temp: Coolest Day(s)	Precipitation: Wettest Day(s)
Sonoma County Airport	2/24	2/01 2/05	2/08
	74 degrees	27 degrees	3.46 inches
San Francisco	2/21 2/24	2/05	2/08
	69 degrees	42 degrees	1.15 inches

Livermore Airport	2/13	2/01	2/28
	75 degrees	32 degrees	0.85 inches
San Jose	2/24	2/04 2/05	2/28
	73 degrees	36 degrees	0.97 inches
Salinas Airport	2/21	2/03 2/05	2/28
	77 degrees	37 degrees	1.18 inches