November 2013 Regional Climate Summary
For the San Francisco Bay Area and Monterey Bay Area

Much like most of 2013, November 2013 was a dry month. November was also slightly warmer than normal. Nearly all of November's significant weather took place over a four day period from the 19th through the 22nd. Weather during these four days included widespread rainfall followed by a damaging offshore wind event. Those offshore winds produced rapid drying and also fanned the flames of two wildfires in the North Bay, only a few days after a soaking rain.

November Precipitation:

November's entire measurable precipitation occurred during just one rain event on the 19th and 20th. Rain began in the North Bay during the afternoon of Tuesday November 19 when a Pacific weather system approached from the northwest. Rain then spread gradually south across the remainder of the region on Tuesday night and into Wednesday the 20th. Heaviest rain occurred during the early afternoon hours of November 20 when rain rates up to a half inch per hour were reported across the central portion of the San Francisco Bay Area. The weather system moved south of the region on Wednesday night, but a few showers continued into the morning hours of Thursday November 21, mainly across the East Bay. Rainfall totals with this weather system generally ranged from 0.50 to 1.50 inches across the San Francisco Bay Areas. As much as three inches of rain fell on isolated portions of the North Bay. Lighter rainfall amounts of only 0.25 to 0.50 inches occurred farther to the south across the Monterey Bay Area.

Besides the November 19-20 rain event, rain occurred on only one other November day. A weak and dissipating weather system produced some very light showers and sprinkles across portions of the region on the morning of November 12. Only trace amounts were reported.

Given that all of November's measurable precipitation occurred in only one rain event, it's no surprise that rain totals for the month were below normal at all National Weather Service climate stations and well below normal at most locations. Some East Bay locations fared the best, picking up as much as 88 percent of their November average (Concord Airport). But for the most part, rain totals for November 2013 were only at half the 30-year average or less (see table below).

November Regional Precipitation Summary

Location	November Rainfall	Normal Nov Rain	Percent of Normal
North Bay			
Angwin	0.94	5.16	18
Calistoga	0.48	4.75	10
Cloverdale	M	5.54	M
Kentfield	1.28	6.46	20
Muir Woods	3.14	5.07	62
Napa	1.13	3.45	33
Napa Airport	0.88	2.56	34
Occidental	2.70	7.34	37
Petaluma Airport	0.87	3.29	26

Location	November Rainfall	Normal Nov Rain	Percent of Normal
Saint Helena	M	4.49	M
San Rafael	1.25	4.31	29
Sonoma County Airport	1.08	4.69	23
Sonoma	M	3.86	M
San Francisco Peninsula			
Half Moon Bay	1.24	3.32	37
Palo Alto	1.17	1.96	60
Redwood City	0.53	2.37	22
San Francisco Airport	0.91	2.38	38
San Francisco Downtown	1.26	3.16	40
Woodside	M	3.70	M
East Bay			
Berkeley	1.55	3.30	47
Concord	1.49	2.22	67
Concord Airport	1.35	1.54	88
Fremont	1.00	1.85	54
Hayward Airport	0.66	2.17	30
Livermore	1.30	1.84	71
Livermore Airport	1.52	1.98	77
Martinez	1.40	2.59	54
Mount Diablo Junction	1.56	3.11	50
Newark	0.87	1.70	51
Oakland	0.57	2.89	20
Oakland Airport	1.17	2.45	48
Richmond	1.66	3.24	51
South Bay and Santa Cruz County			
Ben Lomond	0.80	6.09	13
Gilroy	0.62	2.28	27
Los Gatos	0.60	2.37	25
Moffett Federal Airfield	0.59	1.64	36
Mount Hamilton	0.98	3.57	27
San Jose	0.77	1.68	46
Santa Cruz	0.72	3.75	19
Watsonville	0.46	2.74	17
Watsonville Airport	0.45	2.10	21
Monterey and San Benito Counties			
Big Sur Station	M	4.83	M
Carmel Valley	0.43	2.35	18
Hollister	0.36	1.68	21
King City	0.24	1.11	22
Monterey	0.44	2.32	19
Monterey Airport	0.46	1.88	24
Pinnacles National Park	0.24	1.54	16

Location	November Rainfall	Normal Nov Rain	Percent of Normal
Salinas	0.49	1.76	28
Salinas Airport	0.47	1.40	34

November 21-22 Windstorm:

The same weather system that produced much-needed rainfall on the 19th and 20th dropped south of the region on Thursday November 21 and developed into a deep area of low pressure over southern California. At the same time, strong high pressure formed over northeastern California and northern Nevada. Strong pressure gradients developed between high pressure to the north and northeast of the area and low pressure to the south. Surface pressure gradients maxed out at nearly 12 millibars from Arcata to San Francisco Airport (SFO) and about 16 mb from Elko, Nevada to SFO. These large differences in surface pressure, along with strong easterly flow aloft, resulted in strong and damaging north to northeast winds across the San Francisco Bay Area from the evening of the November 21 through Friday morning, November 22, mainly across the North and East Bay. Strongest winds occurred on Thursday evening, but winds remained strong and gusty into Friday morning. Below is a listing of some of the highest peak wind gusts recorded during the windstorm:

Location	County	Peak Wind Gust (mph)	Elevation (feet)
2 miles WSW of Orinda	Alameda	65	1400
Lick Observatory/Mt. Hamilton	Santa Clara	61	4200
Hawkeye RAWS	Sonoma	60	2000
Los Vaqueros RAWS	Contra Costa	58	1100
6 miles NNE of Livermore	Alameda	57	1100
3 miles ESE of Moraga	Contra Costa	56	1760
Petaluma Airport	Sonoma	56	90
Sonoma County Airport	Sonoma	53	130
Benicia Bridge		49	0
Piedmont	Alameda	47	960
Blackhawk	Contra Costa	47	820
Hayward Airport	Contra Costa	47	50
Oakland Airport	Alameda	46	90
Los Trampas RAWS	Contra Costa	45	1800
Hayward Airport	Contra Costa	44	50
Mount Tamalpais	Marin	41	2300
Golden Gate Bridge	SF/Marin	41	270

Strong winds brought down numerous trees and power lines across the North and East Bay. Downed trees and power lines were responsible for two deaths in Oakland and one injury in Petaluma. The most extensive damage occurred in Alameda County, mainly in and around Oakland and Berkeley. Below is a list of damage reports. All damage occurred between the evening of November 21 and the morning of November 22.

Location	County	Damage
San Leandro	Alameda	Downed tree fell on car and blocked all northbound lanes of I-238. Several cars struck the downed tree before the highway closed for one hour.
Santa Rosa	Sonoma	Large tree fell on a van on 4th Street in Santa Rosa
Oakland	Alameda	Tree came down in the Rockbridge area of Oakland. Power lines came down with tree
Petaluma	Sonoma	Tree fell on a car on US-101 in Petaluma and injured the occupant of the car.
Oakland	Alameda	Man electrocuted (fatal) when hit by falling power line and tree branches in the Fruitvale District
Oakland	Alameda	Man killed while driving on Skyline Blvd – attempting to avoid wind-blown debris on roadway and ran into standing tree.
Berkeley	Alameda	Cedar tree blown down onto power lines on Blake Street
Oakland	Alameda	Downed live wires reported near Bella Vista Elementary School on E 28th Street
Berkeley	Alameda	Car damaged by falling tree on Adeline Street.
Oakland	Alameda	120 foot tall eucalyptus tree near Lake Merritt blown down
Berkeley	Alameda	Several fallen trees blocked the northbound lanes of the 3600 block of Martin Luther King Jr Way.

Photo of the Lake Merritt eucalyptus tree prior to the November 2013 windstorm. The tree was 120 feet tall and nearly 150 years old. Photo: city of Oakland

Photo of Lake Merritt eucalyptus tree taken on Friday, November 22. Photo: City of Oakland

From 4 pm on Thursday afternoon (21st) through 8 am on Friday morning (22nd), the Oakland fire department notified the public works department of 148 tree-related calls and 81 calls relating to downed power lines and arcing.

At the peak of the wind event on Thursday night and into Friday morning, over 40,000 PG&E customers were without power in the East Bay. There were 9000 outages in Oakland alone and over 3000 in Berkeley. In the North Bay, nearly 30,000 customers were without power in Sonoma County, including major power outages in Cazadero, Guerneville, Sonoma, Geyserville, and Santa Rosa.

Strong subsidence and offshore winds on November 21 and 22 produced rapid warming and drying across the region, particularly in the North Bay. At the Sonoma County Airport (STS), the dewpoint temperature plummeted 56 degrees F over the course of about 50 hours. Early in the afternoon of November 20, the dewpoint at STS stood at 57 degrees F with a relative humidity of 100%. By midafternoon on November 22, the dewpoint at STS had fallen to only 1 deg F with a relative humidity of only 6%. More than half of that drying occurred over just a five hour window (the dewpoint fell 29 deg F between 8 am and 1 pm on November 21). The high temperature at KSTS on November 19 was 56 degrees. By November 22, after two days of subsidence warming and drying, the high temperature at KSTS was 20 degrees warmer (76 deg F).

Rapid warming and drying, and gusty offshore winds, produced conditions favorable for wildfire ignition (due to fallen power lines) and spread. Two wildfires occurred in the North Bay on November 21 and 22, less than 2 days after a soaking rain. The Silverado fire began during the late evening of November 21, near the intersection of Silverado Trail and Soda Canyon Road north of Napa. The

fire consumed nearly 200 acres, forced mandatory evacuations, and destroyed one outbuilding. The McCabe fire in Sonoma County started during the early morning hours of November 22 near the geothermal power plant 10 miles northeast of Geyserville. This fire burned 3500 acres, caused evacuations and burned a power plant cooling tower.

November Temperatures:

Average monthly temperatures for November were slightly above normal, mainly due to several sunny and warm days. Only one daily high temperature record was set during the month. Overnight lows dipped slightly below the freezing mark in the North Bay Valleys on a couple of occasions.

November Regional Temperature Summary

Location	Average High	Normal High	Departure from Normal	Average Low	Normal Low	Departure from Normal
North Bay						
Angwin	63.2	59.5	3.7	44.7	42.8	1.9
Calistoga	70.4	66.4	4.0	36.6	40.4	-3.8
Cloverdale	M	65.2	M	M	43.5	M
Kentfield	66.5	62.3	4.2	43.8	45.3	-1.5
Napa	68.4	65.1	3.3	42.9	43.7	-0.8
Napa Airport	66.8	63.7	3.1	38.2	38.8	-0.6
Occidental	65.3	61.6	3.7	46.9	45.9	1.0
Petaluma Airport	68.6	65.1	3.5	40.9	42.2	-1.3
Saint Helena	M	65.1	M	M	42.7	M
San Rafael	67.5	62.4	5.1	46.0	45.9	0.1
Sonoma County Airport	69.6	64.3	5.3	38.7	40.4	-1.7
Sonoma	M	64.8	M	M	41.7	M
San Francisco Peninsula						
Half Moon Bay	61.5	62.4	-0.9	43.9	43.7	0.2
Palo Alto	M	64.8	M	M	42.4	M
Redwood City	66.6	64.5	2.1	43.2	44.3	-1.1
San Francisco Airport	64.7	62.9	1.8	49.7	48.7	1.0
San Francisco Downtown	64.5	63.1	1.4	50.9	50.1	0.8
Woodside	M	67.3	M	M	40.4	M
East Bay						
Berkeley	68.0	64.8	3.2	47.3	46.6	0.7
Concord	68.0	65.2	2.8	46.7	45.8	0.9
Concord Airport	67.0	64.1	2.9	43.2	43.9	-0.7
Fremont	66.3	64.4	1.9	45.1	46.1	-1.0
Hayward Airport	65.4	63.6	1.8	47.6	47.4	0.2
Livermore	67.6	64.4	3.2	42.4	43.4	-1.0
Livermore Airport	69.9	64.6	5.3	43.6	42.5	1.1
Martinez	67.2	63.9	3.3	37.8	40.0	-2.2
Mount Diablo Junction	63.6	61.8	1.8	49.5	44.5	5.0

Location	Average High	Normal High	Departure from Normal	Average Low	Normal Low	Departure from Normal
Newark	65.8	64.4	1.4	48.1	47.5	0.6
Oakland	68.2	64.6	3.6	49.5	49.1	0.4
Oakland Airport	64.9	63.1	1.8	45.7	45.4	0.3
Richmond		64.3			47.9	
South Bay and Santa Cruz County	**Average High**	**Normal High**	**Departure from Normal**	**Average Low**	**Normal Low**	**Departure from Normal**
Gilroy	71.1	67.8	3.3	42.1	42.1	0.0
Los Gatos	67.7	63.9	3.8	40.0	42.7	-2.7
Moffett Federal Airfield	66.7	65.1	1.6	46.4	47.3	-0.9
Mount Hamilton	M	53.3	M	M	42.5	M
San Jose	67.4	64.3	3.1	45.2	46.0	-0.8
Santa Cruz	68.6	66.8	1.8	43.6	44.9	-1.3
Watsonville	69.9	66.5	3.4	43.9	43.0	0.9
Watsonville Airport	68.1	66.0	2.1	42.8	43.3	-0.5
Monterey and San Benito Counties						
Big Sur Station	M	64.5	M	M	44.9	M
Carmel Valley	69.7	68.0	1.7	41.7	42.7	-1.0
Hollister	68.5	67.1	1.4	40.2	41.7	-1.5
King City	72.0	69.7	2.3	40.5	40.5	0.0
Monterey	64.3	62.8	1.5	48.8	47.1	1.7
Monterey Airport	64.8	63.7	1.1	46.4	45.8	0.6
Pinnacles National Park	M	69.0	M	M	36.2	M
Salinas	69.2	67.5	1.7	43.1	42.9	0.2
Salinas Airport	68.6	66.7	1.9	45.1	44.6	0.5

Daily Temperature Records for November 2013			
Date	**Location**	**Record Max Temp**	**Previous Record and Year**
11/13	Moffett Federal Airfield	74	74 in 1999

Monthly Ranks for Downtown San Francisco		
Average High Temperature	64.5 degrees	39th warmest out of 140 years
Average Low Temperature	50.9 degrees	65th warmest out of 140 years
Precipitation	1.26 inches	61st driest 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	11/13	11/4, 11/24	11/19
	80 degrees	30 degrees	0.74 inches
San Francisco	11/01	11/25	11/20
	72 degrees	47 degrees	0.78
Livermore Airport	11/08, 11/13	11/24	11/20
	79 degrees	37 degrees	1.12
San Jose	11/01, 11/09	four days	11/20
	77 degrees	40 degrees	0.47
Salinas Airport	11/01, 11/06	11/05, 11/22	11/20
	81 degrees	39 degrees	0.35 inches

Other Weather of Note:

Foggy conditions occurred during the early morning hours of November 30. Dense fog, with visibility of one-quarter mile or less, was reported at the San Francisco Airport as well as at Monterey and Salinas. The photo shown below was taken just outside the National Weather Service Office in Monterey on the morning of November 30.