



Climate of 2016 – Cabrillo National Monument

Natural Resource Report NPS/CABR/NRR—2017/1562





ON THE COVER

Owl limpets (*Lottia gigantean*) on an exposed rock face located in the rocky intertidal zone during sunset at Cabrillo National Monument (© Michael Ready)

Climate of 2016 – Cabrillo National Monument

Natural Resource Report NPS/CABR/NRR—2017/1562

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Executive Summary

This report details the climate (temperature, precipitation, drought, and streamflow) of Cabrillo National Monument during 2016. Gridded GIS maps are used to present broad-brush conditions across the region for each month. This regional presentation is compared to detailed data from weather stations in the Global Historical Climatology Network (GHCN), automated meteorological stations, and data from USGS stream gages. Prior to analysis, a set of data quality control checks were performed by the author in accordance with an established National Park Service protocol. The region entered into drought conditions in April 2012 (Tercek 2013) and became progressively drier throughout 2013 and 2014. During 2015 and 2016, the area in and near Cabrillo National Monument was classified as “D3 - Extreme Drought” by the US Drought Monitor (Figure 2). ENSO switched from an El Nino to a La Nina Phase during 2016. Normally, La Nina conditions produce drier conditions in southern California while El Nino produces wetter conditions. Northern California saw increased rain during 2016, but the drought gripping southern California did not materially slacken. Annual precipitation was near normal (99% the 1981 – 2010 average) and annual average temperatures were slightly cooler than in 2015. The average of the daily highs for the year was 2.3 degrees above the 30 – year average and the average of daily lows was 2.8 degrees above average. Despite being cooler than 2015, calendar year 2016 was still notably warm. Every month had average temperatures above the 30 – year average (Figures 4,6,7). February had average daytime highs 9.4 degrees above the 30 – year average.

Acknowledgments

Funding for this report was provided by National Park Service Mediterranean Coast Network Inventory and Monitoring Program.

Glossary

GHCN: Global Historical Climatology Network.

PRISM: Parameter-elevation Regression on Independent Slopes Model. See <http://www.prism.oregonstate.edu/>

US Drought Monitor: A broad brush assessment of drought conditions. See <http://drought.unl.edu/dm/monitor.html>

B-91 Forms: Paper data sheets that are used to record climate data at weather stations

Tmax / Tmin: Mean daily Maximum / Minimum Temperatures

NOAA: National Oceanic and Atmospheric Administration

30-year average or “normal”: Official 30-year averages for each weather station are issued every 10 years by NOAA. Prior to 2011, the official reference period was 1971 – 2000.

Introduction

This report details the climate (temperature, precipitation, drought, streamflow) of Cabrillo National Monument during 2016. Climatic events are presented both from a local perspective, with data from individual weather stations, and from a regional perspective, with maps that depict broad-scale conditions across southern California during each month of the year. The climatic conditions of 2016 are also compared to a historical context, based on a 30-year average or “normal” period calculated over the years 1981 – 2010, and to historical data from weather stations that go back to 1939.

Typically, when a weather report states that a particular month was “warmer than average” or “cooler than normal,” the comparison is to a set of averages calculated over an agreed upon time period. These averages, which are known as “climatological normals,” are updated every 10 years by the National Oceanic and Atmospheric Administration (NOAA). From 1991 – 2000, meteorological measurements were compared to 1961 – 1990 averages; from 2001 – 2010 the reference period was 1971 – 2000; and starting in calendar year 2011, most weather data has been compared to 1981 – 2010 averages. NOAA further defines climatological normals as follows:

“In the strictest sense, a “normal” of a particular variable (e.g., temperature) is defined as the 30-year average. For example, the minimum temperature normal in January for a station in Chicago, Illinois, would be computed by taking the average of the 30 January values of monthly-averaged minimum temperatures from 1981 to 2010. Each of the 30 monthly values was in turn derived from averaging the daily observations of minimum temperature for the station. In practice, however, much more goes into NCDC’s Normals product than simple 30-year averages. Procedures are put in place to deal with missing and suspect data values. In addition, Normals include quantities other than averages such as degree days, probabilities, standard deviations, etc. Normals are a large suite of data products that provide users with many tools to understand typical climate conditions for thousands of locations across the United States.” (Source:

<http://www.ncdc.noaa.gov/oa/climate/normals/usnormals.html#WHATARENORMALS>)

Those interested in additional climate-related information for Cabrillo National Monument and the surrounding areas should seek:

The ClimateAnalyzer: www.ClimateAnalyzer.org. This web site allows you to create custom graphs and tables from both “official,” unedited data and from the corrected datasets used in this report. You can also download all the data from the weather stations in the area as spreadsheets.

Western Regional Climate Center (<http://www.wrcc.dri.edu/>)

Drought Monitor (<http://drought.unl.edu/dm/monitor.html>)

NOAA (National Oceanic Atmospheric Administration) National Weather Service
(<http://www.cpc.ncep.noaa.gov/>)

USGS (U.S. Geological Survey) Water National Information System
(<http://waterdata.usgs.gov/nwis>)

Methods

Selection of Datasets

In order to place Cabrillo National Monument within a regional context, gridded-map-based estimates of precipitation and temperature were used to provide a broad overview of climatic conditions in the area. These estimates were generated with a statistical modeling technique that interpolates precipitation and temperature values between actual climate stations while also accounting for the effects of aspect and elevation. Known as the Parameter-elevation Regression on Independent Slopes Model (PRISM; <http://www.prism.oregonstate.edu/>), this approach has a long history of use in the western United States, and it has been shown to provide robust products in a wide variety of studies (Daly et al. 2008). In this report, PRISM data from calendar year 2016 are compared to 1981 – 2010 PRISM averages for each month by calculating the percent of normal precipitation (2016 precipitation divided by 1981 – 2010 precipitation, multiplied by 100) or the temperature departure (2016 temperature minus 1981 – 2010 average temperature) for each grid cell on the map of southern California.

Records from individual precipitation and temperature observing stations were included as a way to highlight intra-regional variability. The process of selecting specific stations included in this report is described in the Rocky Mountain Climate Protocol (Rocky Mountain Climate Working Group 2010). Generally, the selection criteria were:

1. Stations provide good spatial coverage within and near the parks / monuments of interest. In the case of Cabrillo National Monument, National Weather Service (NWS) stations were chosen from nearby locations. Data from these stations are available through the Global Historical Climatology Network (GHCN). GHCN stations have several advantages, including their relatively long period of record (Appendix), and the availability of established 30-year averages that can be used to quantify the difference between the current year and “normal” conditions.
2. Stations provide a sufficient length of record to provide historical context for current observations. For this report, GHCN stations were not considered if they had not been in operation during the period 1981 – 2010 at a minimum.
3. Instrumentation at individual stations is relatively consistent over the life of the record.
4. Instrumentation and siting standards used in selected networks are suitable for providing consistent, continuous, and long-duration records of climate and streamflow.

In addition to the GHCN stations, this report includes data from automated meteorological (MET) stations located at Pt. Loma, within Cabrillo National Monument. These stations have not been in operation long enough to have climatological normals / averages, and they sometimes suffer from equipment malfunctions that produce physically impossible values or missing data. Despite these flaws, however, these stations have the advantage of being located within Cabrillo National

Monument itself, unlike more established stations in the region; and carefully screened data from these Met stations can accurately characterize current year temperature and precipitation.

As a way of presenting the integrated effects of temperature and precipitation, maps from the US Drought Monitor (<http://drought.unl.edu/dm/monitor.html>) were used to depict broad-brush conditions across the region. Even though the watercourses in the region are human-controlled and therefore not directly tied to rainfall, USGS stream gage data (<http://waterdata.usgs.gov/nwis>) were used to contrast streamflow during the 2016 water year, which ran from October 2015 to September 2016, with average conditions during the period of record for the gage of interest (in this case 1982 – 2010).

The locations of weather stations cited in this report are shown in Figure 1. Metadata for these stations can be accessed from the internet links provided in the Appendix.

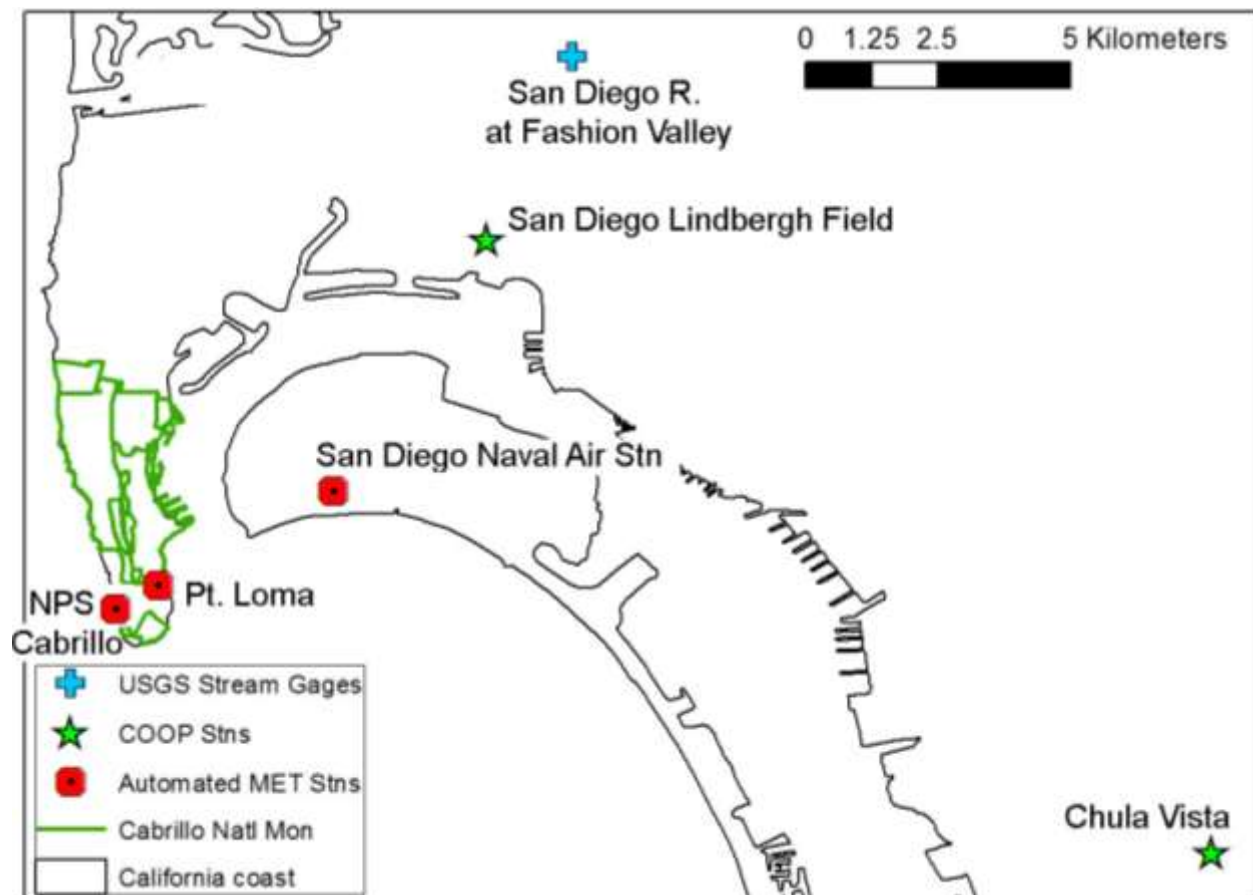


Figure 1. Map showing key climate stations and stream gauges in and near Cabrillo National Monument. Cooperative Observer (COOP) stations are accessed through the Global Historical Climatology Network (see text).

Quality Control of Global Historical Climatology Network Data

All of the GHCN stations used in this report are operated by the National Weather Service (NWS). These stations are sometimes referred to as “Cooperative Observer” (COOP) stations because in most cases their measurements are manually recorded by human observers and submitted to NWS for aggregation and error checking.

Data from these weather stations undergo quality control and error-checking by NWS, and as part of this process many of the observations in the data files are assigned “flags” (letter or number codes) that indicate potential problems or other factors that should be taken into consideration when interpreting the data. Consequently, the author of this report has created software tools that assist in the interpretation of the data flags and diagnostic plotting of the data. Following guidelines from Kittel (2008), Kittel et al. (2009), and Rocky Mountain Climate Working Group (2010), the Qa/Qc employed by these software tools involved graphing and visual inspection of each time series, evaluation of the data quality flags that accompany each observation, comparison with historical observations and observations from surrounding sites, and logical consistency tests (e.g., confirming that minimum daily temperatures were lower than the daily maximum temperatures). Point observations provided by the GHCN stations were also compared to corresponding estimates from the PRISM datasets and to the original datasheets (B-91 forms) used by weather station staff. When possible, data missing in the electronic records were recovered from the original datasheets and hand entered by the author of this report. If more than 3 days of precipitation data were missing for a particular month, a monthly total was not calculated, and the entire month was instead considered missing. Similarly, if more than 5 days of mean daily maximum temperature (Tmax) or mean daily minimum temperature (Tmin) were missing, monthly average temperatures were not calculated. The data handling was conservative, i.e., no data points were changed unless it was very clear that an erroneous value, for example a precipitation measurement with a missing decimal point that could be verified on the original station records, was found. Readers can download the data used in this report and make custom climate graphs and tables of their own by visiting www.ClimateAnalyzer.org

Quality Control of Met Station Data

Because Met data are collected hourly, daily Tmax, Tmin, and precipitation values must be derived from the automated data stream. Furthermore, precipitation is recorded as a running total that must be translated into daily measurements. If any particular day in a record was missing more than six hours of measurements, the entire day was considered missing. In addition, if the temperature during any day varied by less than 2 degrees Fahrenheit, data for the entire day was considered invalid due to instrumental error and replaced with missing values. Once daily statistics had been calculated, diagnostic plots were used to screen for physically impossible measurements (e.g. 500 degrees Fahrenheit), which were ascribed to instrumental error and considered missing; and the missing data criteria just described for GHCN stations were used to calculate monthly statistics.

Results

Temperature, Precipitation, and Drought Status During Calendar Year 2016

The patterns described in this section are often stated as broad generalizations. In most cases there was significant variability across the region and exceptions to the patterns described here were common. In order to appreciate this variability, it is important to examine the PRISM maps found in sub-chapter *PRISM maps depicting spatial patterns in departure from 1981 – 2010 averages*, and compare them to the weather station data presented in the charts and tables found in sub-chapter: *Weather Station Temperature and Precipitation Data*.

Broader Picture – The Ongoing Drought Became More Severe

The region entered into drought conditions in April 2012 (Tercek 2013) and became progressively drier throughout 2013 and 2014. By the end of 2014, the area in and near Cabrillo National Monument was classified as “D3 - Extreme Drought” by the US Drought Monitor and it retained this classification until the end of 2016 (Figure 2).

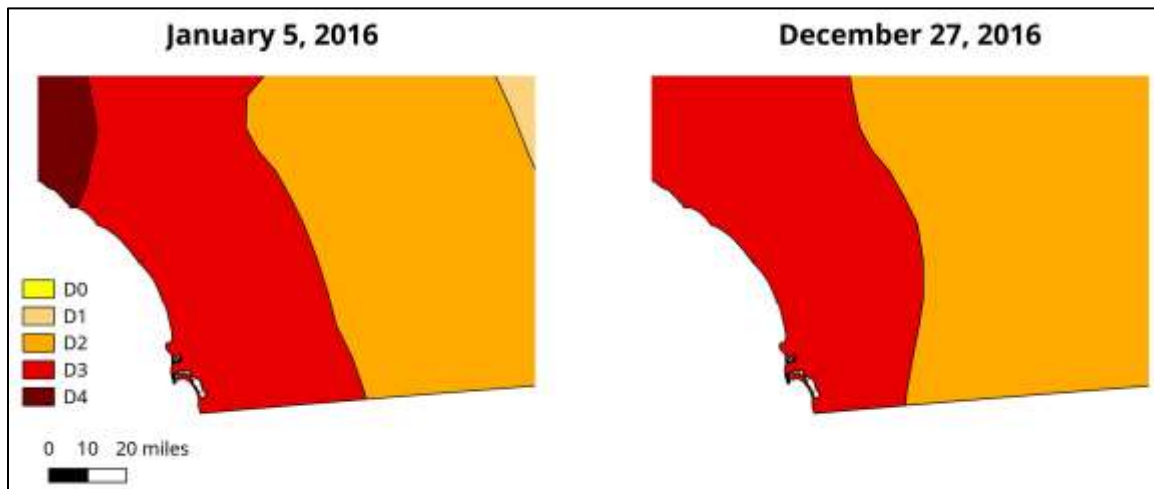


Figure 2. U.S. Drought Monitor maps for Cabrillo National Monument during 2016. Drought codes are D0 – “Abnormally Dry,” D1 – “Moderate Drought,” “D2 – Severe Drought,” “D3 – Extreme Drought,” “D4 – Exceptional Drought.” White areas are the Pacific Ocean. Cabrillo NM is located on the coast, on the lower-left corner of each map. For more information visit: www.drought.unl.edu/dm/monitor.html.

El Nino – La Nina Status

The El Nino – Southern Oscillation (ENSO) is an oscillation of the ocean – atmosphere climate system centered over the tropical Pacific Ocean that follows a rough cycle of approximately 2 – 7 years. When ENSO is in its “El Nino phase,” sea surface temperatures in the central and eastern tropical Pacific are warmer than average, and this generally produces warmer, drier conditions in the northern continental United States and cooler, wetter conditions in the southern United States, particularly the southwest. In contrast, the opposite conditions prevail when ENSO is in its “La Nina phase.” More information on ENSO can be found on the NOAA web site located here:

<http://www.pmel.noaa.gov/tao/elnino/el-nino-story.html>

ENSO switched from an El Nino to a La Nina Phase during 2016. Normally, La Nina conditions produce drier conditions in southern California while El Nino produces wetter conditions. Northern California saw increased rain during 2016, but the drought gripping southern California did not materially slacken during 2016. For long-term El Nino patterns, consult NOAA here:

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml

Weather Station Temperature and Precipitation Data

Generally speaking, there are two components to drought: high temperatures, which increase evapotranspiration, and precipitation, or the lack thereof. Calendar year 2016 was hot but had near-normal precipitation, unlike 2012 and 2013, which had low precipitation but more moderate temperatures, and 2014, which had both low precipitation and high temperatures. As shown in Figure 3, the 2016 average day-time high at San Diego Lindbergh field (72.7 degrees) was slightly cooler than the 2015 average (73.9 degrees), which was the hottest since records began in 1939. Total annual precipitation (10.23 inches) was 99% the 1981 – 2010 (Figure 4; Tables 1-3) average, providing a slight respite to the 5 years of below-average precipitation that preceded (Figures 3-4).

Data from San Diego - Lindbergh Field show that every month during 2016 had significantly warmer than average temperatures (Figure 4). February had the greatest departures from the 1981 – 2010 temperature average, with daytime highs 9.4 (F) above average (Table 2). January and December had above average precipitation, 162% and 276% the 1981 – 2010 averages, respectively. Precipitation during the summer months (May – December) is so slight that calculations of percent average are misleading. An increase of only a few hundredths of an inch can mean the difference between an above vs. below average month.

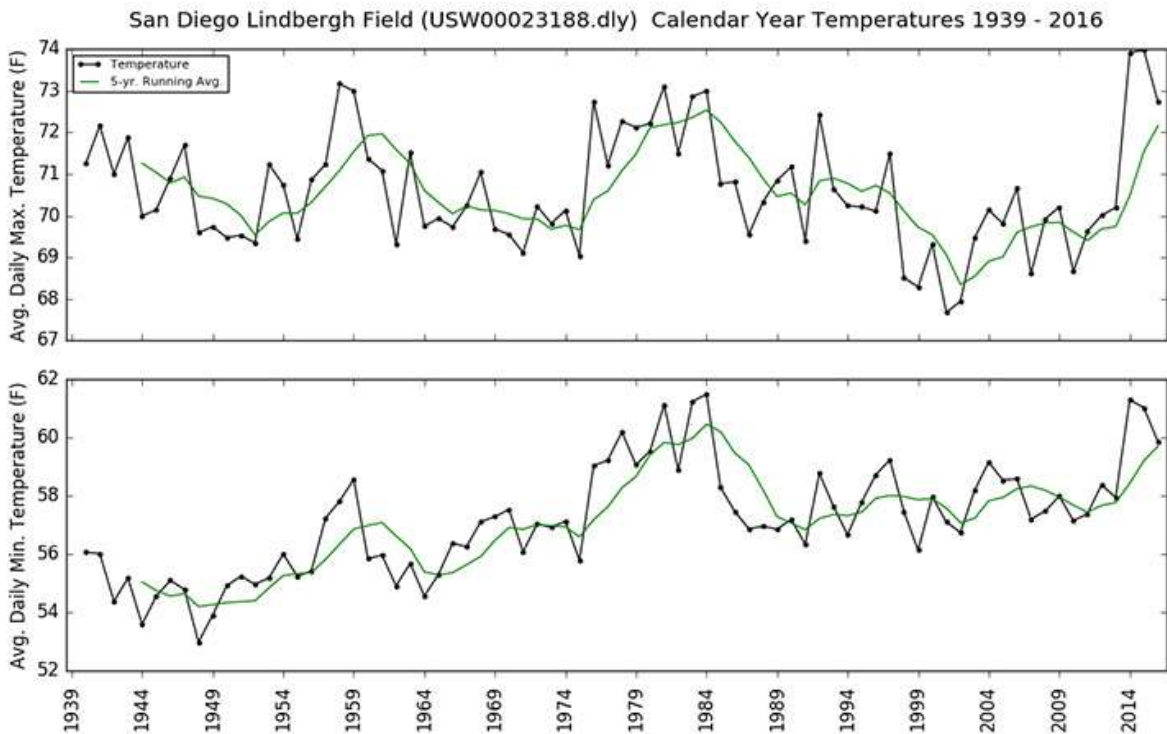
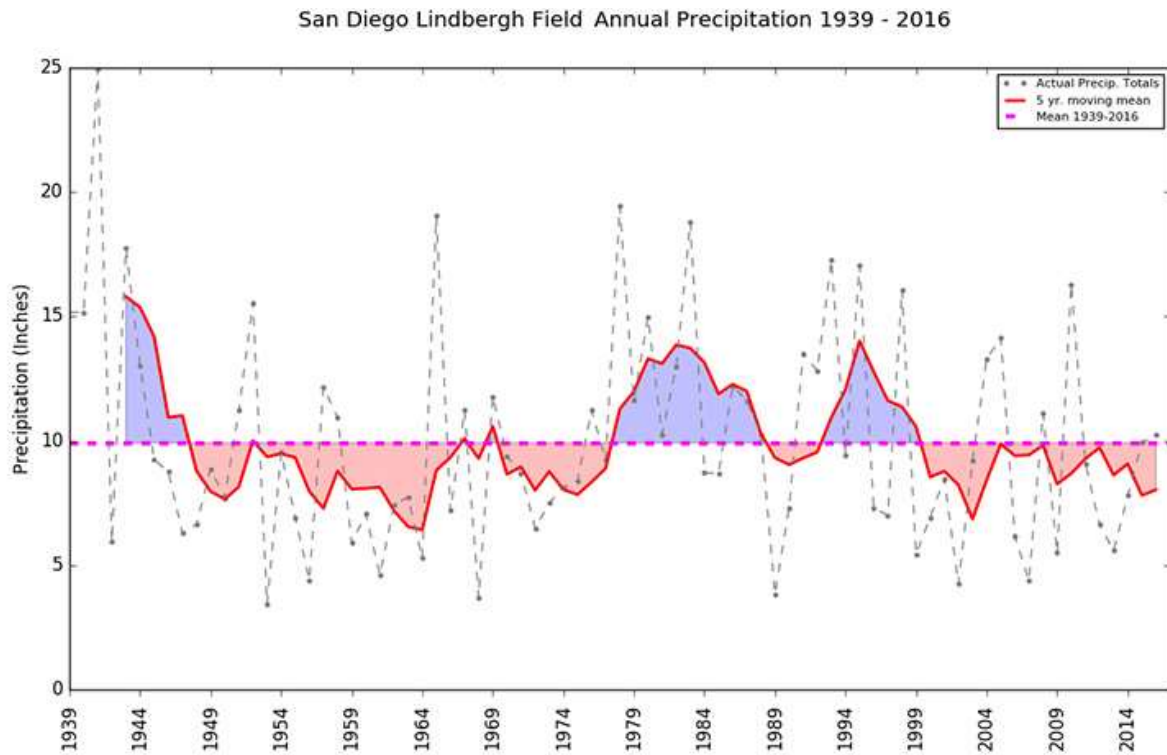
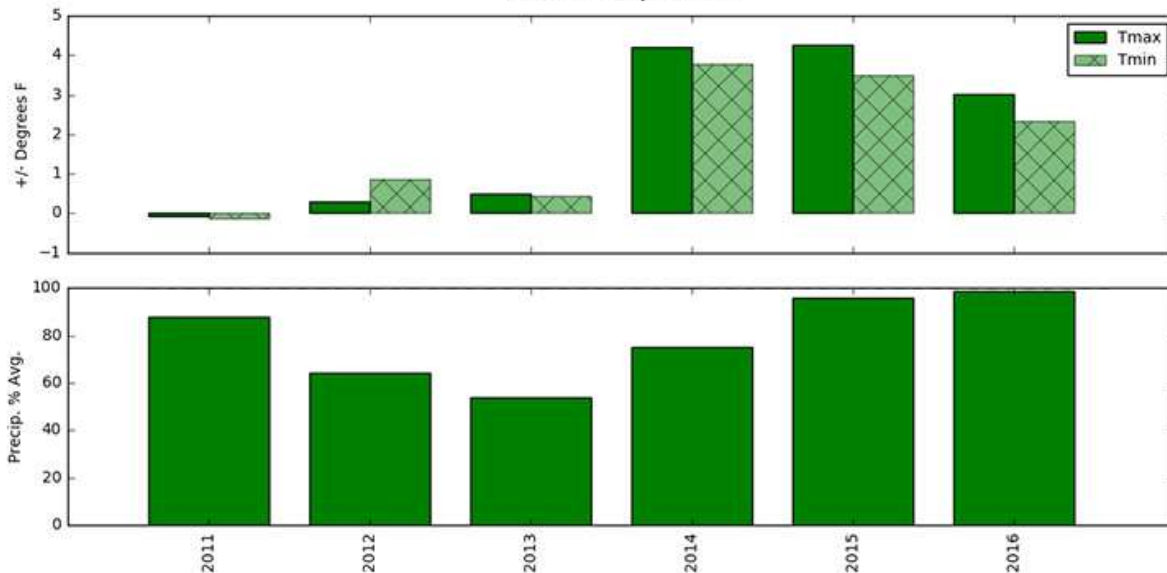


Figure 3. Top: total annual precipitation 1939 – 2016 at San Diego Lindbergh Field (dots). Red-shaded areas = years when the running mean is below the 1939 – 2016 average (dashed red line). Blue-shaded areas = running mean above the 1939 - 2016 average. Bottom: Annual averages for daily maximum temperature and daily minimum temperature 1939 – 2016. Green line = 5 year running average of temperatures. Running averages include the current year and the previous 4 years.

San Diego Lindbergh Field

Annual Departures



Monthly Departures

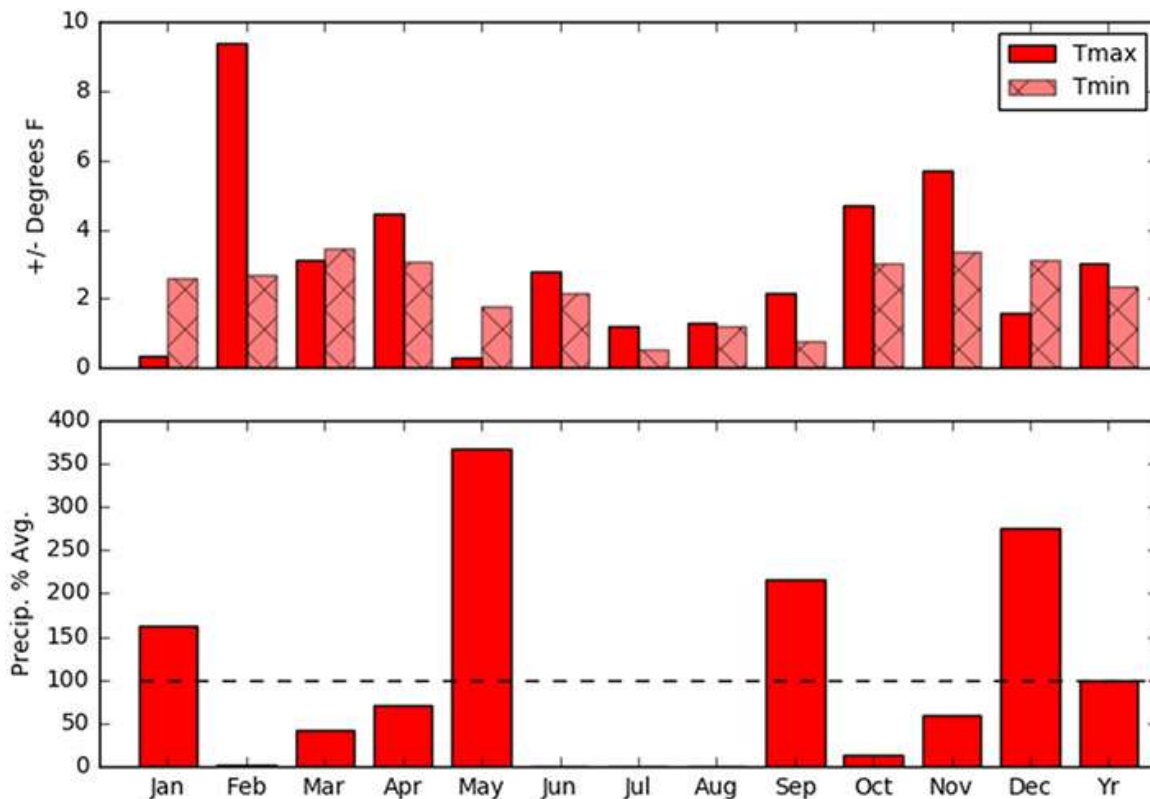


Figure 4. Top: Departure of 2011 - 2016 annual precipitation, Tmax, and Tmin from 1981 - 2010 averages at San Diego Lindbergh Field. Bottom: Monthly departures of precipitation, Tmax, and Tmin from 1981 - 2010 averages during 2016. May - August often have less than 0.2 inches average precipitation so large percent departures, such as shown for August, are a small absolute difference.

Table 1. Total Monthly Precipitation in inches during 2016 and Percent of 1981 – 2010 averages at key weather stations in and near Cabrillo National Monument.

Time Period	San Diego Lindbergh Field		Chula Vista ^a	
	2016 Precip. (in)	% average	2016 Precip. (in)	% average
January	3.21	162	2.34	121
February	0.05	2	0.43	19
March	0.76	42	0.84	50
April	0.55	71	0.88	128
May	0.44	367	0.69	766 ^b
June	0.00	0	0.00	0
July	0.00	0	0.00	0
August	0.00	0	0.00	0
September	0.32	215	0.50	360 ^b
October	0.07	12	0.07	13
November	0.60	60	0.38	42
December	4.22	276	3.98	278
YR	10.23	99	10.11	103

^a Met stations (last two entries in the table) do not have 30-year averages.

^b Precipitation is so low during summer months that departure calculations can be misleading. Summer average precipitation totals are in the range 0.02 – 0.05 inches, making even slight precipitation show a large percent increase.

Table 2. Average daily maximum temperatures (Tmax) during 2016 and departure from 1981 – 2010 averages expressed as +/- Degrees F.

Time Period	San Diego Lindbergh Field		Chula Vista		Pt. Loma ^{a, b}	NPS Cabrillo ^{a, b}
	2016 Tmax (F)	Departure (+/- F)	2016 Tmax (F)	Departure (+/- F)	2016 Tmax (F)	2016 Tmax (F)
January	65.5	0.4	65.9	-2.60	N/A	61.2
February	74.4	9.4	74.9	6.80	N/A	N/A
March	68.7	3.1	68.1	0.03	66.0	61.9
April	72.0	4.5	71.3	1.90	69.4	64.2
May	68.8	0.3	68.6	-1.50	68.6	63.1
June	73.6	2.8	74.8	2.80	73.1	66.1
July	75.8	1.2	77.6	1.70	76.1	69.7
August	77.7	1.3	79.8	2.00	75.7	70.5
September	78.1	2.2	79.0	1.00	N/A	71.8
October	77.5	4.7	77.2	1.50	N/A	N/A

^a Met stations (last two entries in the table) do not have 30-year averages.

^b N/A = Insufficient data for an accurate calculation.

Table 2 (continued). Average daily maximum temperatures (Tmax) during 2016 and departure from 1981 – 2010 averages expressed as +/- Degrees F.

Time Period	San Diego Lindbergh Field		Chula Vista		Pt. Loma ^{a, b}	NPS Cabrillo ^{a, b}
	2016 Tmax (F)	Departure (+/- F)	2016 Tmax (F)	Departure (+/- F)	2016 Tmax (F)	2016 Tmax (F)
November	74.7	5.7	74.3	2.50	N/A	N/A
December	66.3	1.6	66.9	-0.50	N/A	N/A
YR	72.7	3.0	73.2	1.30	N/A	N/A

^a Met stations (last two entries in the table) do not have 30-year averages.

^b N/A = Insufficient data for an accurate calculation.

Table 3. Average daily minimum temperatures (Tmin) during 2016 and departure from 1981 – 2010 averages expressed as +/- Degrees F.

Time Period	San Diego Lindbergh Field		Chula Vista		Pt. Loma ^{a, b}	NPS Cabrillo ^{a, b}
	2016 Tmin (F)	Tmin Departure (+/- F)	2016 Tmin (F)	Tmin Departure (+/- F)	2016 Tmin (F)	2016 Tmin (F)
January	51.6	2.6	49.5	3.7	N/A	53.9
February	53.4	2.7	51.1	3.6	N/A	N/A
March	56.6	3.4	54.3	4.0	54.1	56.4
April	59.0	3.1	56.5	3.5	56.7	58.8
May	61.2	1.8	59.7	2.2	57.8	60.3
June	64.2	2.2	63.6	3.0	61.1	63.0
July	66.0	0.6	66.7	2.3	64.3	66.8
August	67.9	1.2	66.9	1.3	65.2	67.4
September	66.0	0.8	65.2	2.0	N/A	65.2
October	63.6	3.1	59.8	1.9	N/A	N/A
November	57.0	3.4	52.7	2.5	N/A	N/A
December	51.5	3.1	49.2	3.9	N/A	N/A
YR	59.8	2.3	58.0	2.8	N/A	N/A

^a Met stations (last two entries in the table) do not have 30-year averages.

^b N/A = Insufficient data for an accurate calculation.

PRISM maps depicting spatial patterns in departure from 1981 – 2010 averages

The regional precipitation and temperature patterns seen in the PRISM maps (Figures 5 - 7) are similar to the patterns seen in the weather station data. January and December had above average precipitation, while February was notably warm.

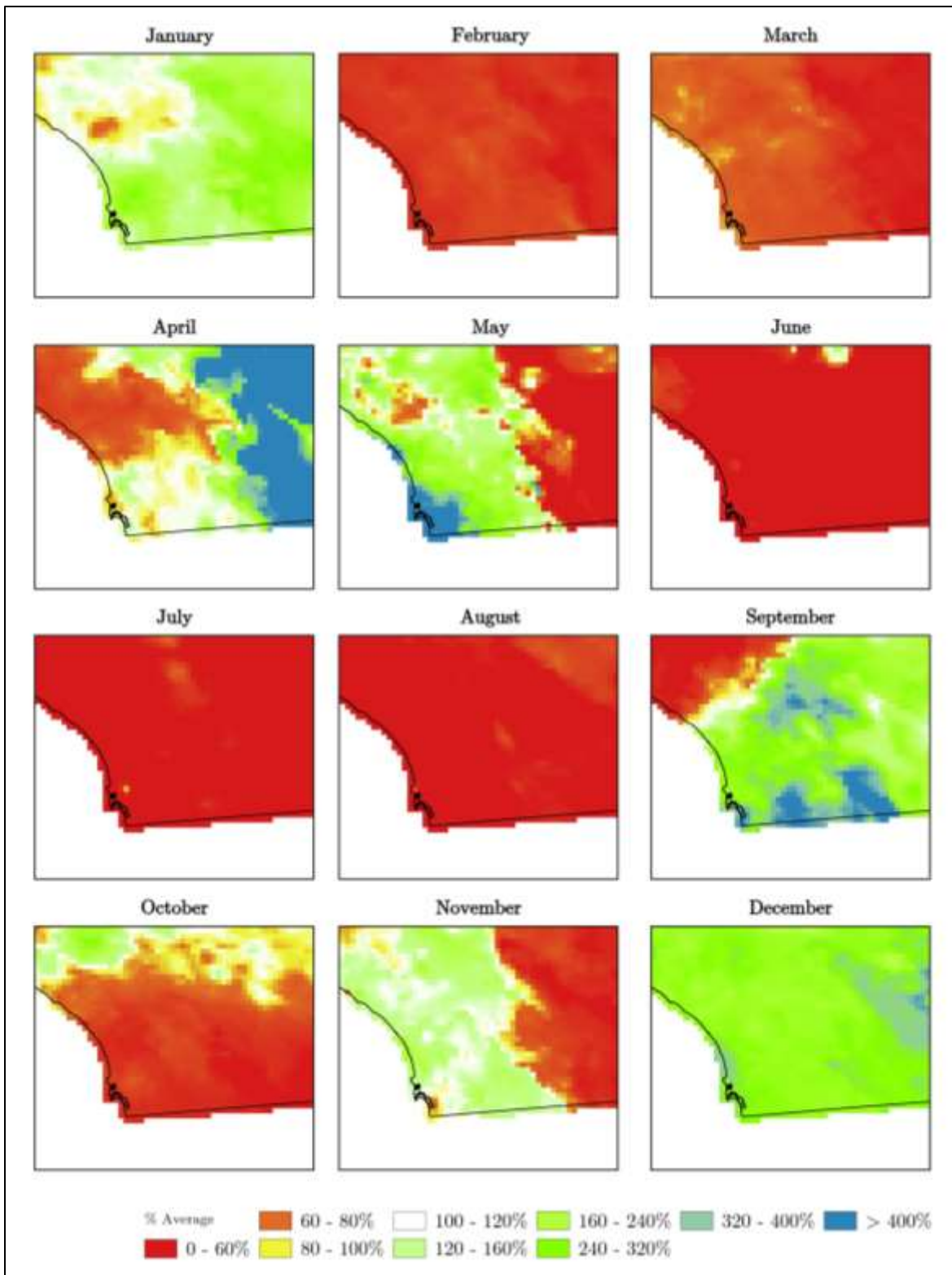


Figure 5. Maps showing percent of average precipitation relative to 1981–2010 for each month during 2016. Estimates are from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). White areas = Pacific Ocean. Cabrillo is located in the bottom left corner of each map. For more information, see <http://www.prism.oregonstate.edu/>.

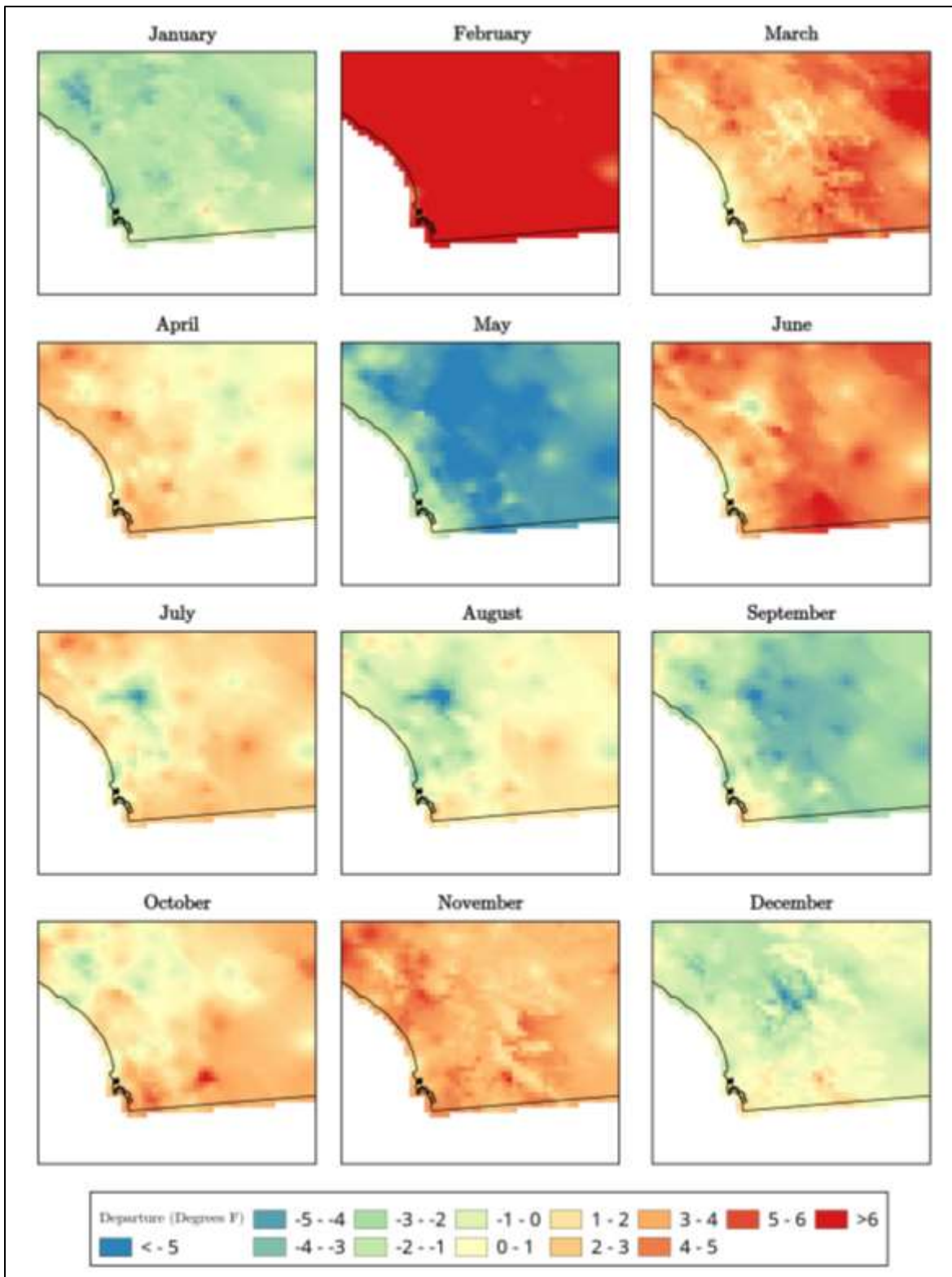


Figure 6. Maps showing departures from 1981 – 2010 average daily maximum temperatures (Tmax) in degrees Fahrenheit during 2016. Estimates are from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). White areas = Pacific Ocean. Cabrillo NM is on the coast, bottom left. For more information, see <http://www.prism.oregonstate.edu/>.

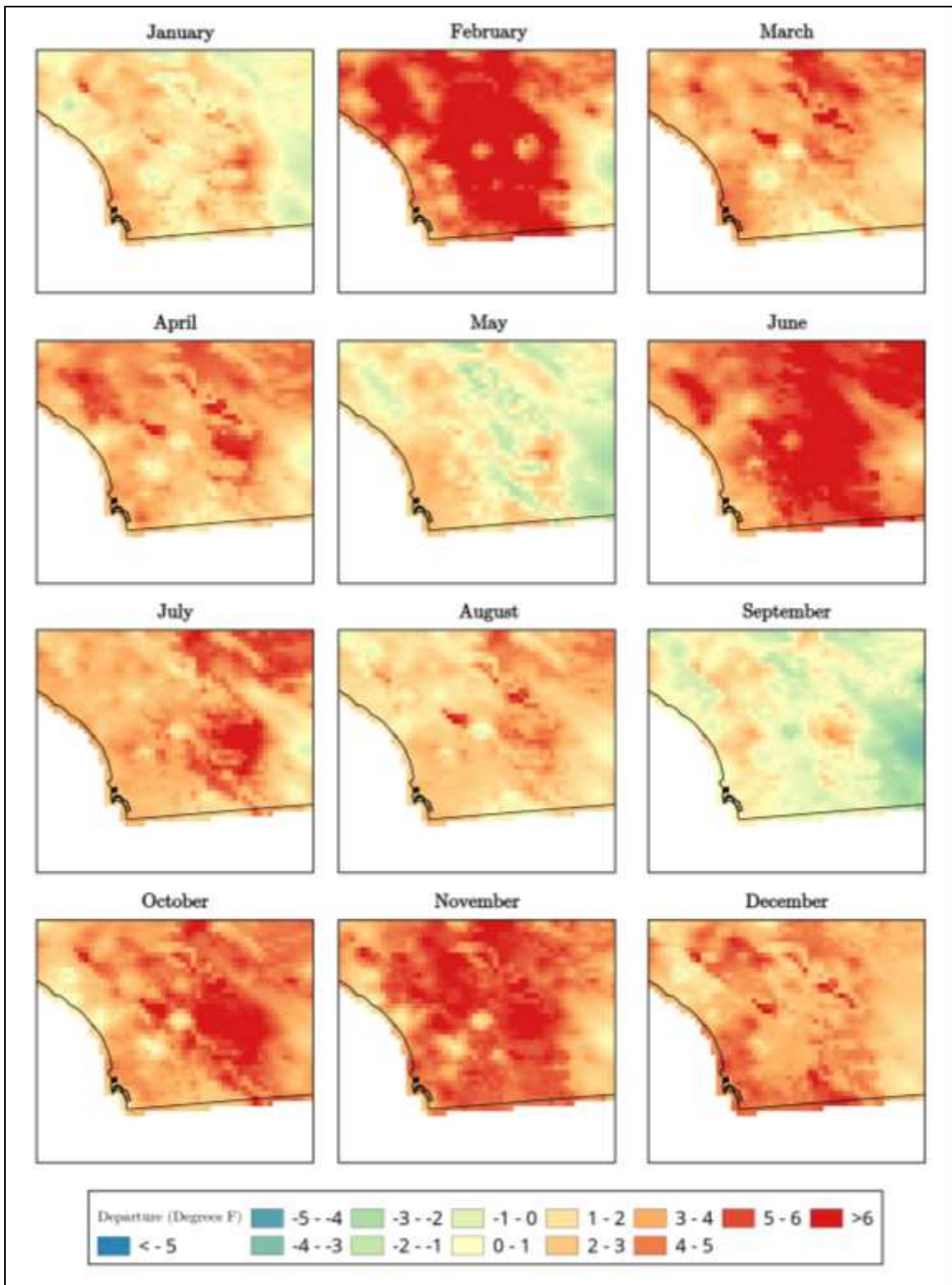


Figure 7. Maps showing departures from 1981 – 2010 average daily minimum temperatures (Tmin) in degrees Fahrenheit during 2016. Estimates are from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). White areas = Pacific Ocean. Cabrillo NM is on the coast, bottom left. For more information, see <http://www.prism.oregonstate.edu/>.

Streamflow

Since the rivers near Cabrillo National Monument are all heavily influenced by human activity, including artificial dams, streamflow is as much a result of management priorities as annual climatic events. Nevertheless, it is worth noting that streamflows were ≤ 1 cubic foot per second (CFS) for much of summer 2016, in contrast to 2015, which had more constant flows (Figure 8).

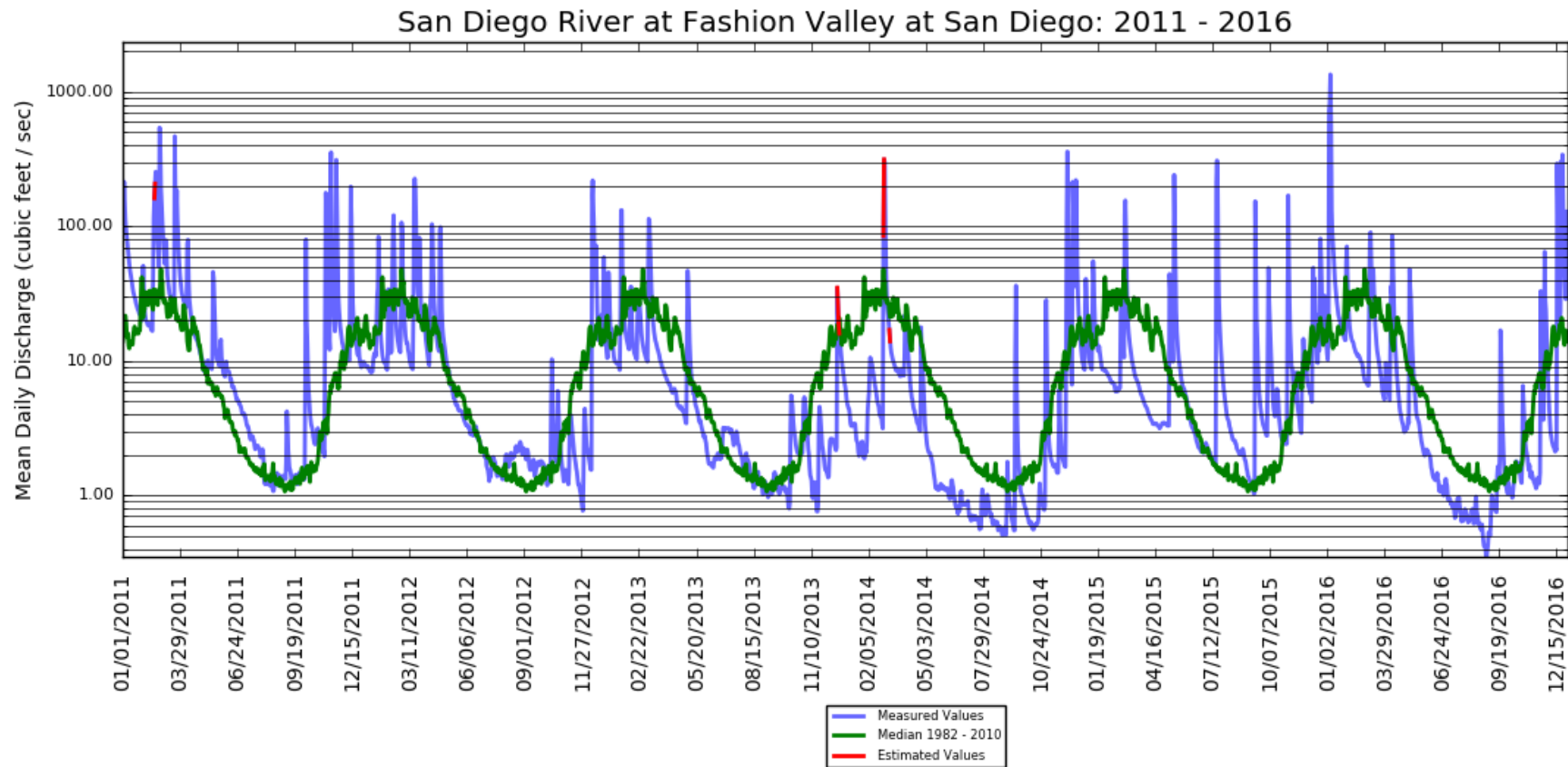


Figure 8. Stream discharge on the San Diego River near Cabrillo National Monument during 2011 – 2016.

Accumulated Growing Degree Days, an Index of Growing Season Length

Accumulated Growing Degree Days (AGDD) are often used as an index of growing season length. They are calculated as the sum of the differences between the average temperature for each day of the year and a base temperature. This base temperature is often chosen as the threshold below which plants are thought to be metabolically inactive. In the case of AGDD40, the base temperature is 40 degrees Fahrenheit. Consequently, 40 is subtracted from the mean temperature for each day, and these differences are added up for the entire year, giving a single number. Similarly, AGDD50 is calculated with a base temperature of 50 (F).

When viewed from the perspective of growing season length, calendar-year 2015 was above average (Table 4). At San Diego Lindbergh Field, AGDD 40 was 113% the 1981 – 2010 average and AGDD 50 was 123%. At Chula Vista, AGDD40 was 122% and AGDD50 was 139% the average.

Table 4. Accumulated Growing Degree Days (AGDD) and days above or below critical temperature thresholds during 2016.

Station Name	Time Period	AGDD40	AGDD50	# days ≥ 90 F	# days ≤ 32F
San Diego Lindbergh Field	2016 Value	9619	5959	4.0	0.0
	1981 - 2010 Avg.	8478	4832	2.5	0.0
Chula Vista	2016 Value	9355	5695	8.0	0.0
	1981 - 2010 Avg.	7679	4059	1.9	0.9
Pt. Loma ^{a, b}	2016 Value	N/A	N/A	N/A	N/A
NPS Cabrillo ^{a, b}	2016 Value	N/A	N/A	N/A	N/A

^a Met stations (last two entries in the table) do not have 30-year averages.

^b N/A = Insufficient data for an accurate calculation.

Conclusions

- ENSO switched from an El Nino to a La Nina Phase during 2016. Normally, La Nina conditions produce drier conditions in southern California while El Nino produces wetter conditions. Northern California saw increased rain during 2016, but the drought gripping southern California did not materially slacken during 2016.
- The area in and near Cabrillo National Monument was classified as “D3 - Extreme Drought” by the US Drought Monitor and it retained this classification until the end of 2016
- Annual precipitation was near normal (99% the 1981 – 2010 average) and annual average temperatures were slightly cooler than in 2015. The average of the daily highs for the year was 2.3 degrees above the 30 – year average and the average of daily lows was 2.8 degrees above average.
- Despite being cooler than 2015, calendar year 2016 was still notably warm. Every month had average temperatures above the 30 – year average (Figures 4,6,7). February had average daytime highs 9.4 degrees above the 30 – year average.

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Appendix

Table A-1. Climate stations used in this report. Detailed histories, period of record, and 30-year averages can be accessed from the links provided.

Site Name	Station type*	Station ID	Metadata
Pt. Loma	MET ^a	SDL13	http://mesowest.utah.edu/cgi-bin/droman/meso_base.cgi?stn=SDL13&unit=0&timetype=LOCAL
NPS Cabrillo	MET ^a	HP017	http://mesowest.utah.edu/cgi-bin/droman/meso_base.cgi?stn=HP017&unit=0&timetype=LOCAL
Chula Vista	GHCN ^b	41758	http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1758
San Diego WSO Airport AKA Lindbergh Field	GHCN ^a	47740	http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7740
San Diego Naval Air Station	MET ^a	KNZY	http://www.climateanalyzer.org/raws/KNZY/
San Diego R at Fashion Valley	Stream Gage ^c	11023000	http://waterdata.usgs.gov/nwis/dvstat/?format=sites_selection_links&search_site_no=11023000&agency_cd=USGS&referred_module=sw

^aMET = Automated Meteorological Stations,

^bGHCN = Global Historical Climatology Network,

^cStream Gage = USGS Stream Gage Station

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