



Santa Monica Mountains National Recreation Area – Climate of 2011

Natural Resource Data Series NPS/MEDN/NRDS—2012/375



ON THE COVER

Coastal bluffs in the Santa Monica Mountains overlook the Pacific Ocean
Photograph by: Asheia Mills

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Natural Resource Data Series NPS/MEDN/NRDS—2012/375

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The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Data Series is intended for the timely release of basic data sets and data summaries. Care has been taken to assure accuracy of raw data values, but a thorough analysis and interpretation of the data has not been completed. Consequently, the initial analyses of data in this report are provisional and subject to change.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data.

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Executive Summary

This report details the climate (temperature, precipitation, drought, streamflow, and wind conditions) of Santa Monica Mountains National Recreation Area (NRA) during 2011. 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 Remote Automated Weather Stations (RAWS), weather stations in Global Historical Climatology Network (GHCN), 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 (Rocky Mountain Climate Working Group 2010). Key points summarizing calendar year 2011 are presented as bullets in the Conclusion section at the end of the report. There was significant spatial and month to month variability in the data that provided exceptions to these generalizations, so an examination of the regional maps (Figs. 4-6) are key to understanding the climatic patterns for 2011. The Results section contains a narrative that provides details for each season of the year. Readers can download the data used in this report and make custom climate graphs and tables of their own by visiting www.ClimateAnalyzer.org

Acknowledgments

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Glossary

GHCN – Global Historical Climatology Network.

RAWS – Remote Automated Weather Station

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. Because 2011 was the first year in which 1981 – 2010 averages were in widespread use, both reference periods were used in this report.

Introduction

This report details the climate (temperature, precipitation, drought, streamflow, and wind conditions) of Santa Monica Mountains National Recreation Area (NRA) during 2011. 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 2011 are also compared to a historical context, based primarily on a 30-year average or “normal” period.

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 will be 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>)

Since 2011 was the first year in which 1981 – 2010 averages were commonly used, most of the climate parameters in this report are compared to both 1971 – 2000 and 1981 – 2010 averages. If this approach had not been taken, it would have been difficult to compare this report to its predecessor (Tercek 2011), which summarized the climate of Santa Monica Mountains NRA during 2010. This is because a precipitation measurement that would have been considered below average (for example, during March) when compared to the 1971 – 2000 averages, might instead be near normal when compared to the 1981 – 2010 averages. The differences between these two time periods are described in more detail in the results section.

The content in this report is divided into three sections that discuss: (1) precipitation, temperature and drought, (2) streamflow, and (3) wind conditions. The section on temperature, precipitation and drought is further sub-divided into seasonal narratives that highlight key data and events. Those interested in additional climate-related information for Santa Monica Mountains NRA and the surrounding areas should seek:

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>)

Approach and Methods

Selection of Datasets

In order to place Santa Monica Mountains NRA within a regional context, grid-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). At the time of writing, 1981 – 2010 averages (normals) were not available for PRISM data, so 1971 – 2000 PRISM normals were used.

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 of interest. In the case of Santa Monica Mountains NRA, RAWS stations were chosen because they are located within the administrative boundaries of the recreation area (Fig. 1) and are routinely consulted by NPS staff. In addition, National Weather Service (NWS) stations were chosen from nearby locations. Data from the NWS stations are available through the Global Historical Climatology Network (GHCN). GHCN stations have several advantages, including their relatively long period of record (Appendix 1), and the availability of established 30-year averages that can be used to quantify the difference between the current year and “normal” conditions. For this report, NWS/GHCN stations were selected along an axis of increasing distance from the Pacific Coast, with Santa Monica Pier measuring the more moderate ocean climate, and Burbank – Glendale Airport at the inland extreme (Figure 1).
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 1971 – 2000 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.

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. To present more fine-scale drought conditions, the Keetch-Byram Drought Index (KBDI) was calculated for every day during the period of record at select weather stations in the region. Methods for these calculations were based on Alexander (1990), who identified typographical errors in the original Keetch-Byram (1968) description of the index. The KBDI can be interpreted as the amount of precipitation (expressed in hundredths of inches) that

would be needed to restore the soil to full capacity. A KBDI index of zero indicates soil saturation, and a KBDI of 800 indicates maximum possible drought, in which, theoretically, 8 or more inches of rain would be needed to replenish the soil (Keetch and Byram 1968, Alexander 1990). The KBDI is used in fire modeling and has been shown to be a good predictor of conditions that favor fires that burn deeply into the organic soil layers, thus making them more resistant to control efforts (Dolling et al. 2005).

Even though the watercourses in the region are human-controlled and not directly tied to rainfall, USGS stream gage data (<http://waterdata.usgs.gov/nwis>) were used to contrast streamflow during the 2011 water year, which ran from October 2010 to September 2011, with average conditions during the period 1971 – 2000.

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 Appendix 1.

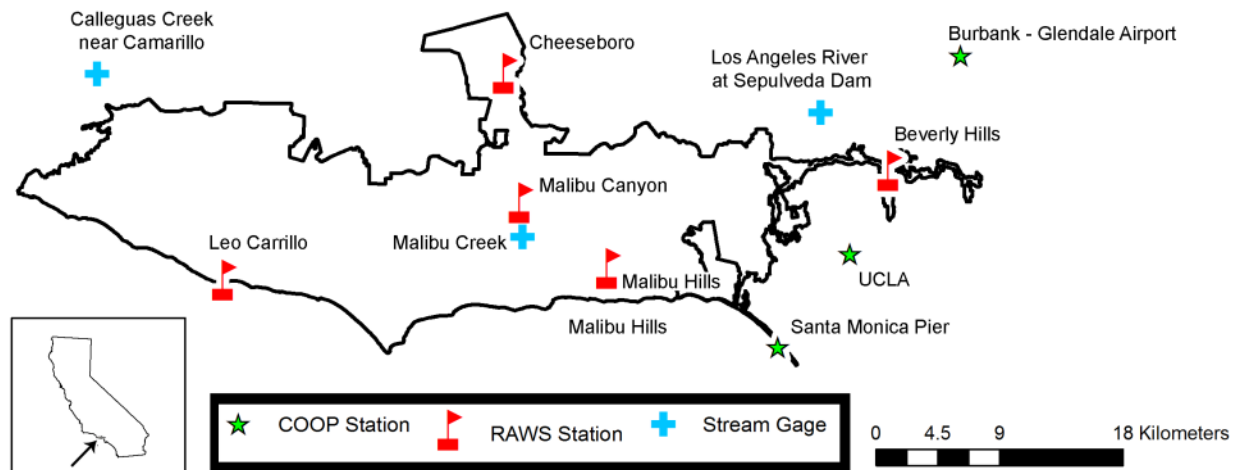


Figure 1. Map showing key climate stations and stream gauges in and near Santa Monica Mountains National Recreation Area.

Quality Control of Global Historical Climatology Network Data

As of January 2012, weather station data are no longer available from the internet in the Cooperative Observer Program (COOP) format, and this format is not expected to return “any time soon” (National Climatic Data Center, personal communication to author). All of the weather stations that were served by this data portal have been transferred to the Global Historical Climatology Network (GHCN), which is available online at this address: <http://www.ncdc.noaa.gov/cdo-web/search>.

In addition to using metric units, different methods of expressing missing values, and a different row / column arrangement of values, this format also employs a new set of data quality flags that indicate the level of confidence in each measurement and any modifications that were made to each data point during routine Qa/Qc by the National Weather Service. In response to these changes, 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. To download the software used for data screening and to learn more about the methods, visit www.YellowstoneEcology.com. 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 RAWS Data

Because RAWS 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 two 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, 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.

All the data used in the preparation of this report (including original and quality checked files) are available electronically from the Mediterranean Coast Network I&M program. These data files may be read and re-analyzed by the same software that was used to produce this report, available for download at www.YellowstoneEcology.com.

Analysis of Wind Data

Wind roses were used to present average conditions during 2011 and to contrast them with the period 2005 – 2010. This period was chosen because it was common to all the RAWS stations in the study area.

Results

Comparison of 1971 – 2000 vs. 1981 – 2010 averages.

Figure 2 shows the differences between 1971 – 2000 and 1981 – 2010 averages at two weather stations near Santa Monica Mountain NRA. In general, average daily maximum temperatures (Tmax) and average daily minimum temperatures (Tmin) differed little between the two time periods. Precipitation averages for February, April, October, and December were greater during 1981 – 2010. March average precipitation was lower during 1981 – 2010, and other months had smaller changes in precipitation.

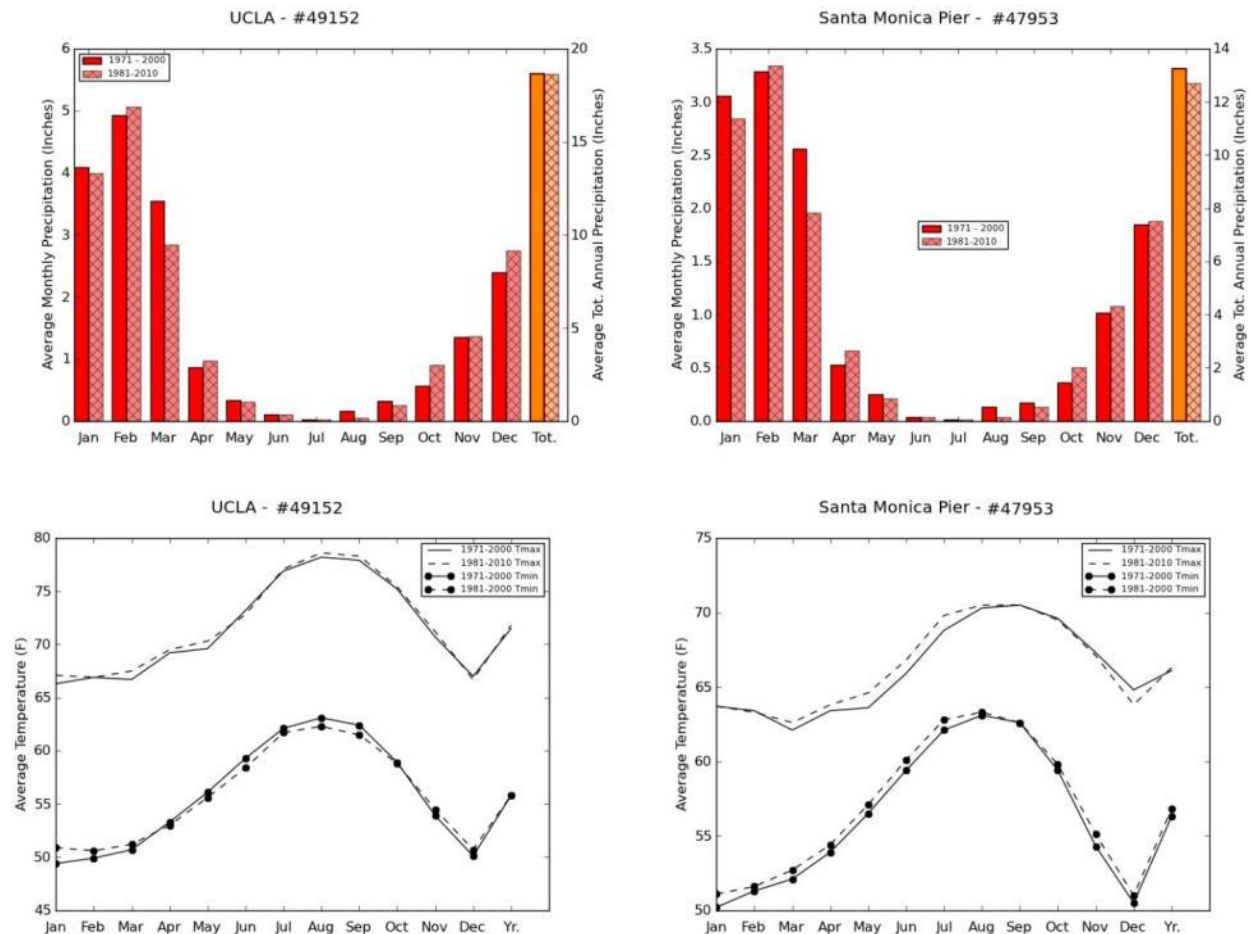


Figure 2. Differences between climatic “normals” (30-year averages) calculated for 1971 – 2000 vs. 1981 – 2010 at two weather stations near Santa Monica Mountains National Recreation Area. These normals are issued by the National Weather Service and are not calculated as simple arithmetic averages. Instead, the number of missing values and other factors are taken into account. Note that annual precipitation totals are plotted on the right axis.

Temperature, Precipitation, and Drought Status During Calendar Year 2011

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

(Figures 4 – 6) and compare them to the weather station data presented in Figures 7 – 9 and Tables 1 - 2.

Broader Picture – La Nina conditions

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 interacts with another climatological cycle known as the Pacific Decadal Oscillation (PDO), which has similar effects on weather in the United States but cycles over roughly 10 – 30 years. More information on the PDO can be obtained from NOAA here: <http://www.ncdc.noaa.gov/teleconnections/pdo/>

During 2011, ENSO was in a strong La Nina phase and the PDO was in a cool phase that should have reinforced the La Nina effects on climate. For long-term El Nino patterns, consult NOAA here: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml

Normally, La Nina conditions would produce drier conditions in southern California. However, in the case of the 2010 - 2011 winter, the expected La Nina effects were not clearly seen. Rather than being dry, December 2010 had 380% average precipitation at the Burbank – Glendale Airport and 480% average at UCLA. January – February 2011, were indeed drier than average, ranging from 18 – 24% the 1981 – 2010 averages during January and 64% - 67% average during February.

Annual Summary of Precipitation and Temperature

After recovering from drought during 2010, the region remained drought free for the entirety of calendar year 2011 (Figure 3). This was true despite below average precipitation during January, April, September, and December (Figure 4). Total annual precipitation was 16.1 inches at UCLA, which was 86% the 1981 – 2010 averages. Temperatures were generally near to below the 30-year averages throughout much of the region, with the exception of January and April, which were in some places 2 or more degrees (F) above average. Remote Automated Weather Stations (RAWS) recorded generally above average precipitation and average to below average temperatures (Figure 9). Highlights of interest for each season are described below. See Figures 4 – 10 and Tables 1 – 3 for more details.

January – May: Highlights.

Quick Summary: The region remained drought free because dry and warm conditions during January and February were compensated by wetter than average conditions in March and May. April was drier than average but had near normal temperatures.

More Detail: Temperatures were generally above average during January, and precipitation was well below average during both January and February (Figures 4 -6). UCLA had January average daily maximum temperatures (Tmax) 4.6 degrees (F) above the 1971 – 2000 average, which was 3.8 degrees (F) above the 1981 – 2010 average. Most of the region, however, was only 1 – 2

degrees above average during January (Figures 4, 5; Table 2). March had generally above average precipitation, with temperatures that were generally near average. April precipitation was generally well below average (< 25% average throughout most of the region, Figure 4), however, the weather station on Santa Monica Pier was an interesting exception, reporting 109% the 1971 – 2000 average during April (Figure 7, Table 1). May had generally above average precipitation (as much as 207% the 1981 – 2010 averages at UCLA) and average to below average temperatures. See Figures 4 – 10 and Tables 1 – 3 for more details.

June – August: Highlights

Quick Summary: The region typically has low precipitation during the summer, but June was unusual because the western part of the region surrounding Santa Monica Mountains NRA, particularly the Channel Islands, had quite high precipitation, and the eastern part of the region had precipitation below average. Temperatures were generally below average.

More Detail: Weather stations in the region typically record very little precipitation during June – August. For example, June average precipitation for Santa Monica Pier during 1971 – 2000 was 0.04 inches, and July average precipitation during 1971 – 2000 at Santa Monica Pier and UCLA were 0.01 and 0.02 inches, respectively. August precipitation at the GHCN stations cited in this report (Figure 1) averaged 0.13 – 0.18 inches during 1971 – 2000.

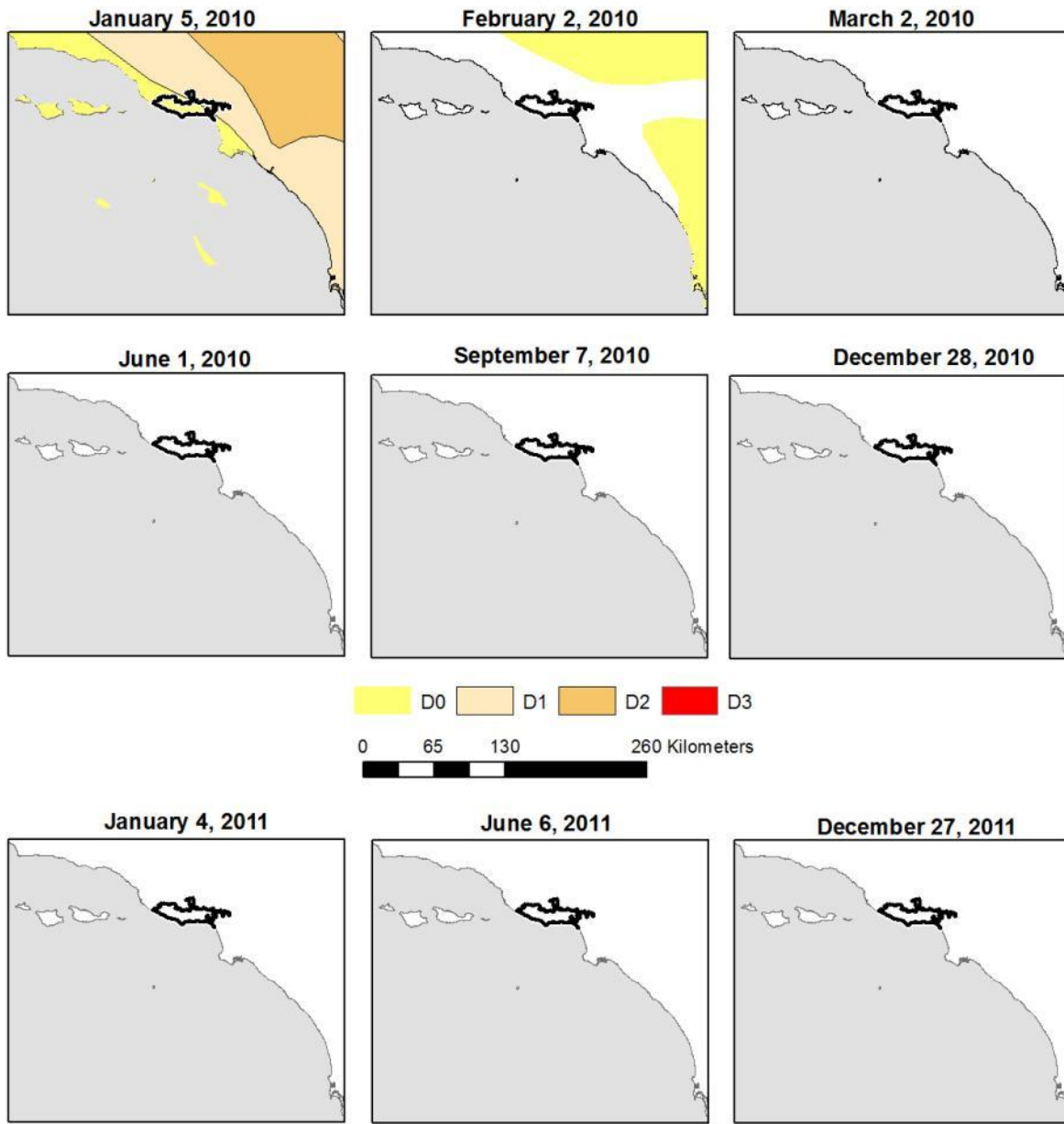


Figure 3. U.S. Drought Monitor maps for Santa Monica Mountains National Recreation Area during calendar years 2010 - 2011. Drought classifications range from “abnormally dry” (D0) to “exceptional drought” (D4). White areas on the map indicate lack of drought status. For more information visit: www.drought.unl.edu/dm/monitor.html

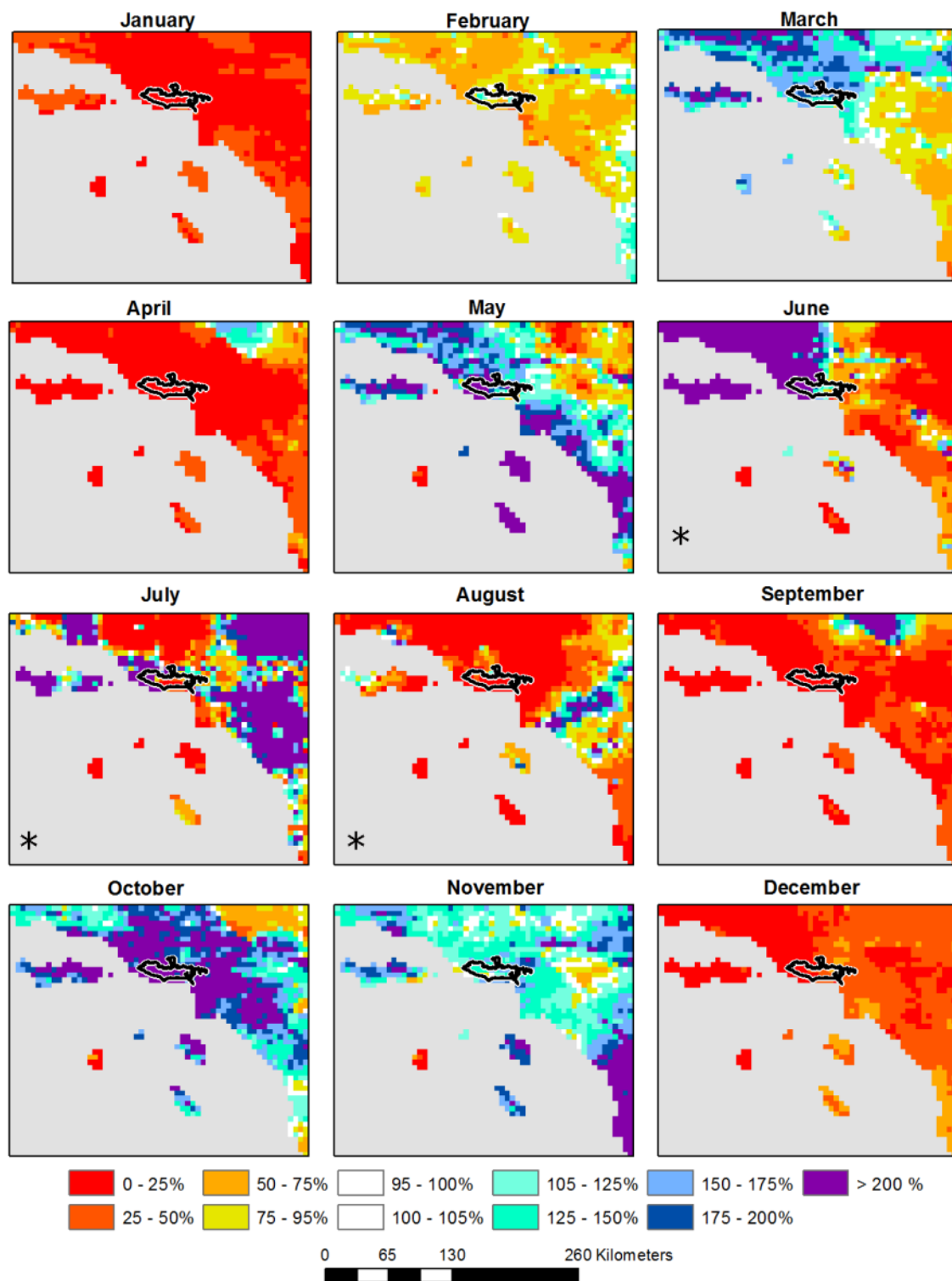


Figure 4. Maps showing percent of average precipitation relative to 1971–2000 for each month during 2011. Estimates are from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). Gray areas = Pacific Ocean. Santa Monica NRA is shown as a black outline. For more information, see <http://www.prism.oregonstate.edu/>. Asterisks indicate months that had very low average precipitation during 1971 – 2000. For example, key weather stations in this region have monthly average precipitation during summer months ranging 0.01 – 0.2 inches (see Fig. 5). For this reason, map colors indicating 0 – 25% average precipitation may represent very small absolute departure from average (0.01 – 0.2 inches less than normal).

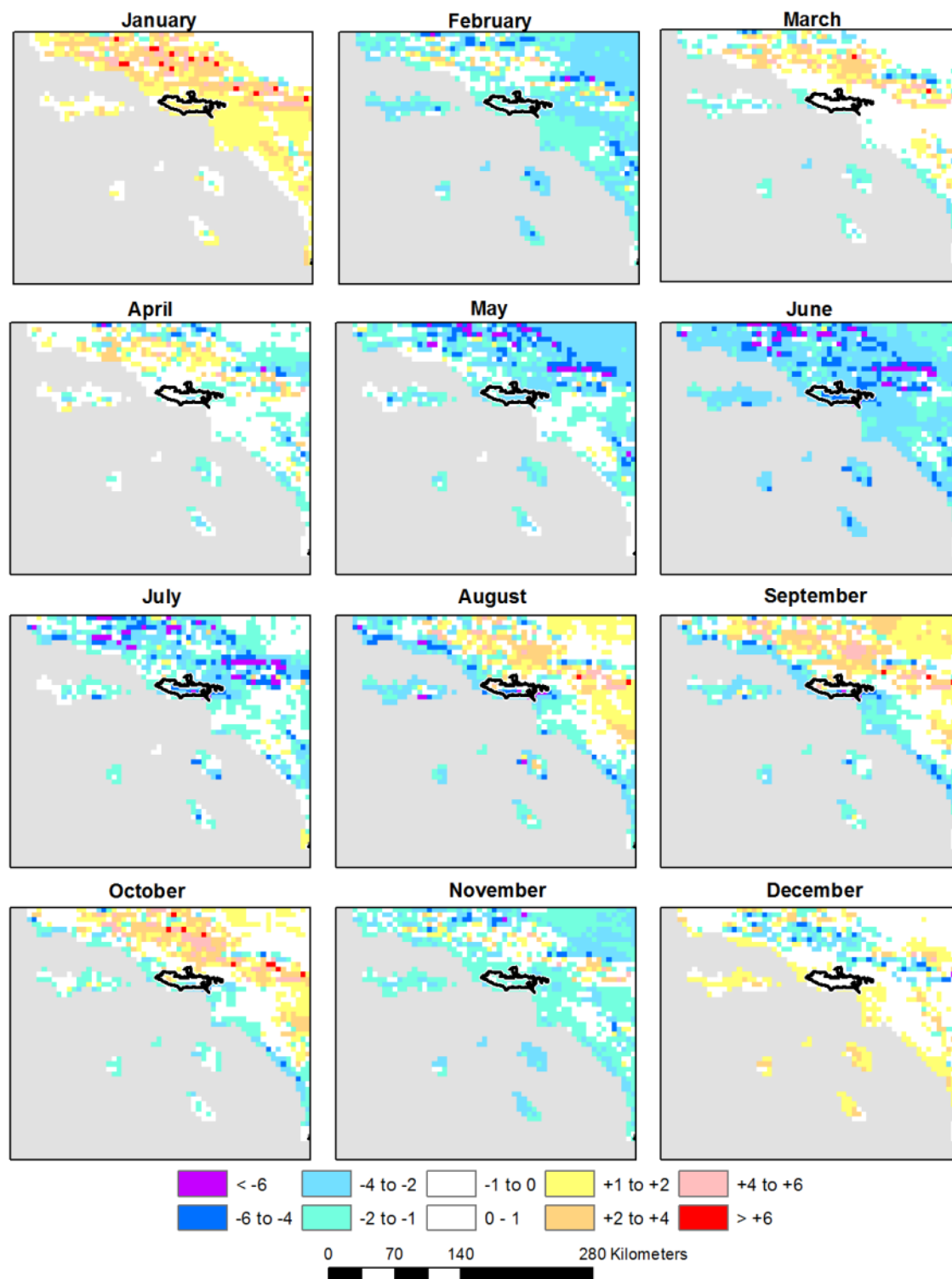


Figure 5. Maps showing departures from 1971 – 2000 average daily maximum temperatures (Tmax) in degrees Fahrenheit. Estimates are from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). Gray areas = Pacific Ocean. Santa Monica NRA is shown as a black outline. For more information, see <http://www.prism.oregonstate.edu/>.

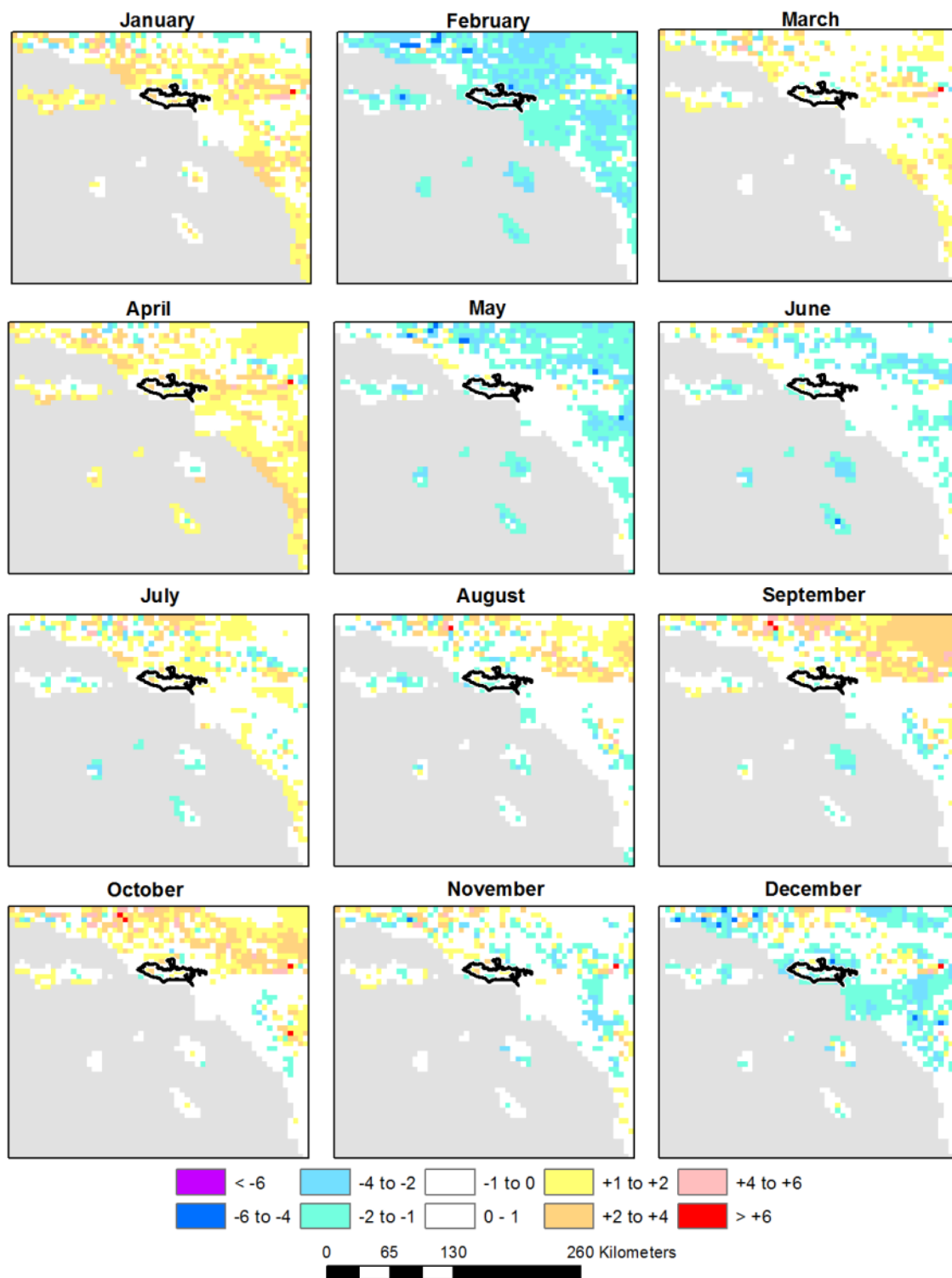


Figure 6. Maps showing departures from 1971 – 2000 average daily minimum temperatures (Tmin) in degrees Fahrenheit. Estimates are from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). Gray areas = Pacific Ocean. Santa Monica NRA is shown as a black outline. For more information, see <http://www.prism.oregonstate.edu/>.

Because average (“normal”) precipitation is low during June - August, care should be taken when interpreting statistics that quantify the amount (%) of normal precipitation that fell during the summer months. For example, during 2011 PRISM precipitation maps (Fig. 4) show very complex patterns during July and August, with some parts of the region very dry (0-25% average precipitation) and others very wet (>200% average precipitation). It is important to keep mind that the absolute difference in precipitation (expressed as inches of rain rather than percent average) was very small. For example, 0.04 inches of rain during June at the UCLA weather station was only 36% of the 1971 – 2000 average, but if only an additional 0.07 inches of rain had fallen, the measurements would have been approximately 100% normal (Table 1).

For the reasons just described, most of the “patchiness” in the PRISM precipitation maps (Figure 4) during June – August can be explained by the region’s characteristically low summer rainfall. However, a noteworthy pattern can be seen in the June precipitation map (Figure 4), where western regions have precipitation that is well above average, and eastern regions are below average. The division between these two precipitation regimes appears to run straight down the middle of Santa Monica Mountains NRA, and it is striking that eastern stations like UCLA and the Burbank-Glendale Airport recorded 0 -35% average, while the Channel Islands (western) experienced extremely high rainfall during June. Santa Cruz Island, for example, recorded roughly 2700% the 1971 – 2000 average, i.e. 270x times normal rainfall during June, making it the third wettest June at that location since records began in 1904.

Temperatures during this period were generally below average (Figures 7,9; Tables 2,3). Average daily maximum temperatures (Tmax) were as much as 7 degrees below the 1971 – 2000 average during June (Burbank-Glendale Airport), while most average daily minimum temperatures (Tmin) were 1 – 2 degrees below the 30-year averages during June – August. During this period, RAWS stations, with the exception of Beverly Hills, recorded some of the coolest monthly averages in their record (Figure 9). See Figures 4 – 10 and Tables 1 – 3 for more details.

September – December: Highlights

Quick Summary: September and December precipitation was generally less than 70% the 30 – year averages. October and November precipitation was generally 150% or more the 30-year averages (Figure 4, Table 1). Temperatures were generally near to below the 30-year averages.

More Detail: During September and October, it was generally cooler than average near the coast and warmer inland. For example, average daily maximum temperature (Tmax) at Santa Monica Pier was roughly 3 degrees (F) below both the 1971 – 2000 and 1981 – 2010 averages, but Tmax at UCLA during this month was roughly 1 degree (F) above the 30-year averages (Table 2, Figure 7). Low precipitation during September and December (20 – 50% average) was compensated by quite wet conditions during October and November (150% - 300% the 30-year averages, Table 1). October was noteworthy because there was a significant increase in average precipitation during 1971 – 2000 vs. 1981 – 2010 (Figure 2). At the UCLA weather station, this difference during 1981 – 2010 relative to 1971 – 2000, which meant that 1.73 inches of October rain was roughly 300% of “normal” when compared to the 1971- 2000 average, but only 190% of “normal” when compared to 1981 – 2010. November precipitation was roughly 160% - 200% the 30-year averages and temperatures during this month ranged from near normal to as much as 2.9 degrees (F) below the 1971 – 2000 average (Figure 7; Tables 1, 2). December precipitation

was 28% - 51% the 30-year averages at the weather stations in the region (Table 1) and temperatures ranged from near normal to as much as 2.7 degrees below the 1971 – 2000 average (Burbank – Glendale Airport). See Figures 4 – 10 and Tables 1 – 3 for more details.

Table 1. Total Monthly Precipitation in inches during 2011 and departure (%) from both 1971 – 2000 and 1981 – 2010 averages. (-) = insufficient data for and accurate calculation.

Station Name	Type	ID	Parameter	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
Burbank - Glendale Airport	GHCN	41194	Precip. (in)	0.63	2.89	5.25	(-)	0.4	0	0	(-)	(-)	0.81	2.23	0.89	(-)
			% 1971 – 2000	17.69	67.36	135	(-)	108	0	0	(-)	(-)	148	212	41.38	(-)
			% 1981 – 2010	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
UCLA	GHCN	49152	Precip. (in)	0.93	3.26	6.27	0	0.64	0.04	0	0	0.07	1.73	2.36	0.79	16.11
			% 1971 – 2000	22.81	66.2	177	0	189	35.8	0	0	22.15	304	175	33.11	86.24
			% 1981 – 2010	23.39	64.37	220.83	0	207	35.8	0	0	28.35	190	174	28.78	86.47
Santa Monica Pier	GHCN	47953	Precip. (in)	(-)	0.11	0.83	0.58	0.36	0	0	0	0	0.01	1.75	0.94	(-)
			% 1971 – 2000	(-)	3.35	32.42	109	144	0	0	0	0	3.28	172	50.81	(-)
			% 1981 – 2010	(-)	3.3	42.35	87.88	171	0	0	0	0	2.36	162	50	(-)
Beverly Hills	RAWS		Precip. (in)	0.92	3.8	6.09	0	0.51	0.08	0	0	0	1.16	2.37	1.28	16.21
Leo Carrillo	RAWS		Precip. (in)	0.6	1.62	2.08	0	0.25	0.03	0	0	(-)	0.7	1.61	0.53	(-)
Malibu Hills	RAWS		Precip. (in)	0.44	2.12	4.26	0	0.22	0.05	0	0	0.01	2.86	2.85	(-)	(-)
Malibu Canyon	RAWS		Precip. (in)	1.03	4.07	5.41	0	0.62	0.01	0	0	0.45	2.18	2.25	1.3	17.32
Cheeseboro	RAWS		Precip. (in)	0.52	2.39	4.03	0.02	0.39	0.05	0	0	0	0.46	1.73	0.66	10.25

Table 2. Average daily maximum temperatures (Tmax), Average daily minimum temperatures (Tmin) during 2011 and departure from 1971 – 2000 and 1981 - 2010 averages expressed as +/- Degrees F. (-) = insufficient data for and accurate calculation.

Station Name	Type	ID	Parameter	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
Burbank - Glendale Airport	GHCN	41194	Tmax (F)	69	63.63	68.8	(-)	73.24	76.05	83.84	87.59	85.2	80.91	70.6	65.2	(-)
			Tmax Departure (+/- F) from 1971 – 2000	1.5	-5.87	-1.8	(-)	-4.26	-7.15	-5.06	-2.31	1.93	-0.59	2.89	-2.7	(-)
			Tmax Departure (+/- F) from 1981 – 2010	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
			Tmin (F)	44.49	41.78	48.1	(-)	51.5	56.65	62.52	61.51	60.9	54.49	44.6	39.1	(-)
			Tmin Departure (+/- F) from 1971 – 2000	2.49	-2.52	1.9	(-)	-2.7	-1.65	0.42	-0.89	0.97	0.89	0.81	-2.23	(-)
			Tmin Departure (+/- F) from 1981 – 2010	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
UCLA	GHCN	49152	Tmax (F)	70.91	64.53	68.32	71.86	70.78	71.81	76.35	77.47	76.4	76.3	70.6	67.4	71.9
			Tmax Departure (+/- F) from 1971 – 2000	4.61	-2.37	1.62	2.66	1.18	-1.39	-0.55	-0.73	-	1.48	1.1	0.06	0.4
			Tmax Departure (+/- F) from 1981 – 2010	3.81	-2.37	0.82	2.36	0.48	-0.99	-0.75	-1.13	1.88	0.9	0.56	0.72	0.1
			Tmin (F)	52.24	47.17	50.32	54.7	54.62	56.53	61.43	61.01	60.6	58.61	53.1	48.5	54.91
			Tmin Departure (+/- F) from 1971 – 2000	2.84	-2.73	-0.38	1.4	-1.48	-2.77	-0.67	-2.09	-	1.79	-0.29	0.83	-1.55
			Tmin Departure (+/- F) from 1981 – 2010	1.34	-3.43	-0.88	1.7	-0.98	-1.87	-0.27	-1.29	0.89	-0.19	1.43	-2.15	-0.89

Table 2. Continued.

Station Name	Type	ID	Parameter	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YR
Santa Monica Pier	GHCN	47953	Tmax (F)	(-)	62.78	61.12	64.71	64.18	64	67.64	67.57	67.7	66.55	66.6	63.6	(-)
			Tmax Departure (+/- F) from 1971 – 2000	(-)	-0.63	-0.98	1.31	0.58	-1.9	-1.16	-2.73	2.78	-3.05	0.71	-1.21	(-)
			Tmax Departure (+/- F) from 1981 – 2010	(-)	-0.52	-1.48	0.91	-0.42	-2.8	-2.16	-2.93	2.78	-2.95	0.51	-0.21	(-)
			Tmin (F)	(-)	49.1	51.6	54.99	55.33	58.19	62.66	61.67	61.6	58.48	53.9	48.5	(-)
			Tmin Departure (+/- F) from 1971 – 2000	(-)	-2.2	-0.5	1.09	-1.17	-1.21	0.56	-1.43	1.04	-0.92	0.33	-2.04	(-)
			Tmin Departure (+/- F) from 1981 – 2010	(-)	-2.5	-1.1	0.59	-1.77	-1.91	-0.14	-1.63	1.04	-1.32	1.13	-2.54	(-)
Beverly Hills	RAWS		Tmax (F)	72.19	68.54	73.29	77.23	78.19	82.3	91.81	94.61	91.8	87.65	73.1	71	80.14
			Tmin (F)	51	44.14	48.71	50.4	50.71	53.13	59.52	60.32	59.7	57.84	51.2	47.9	52.89
Leo Carrillo	RAWS		Tmax (F)	67.45	62.82	63.23	66.83	67.19	67.63	72.61	72.74	72.0	71.39	67.4	65.5	68.07
			Tmin (F)	50.48	45.86	48.03	49.93	50	52.47	57.42	56.52	57.3	56.19	51.9	48.4	52.04
Malibu Hills	RAWS		Tmax (F)	67.39	61.25	66.45	70	70.48	72.67	82.9	86.13	82.4	78.81	66.9	(-)	(-)
			Tmin (F)	53.16	45.21	50.23	51.23	51.77	53.13	60.23	62.81	60.6	59.61	51.7	(-)	(-)
Malibu Canyon	RAWS		Tmax (F)	70.9	64.71	70	73.37	73.29	73.47	81.45	84.45	80.6	79.03	68.9	66.9	73.93
			Tmin (F)	36.9	33.25	39.71	43.37	43.45	49.47	55.16	54.16	53.4	46.48	38.1	33.1	43.88
Cheeseboro	RAWS		Tmax (F)	65.35	60.96	66.23	71.03	74.58	79.7	89.23	92.65	90.7	82.42	67.9	64.1	75.4
			Tmin (F)	51.68	44.61	49.42	50.3	50.84	53.57	60.55	63	61.5	58.81	50.8	49.3	53.69

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 AGDD 40, 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, AGDD 50 is calculated with a base temperature of 50 (F).

When viewed from the perspective of growing season length, calendar-year 2011 was near average to below average. At the UCLA weather station, AGDD indices were very close to 100% the long-term average, while at Santa Monica Pier they were roughly 85 – 88% average.

Streamflow

Unlike other climate parameters in this report, streamflow is presented across a standard water year, which ran from October 1, 2010 to September 30, 2011. This better matches the annual cycle of precipitation, which is minimal during summer months. Since the rivers and creeks in and near Santa Monica Mountains NRA are all influenced by human activity, streamflow is as much a result of management priorities as annual climatic events. Nevertheless, a few patterns are worth noting.

The midpoint of annual discharge on both the Los Angeles River and Calleguas Creek were 1 - 3 weeks earlier than the historical average (Figure 11), possibly because of heavier than average rainfall in March (Figure 4, Table1). Most of the other features of streamflow in the region are likely due to management action. For example, discharge on the Los Angeles river during the 2010 – 2011 water year was consistently higher than the historical average (green line in Figure 11), but this apparently high flow has been consistent for many years (Figure 11). Going back in the record, “average” (i.e. lower than current year) streamflows are not found until the period spanning roughly 1955 – 1980 (Figure 11).

Wind and Fire Risk Conditions

Summary wind data suggest that calendar-year 2011 was similar to 2005 – 2010, with the exception of the Cheeseboro RAWS station, which experienced more westerly winds during 2011 (Figure 12). More detail is presented in Appendix 2, where wind roses for every month of 2011 have been plotted for each RAWS station in Santa Monica Mountains NRA.

The Keetch – Byram Drought Index (KBDI; see Methods above), calculated for every day during the period of record at the UCLA weather station, indicated that 2011 was similar to 2010 in being a year of moderate to low fire risk (Figure 13). Seasonal patterns in KBDI at this station were similar to patterns at other weather stations in the region (not shown). Drought/fire risk was highest during the summer months, when regional precipitation was at a minimum. This index can be calculated automatically on a near-real-time basis as a prediction tool. Contact the Mediterranean Coast Network Inventory and Monitoring Program to obtain the computer code that was used for these calculations.

Table 3. Accumulated Growing Degree Days (AGDD) and days above or below critical temperature thresholds during 2011.

Station Name	Station Type	Station ID	AGDD40	AGDD50	# days >= 80 F	# days >= 90 F	# days <= 32F
UCLA	GHCN	49152	8561	4920	59	5	0
		Avg. 1933 - present	8477	4841	(-)	9	0
Burbank Glendale Airport	GHCN	41194	N/A	N/A	N/A	N/A	N/A
		Avg. 1939 - present	8825	5223	(-)	56	4
Santa Monica Pier	GHCN	47953	6880	3543	3	0	0
		Avg. 1937 - present	7783	4139	(-)	1	0
Beverley Hills	RAWS		9705	6088	179	80	0
Cheeseboro	RAWS		8990	5469	137	64	0
Leo Carrillo	RAWS		7261	3652	11	1	0
Malibu Canyon	RAWS		6925	3475	84	22	51
Malibu Hills	RAWS		8447	4847	77	34	0

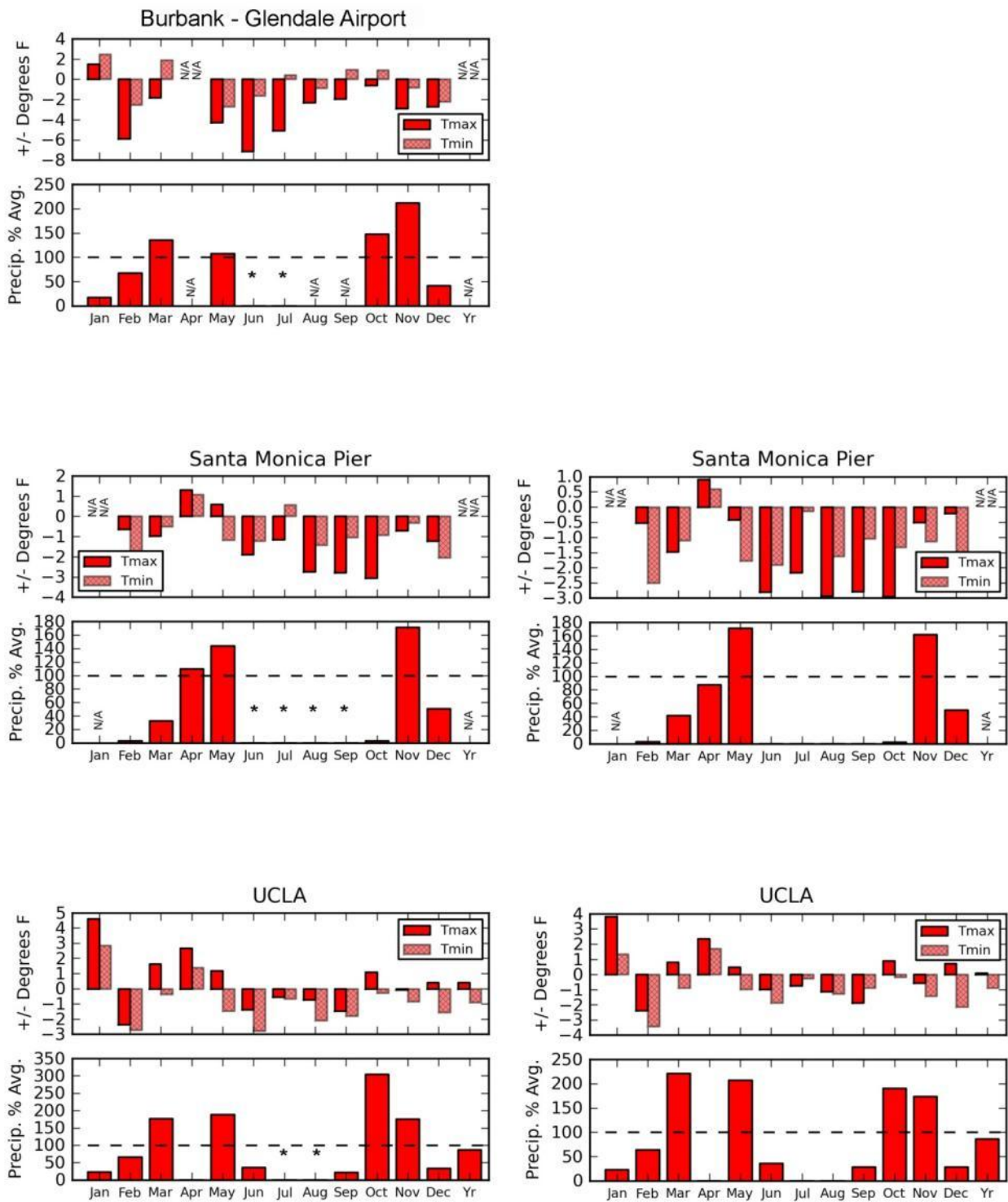


Figure 7. Departure of 2011 precipitation, average daily maximum temperature (Tmax), and average daily minimum temperature (Tmin) from 30-year averages at key weather stations near Santa Monica Mountains National Recreation Area. Left column = departure from 1971 – 2000 averages. Right column = departure from 1981 – 2010 averages. Asterisks indicate months that had less than 0.2 inches average precipitation. For these months, 0% average precipitation may represent a small difference in absolute precipitation departure. N/A = insufficient data for an accurate calculation.

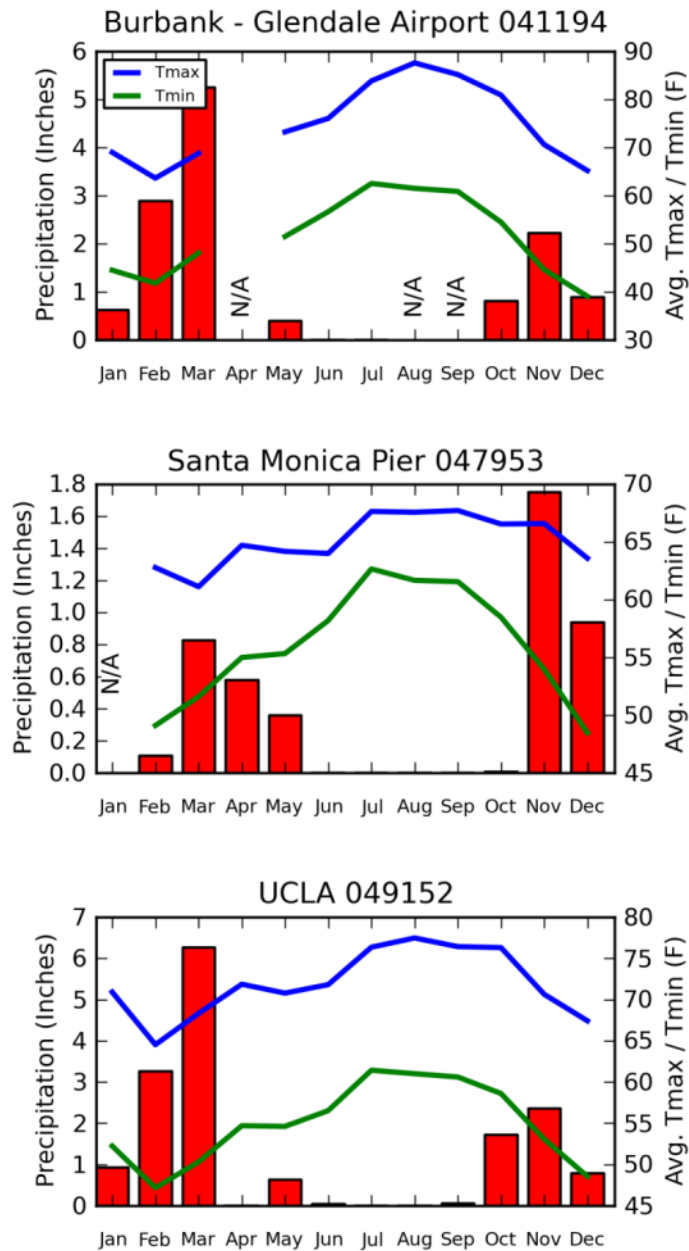


Figure 8. Total monthly precipitation, average daily maximum temperature (Tmax), and average daily minimum temperature (Tmin) during 2011 at key weather stations near Santa Monica Mountains National Recreation Area. N/A = Insufficient data for an accurate calculation.

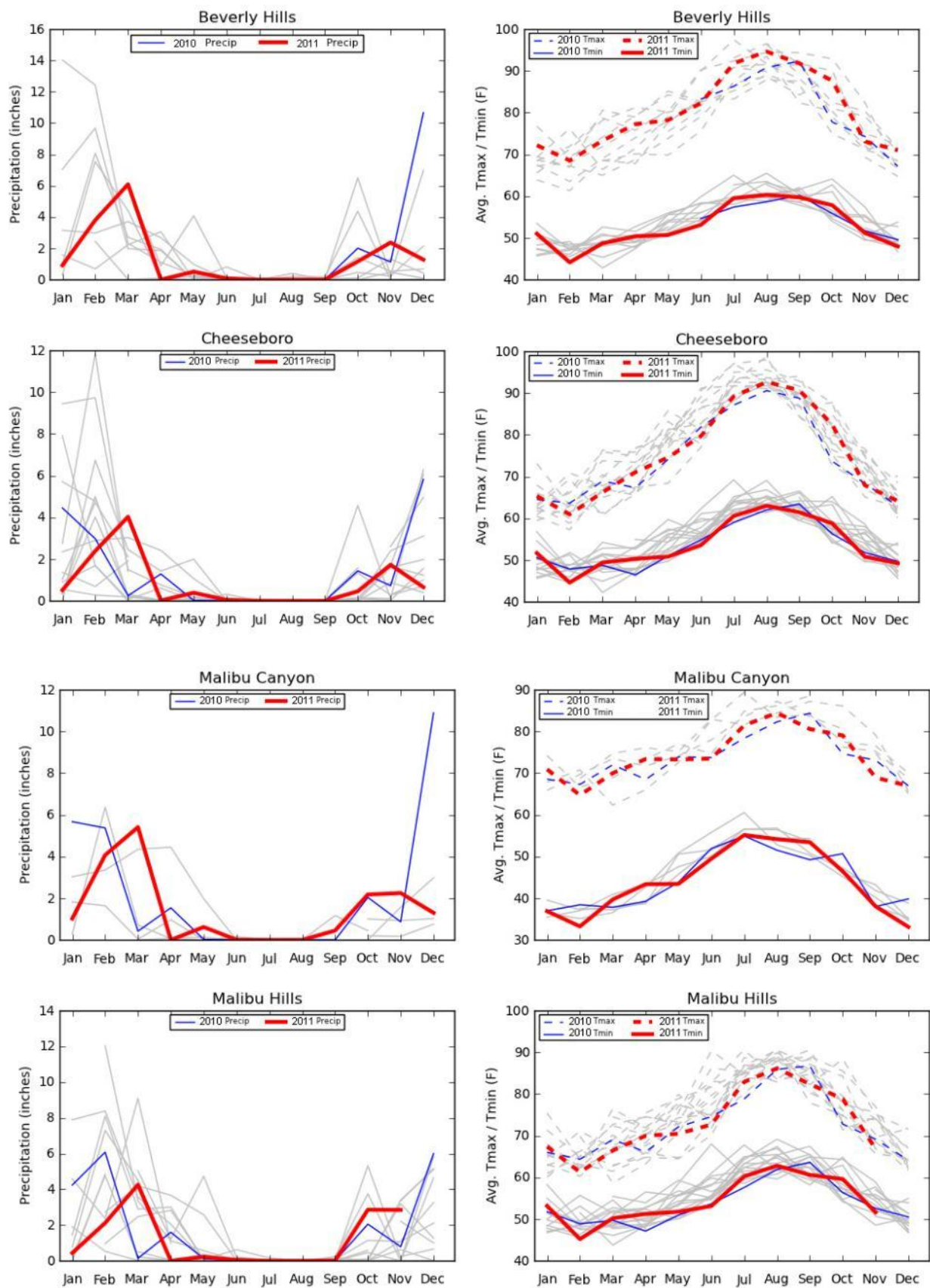


Figure 9. Total monthly precipitation, average daily maximum temperature (Tmax), and average daily minimum temperature (Tmin) for the period of record at RAWS stations in Santa Monica Mountains National Recreation Area. Calendar year 2011 is shown in red and 2010 is shown in blue. All earlier years are shown as gray lines.

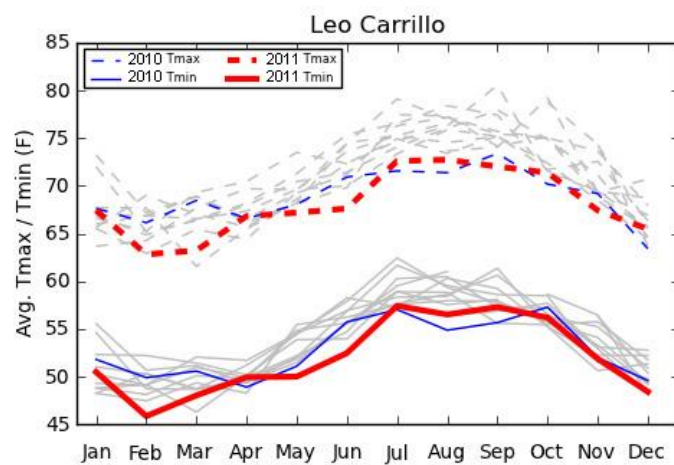
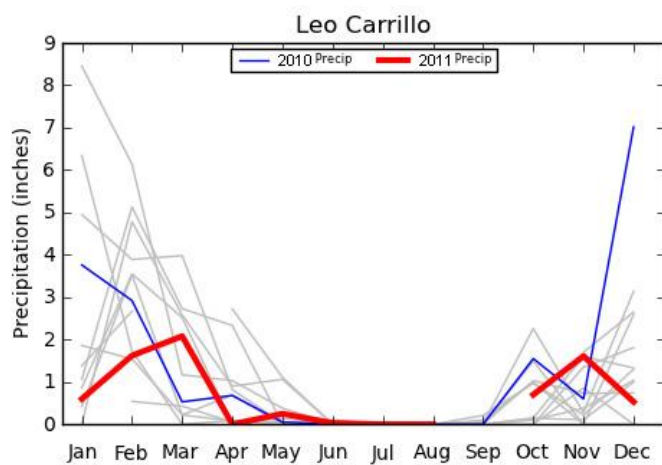


Figure 9. Continued.

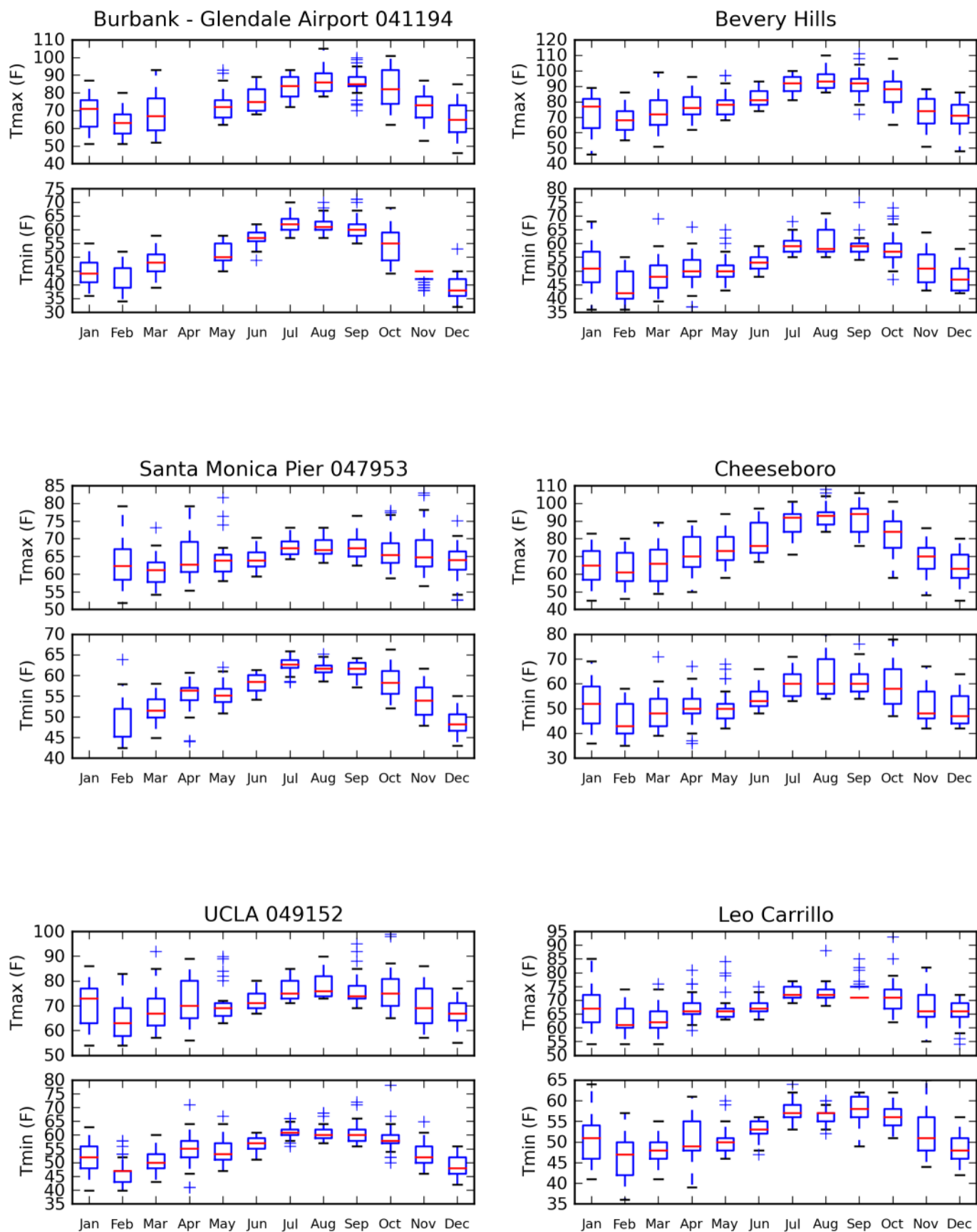


Figure 10. Boxplots of average maximum (Tmax) and average minimum (Tmin) daily temperatures at key climate stations in and near Santa Monica Mountains National Recreation Area during 2011. Horizontal lines indicate the median value. Boxes indicate the 25th and 75th percentiles. Whiskers extend 1.5 times the interquartile Range (IQR). Crosses indicate values exceeding 1.5 times the IOR.

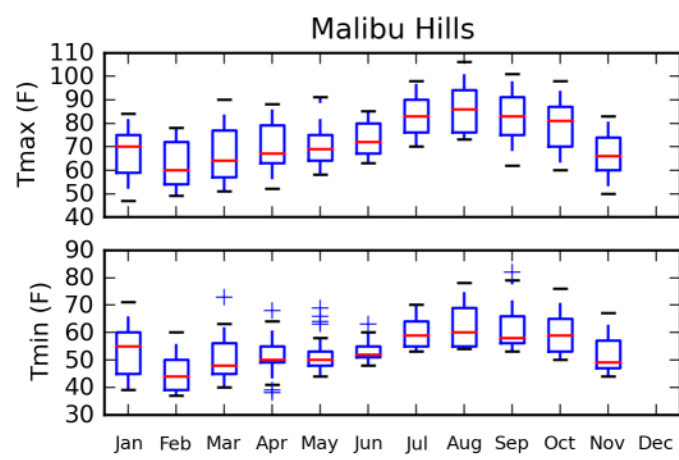
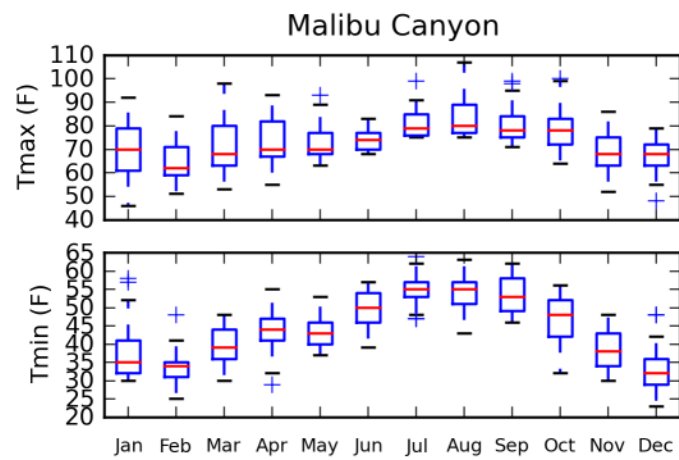


Figure 10. Continued.

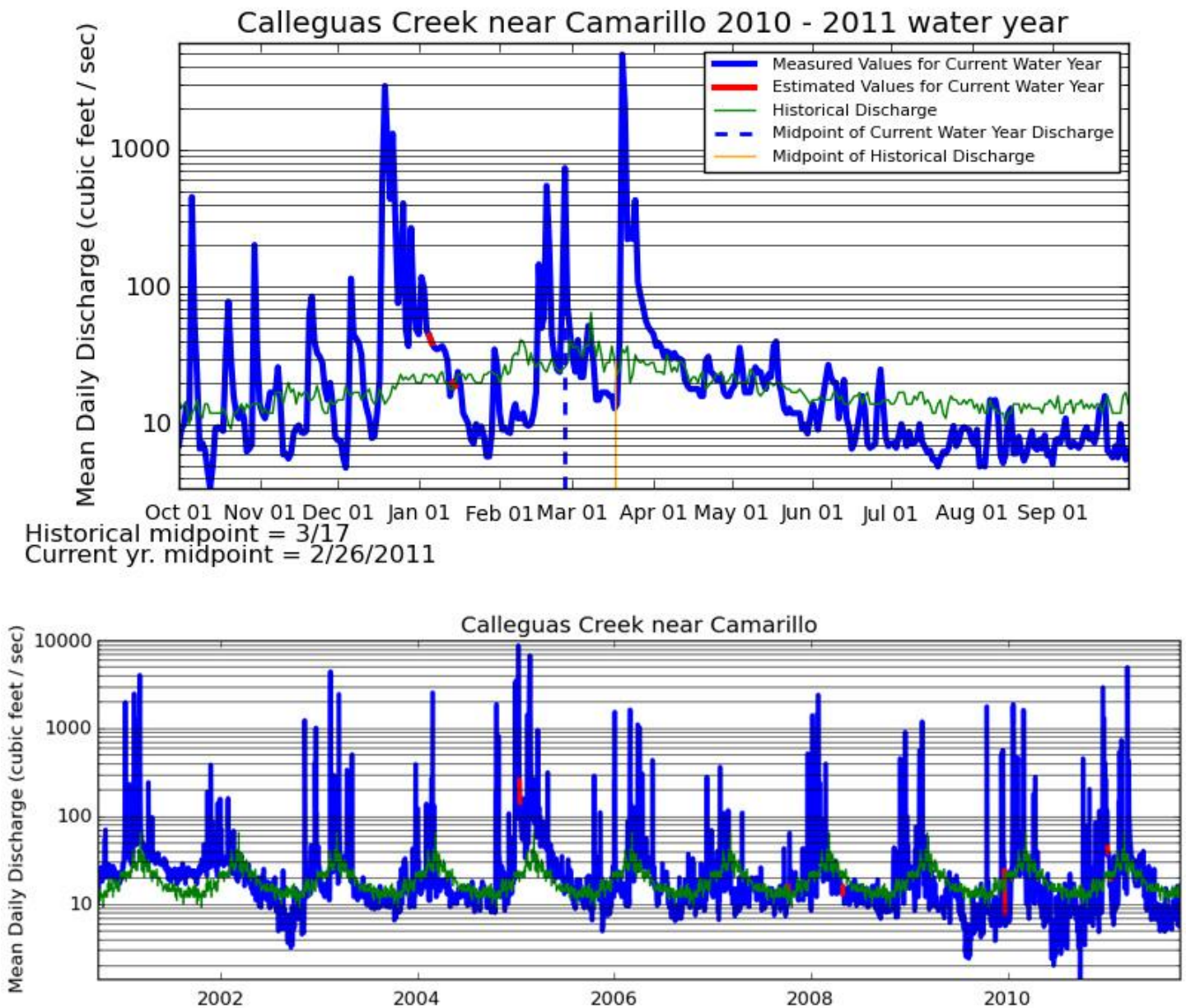


Figure 11. Streamflows from representative gauges in and near Santa Monica Mountains National Recreation Area for the 2011 water year (October 2010 through September 2011) are shown versus median daily flows. For Calleguas and Malibu Creeks, medians are calculated for the period 1971 – 2000. For the Los Angeles River, medians are based on all available data during 1943 – 2010. Notice that in the long-term graphs, the green trace (historical flow) is repeated identically for every year. In the case of the Los Angeles River, this makes it apparent that “average” conditions (i.e. streamflow near the historical averages) have not occurred since roughly 1954 – 1978. Data courtesy of the U.S. Geological Survey.

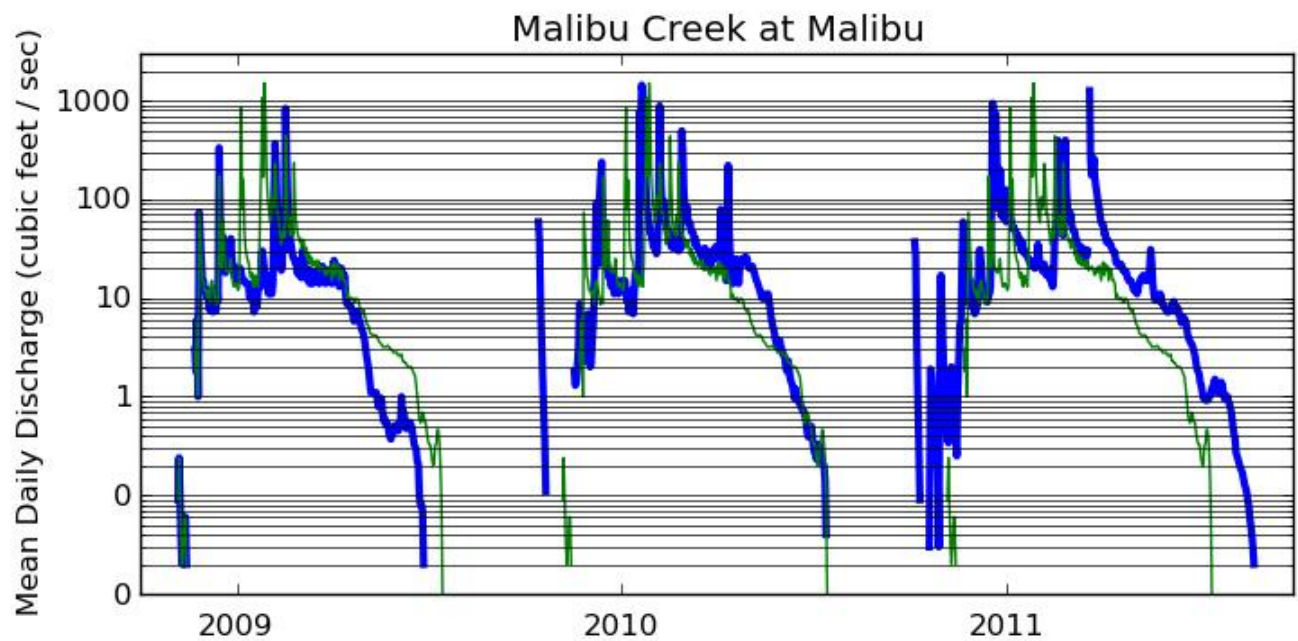
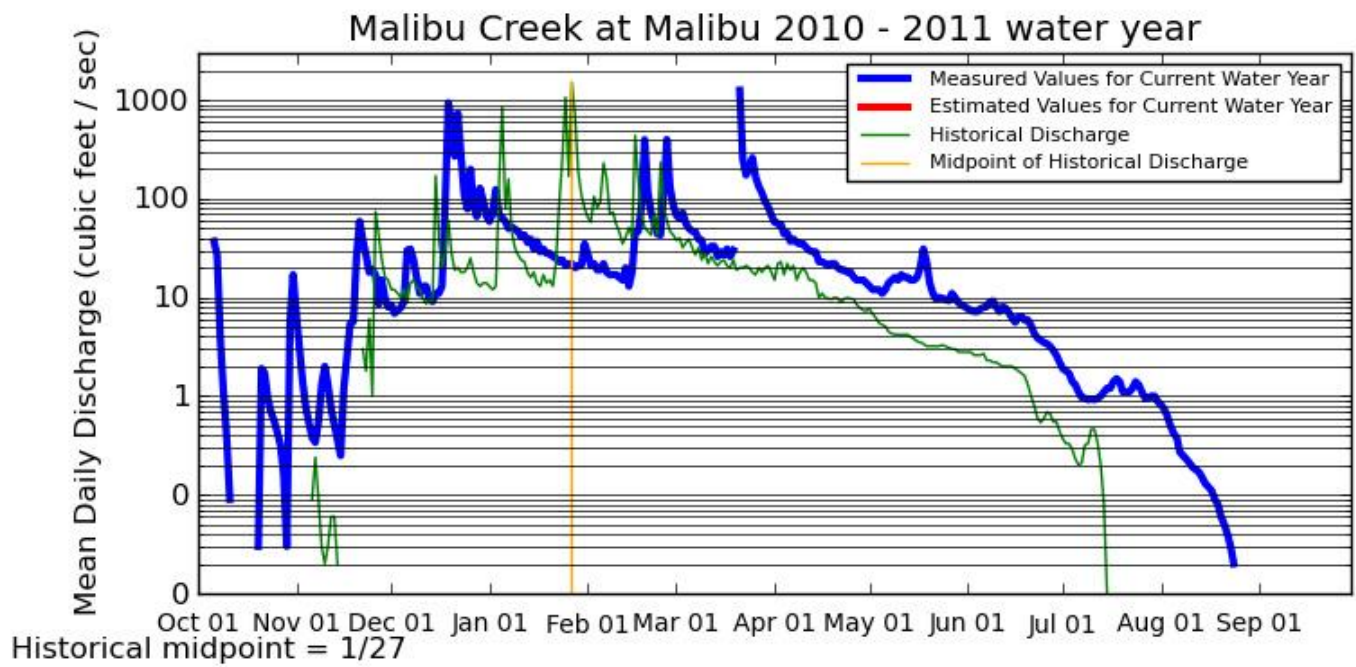


Figure 11. Continued.

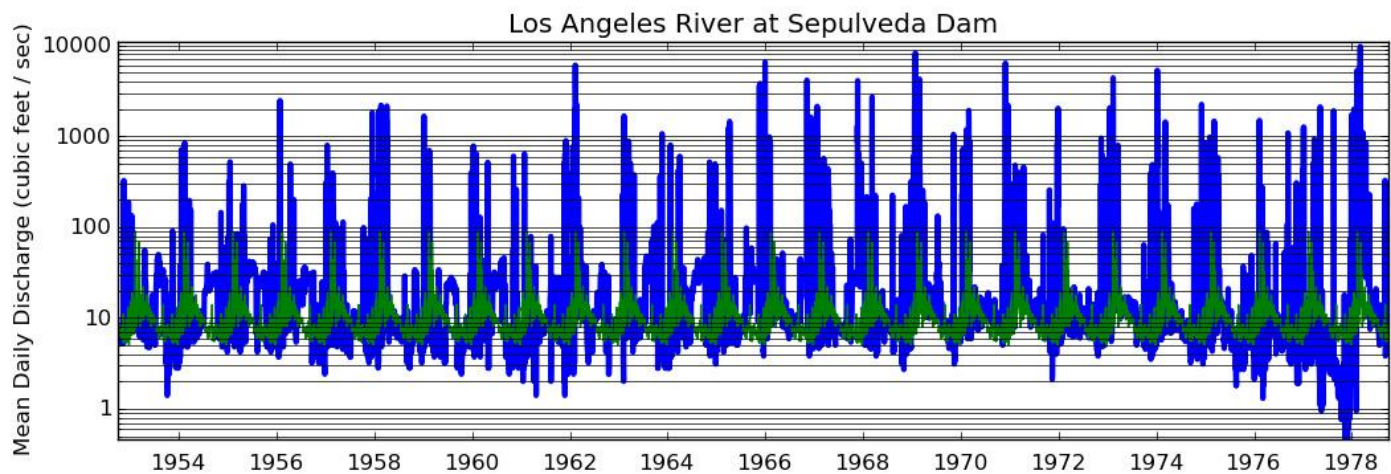
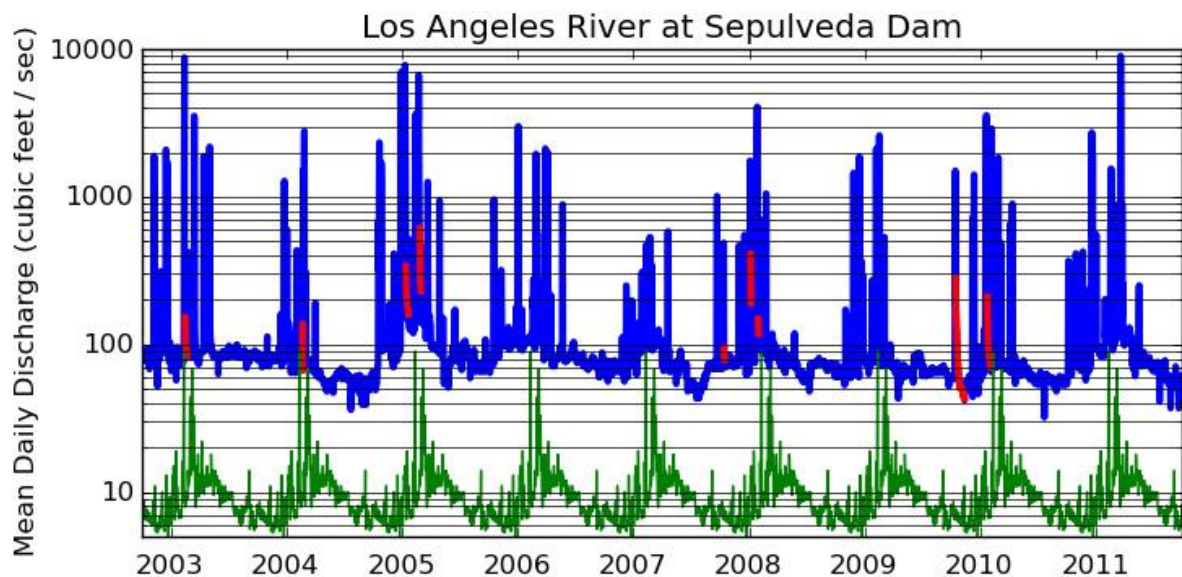
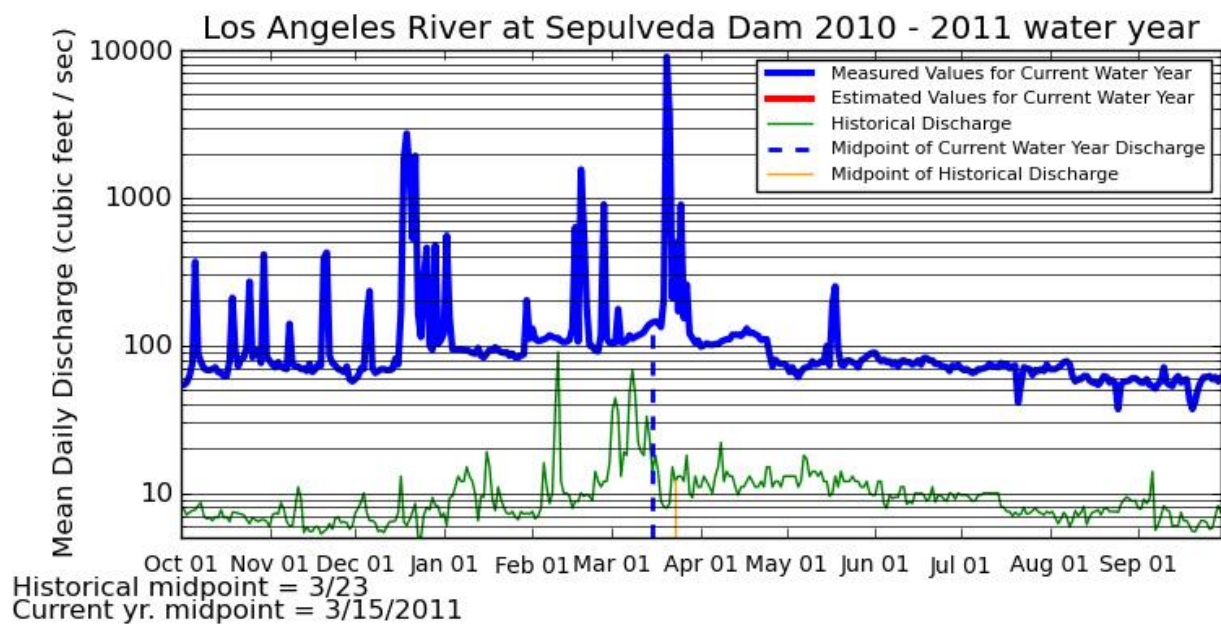
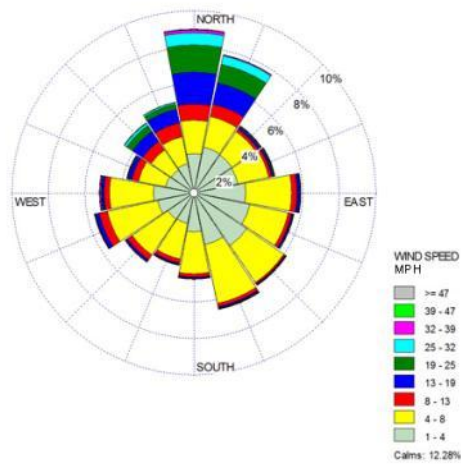
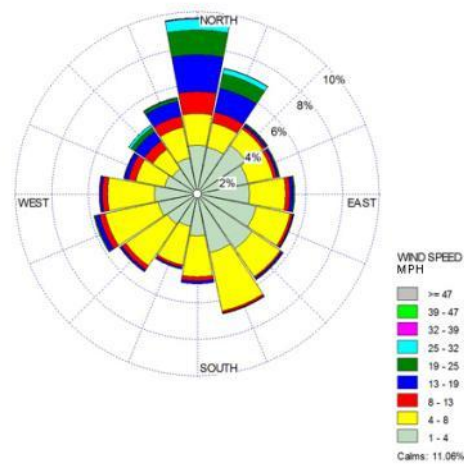


Figure 11. Continued.

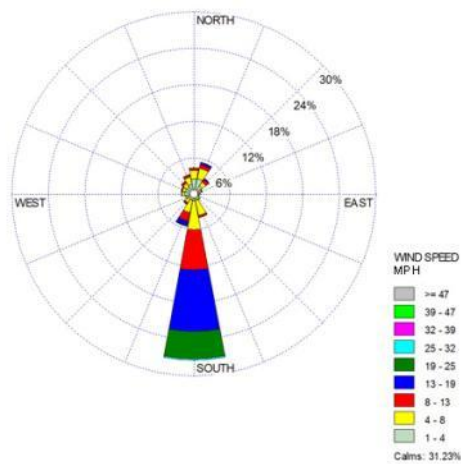
Malibu Hills 2005 - 2010



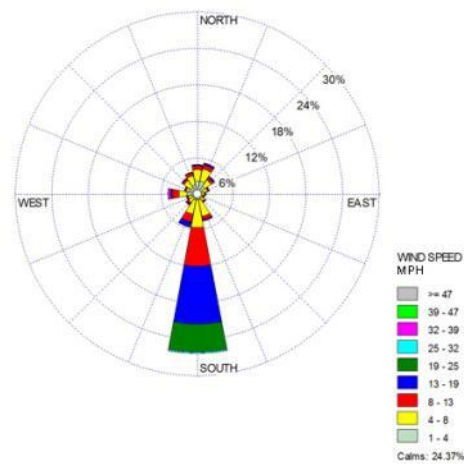
Malibu Hills 2011



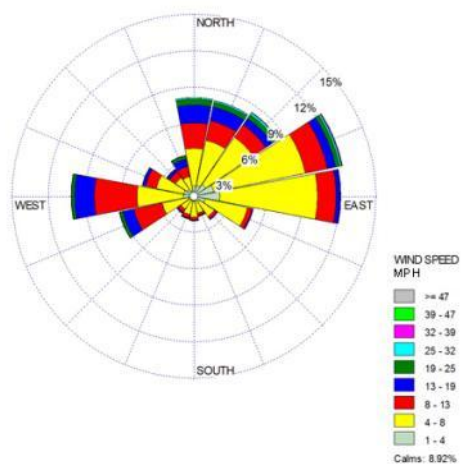
Malibu Canyon 2005 - 2010



Malibu Canyon 2011



Cheeseboro 2005 - 2010



Cheeseboro 2011

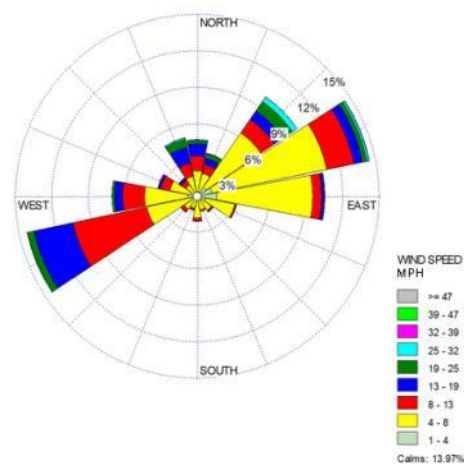
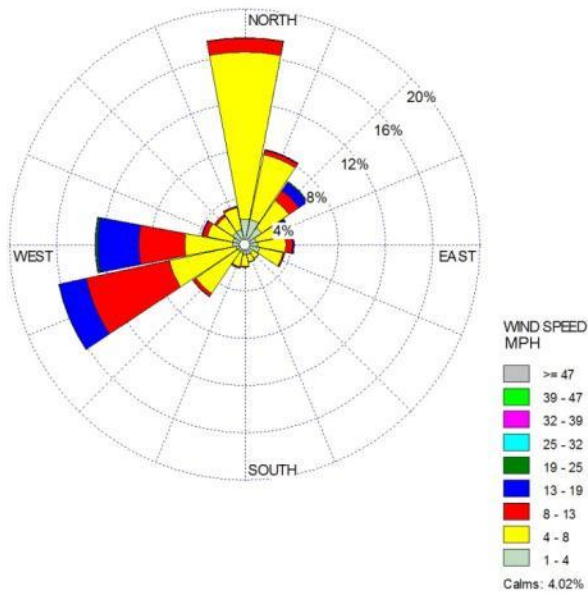
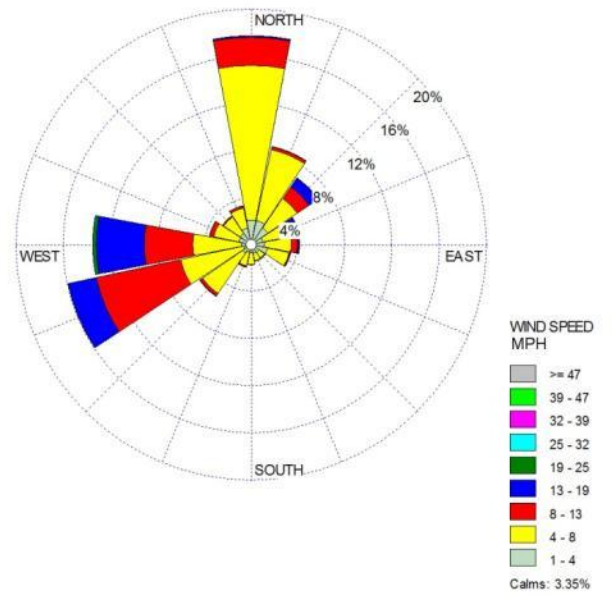


Figure 12. Wind roses for RAWs stations in Santa Monica Mountains National Recreation, contrasting calendar year 2011 to the averages for 2005 – 2010. The orientation of a spoke indicates wind direction (compass heading, degrees from which the wind originated), and the length of a spoke indicates the amount of time (%) that wind from a given direction occurred. Colors within the spokes express the amount of time (%) that wind from each direction had the indicated velocity.

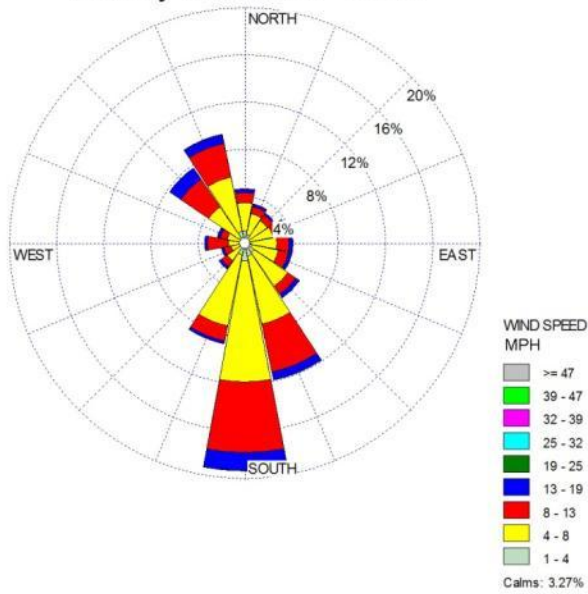
Leo Carrillo 2005 - 2010



Leo Carrillo 2011



Beverly Hills 2005 - 2010



Beverly Hills 2011

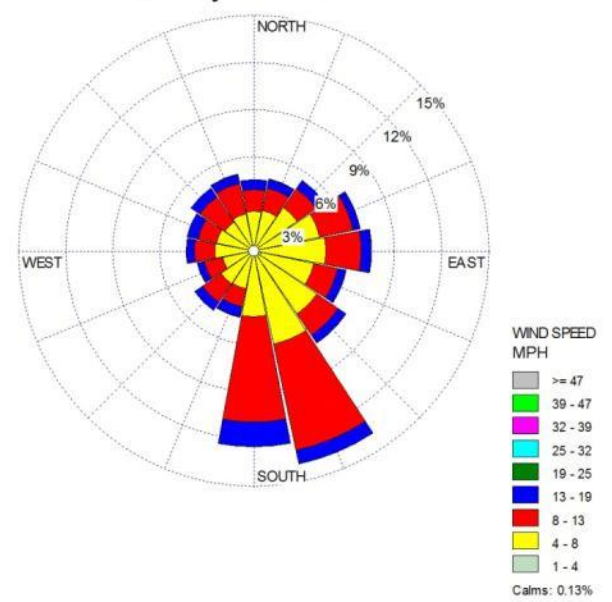


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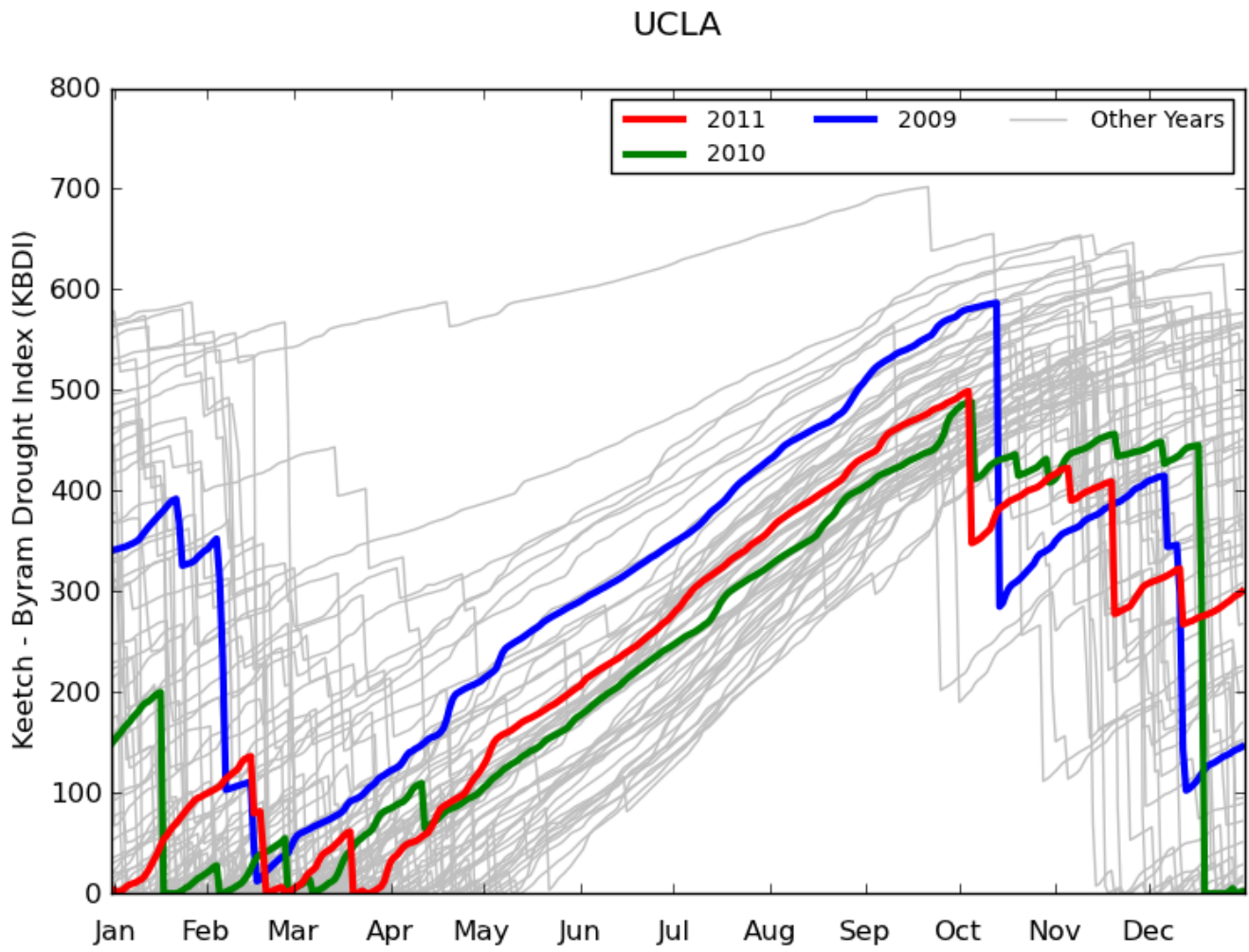


Figure 13. The Keetch-Byram Drought Index (KBDI) calculated for every day during the period of record for the UCLA weather station.

Conclusions

- The region recovered from drought during 2010, and remained drought free during 2011
- Temperatures during 2011 were generally near to below 1971 – 2000 and 1981 – 2010 averages.
- January, April, September and December had below average precipitation. Other months had precipitation near or above the 30-year averages.
- During 2011, the midpoint of annual streamflow was 1 – 3 weeks earlier than the historical average.
- Wind patterns were not out of the ordinary and fire risk was low – moderate.

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Appendix 1

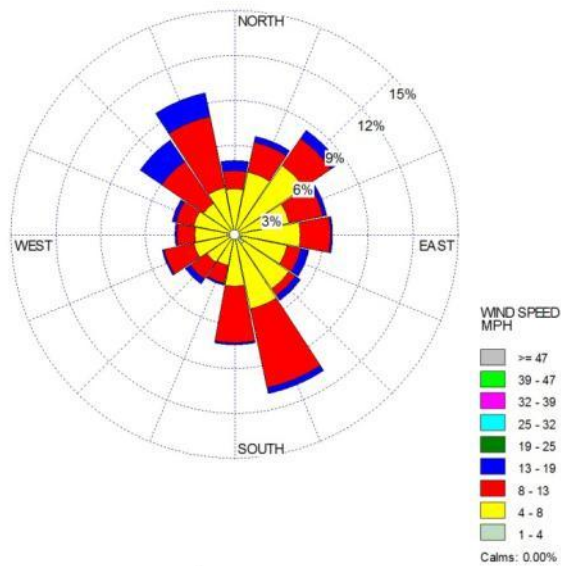
Table of climate stations used in this report. Detailed histories, period of record, and 30-year averages can be accessed from the links provided.

Name	Stn type	ID	Metadata
Burbank Valley Pump Plant AKA Burbank Glendale Airport	GHCN	41194	http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1194
UCLA	GHCN	49152	http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9152
Santa Monica Pier	GHCN	47953	http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7953
Beverly Hills	RAWS		http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCBEV
Leo Carrillo	RAWS		http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCLEO
Malibu Hills	RAWS		http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCMAL
Malibu Canyon	RAWS		http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCMCN
Cheeseboro	RAWS		http://www.wrcc.dri.edu/cgi-bin/rawMAIN.pl?caCCHB
Calleguas Creek nr Camarillo	USGS Stream Gage	11106550	http://waterdata.usgs.gov/nwis/dv/?site_no=11106550&agency_cd=USGS&referred_module=sw
Malibu Creek at Malibu California	USGS Stream Gage	11105510	http://waterdata.usgs.gov/nwis/dvstat/?format=sites_selection_links&search_site_no=11105510&agency_cd=USGS&referred_module=sw
Los Angeles River a Sepulveda Dam	USGS Stream Gage	11092450	http://waterdata.usgs.gov/nwis/dvstat/?format=sites_selection_links&search_site_no=11092450&agency_cd=USGS&referred_module=sw

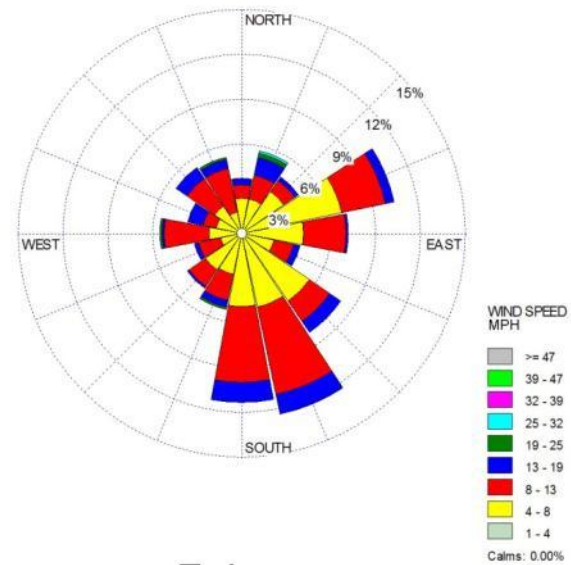
Appendix 2

Monthly wind roses for RAWS Stations in Santa Monica Mountains NRA during 2011.

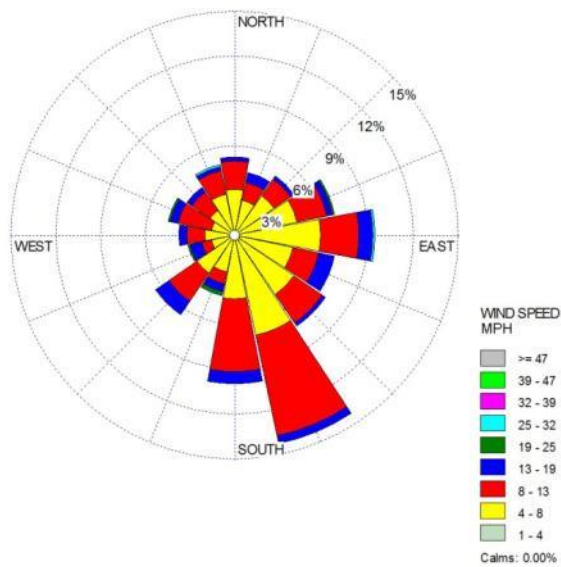
Beverly Hills



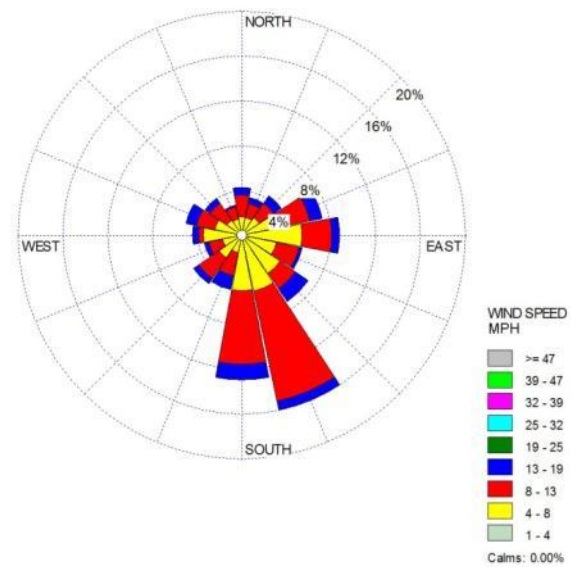
January



February

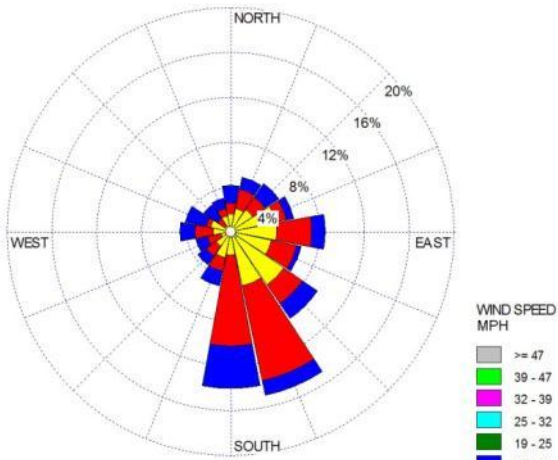


March

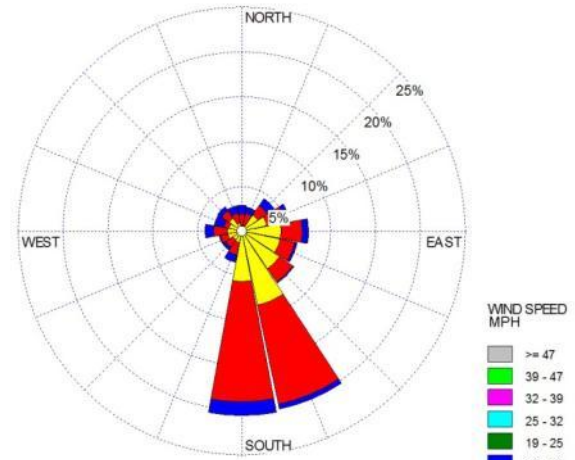


April

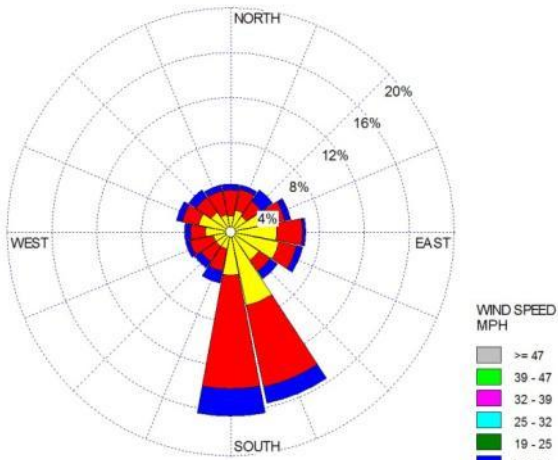
Beverly Hills



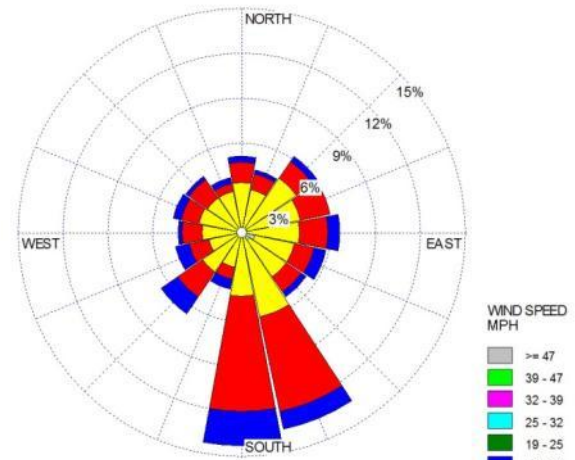
May



June

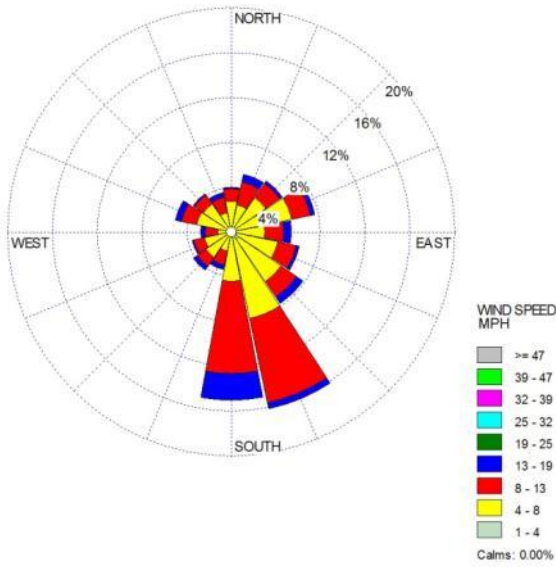


July

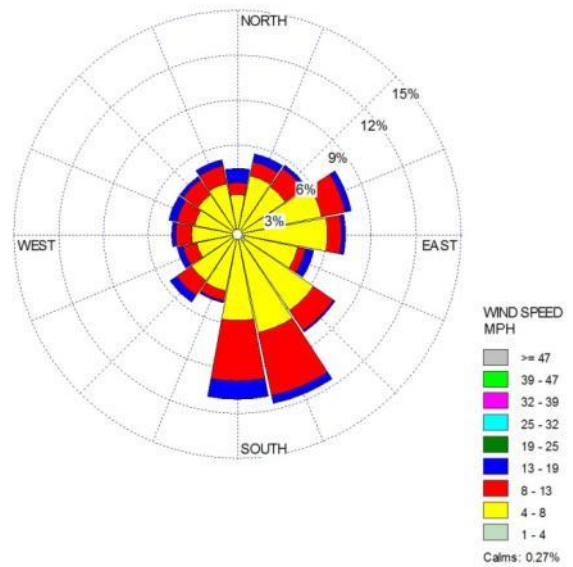


August

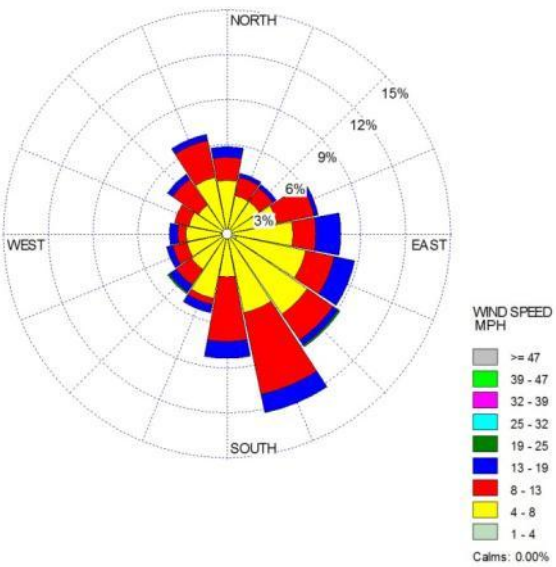
Beverly Hills



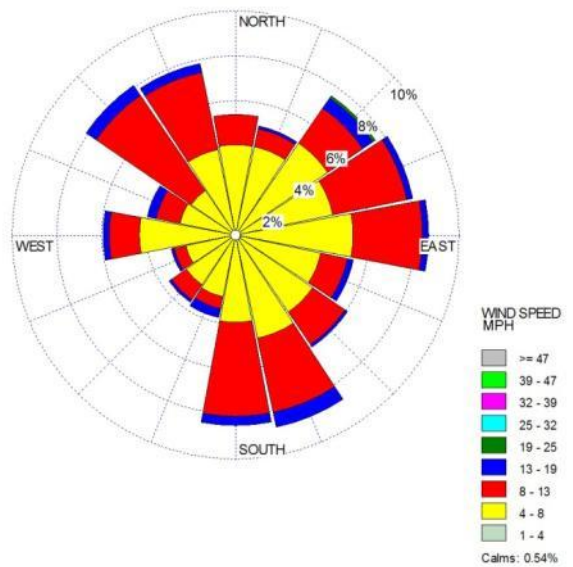
September



October

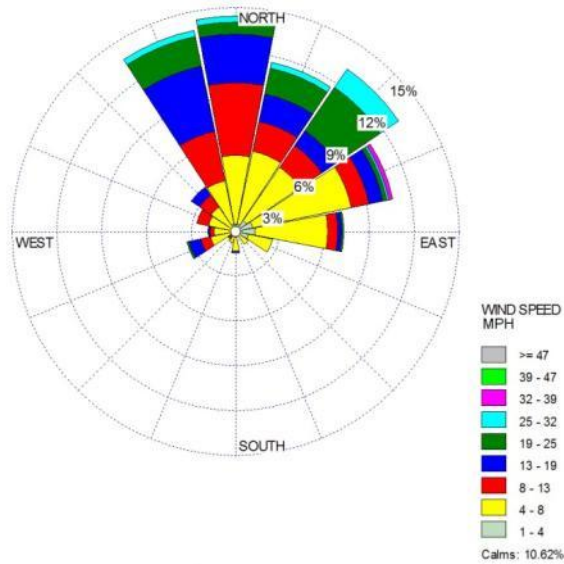


November

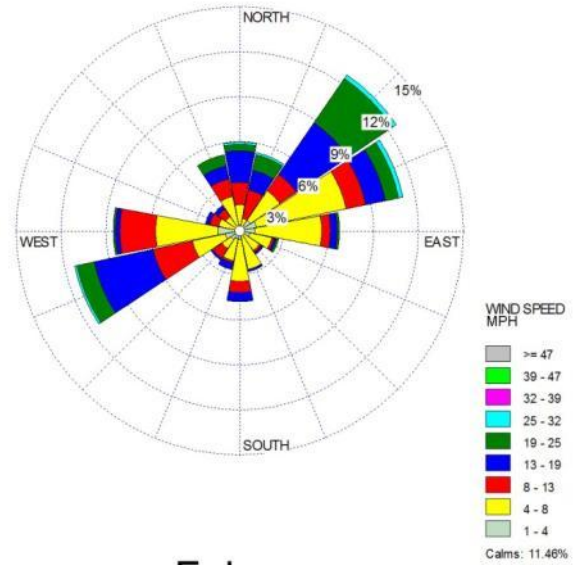


December

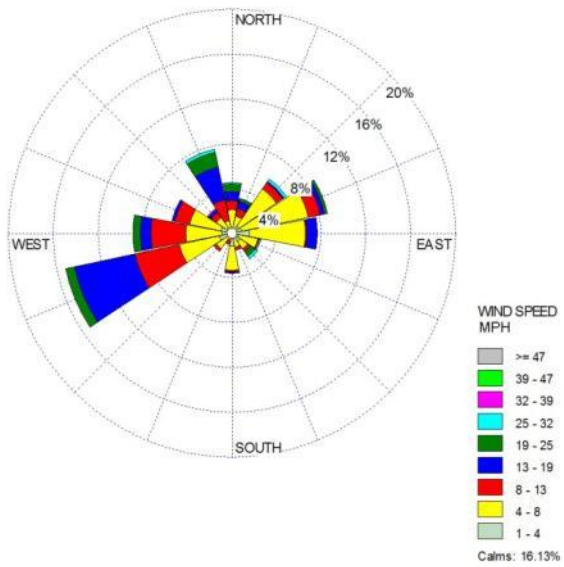
Cheeseboro



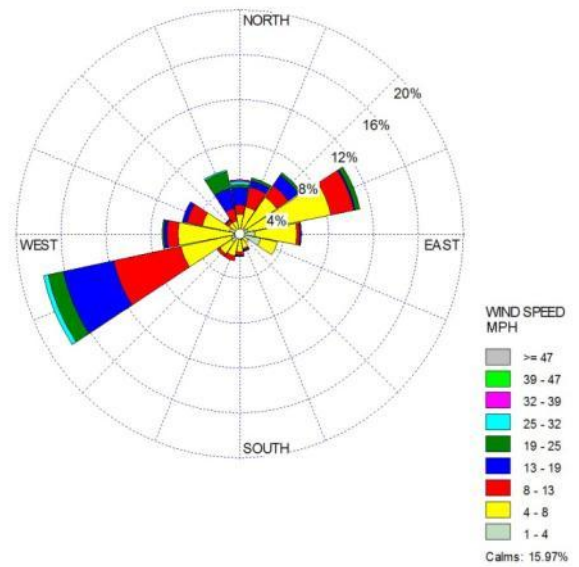
January



February

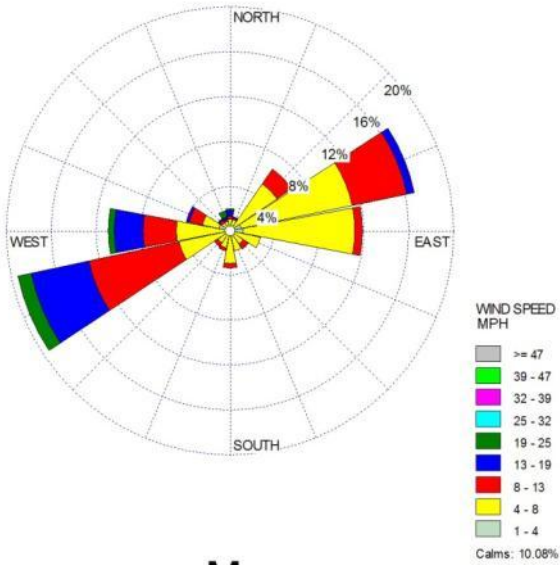


March

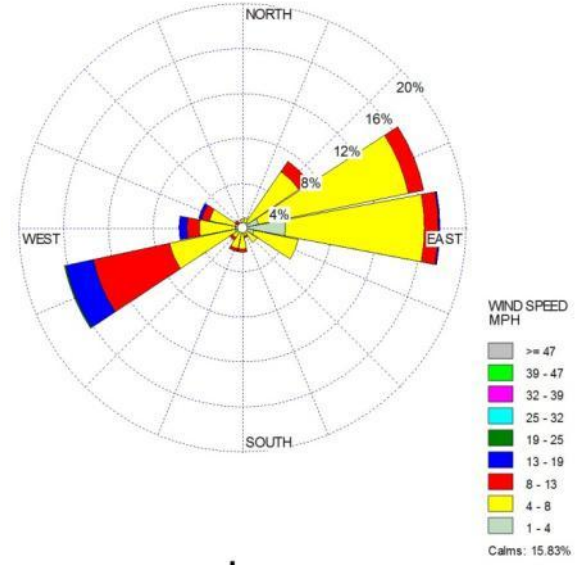


April

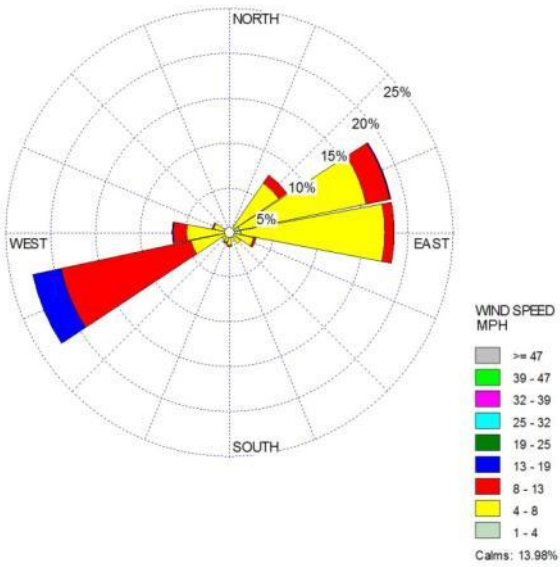
Cheeseboro



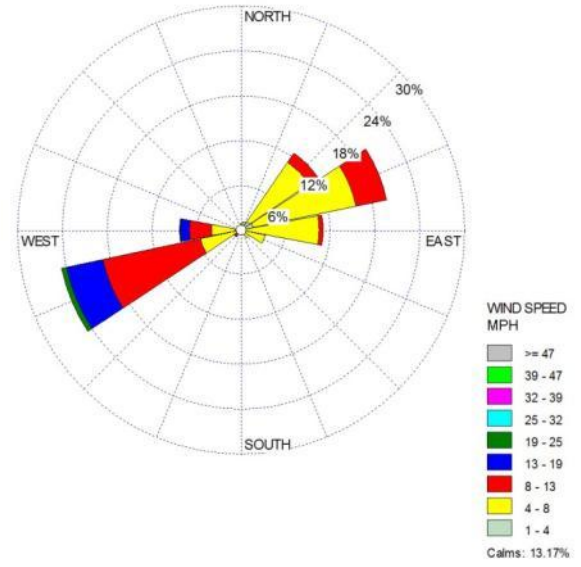
May



June

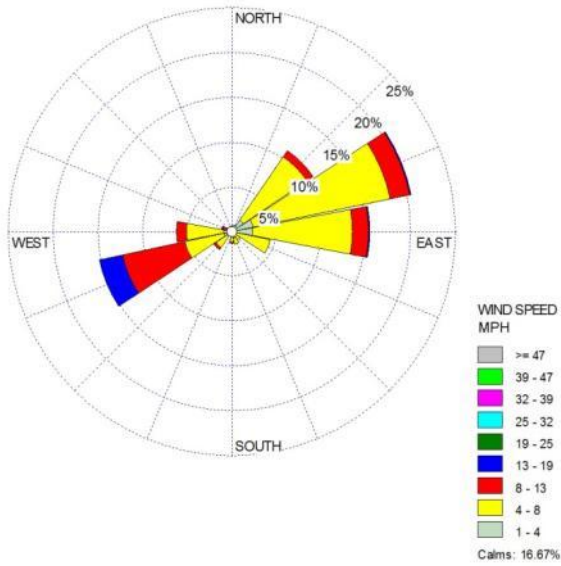


July

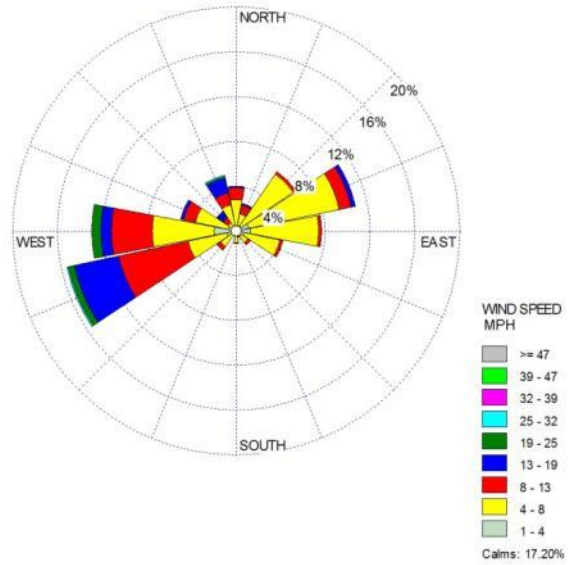


August

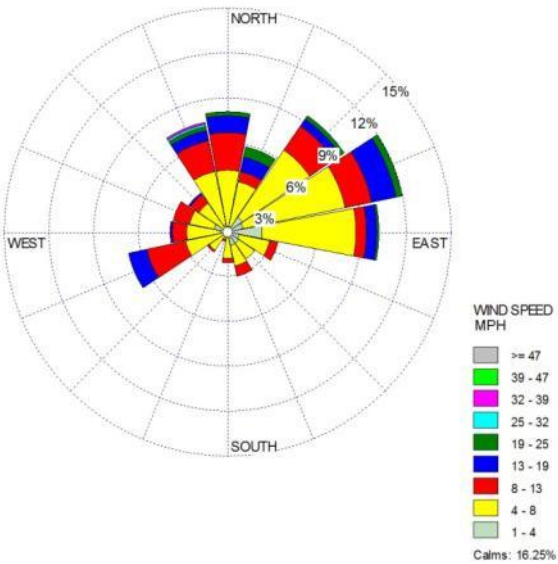
Cheeseboro



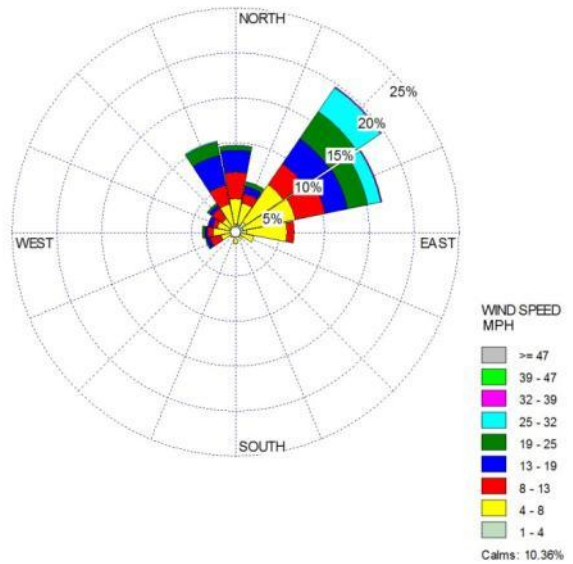
September



October

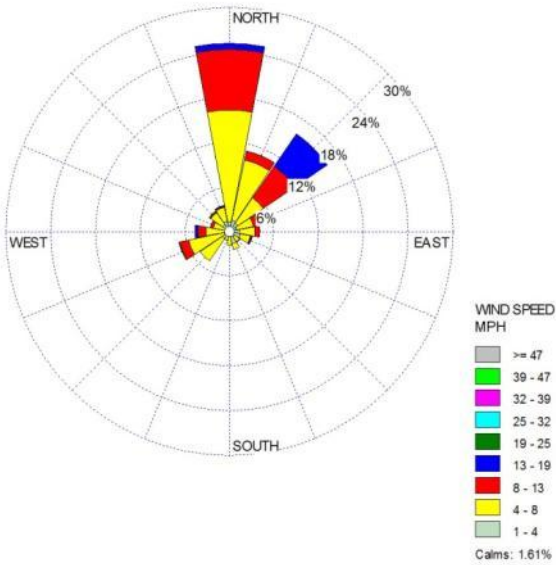


November

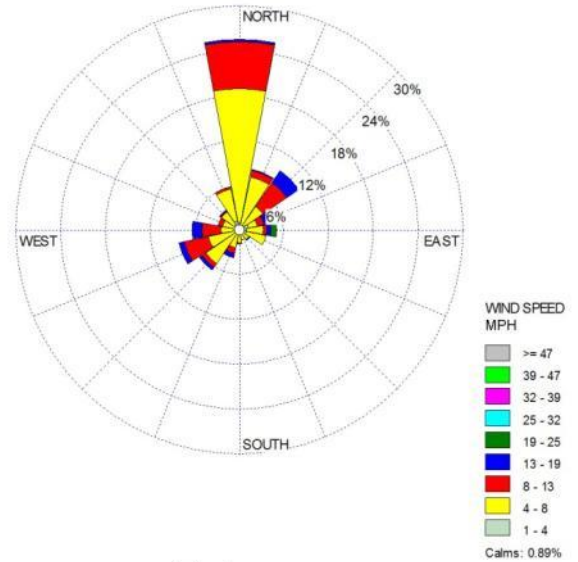


December

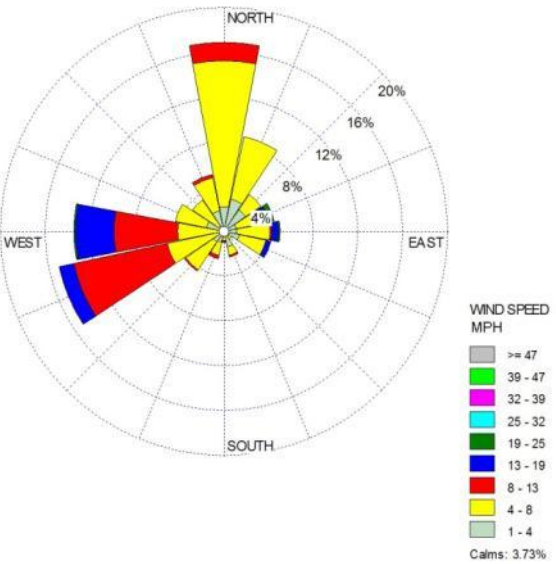
Leo Carrillo



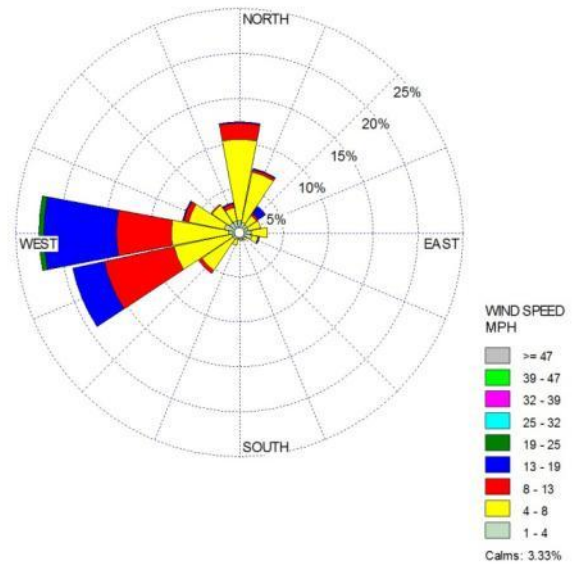
January



February

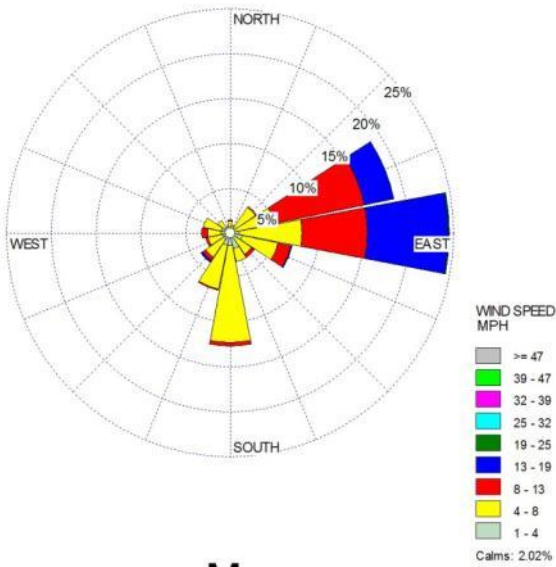


March

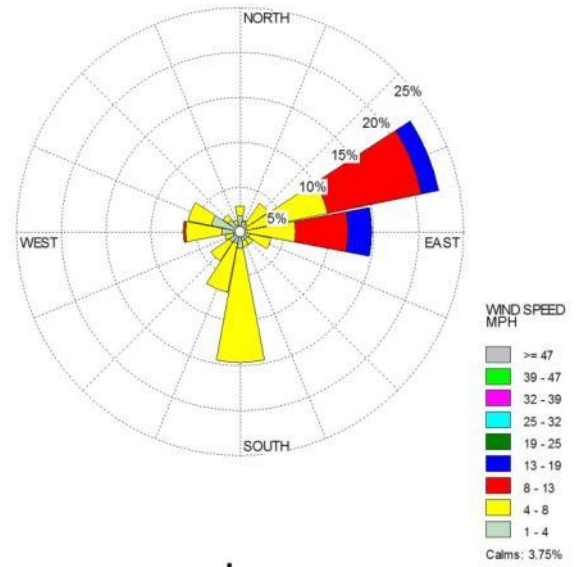


April

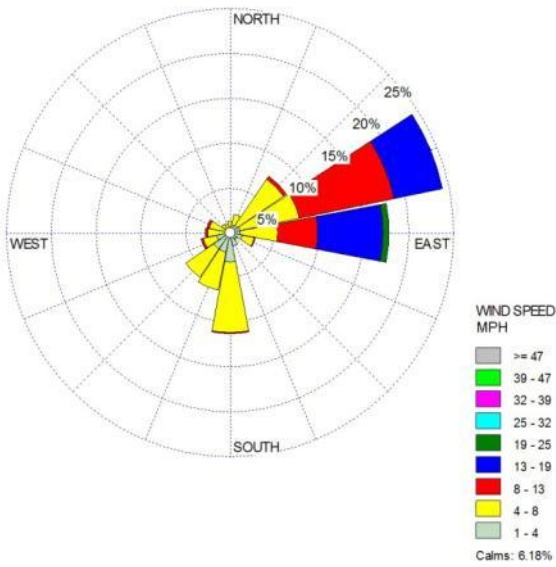
Leo Carrillo



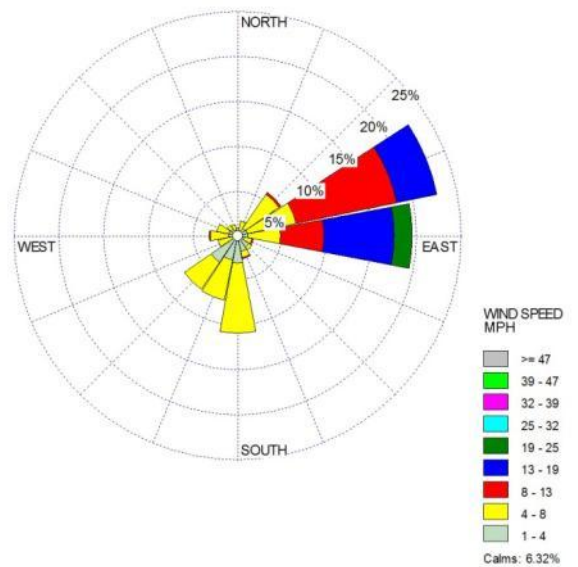
May



June

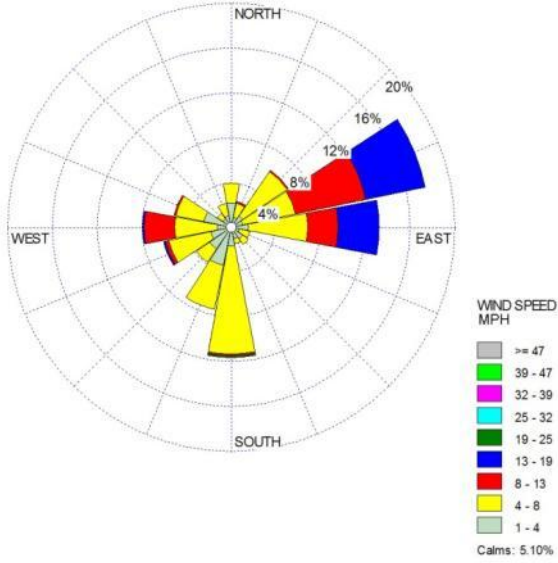


July

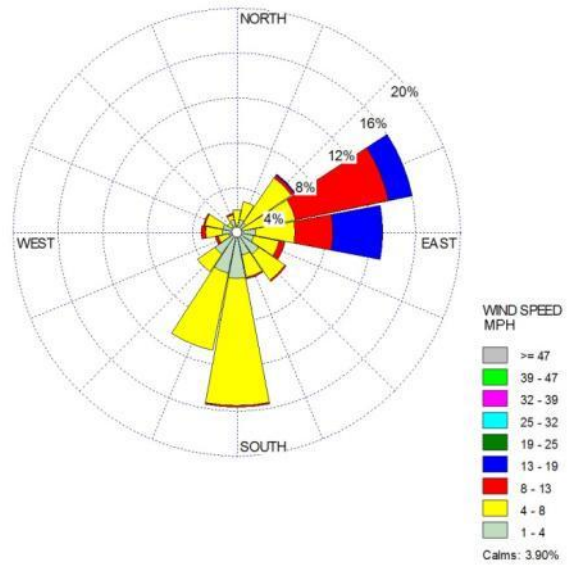


August

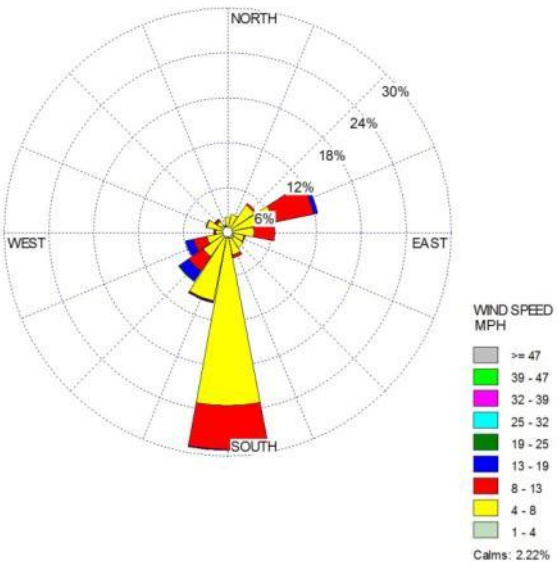
Leo Carrillo



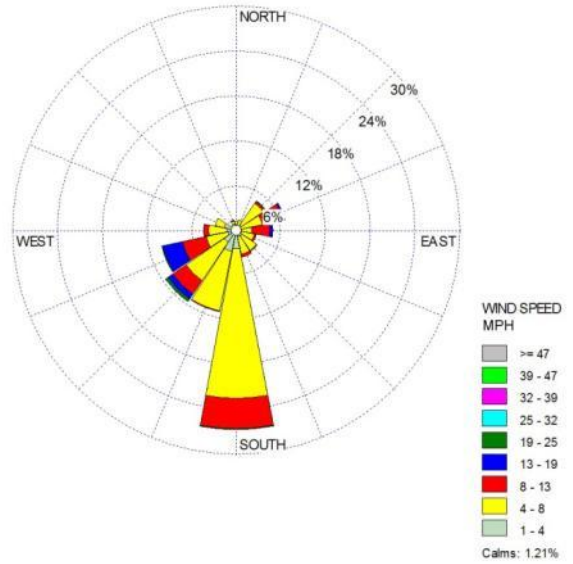
September



October

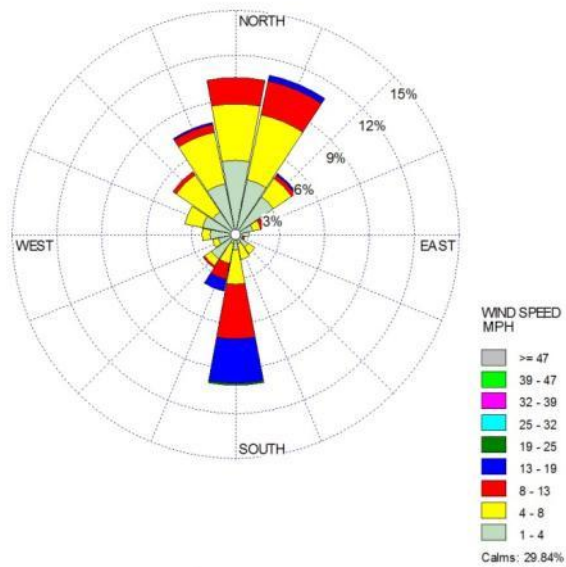


November

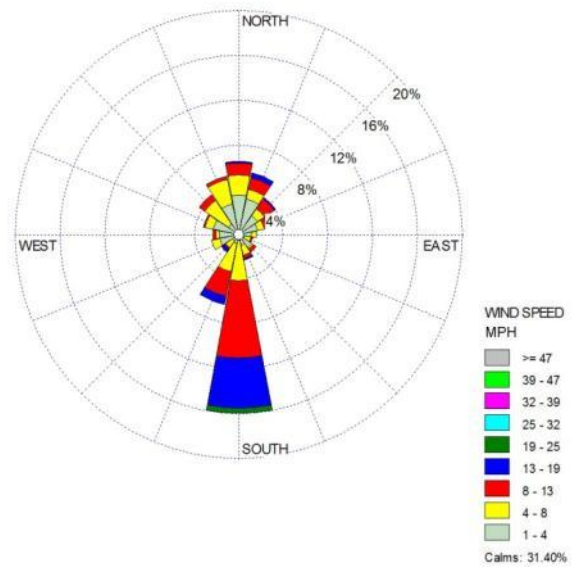


December

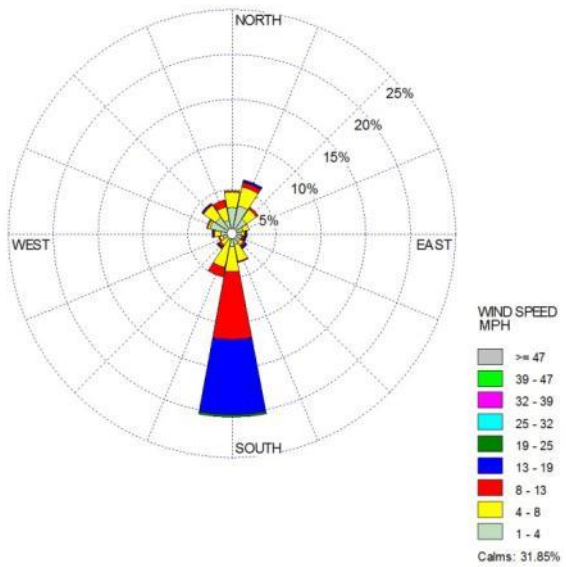
Malibu Canyon



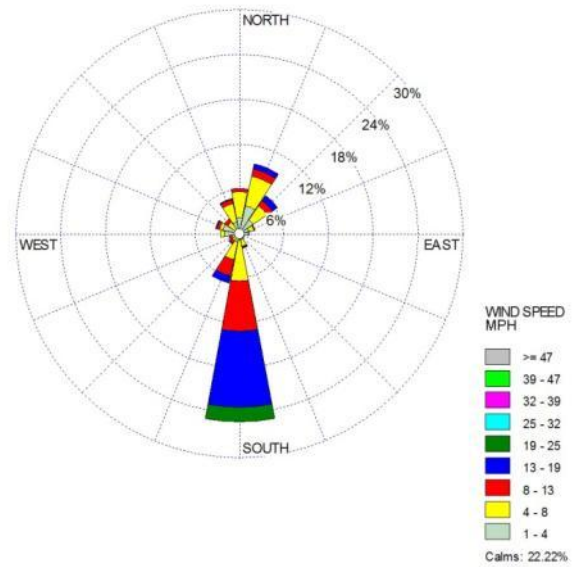
January



February

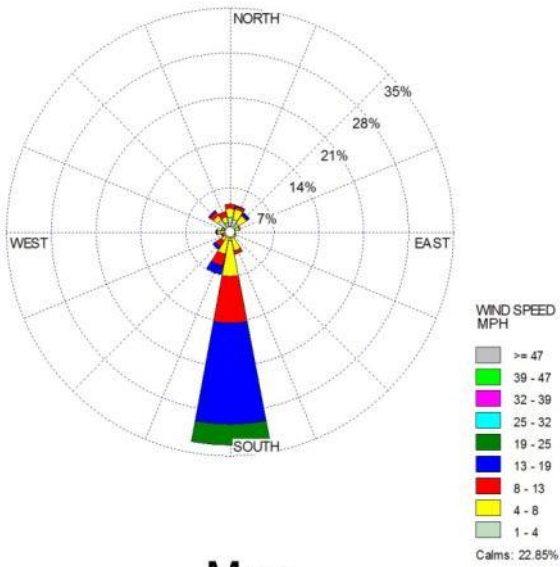


March

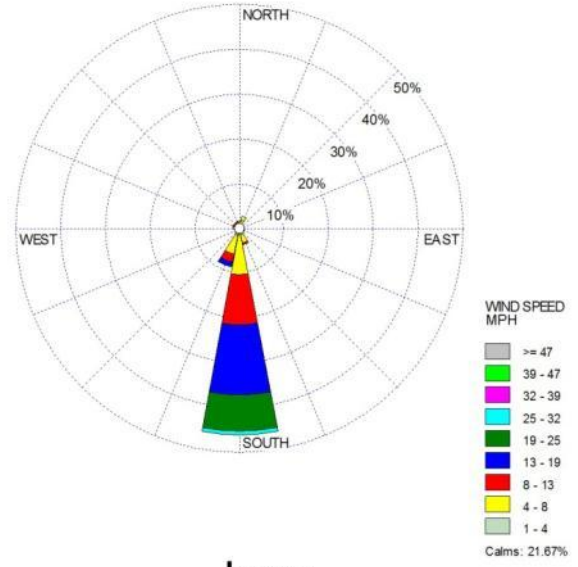


April

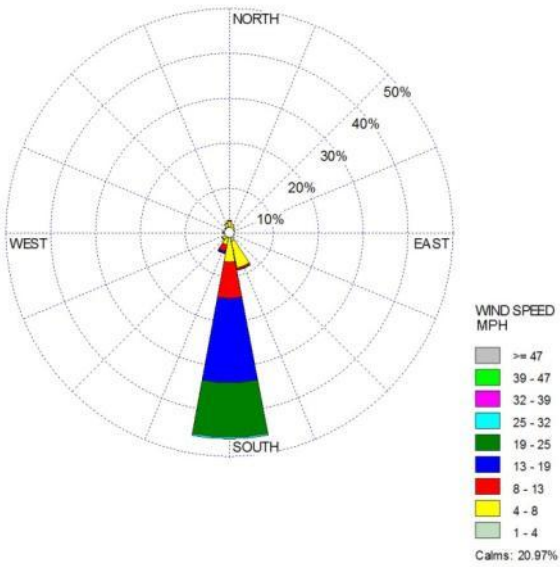
Malibu Canyon



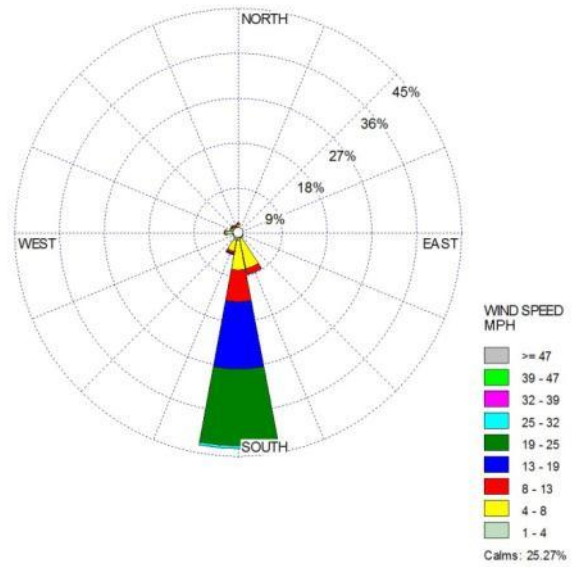
May



June

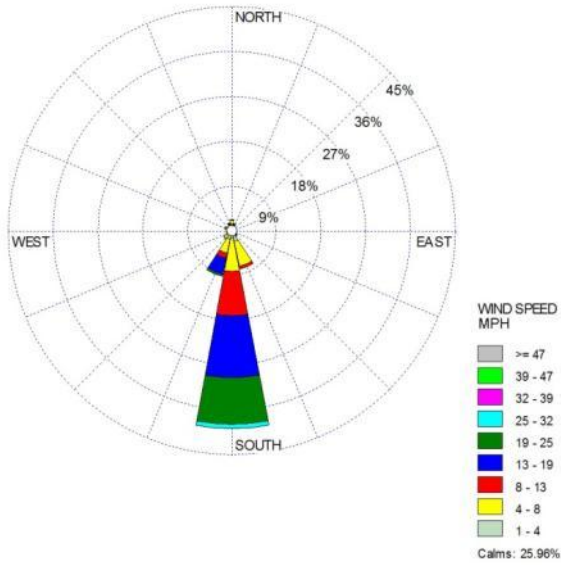


July

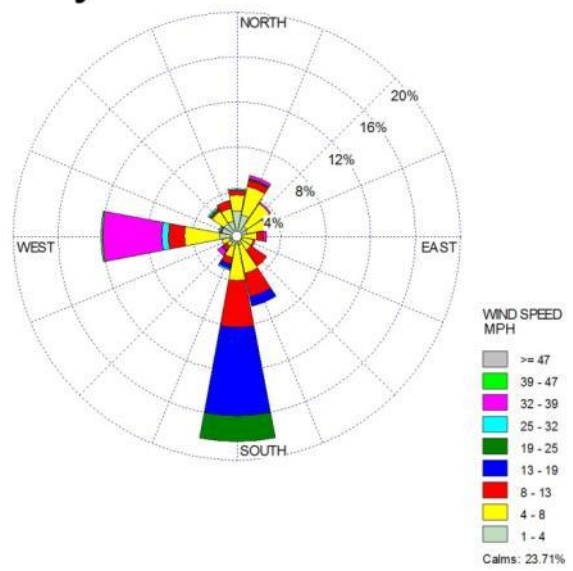


August

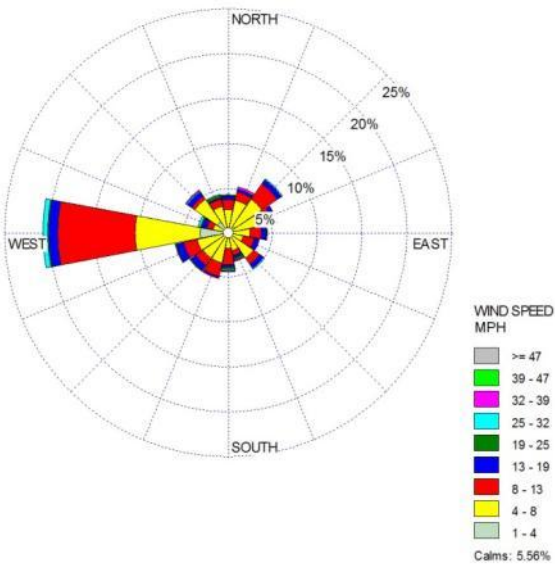
Malibu Canyon



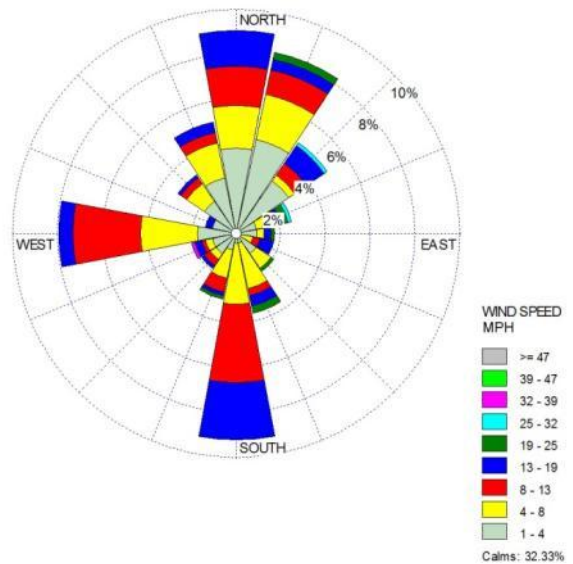
September



October

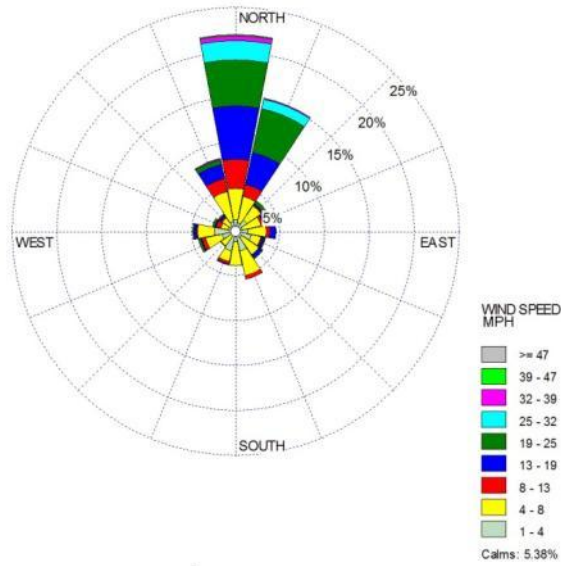


November

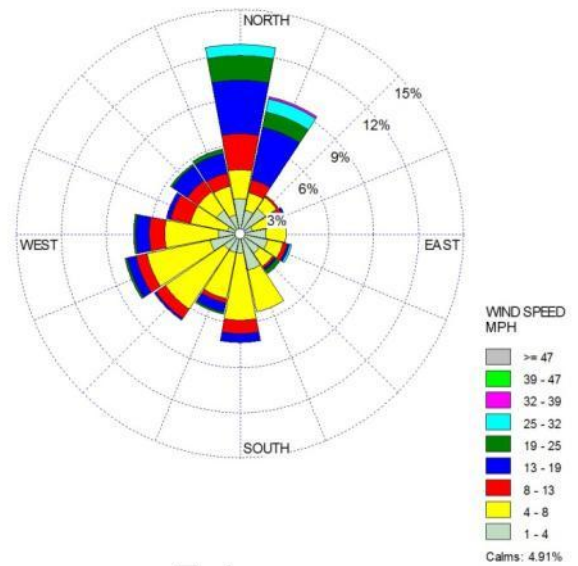


December

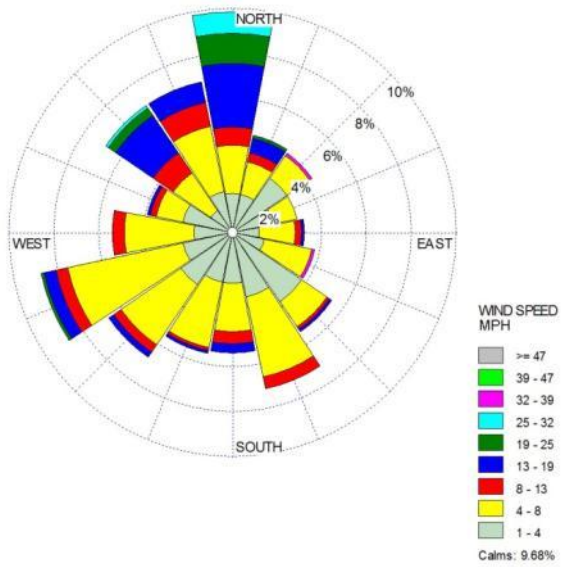
Malibu Hills



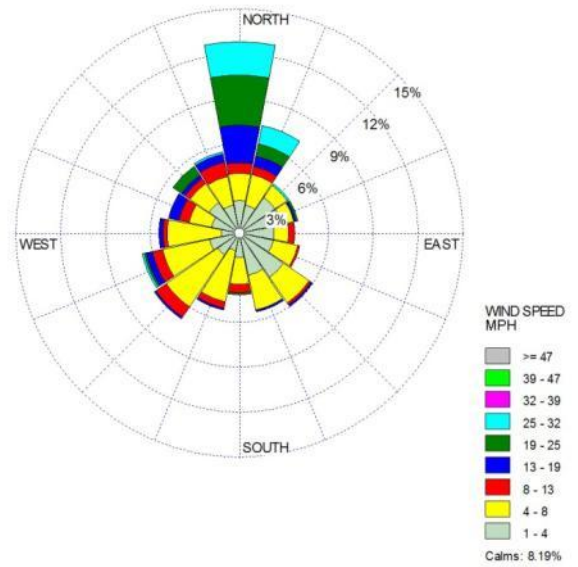
January



February

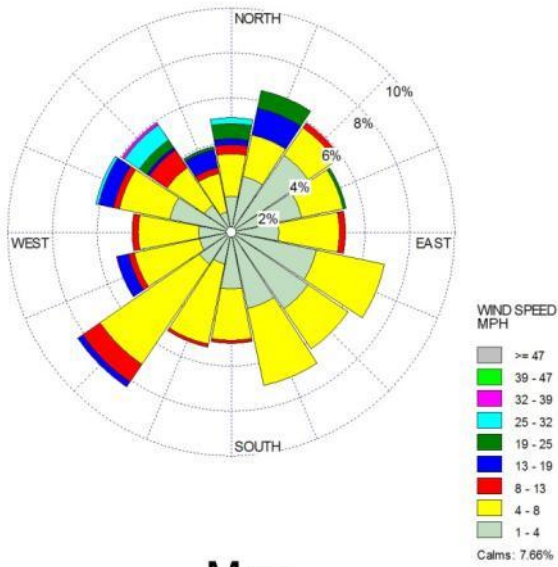


March

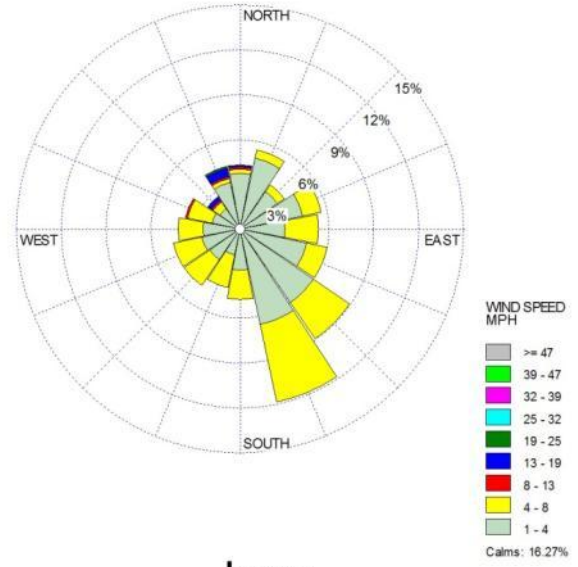


April

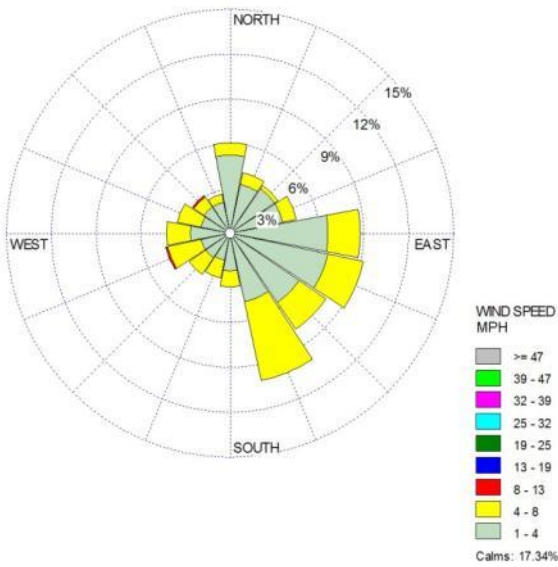
Malibu Hills



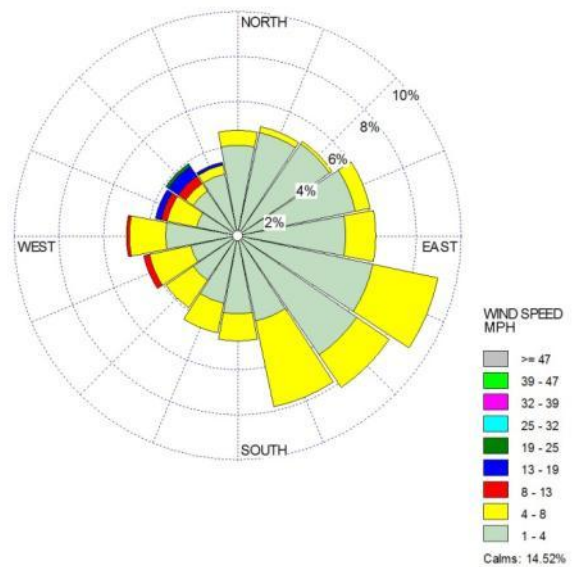
May



June

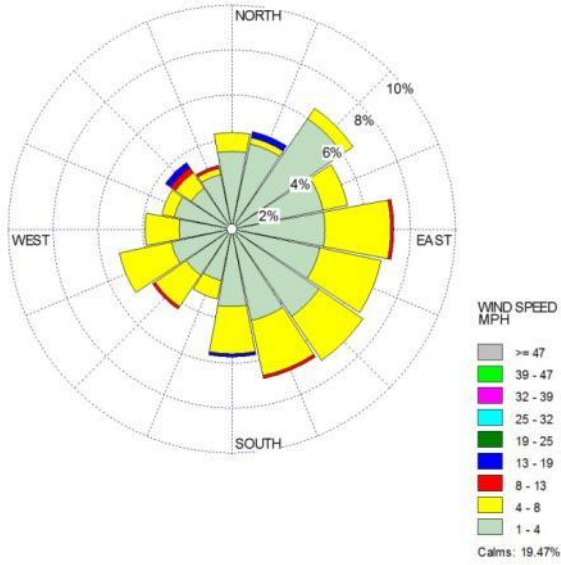


July

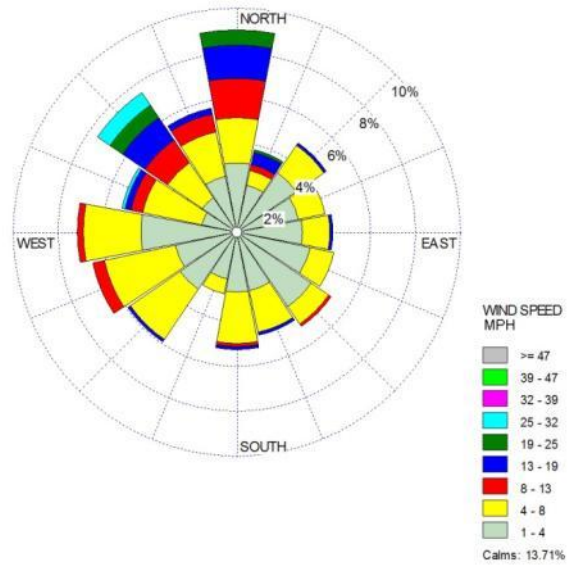


August

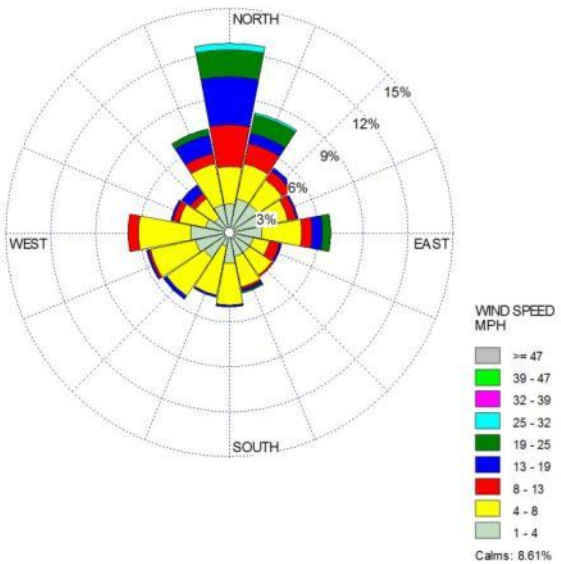
Malibu Hills



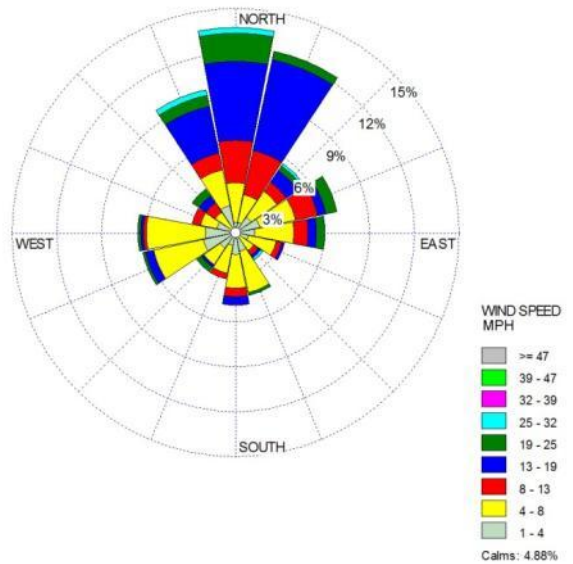
September



October



November



December

Appendix 3

Monthly summary data for RAWS stations in and near Santa Monica Mountains NRA. See Methods for description of the Qa/Qc procedures used.

N/A indicates either missing data or data that did not pass quality checks.

Tmax = Average daily maximum temperature.

Tmin = Average daily minimum temperature.

BEVERLY HILLS

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
1997	11	N/A	69.32	52.40
1997	12	4.51	64.74	49.61
1998	1	3.57	65.32	48.97
1998	2	N/A	N/A	N/A
1998	3	5.95	68.42	49.03
1998	4	0.88	70.13	48.90
1998	5	4.08	69.84	51.16
1998	6	0.14	75.60	54.47
1998	7	0.00	87.48	61.58
1998	8	0.00	93.52	65.48
1998	9	0.03	82.37	60.43
1998	10	0.11	80.32	56.55
1998	11	1.32	72.00	51.83
1998	12	0.42	66.71	48.61
1999	1	1.58	68.65	49.87
1999	2	0.69	67.21	47.54
1999	3	2.23	65.00	45.35
1999	4	3.06	68.77	48.10
1999	5	0.01	73.84	51.10
1999	6	0.81	79.07	53.20
1999	7	0.00	87.13	59.58
1999	8	0.00	88.61	59.61
1999	9	0.00	84.23	58.60
1999	10	0.00	88.71	62.71
1999	11	0.47	75.00	53.93
1999	12	0.09	72.39	52.71
2000	1	1.06	67.52	50.94
2000	2	8.07	63.52	47.97
2000	3	2.70	69.00	48.52
2000	4	1.93	74.00	52.70
2000	5	0.00	77.94	55.97
2000	6	0.00	82.50	58.23
2000	7	0.00	85.23	59.10
2000	8	0.20	89.06	63.19
2000	9	0.18	86.70	61.13
2000	10	4.37	74.97	54.65

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2000	11	0.00	71.20	50.60
2000	12	0.04	72.45	53.77
2001	1	7.05	63.90	47.32
2001	2	9.68	61.32	45.54
2001	3	1.98	68.55	49.29
2001	4	1.86	67.80	47.70
2001	5	0.00	77.68	55.58
2001	6	0.00	83.30	58.40
2001	7	0.00	83.26	58.03
2001	8	0.40	87.90	60.29
2001	9	0.00	87.53	61.47
2001	10	N/A	N/A	N/A
2001	11	N/A	N/A	N/A
2001	12	N/A	N/A	N/A
2002	1	N/A	N/A	N/A
2002	2	N/A	N/A	N/A
2002	3	N/A	N/A	N/A
2002	4	N/A	N/A	N/A
2002	5	0.19	75.52	51.74
2002	6	0.00	80.73	56.10
2002	7	N/A	N/A	N/A
2002	8	N/A	N/A	N/A
2002	9	N/A	N/A	N/A
2002	10	N/A	N/A	N/A
2002	11	N/A	N/A	N/A
2002	12	N/A	N/A	N/A
2003	1	N/A	N/A	N/A
2003	2	N/A	N/A	N/A
2003	3	N/A	N/A	N/A
2003	4	N/A	N/A	N/A
2003	5	N/A	N/A	N/A
2003	6	N/A	N/A	N/A
2003	7	0.00	93.10	62.74
2003	8	0.00	96.52	63.52
2003	9	0.00	91.73	59.90
2003	10	0.46	90.03	61.06
2003	11	0.23	72.80	49.63
2003	12	2.15	68.35	47.77
2004	1	0.30	69.48	47.42
2004	2	7.54	66.90	46.03
2004	3	4.41	80.55	52.61
2004	4	0.06	78.93	51.53
2004	5	0.00	85.13	55.55
2004	6	0.00	82.67	56.07
2004	7	N/A	90.83	59.33
2004	8	0.00	89.84	58.81
2004	9	0.01	92.67	62.10

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2004	10	6.50	79.03	54.00
2004	11	0.30	71.10	49.47
2004	12	6.97	68.84	49.16
2005	1	14.02	67.23	49.77
2005	2	12.43	67.96	48.46
2005	3	2.32	71.84	48.74
2005	4	1.11	76.53	49.80
2005	5	0.30	80.13	53.81
2005	6	0.00	81.60	54.03
2005	7	0.00	90.97	59.55
2005	8	0.00	91.55	60.10
2005	9	0.10	88.13	57.83
2005	10	1.41	81.00	55.77
2005	11	0.54	79.13	55.43
2005	12	0.68	70.61	49.26
2006	1	3.15	69.29	48.29
2006	2	2.98	76.14	49.11
2006	3	3.71	66.39	42.81
2006	4	2.68	71.40	47.43
2006	5	0.98	79.06	53.74
2006	6	0.00	89.97	59.87
2006	7	0.00	97.45	65.03
2006	8	0.00	91.68	59.71
2006	9	0.00	91.37	58.53
2006	10	0.01	82.45	55.19
2006	11	0.00	80.33	55.03
2006	12	0.00	71.45	49.35
2007	1	0.01	68.48	46.00
2007	2	0.00	71.93	47.43
2007	3	0.00	78.71	50.97
2007	4	0.01	75.77	49.13
2007	5	N/A	80.65	52.65
2007	6	N/A	N/A	N/A
2007	7	N/A	N/A	N/A
2007	8	0.01	96.35	62.74
2007	9	N/A	89.07	59.43
2007	10	N/A	N/A	N/A
2007	11	N/A	N/A	N/A
2007	12	N/A	N/A	N/A
2008	1	N/A	65.56	45.70
2008	2	2.44	71.24	47.07
2008	3	0.02	78.16	50.52
2008	4	0.09	81.20	50.47
2008	5	0.19	80.19	51.97
2008	6	0.00	90.27	58.07
2008	7	0.00	92.39	59.84
2008	8	0.00	94.45	60.52

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2008	9	0.00	94.37	61.63
2008	10	N/A	92.87	64.10
2008	11	N/A	82.40	57.40
2008	12	N/A	66.42	46.65
2009	1	N/A	76.70	53.43
2009	2	N/A	69.36	47.14
2009	3	N/A	74.10	48.06
2009	4	0.01	79.23	49.13
2009	5	0.00	84.26	54.26
2009	6	0.23	82.20	54.80
2009	7	N/A	N/A	N/A
2009	8	N/A	N/A	N/A
2009	9	N/A	N/A	N/A
2009	10	N/A	N/A	N/A
2009	11	N/A	N/A	N/A
2009	12	N/A	N/A	N/A
2010	1	N/A	N/A	N/A
2010	2	N/A	N/A	N/A
2010	3	N/A	N/A	N/A
2010	4	N/A	N/A	N/A
2010	5	N/A	N/A	N/A
2010	6	0.00	83.23	54.63
2010	7	0.01	86.29	57.39
2010	8	0.00	90.81	58.65
2010	9	0.00	92.30	60.17
2010	10	2.01	77.74	55.87
2010	11	1.13	74.27	51.70
2010	12	10.66	67.16	49.55
2011	1	0.92	72.19	51.00
2011	2	3.80	68.54	44.14
2011	3	6.09	73.29	48.71
2011	4	0.00	77.23	50.40
2011	5	0.51	78.19	50.71
2011	6	0.08	82.30	53.13
2011	7	0.00	91.81	59.52
2011	8	0.00	94.61	60.32
2011	9	0.00	91.80	59.70
2011	10	1.16	87.65	57.84
2011	11	2.37	73.10	51.20
2011	12	1.28	71.00	47.97

CHEESEBORO

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
1995	10	N/A	79.97	58.97
1995	11	N/A	76.63	58.00
1995	12	N/A	65.65	51.32
1996	1	N/A	63.16	49.87
1996	2	N/A	N/A	N/A
1996	3	N/A	N/A	N/A
1996	4	N/A	76.77	54.93
1996	5	N/A	80.13	54.35
1996	6	N/A	89.07	57.80
1996	7	N/A	97.06	64.13
1996	8	N/A	97.94	64.94
1996	9	N/A	89.33	59.50
1996	10	N/A	82.13	56.74
1996	11	1.69	72.37	54.10
1996	12	6.06	64.32	50.03
1997	1	N/A	60.84	47.74
1997	2	N/A	66.68	48.75
1997	3	0.00	75.90	52.84
1997	4	N/A	74.93	52.97
1997	5	N/A	85.77	59.71
1997	6	N/A	81.20	56.60
1997	7	N/A	88.23	60.58
1997	8	N/A	93.74	64.45
1997	9	N/A	91.64	66.54
1997	10	N/A	80.90	59.23
1997	11	2.61	71.97	54.67
1997	12	4.96	61.65	48.52
1998	1	2.77	62.68	48.32
1998	2	11.84	58.86	44.89
1998	3	1.42	65.00	47.87
1998	4	N/A	67.43	48.03
1998	5	N/A	68.42	49.71
1998	6	N/A	77.03	54.60
1998	7	N/A	92.48	64.42
1998	8	0.00	98.81	69.06
1998	9	0.04	84.37	60.93
1998	10	0.00	78.52	57.48
1998	11	0.89	70.00	52.43
1998	12	0.40	64.32	49.16
1999	1	1.37	66.00	50.42
1999	2	0.69	63.36	47.43
1999	3	1.92	61.29	44.97
1999	4	N/A	65.73	47.80
1999	5	0.00	74.06	50.81
1999	6	0.32	82.73	54.33

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
1999	7	0.00	89.58	62.13
1999	8	N/A	91.71	63.45
1999	9	N/A	86.63	59.40
1999	10	N/A	87.71	65.23
1999	11	0.55	75.03	54.60
1999	12	N/A	68.55	53.61
2000	1	1.05	64.94	50.81
2000	2	4.72	60.55	47.52
2000	3	2.11	66.71	48.71
2000	4	N/A	73.17	53.17
2000	5	N/A	79.90	57.03
2000	6	N/A	86.40	59.27
2000	7	N/A	88.90	61.10
2000	8	0.00	92.26	65.42
2000	9	0.07	87.03	62.80
2000	10	N/A	72.77	54.35
2000	11	N/A	67.73	50.63
2000	12	0.01	70.16	54.10
2001	1	5.71	60.48	47.06
2001	2	4.77	57.29	44.57
2001	3	N/A	67.10	48.68
2001	4	N/A	65.57	47.63
2001	5	N/A	81.29	55.90
2001	6	N/A	86.67	59.93
2001	7	0.00	88.23	59.19
2001	8	0.00	92.65	63.13
2001	9	0.00	89.63	62.60
2001	10	0.12	82.61	58.03
2001	11	1.67	70.40	52.87
2001	12	1.23	60.71	47.06
2002	1	0.55	63.29	47.61
2002	2	0.28	70.89	51.82
2002	3	0.19	67.77	47.10
2002	4	0.02	71.43	47.77
2002	5	0.12	76.97	50.87
2002	6	0.00	85.23	56.03
2002	7	N/A	N/A	N/A
2002	8	N/A	N/A	N/A
2002	9	0.00	90.83	65.03
2002	10	0.02	74.97	54.03
2002	11	2.40	73.77	56.73
2002	12	3.11	62.00	47.45
2003	1	0.01	73.10	56.77
2003	2	6.74	63.11	47.64
2003	3	2.46	70.45	51.06
2003	4	1.43	66.97	46.10
2003	5	2.00	78.97	52.77

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2003	6	0.01	79.40	55.27
2003	7	0.00	94.97	65.19
2003	8	0.00	95.55	66.84
2003	9	0.00	92.83	62.33
2003	10	0.10	87.61	63.29
2003	11	0.03	67.00	49.87
2003	12	1.55	63.06	48.32
2004	1	0.32	65.32	48.16
2004	2	4.02	59.93	45.90
2004	3	0.32	76.32	54.26
2004	4	0.04	75.83	52.63
2004	5	0.00	81.23	57.42
2004	6	0.00	82.63	56.27
2004	7	0.00	91.77	61.67
2004	8	0.00	91.03	61.42
2004	9	0.00	89.60	63.73
2004	10	4.57	75.26	54.97
2004	11	0.11	65.10	49.57
2004	12	6.29	62.71	50.03
2005	1	9.44	61.77	50.13
2005	2	9.73	61.43	48.86
2005	3	1.50	66.32	49.71
2005	4	0.77	71.83	50.17
2005	5	0.19	78.39	55.45
2005	6	0.00	79.23	55.23
2005	7	0.00	92.58	63.81
2005	8	0.00	92.52	63.32
2005	9	0.02	84.40	60.23
2005	10	1.34	76.39	57.55
2005	11	0.28	73.23	57.23
2005	12	0.71	65.32	51.19
2006	1	2.35	62.84	48.97
2006	2	2.90	69.43	51.29
2006	3	3.03	60.68	42.26
2006	4	2.42	66.97	47.10
2006	5	1.07	79.32	54.39
2006	6	0.00	90.60	62.30
2006	7	0.00	97.00	69.23
2006	8	0.00	92.58	61.52
2006	9	0.02	90.00	63.13
2006	10	0.15	77.90	56.00
2006	11	0.11	75.97	56.30
2006	12	N/A	66.29	49.68
2007	1	0.91	62.19	45.97
2007	2	1.69	66.11	47.79
2007	3	0.08	73.77	51.42
2007	4	0.61	73.43	49.70

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2007	5	0.02	78.74	51.87
2007	6	0.00	87.57	56.60
2007	7	0.00	93.26	63.06
2007	8	0.00	94.68	65.26
2007	9	0.03	85.60	60.37
2007	10	N/A	N/A	N/A
2007	11	0.29	73.43	53.90
2007	12	1.01	60.10	45.61
2008	1	7.90	59.42	45.65
2008	2	1.69	62.97	47.72
2008	3	0.00	69.71	51.52
2008	4	0.02	77.03	50.83
2008	5	0.04	77.55	52.35
2008	6	0.00	91.17	61.10
2008	7	0.00	91.71	62.06
2008	8	0.00	91.74	63.16
2008	9	0.00	89.07	64.20
2008	10	0.00	84.84	64.00
2008	11	1.60	74.80	58.60
2008	12	1.98	60.90	46.23
2009	1	0.33	67.94	54.58
2009	2	5.00	62.61	47.54
2009	3	0.24	67.10	48.19
2009	4	0.00	71.20	50.07
2009	5	0.00	83.19	56.35
2009	6	0.10	77.70	55.63
2009	7	0.08	93.97	64.16
2009	8	0.00	93.13	63.45
2009	9	0.02	94.07	66.13
2009	10	1.58	77.97	57.03
2009	11	N/A	N/A	N/A
2009	12	2.52	61.94	46.52
2010	1	4.45	64.55	50.55
2010	2	2.98	63.64	47.86
2010	3	0.25	68.90	48.74
2010	4	1.29	67.33	46.50
2010	5	0.02	74.13	50.97
2010	6	0.00	81.87	54.87
2010	7	0.00	87.13	59.00
2010	8	0.00	90.58	62.03
2010	9	0.00	88.77	63.40
2010	10	1.44	73.68	56.32
2010	11	0.73	68.33	51.80
2010	12	5.82	62.90	49.68
2011	1	0.52	65.35	51.68
2011	2	2.39	60.96	44.61
2011	3	4.03	66.23	49.42

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2011	4	0.02	71.03	50.30
2011	5	0.39	74.58	50.84
2011	6	0.05	79.70	53.57
2011	7	0.00	89.23	60.55
2011	8	0.00	92.65	63.00
2011	9	0.00	90.67	61.47
2011	10	0.46	82.42	58.81
2011	11	1.73	67.90	50.80
2011	12	0.66	64.13	49.26

LEO CARRILLO

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
1999	8	0.00	73.68	56.39
1999	9	0.00	74.07	56.87
1999	10	0.00	79.26	57.71
1999	11	0.86	69.33	53.10
1999	12	0.00	70.71	52.77
2000	1	1.06	66.90	51.03
2000	2	5.13	64.86	50.28
2000	3	2.73	66.52	48.71
2000	4	2.33	68.17	51.20
2000	5	0.00	71.29	54.42
2000	6	0.01	75.40	58.27
2000	7	0.00	76.52	57.32
2000	8	0.00	78.42	60.32
2000	9	0.10	77.43	59.23
2000	10	0.99	71.58	55.23
2000	11	0.00	69.47	50.63
2000	12	0.00	68.74	51.35
2001	1	4.95	65.55	48.26
2001	2	3.89	62.93	47.46
2001	3	3.98	65.45	49.35
2001	4	0.82	64.37	48.27
2001	5	0.02	69.39	55.45
2001	6	0.02	74.50	56.23
2001	7	0.00	75.29	57.58
2001	8	0.00	74.55	57.97
2001	9	0.00	75.20	57.93
2001	10	0.15	72.39	55.71
2001	11	1.60	68.50	54.10
2001	12	1.33	64.45	49.35
2002	1	N/A	65.65	48.26
2002	2	0.54	69.00	50.32
2002	3	0.43	67.03	48.68

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2002	4	0.05	65.70	49.47
2002	5	0.14	68.61	51.48
2002	6	0.00	72.37	55.63
2002	7	0.00	74.94	58.94
2002	8	0.01	73.42	57.55
2002	9	0.06	75.23	58.10
2002	10	N/A	N/A	N/A
2002	11	1.70	74.30	56.33
2002	12	2.65	65.94	50.35
2003	1	0.01	73.26	55.55
2003	2	4.78	67.18	50.68
2003	3	2.58	68.94	51.16
2003	4	0.90	66.17	49.30
2003	5	1.06	68.13	52.06
2003	6	0.01	69.83	56.87
2003	7	0.00	77.48	61.68
2003	8	0.01	77.32	59.55
2003	9	0.00	74.17	58.60
2003	10	0.10	75.16	58.48
2003	11	0.38	69.50	51.57
2003	12	1.04	65.74	49.77
2004	1	0.86	66.61	48.81
2004	2	3.55	65.28	49.14
2004	3	2.52	69.32	52.06
2004	4	0.00	70.47	51.70
2004	5	0.00	73.52	54.52
2004	6	0.00	72.33	56.93
2004	7	N/A	74.73	58.33
2004	8	0.00	76.29	58.42
2004	9	0.02	80.57	61.37
2004	10	2.26	71.45	55.23
2004	11	0.28	69.40	52.27
2004	12	3.14	66.94	52.23
2005	1	8.45	66.00	52.32
2005	2	6.14	66.89	52.21
2005	3	1.17	66.55	51.42
2005	4	1.03	67.37	50.20
2005	5	0.38	69.65	53.87
2005	6	0.01	70.00	53.97
2005	7	0.00	73.35	58.90
2005	8	0.00	75.90	58.84
2005	9	0.00	75.20	55.60
2005	10	1.03	71.71	55.45
2005	11	0.73	72.57	55.77
2005	12	0.74	66.35	51.77
2006	1	1.38	67.71	50.26
2006	2	2.67	67.68	49.14

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2006	3	N/A	61.55	46.29
2006	4	2.72	65.50	50.03
2006	5	1.11	68.23	54.58
2006	6	0.00	74.43	57.90
2006	7	0.00	79.13	62.45
2006	8	0.00	77.00	59.35
2006	9	0.00	75.47	57.73
2006	10	0.14	75.03	56.29
2006	11	0.11	73.67	55.23
2006	12	1.00	67.94	50.90
2007	1	1.86	66.97	49.29
2007	2	1.54	66.86	49.11
2007	3	0.22	68.87	50.97
2007	4	0.69	66.57	49.93
2007	5	0.00	69.23	52.19
2007	6	0.00	71.23	54.70
2007	7	0.00	76.32	60.29
2007	8	0.00	77.19	60.48
2007	9	0.21	75.73	57.27
2007	10	0.97	75.00	57.23
2007	11	0.22	68.90	52.93
2007	12	1.30	65.58	48.19
2008	1	6.34	63.68	48.81
2008	2	1.73	64.28	48.14
2008	3	0.00	67.71	50.10
2008	4	0.09	69.70	49.80
2008	5	0.06	69.61	51.84
2008	6	0.00	73.63	55.57
2008	7	0.00	75.29	59.52
2008	8	0.00	76.58	61.03
2008	9	N/A	N/A	N/A
2008	10	0.00	78.77	58.65
2008	11	1.35	74.37	56.47
2008	12	1.81	63.74	48.10
2009	1	0.42	72.00	54.61
2009	2	3.53	65.21	48.71
2009	3	0.22	66.35	48.68
2009	4	0.08	67.93	49.80
2009	5	0.00	70.45	54.87
2009	6	0.10	71.43	55.63
2009	7	0.00	74.10	57.68
2009	8	0.00	76.03	58.61
2009	9	0.00	77.97	60.63
2009	10	1.49	74.87	56.58
2009	11	0.00	71.17	53.30
2009	12	2.59	64.65	49.19
2010	1	3.76	67.65	51.81

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2010	2	2.92	66.14	49.89
2010	3	0.53	68.48	50.58
2010	4	0.68	66.57	48.90
2010	5	0.05	68.06	51.10
2010	6	0.00	70.93	55.73
2010	7	0.03	71.58	57.03
2010	8	0.00	71.39	54.87
2010	9	0.00	73.40	55.67
2010	10	1.55	70.19	57.29
2010	11	0.60	69.20	52.00
2010	12	7.02	63.42	49.58
2011	1	0.60	67.45	50.48
2011	2	1.62	62.82	45.86
2011	3	2.08	63.23	48.03
2011	4	0.00	66.83	49.93
2011	5	0.25	67.19	50.00
2011	6	0.03	67.63	52.47
2011	7	0.00	72.61	57.42
2011	8	0.00	72.74	56.52
2011	9	nan	72.04	57.30
2011	10	0.70	71.39	56.19
2011	11	1.61	67.43	51.87
2011	12	0.53	65.48	48.42

MALIBU CANYON

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2005	10	1.01	76.23	47.35
2005	11	0.93	75.23	41.83
2005	12	1.03	68.68	38.84
2006	1	3.03	67.84	36.42
2006	2	3.35	70.79	35.14
2006	3	4.35	62.32	36.55
2006	4	4.45	66.03	42.70
2006	5	1.98	72.55	50.84
2006	6	0.00	82.77	55.77
2006	7	0.00	89.35	60.55
2006	8	0.00	83.39	52.81
2006	9	N/A	84.00	50.33
2006	10	0.20	77.48	45.16
2006	11	0.17	76.53	40.20
2006	12	0.76	70.00	34.68
2007	1	1.82	65.87	35.48
2007	2	1.64	69.68	37.04
2007	3	0.04	73.45	40.94

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2007	4	0.97	71.70	43.20
2007	5	0.00	74.16	47.55
2007	6	0.00	77.97	50.03
2007	7	0.00	83.52	56.55
2007	8	0.00	87.23	56.81
2007	9	1.17	83.50	50.80
2007	10	0.45	80.61	46.97
2007	11	N/A	N/A	N/A
2007	12	N/A	N/A	N/A
2008	1	N/A	N/A	N/A
2008	2	N/A	68.69	37.54
2008	3	0.00	74.74	37.23
2008	4	0.08	76.07	39.07
2008	5	0.13	75.16	45.77
2008	6	0.00	82.90	51.80
2008	7	0.00	81.61	56.58
2008	8	0.00	84.42	56.42
2008	9	0.00	87.20	53.67
2008	10	0.00	86.10	45.97
2008	11	1.57	79.17	43.27
2008	12	2.98	65.74	34.97
2009	1	0.29	74.19	39.55
2009	2	6.36	66.64	37.21
2009	3	0.72	68.94	37.84
2009	4	0.06	73.33	38.70
2009	5	0.00	77.00	50.58
2009	6	0.16	74.63	51.60
2009	7	0.00	84.84	54.90
2009	8	0.00	86.16	54.39
2009	9	N/A	88.54	54.31
2009	10	N/A	N/A	N/A
2009	11	N/A	74.74	38.00
2009	12	4.15	65.13	35.32
2010	1	5.67	68.55	37.00
2010	2	5.37	67.29	38.43
2010	3	0.42	72.00	37.84
2010	4	1.54	68.47	39.27
2010	5	0.03	73.90	43.84
2010	6	0.00	73.73	51.93
2010	7	0.00	78.35	54.94
2010	8	0.00	82.29	51.52
2010	9	0.00	84.37	49.23
2010	10	2.04	74.65	50.68
2010	11	0.87	73.10	38.00
2010	12	10.89	66.94	39.84
2011	1	1.03	70.90	36.90
2011	2	4.07	64.71	33.25

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2011	3	5.41	70.00	39.71
2011	4	0.00	73.37	43.37
2011	5	0.62	73.29	43.45
2011	6	0.01	73.47	49.47
2011	7	0.00	81.45	55.16
2011	8	0.00	84.45	54.16
2011	9	0.45	80.57	53.43
2011	10	2.18	79.03	46.48
2011	11	2.25	68.93	38.07
2011	12	1.30	66.94	33.13

MALIBU HILLS

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
1995	1	4.58	60.08	50.00
1995	2	2.37	66.57	55.68
1995	3	9.09	62.71	51.48
1995	4	0.98	65.90	52.37
1995	5	N/A	64.71	50.06
1995	6	0.63	73.57	55.70
1995	7	N/A	85.45	64.26
1995	8	N/A	89.10	69.16
1995	9	N/A	85.50	65.43
1995	10	N/A	77.65	58.97
1995	11	N/A	N/A	N/A
1995	12	N/A	N/A	N/A
1996	1	N/A	N/A	N/A
1996	2	N/A	N/A	N/A
1996	3	N/A	65.97	50.93
1996	4	N/A	74.57	56.50
1996	5	N/A	72.77	55.55
1996	6	N/A	78.53	58.03
1996	7	N/A	86.52	64.97
1996	8	0.00	88.45	65.48
1996	9	N/A	80.33	60.03
1996	10	2.30	76.23	57.29
1996	11	N/A	N/A	N/A
1996	12	N/A	N/A	N/A
1997	1	N/A	N/A	N/A
1997	2	N/A	N/A	N/A
1997	3	N/A	74.54	55.46
1997	4	0.00	71.90	53.93
1997	5	N/A	79.90	59.32
1997	6	0.05	73.23	56.60
1997	7	0.00	80.19	60.06

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
1997	8	0.01	86.58	65.35
1997	9	0.18	88.30	67.47
1997	10	0.00	76.10	59.29
1997	11	3.40	68.60	52.13
1997	12	5.11	61.65	49.26
1998	1	4.14	60.74	47.71
1998	2	N/A	N/A	N/A
1998	3	5.03	62.97	48.10
1998	4	1.21	64.83	48.83
1998	5	4.73	64.48	50.06
1998	6	0.19	70.17	53.57
1998	7	0.01	83.97	63.29
1998	8	0.00	90.90	67.42
1998	9	0.06	77.87	59.83
1998	10	N/A	74.97	57.35
1998	11	2.21	68.27	52.17
1998	12	1.00	64.19	49.81
1999	1	N/A	65.90	49.81
1999	2	0.96	63.11	47.79
1999	3	2.47	61.48	46.10
1999	4	2.83	64.93	48.33
1999	5	0.08	75.58	58.61
1999	6	0.62	90.33	68.00
1999	7	0.16	84.77	60.71
1999	8	0.00	88.58	62.52
1999	9	0.02	82.23	58.20
1999	10	0.00	88.39	64.87
1999	11	0.63	75.13	54.93
1999	12	0.01	71.55	53.94
2000	1	1.45	68.00	51.42
2000	2	8.10	62.48	47.52
2000	3	2.89	69.03	48.35
2000	4	3.01	75.47	52.87
2000	5	0.05	78.90	55.84
2000	6	0.01	81.67	58.33
2000	7	0.00	85.61	60.10
2000	8	0.00	89.87	65.19
2000	9	0.23	85.87	62.23
2000	10	3.75	73.26	54.16
2000	11	0.00	69.63	51.40
2000	12	0.00	71.71	54.97
2001	1	7.89	63.19	47.81
2001	2	8.38	60.29	45.68
2001	3	3.56	67.26	49.00
2001	4	2.05	68.27	48.27
2001	5	0.07	77.03	55.77
2001	6	0.01	83.00	59.83

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2001	7	0.00	82.77	58.58
2001	8	0.00	87.84	62.10
2001	9	0.00	85.43	62.43
2001	10	0.11	79.52	58.29
2001	11	3.19	70.33	53.30
2001	12	1.27	62.65	48.42
2002	1	N/A	64.70	48.37
2002	2	N/A	71.07	53.11
2002	3	0.51	67.10	47.74
2002	4	0.04	67.60	48.20
2002	5	0.37	72.10	50.84
2002	6	0.00	77.47	55.33
2002	7	0.00	83.81	59.52
2002	8	0.03	83.55	60.81
2002	9	0.00	88.67	65.00
2002	10	N/A	71.38	54.72
2002	11	3.36	74.40	57.70
2002	12	5.17	63.97	49.00
2003	1	0.00	75.39	58.26
2003	2	4.85	64.37	49.44
2003	3	N/A	70.13	54.58
2003	4	1.65	65.40	47.67
2003	5	N/A	N/A	N/A
2003	6	0.20	71.76	55.45
2003	7	0.00	86.81	64.81
2003	8	0.00	90.52	66.94
2003	9	0.00	87.07	60.53
2003	10	0.59	84.26	62.94
2003	11	N/A	66.80	50.63
2003	12	2.41	64.32	49.03
2004	1	0.79	65.48	48.48
2004	2	7.30	62.24	46.28
2004	3	4.50	76.45	51.94
2004	4	0.00	71.97	52.67
2004	5	0.00	77.74	56.77
2004	6	0.00	74.73	55.10
2004	7	N/A	85.33	60.97
2004	8	0.00	82.87	59.61
2004	9	0.00	85.80	63.57
2004	10	5.32	73.48	54.58
2004	11	0.16	65.70	48.57
2004	12	N/A	64.58	50.29
2005	1	N/A	65.44	52.44
2005	2	12.03	62.29	49.21
2005	3	3.35	66.13	49.19
2005	4	1.12	70.47	49.80
2005	5	0.57	74.29	53.68

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2005	6	0.01	75.13	54.67
2005	7	0.00	86.94	62.35
2005	8	0.00	86.19	61.84
2005	9	0.07	81.20	59.47
2005	10	1.15	74.65	56.42
2005	11	1.08	73.83	55.87
2005	12	2.11	67.03	51.39
2006	1	N/A	N/A	N/A
2006	2	2.72	69.89	51.54
2006	3	4.19	58.68	43.77
2006	4	3.67	63.27	48.50
2006	5	2.58	70.71	53.68
2006	6	0.02	82.73	61.00
2006	7	0.00	90.58	67.77
2006	8	0.00	83.55	61.90
2006	9	0.01	84.70	63.40
2006	10	N/A	N/A	N/A
2006	11	0.24	74.10	57.00
2006	12	0.66	66.65	51.32
2007	1	1.90	62.81	47.06
2007	2	0.53	66.21	48.54
2007	3	0.02	72.39	52.06
2007	4	0.01	70.20	49.37
2007	5	0.01	72.84	52.10
2007	6	0.00	79.67	55.60
2007	7	0.00	85.32	62.39
2007	8	0.00	89.00	64.71
2007	9	0.01	82.97	60.63
2007	10	0.00	79.00	59.13
2007	11	0.02	74.07	54.40
2007	12	5.83	62.06	46.77
2008	1	9.13	60.94	46.74
2008	2	N/A	65.00	48.69
2008	3	0.03	72.71	52.77
2008	4	0.05	74.50	51.57
2008	5	0.15	73.29	53.19
2008	6	0.00	86.17	60.33
2008	7	0.00	85.32	61.52
2008	8	0.00	88.10	62.06
2008	9	0.00	89.00	64.90
2008	10	0.02	85.52	64.29
2008	11	1.10	77.00	58.90
2008	12	3.26	63.03	47.00
2009	1	0.18	71.32	55.00
2009	2	4.77	64.93	48.18
2009	3	0.21	67.58	48.55
2009	4	0.03	71.27	50.30

Year	Month	Precip (Inches)	Tmax (F)	Tmin (F)
2009	5	0.01	77.42	54.39
2009	6	0.07	74.70	54.80
2009	7	0.00	88.68	63.35
2009	8	0.00	87.81	63.39
2009	9	0.00	90.53	65.53
2009	10	0.46	77.52	57.32
2009	11	0.00	75.60	55.37
2009	12	4.64	62.35	47.52
2010	1	4.24	66.03	51.77
2010	2	6.08	64.36	48.86
2010	3	0.14	69.06	49.71
2010	4	1.60	66.10	47.13
2010	5	0.12	72.13	50.97
2010	6	0.01	74.57	53.67
2010	7	0.03	78.81	57.58
2010	8	0.00	85.90	61.90
2010	9	0.00	86.73	63.63
2010	10	2.05	72.77	56.35
2010	11	0.79	69.17	52.60
2010	12	6.00	64.10	50.52
2011	1	0.44	67.39	53.16
2011	2	2.12	61.25	45.21
2011	3	4.26	66.45	50.23
2011	4	0.00	70.00	51.23
2011	5	0.22	70.48	51.77
2011	6	0.05	72.67	53.13
2011	7	0.00	82.90	60.23
2011	8	0.00	86.13	62.81
2011	9	0.01	82.37	60.60
2011	10	2.86	78.81	59.61
2011	11	2.85	66.87	51.67
2011	12	N/A	N/A	N/A