The North Coast Observer
NORTHWEST CALIFORNIA WEBLETTER
National Weather Service • Eureka, CA
WINTER 2017-2018
ISSUE #7

In this issue…

Upcoming Events	
Date	**Event**
Dec 1	Meteorological winter begins
Dec 21	Astronomical winter begins at 8:28am
Feb 9	Birthday of the National Weather Service
Mar 1	Meteorological spring begins
	Growing season begins for zones 101, 103, & 109-113

Follow Us on Social Media!

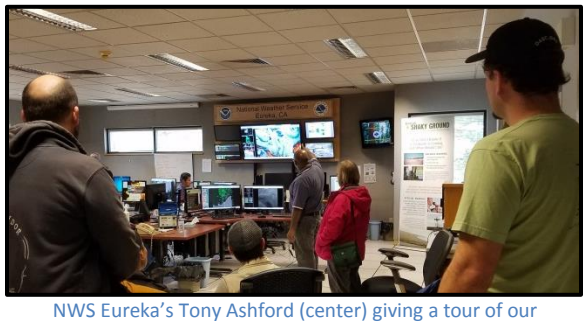
Website	weather.gov/eureka
Facebook	facebook.com/nwseureka
Twitter	twitter.com/nwseureka
YouTube	youtube.com/NWSEureka

NWS Eureka Hosts an Open House

by Karleisa Rogacheski

Front entrance display table with brochures and local Weather Ready Nation ambassador presentation

As part of **Earthquake and Tsunami Preparedness Week**, the National Weather Service in Eureka, CA hosted an open house for the public on October 21, 2017. Over 200 participants passed through the office and learned the importance of fire weather forecasting and the forecast process, participated in hands on experiments about flooding and severe weather, and learned about our climatology program. Additionally, they were also introduced to the **Weather Ready Nation** program. We look forward to hosting future open house events to continue working toward a Weather Ready Northwest California!



NWS Eureka's Tony Ashford (center) giving a tour of our operations area

NWS Eureka's William Iwasko gives visitors a look at our weather instruments

Weather experiment area

A Wildfire Season to Remember
by Brad Charboneau

In the wee hours of October 8th, the lives of thousands of northern California citizens were forever altered when a series of destructive wildfires raged under the cover of darkness. Fueled by a combination of unusually strong winds, very low humidity, and exceptionally dry vegetation, these wildfires quickly spread down hillsides and into communities in a matter of just a few hours, where they eventually destroyed an estimated 8,900 structures and, tragically, claimed the lives of 43 people.

The communities of Santa Rosa and Redwood Valley were hit especially hard by these fires, where entire neighborhoods were reduced to a pile of ashes in some cases. All told, this series of wildfires will ultimately go down as both the deadliest and costliest wildfire event in California history. While extraordinarily catastrophic events such as this are rarely ever caused by one single factor, a particularly unique combination of weather and climate conditions played a key role in the rapid spread of these fires.

In most years in the late summer and early fall, conditions become more favorable for the development of strong northeasterly and easterly winds across many parts of California. Nicknamed "El Diablo" winds in northern portions of the state, these winds are driven towards the ocean by strong high pressure across the intermountain west. While this air is typically cool and already relatively dry at its source, its temperature rises and humidity drops as it descends in elevation towards the coast and is often accelerated as it is forced through canyons, and over, around, and down mountainsides *(figure 1 below)*.

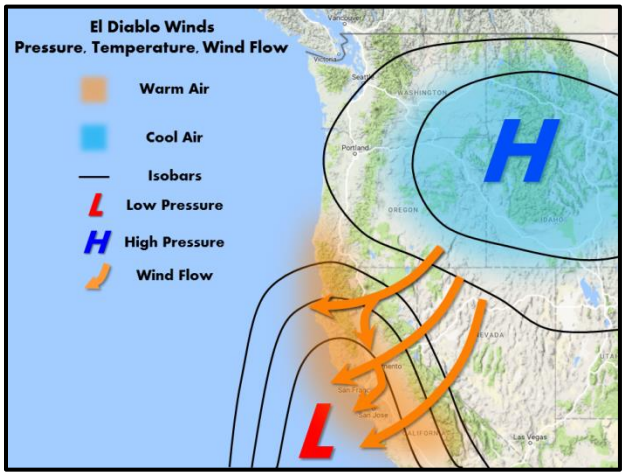


Figure 1

But these winds are not particularly uncommon, and while they can and often do result in an enhanced fire risk, many "offshore" wind events happen on a yearly basis without incident. What set this event apart from most others was that wind speeds were much stronger than usual, even for a "strong" El Diablo event by many standards.

A Wildfire Season to Remember *(continued)*
by Brad Charboneau

So why were the wind speeds so strong this time around? Well, the devil's in the details. As wind moves toward the coast, it must figure out a way to pass through the mountainous terrain. The path it takes depends on a number of subtle factors in the atmosphere, and when these factors combine just right, they can lead to accelerated winds in areas that would typically remain sheltered. In this particular case, instead of skirting the tops of ridges and remaining above the valley floors, the already strong winds were forced down the lee slopes of mountains and accelerated into valleys, contributing to rapid fire spread in many areas. While observations in the region were sporadic, a few stations near the Tubbs fire in Santa Rosa recorded gusts of over 60 mph!

But the weather that night was only one piece of the puzzle. Wildfires need a receptive fuel to consume, and this event was no exception. After a long, wet winter led to robust vegetation growth in the spring, California experienced its warmest June through September period since at least 1895 *(figure 2 below)*. When coupled with California's typical summertime drought which features only sporadic showers even in "wet" years, this new vegetation quickly dried out, including the now abundant crop of grass. This combination of nearly unprecedented wind speeds and very dry fuels resulted in extremely volatile conditions for wildfires, and unfortunately that threat was realized in a tragic way.

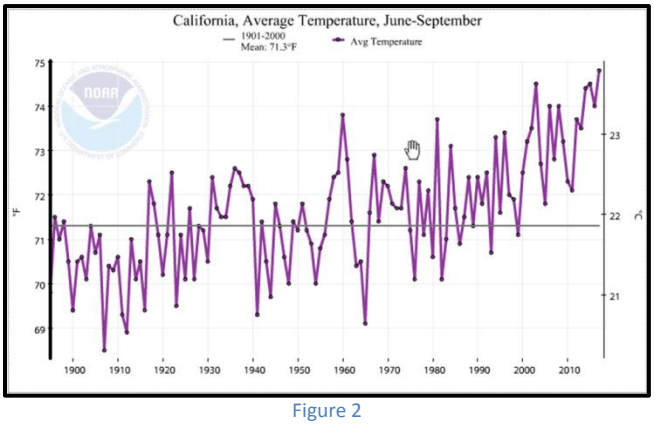


Figure 2

While this was certainly the most destructive event of 2017, it was only one event of many during a particularly active season. Numerous large fires were ignited by waves of lightning across Northern California from late June through August. Local residents won't soon forget the Helena-Fork Complex which burned several homes in the rural community of Helena. And, while November rains put an end to high fire season in the north, Santa Ana winds continue to fuel the massive Thomas Fire in southern California, which has grown to over 270,000 acres by late December. All told, 1.27 million acres have been consumed by wildfire in California so far in 2017, the highest total since 2008.

Climate Page
by Matthew Kidwell & Scott Carroll

Fall started off with a heat event across much of the state in early September. This was due to strong high pressure over the region. Light easterly winds at the coast kept the marine layer at bay and allowed temperatures to climb into the 80s even at the coast. A few early season storms managed to break down the high pressure occasionally and brought some rain to the area in September and October, but rainfall amounts remained generally near to below normal. In November, the ridge broke down, and numerous storm systems moved through bringing above normal rainfall to much of the area.

September

High pressure was the main influence on the weather for the month of September, with a few weather systems breaking through the ridge to bring some rain to the area. Temperatures inland were close to normal, while the coastal temperatures were 4 to 6°F above normal. Multiple high temperature records were set along the coast, including Eureka tying the all-time high temperature record. Rainfall was significantly higher in the northern areas with above normal amounts, while areas farther south ended the month well below normal.

October

High pressure was in place for much of the month across the region. This brought numerous sunny days across the interior and only a few days of rain. Along the coast, there were some sunny days, although there were also quite a few days with coastal stratus remaining in place through the day. The high pressure kept most of the rain to the north of the area, and rainfall across the area ended up below normal. The mainly dry conditions resulted in above normal high temperatures and below normal low temperatures although this was moderated slightly at the coast due to the periods of marine clouds.

November

A series of weather systems brought significant rainfall to the region, and most areas saw above normal amounts. Inland areas saw near to slightly below normal high temperatures due to the increased cloud cover, while at the coast, high temperatures were near to above normal. This was due, at least partially, to a few warm days when the coastal areas saw offshore flow and temperatures were well above normal. Eureka and Crescent City both set high temperature records of 75°F and 69°F respectively on the 21st. Overnight low temperatures were above normal due to the increased moisture and cloud cover, especially across the interior.

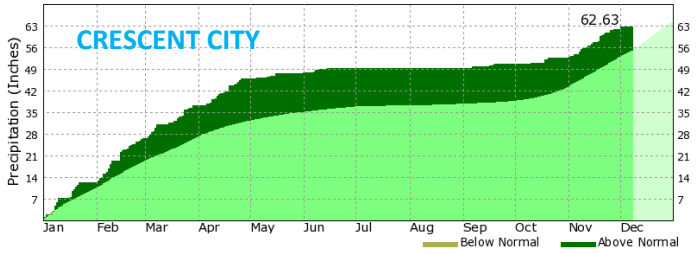
Climate Page *(continued)*
by Matthew Kidwell & Scott Carroll

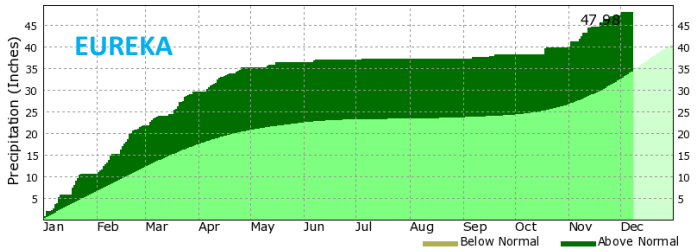
Fall 2017 Monthly Climate Comparison

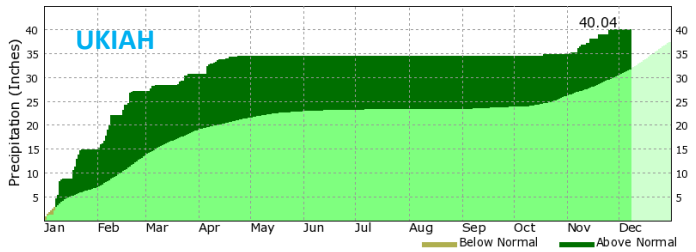
	Crescent City			Eureka			Ukiah		
	Ave Hi	Ave Lo	Total Rain	Ave Hi	Ave Lo	Total Rain	Ave Hi	Ave Lo	Total Rain
Sep	65.3	50.9	1.26	67.4	53.1	1.01	87.0	52.3	0.03
Oct	61.0	44.9	2.03	62.0	44.2	1.64	80.7	41.6	0.21
Nov	56.2	45.3	9.25	59.9	45.7	7.40	61.6	43.7	5.22

temperatures in °F, rainfall in inches

Year-to-Date Precip Comparison click images for links







data through December 7th

Winter Outlook (Dec-Feb) click images for links

The Climate Prediction Center's winter outlook for NW California is calling for equal chances for above or normal temperatures (fig. 1) and precipitation (fig. 2). Better chances of wetter and cooler than normal weather are expected across the Pacific Northwest, and better chances of drier and warmer than normal weather are expected over southern California.

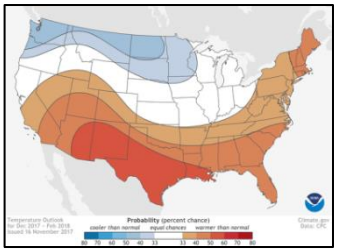


Figure 3 – Temperature Outlook

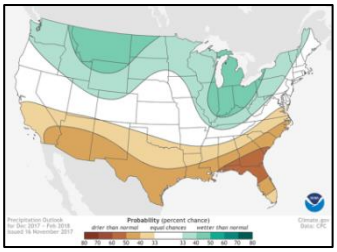


Figure 4 – Precipitation Outlook

Numerous Local Records Set in the Fall
by Scott Carroll

This fall, numerous records were either tied or broken across the area. Many of these records were maximum temperature records were the result of persistent high pressure over the area. Included in this list is the high temperature of 87°F in Eureka on September 2nd, which tied the all-time high temperature record for any day of the year! This record was previously set on October 26th of 1993.

Fall Record Events

Date	Location	Record	Value	Previous Record
Sep 1	Eureka	Max Temp	76	75 in 1979
Sep 2	Eureka	Max Temp	87†	75 in 1979
Sep 3	Eureka	Max Temp	78	74 in 2003
Sep 5	Eureka	Max Temp	74	72 in 2013
Sep 27	Eureka	Max Temp	77	75 in 1976
Sep 28	Eureka	Max Temp	79	79 in 1945*
Oct 9	Eureka	Min Temp	38	39 in 1985
Oct 24	Eureka	Max Temp	76	74 in 1986
Oct 26	Ukiah	Max Temp	93	93 in 1917*
Oct 27	Ukiah	Max Temp	92	90 in 2003
Nov 5	Eureka	Min Temp	36	36 in 1935*
Nov 21	Crescent City	Max Temp	69	68 in 1967
"	Eureka	Max Temp	75	70 in 1930
Nov 25	Eureka	Max Temp	74	70 in 1977
Nov 27	Ukiah	Max Temp	80	76 in 1954

†tied all-time record high set on October 26, 1993 *record tied

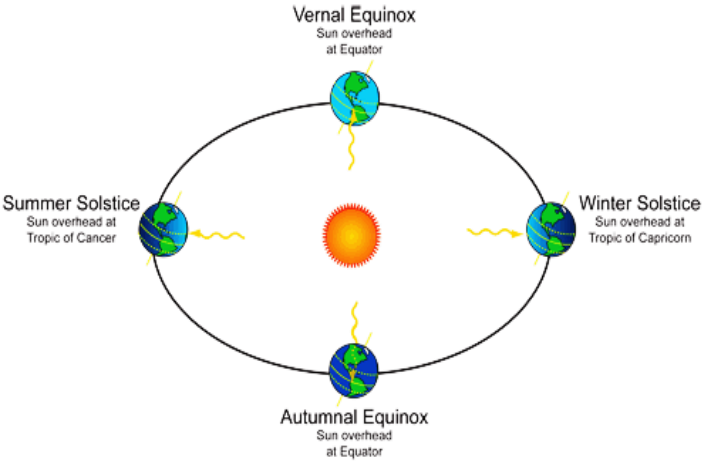
Rain, Snow, & Hail Observers Needed!
by Scott Carroll

The National Weather Service is always looking for volunteers interested in participating in the **CoCoRaHS** (**Co**mmunity **Co**llaborative **Ra**in, **H**ail, and **S**now Network) program. In our area, this is especially true during the rainy season of late fall through early spring. Rain, snow, and hail measurements from local volunteers helps us verify our forecasts and warnings, provide useful information for flood forecasting, and give us ground truth in normally data sparse areas. Daily data can be entered via either a website or a smart phone app. This data makes its way into a local text product, the CoCoRaHs Precipitation Summary, issued locally during the early to mid-morning.

For more information on the national CoCoRaHS program, click here. For specific questions regarding the NWS Eureka program, email Matthew Kidwell, local CoCoRaHS coordinator.

The Winter Solstice
by Ricky Lam

The winter solstice occurred at 2:23 PM on Friday, December 21st. The winter solstice marks the day with the shortest period of daylight and the longest night of the year. With Earth's 23.5 degree tilt, the northern hemisphere is farther away from the sun than the southern hemisphere. As a result, the farther north you go, the lower the sun is in the sky, and, thus the less daylight one will see.



Here's a list of cities with their corresponding sunrise, sunset, and length of day on the winter solstice:

City	Sunrise	Sunset	Day
Utqiagvik (Barrow), AK	1:17 PM (1/22/18)	1:18 PM (11/18/17)	0 h
Fairbanks, AK	10:58 AM	2:41 PM	3 h 43 m
Anchorage, AK	10:14 AM	3:42 PM	5 h 28 m
Juneau, AK	8:45 AM	3:07 PM	6 h 22 m
Seattle, WA	7:55 AM	4:20 PM	8 h 25 m
Portland, OR	7:48 AM	4:30 PM	8 h 42 m
Crescent City, CA	7:41 AM	4:49 PM	9 h 8 m
Eureka, CA	7:38 AM	4:52 PM	9 h 14 m
San Francisco, CA	7:22 AM	4:55 PM	9 h 33 m
Los Angeles, CA	6:55 AM	4:48 PM	9 h 53 m
San Diego, CA	6:47 AM	4:47 PM	10 h

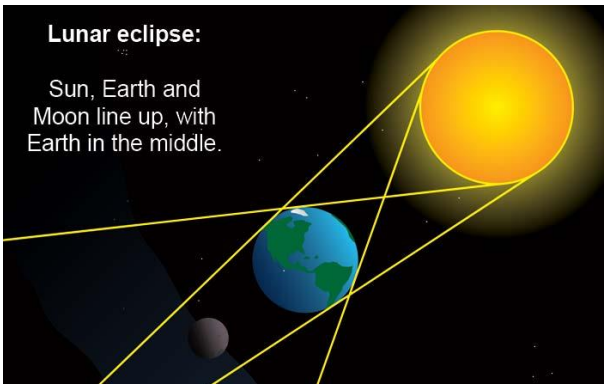
After the winter solstice, the northern hemisphere will start to see increasing daylight each day. ***Happy winter solstice!!!***

Night Sky Corner
by Scott Carroll

Total Lunar Eclipse Coming Up at the End of January

For those willing to venture out into the late night winter chill, a total lunar eclipse on January 31, 2018, should make for some excellent viewing (weather permitting, of course). A lunar eclipse occurs when the Sun, Earth, and Moon line up with the Earth between the Sun and Moon *(see image below)*. This occurs at the time that the moon is normally full. Every year, there are at least two lunar eclipses (and sometimes as many as five) visible somewhere on the Earth. However, they are not always total eclipses.

The shadow of the Earth on the moon has two distinctive parts, the **umbra** and **penumbra**. Within the umbra, there is no direct solar radiation reaching the Moon. Due to the Sun's large angular size, solar radiation is only partially blocked in the outer portion of Earth's shadow, which is called the penumbra. Some eclipses are only penumbral. This particular eclipse is a total eclipse, although there is still a penumbral stage before and after totality.



Credit: NASA

The following table lists approximate eclipse particulars for the local area:

Total Lunar Eclipse – Jan 31, 2018	
Eclipse Duration	4h 43m
Duration of Totality	1h 16m
Penumbral Eclipse Begins	2:51am
Partial Eclipse Begins	3:48am
Full Eclipse Begins	4:52am
Maximum Eclipse	5:30am
Full Eclipse Ends	6:08am
Civil Twilight Begins	6:58am
Partial Eclipse Ends	7:11am
Sunrise	7:27am
Moonset	7:34am

Night Sky Corner *(continued)*
by Scott Carroll

Winter Moon Phases		
December	**January**	**February**
3rd	1st	7th
9th	8th	15th
17th	16th	23rd
26th	24th	
	31st	

Winter Night Sky Calendar	
Date	**Event**
Dec 12	Mercury inferior conjunction
Dec 13	Moon-Mars conjunction
Dec 14	Moon-Jupiter conjunction
Dec 22	Ursid meteor shower maximum
Jan 3	Quadrantid meteor shower maximum
Jan 6	Mars-Jupiter conjunction
Jan 10	Moon-Jupiter conjunction
Jan 12	Mercury-Saturn conjunction
Jan 14	Moon-Saturn conjunction
Jan 31	Total lunar eclipse
Feb 7	Moon-Jupiter conjunction
Feb 8	Moon-Mars conjunction
Feb 11	Moon-Saturn conjunction

moon phase and event information courtesy of NASA

NWS Eureka Employees Volunteer at Local Animal Shelter
by William Iwasko

This year marked the 7th annual National Weather Service (NWS) Week of Service event. During the week of September 24th through September 30th, 58 NWS offices and centers amounting to over 1,000 employees across the country volunteered their time to better their communities. This year, 8 members from NWS Eureka helped out at the Humboldt County Animal Shelter near the Arcata/Eureka Airport north of McKinleyville. As volunteers for the shelter, we walked and played with the dogs and cats that are still waiting to find their permanent homes. All of our volunteers enjoyed their time with the cats and dogs and were very tempted to adopt these animals themselves. Several of our staff members continue to volunteer their time at the shelter. **For more information about the Humboldt County Animal Shelter, visit their Facebook page at here. For a list of adoptable animals near you, visit petharbor.com.**

SKYWARN Recognition Day 2017

by William Iwasko

Part of the NWS Eureka ham radio station. Our office was recently approved to use the vanity call sign "WX6EKA".

This year was the 19th annual SKYWARN Recognition Day which was held December 1st-2nd. SKYWARN recognition day recognizes the contributions that all amateur radio operators make to the mission of the NWS in our mission to protect life and property. Amateur radio operators comprise a large percentage of SKYWARN volunteers across the country who relay weather information from the field back to their local NWS office. Amateur radio operators also provide vital communication capabilities between NWS offices and local emergency management agencies when normal communications are compromised.

During this special event, operators came to our office and attempted to make radio contact with other radio operators across the country and around the world. This year, we had over 10 local amateur radio operators stop by the office to participate from the **Humboldt Amateur Radio Club**. These operators spent 16 hours making radio contacts via the various amateur radio frequencies in addition to utilizing computer and other digital technology. They contacted 24 different NWS offices across the country, making contacts in 21 different states and Mexico. We want to thank all of the operators who came by the office for their hard work and dedication in protecting life and property within our area. We look forward to working more closely with them in the future!

Pictured (L to R): William Iwasko (NWS Eureka), Howard Lang, Jim Armstrong, Dan Eaton, Robert Deja, and Steve Isherwood

Winter Weather Safety

by NWS Public Information & Karleisa Rogacheski

Make this holiday season happy and safe for you and your family! As you are out and about celebrating, be aware and prepared for the numerous weather hazards that can affect your area. Being prepared means learning how to stay safe when faced with winter weather hazards, such as extreme cold, snow, ice, fog, high winds and flooding. Stay safe this holiday season: **Know Your Risk**, **Take Action**, and **Be a Force of Nature** by sharing your actions to inspire others.

Looking for some tips when traveling this winter? We've got you covered…

- ✓ **Make sure you fuel up and always stay above a half tank throughout your trip.**
- ✓ **Check the forecast before leaving your current location, along your route, and at your destination.**
- ✓ **Tell someone where you are going, what time you leave, and the route you will take to get there. Use the better-traveled roads.**
- ✓ **Do not use cruise control on wet or icy roads.**
- ✓ **Slow down on sharp curves and bridges.**
- ✓ **Wear your seatbelt.**
- ✓ **Wear winter weather clothing while driving. If you are in an accident, it may take a while for someone to find you and for responders to get there. You don't want to suffer frostbite or hypothermia while waiting for help.**

To learn more about winter hazards, visit http://www.weather.gov/safety. As always, get your local forecast at http://www.weather.gov.

Editor-in-Chief
Scott E. Carroll
Editors
Ryan Aylward
Brad Charboneau
Meteorologist-in-Charge
Troy Nicolini

Contributing Writers
Scott Carroll
Brad Charboneau
William Iwasko
Matthew Kidwell
Richard Lam
Karleisa Rogacheski