The North Coast Observer
NORTHWEST CALIFORNIA WEBLETTER
National Weather Service • Eureka, CA
FALL 2017
ISSUE #6

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Features…

NWS Eureka Outreach…

Ensure You & Your Family are Ready for any Tsunami or Earthquake

by Ryan Aylward

Use the following two upcoming events in October to ensure you and your family are ready for ***ANY*** tsunami or earthquake…

Tsunami Warning Test

(when a tsunami comes from far away)

Wednesday, October 18, 2017

11 am - noon

What to do: Listen or watch for the Tsunami Warning on TV and radio stations, or NOAA Weather Radios. In some areas, you may receive notification on your phone or hear a siren or civil air patrol message. ***REMEMBER - IT IS ONLY A TEST!***

In the tsunami zone? Practice your plan for when you receive a Tsunami Warning that says a tsunami is coming from far away and will arrive in the next 3 to 15 hours.

◆◆◆◆◆

California ShakeOut

(when a tsunami comes from nearby)

Thursday, October 19, 2017

at 10:19 am

What to do: At 10:19 am, pretend that you just felt an earthquake and ***Drop, Cover, and Hold On!***

In the tsunami zone? ***THINK TSUNAMI!*** Practice evacuating - go to higher ground or inland. A tsunami could arrive in as little as 10 minutes. For a real tsunami, you will need to stay away from the coast until officials tell you the coast is clear - it could be days!

Live in Humboldt County? Sign up to receive alerts directly from Humboldt County at http://humboldtgov.org/alerts

NWS Eureka Brings Home the Trophy

by Richard Lam

Marine stratus and rain are the most prevalent weather in Northwest California. However, thunderstorms occasionally occur over the interior mountains - and sometimes even near the coast. NWS Eureka forecasters participated in a severe weather forecast contest in order to sharpen their skills in forecasting severe thunderstorms. This forecast contest is organized by the Warning Decision Training Division in Norman, Oklahoma. Meteorologists from various forecast offices across the country participated in this forecast challenge over 10 weeks from April to July. Participants forecasted for areas where they thought tornadoes, hail, and/or damaging winds would occur. Team Eureka was able to finish the contest with the highest score!

Forecasters of Team Eureka *(left to right)*: Richard Lam, Matthew Kidwell, Jonathan Garner, Karleisa Rogacheski, Ryan Aylward, and Brad Charboneau. Patrick Doll and William Iwasko also participated but are not pictured.

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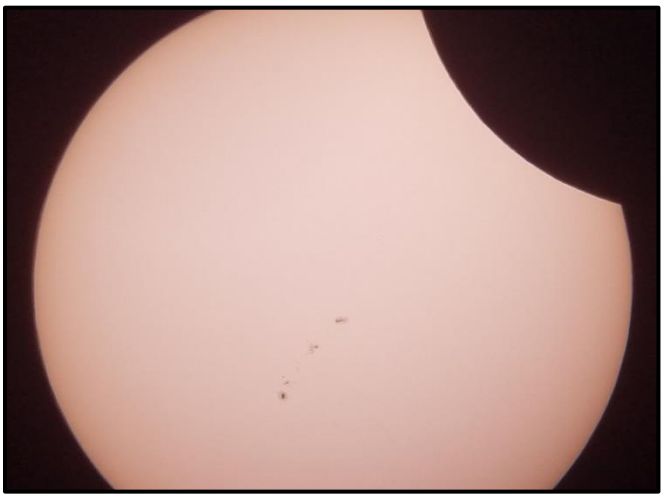
August 21st Solar Eclipse Wrap-up

by William Iwasko



Picture of the eclipse taken from a telescope with a solar filter near Blue Lake. Note the sunspots in the lower middle portion of the solar disk. (courtesy of Scott Carroll)

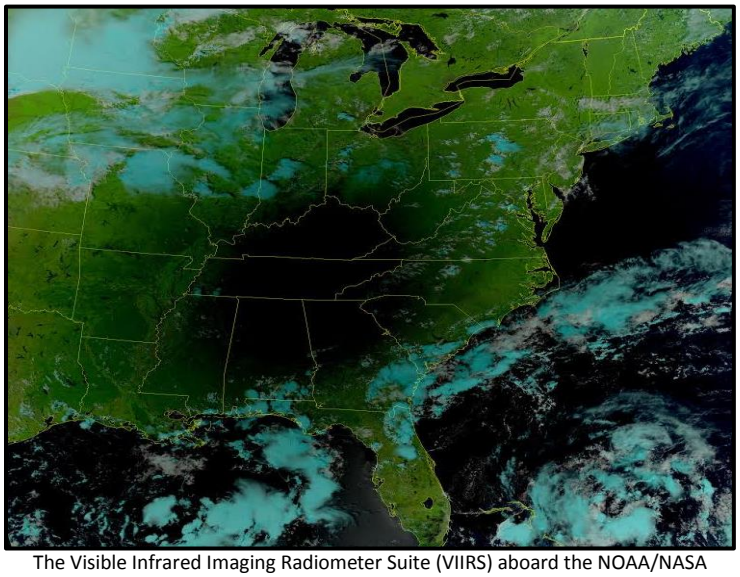
This August, the U.S. was treated to a total solar eclipse for the first time in almost 40 years. Unfortunately, the North Coast was locked under smoke and cloud cover, so most did not get to see the partial eclipse that traversed our area. But for those who could actually see the total solar eclipse, it was widely described as one of the best moments of their lives. Obviously, the eclipse is a rare and interesting phenomenon to watch, but it can also wreak havoc with things on Earth such as animal life thinking it is nighttime.

But, on an even larger scale, the loss of daytime heating can drastically change the weather patterns here on Earth. While Eureka and Crescent City did not see much of a change in their temperature profile due to cloud and smoke cover, Gasquet reported the largest drop within our area of at least 10°F during the span of the eclipse. Numerous other locations across the U.S. also experienced 10°F+ drops in temperature during the eclipse. Another widely noted phenomenon was the dissipation of mid-level clouds most likely due to the loss of the daytime thermals however other locations reported an increase in cloud cover. Numerous meteorological experiments from various organizations were conducted across the U.S. before, during, and after the passage of the eclipse to help us better understand how rapid loss of solar radiation can change weather patterns. Several NWS offices across the country launched special weather balloons to see how the entire depth of the atmosphere changed with respect to temperature, dew point, and wind speed. Satellites also recorded the eclipse from orbit *(see image in next column)*. With such a large and diverse dataset collected from the ground, air, and space, it will take some time before all the data can be analyzed and conclusions drawn from this rare opportunity.

August 21st Solar Eclipse Wrap-up *(cont.)*

by William Iwasko

For those who like to plan ahead, the next total solar eclipse visible in the U.S. will be April 8, 2024 from Texas to Maine. You can bet that meteorologists are already planning on how they can observe the next total solar eclipse to gain even more valuable information of how our complex atmosphere works. If you don't feel like traveling to the eclipse in 2024, the North Coast will experience a total solar eclipse on August 12, 2045, so start making your viewing plans now!



The Visible Infrared Imaging Radiometer Suite (VIIRS) aboard the NOAA/NASA Suomi NPP satellite captured this color-enhanced infrared image of the moon's shadow during the August 21, 2017 solar eclipse. Note how nothing appears in the area covered by the moon's shadow.

Night Sky Corner

Fall Moon Phases

September	October	November
6th	5th	3rd
12th	12th	10th
19th	19th	18th
27th	27th	26th

Fall Night Sky Calendar

Date	Event
Sep 16	Mercury-Mars conjunction
Sep 17	Moon-Venus conjunction
Sep 22	Moon-Jupiter conjunction
Sep 26	Moon-Saturn conjunction
Oct 5	Venus-Mars conjunction
Oct 8	Draconid meteor shower maximum
Oct 17	Moon-Venus conjunction Moon-Mars conjunction
Oct 21	Orionid meteor shower maximum
Oct 24	Moon-Saturn conjunction
Nov 12	Venus-Jupiter conjunction
Nov 14	Moon-Mars conjunction
Nov 17	Leonid meteor shower maximum
Nov 20	Moon-Saturn conjunction

moon phase and event information courtesy of NASA

Climate Page
by Matthew Kidwell & Scott Carroll

High pressure dominated the west coast this summer, bringing above normal temperatures to the interior areas and below normal rainfall across the region. In August, some thunderstorms brought rain to a few of the interior areas, but these were the exception rather than the rule.

Summer Record Events				
Date	**Location**	**Record**	**Value**	**Previous Record**
Jun 18	Ukiah	Max Temp	108	104 in 1945
Jun 21	Ukiah	Max Temp	107	107 in 1961*
Jun 22	Ukiah	Max Temp	111	104 in 1970
Aug 1	Ukiah	Max Temp	110	110 in 1908*
Aug 2	Ukiah	Max Temp	109	108 in 1946
Aug 3	Ukiah	Max Temp	106	106 in 1987*
Aug 28	Ukiah	Max Temp	108	108 in 2008*

*record tied

June

Early in the month, a couple of weather systems brought rain mainly to the northern portion of the area. Del Norte county saw over an inch and a half of rain, bringing Crescent City close to normal for the month. Rainfall amounts tapered off to the south, with Ukiah seeing less than a tenth of an inch of rain and ending the month well below normal. By the second half of the month, and hot and dry weather moved in. Inland, the month ended up above normal after a cooler than normal start with numerous daily high temperature records set. Temperatures at the coast generally stayed seasonally cool, although Fort Bragg hit 77°F on the 22nd.

July

Hot and dry weather persisted across the interior. At the coast, temperatures remained within a degree of normal with some drizzle at times. Otherwise it was mainly dry across the area. Temperatures across inland areas were around 5°F above normal for the month, but no high temperature records were set.

August

High pressure continued to bring hot weather across the interior. The hottest weather was on the first several days of the month when interior areas saw several records broken. Once this initial heatwave ended, there were several days of thunderstorms across the interior. A few locations received over an inch of rain, but most areas saw much less (or none). On the morning of the 10th, a few thunderstorms moved west to the Humboldt coast, but only the Arcata airport received rain (.01"). Temperatures across the interior were over 5°F above normal for the month while the coastal areas remained within 1°F of normal. At the coast, the NWS office on Woodley Island received some drizzle several times resulting in a few hundredths of an inch of rain.

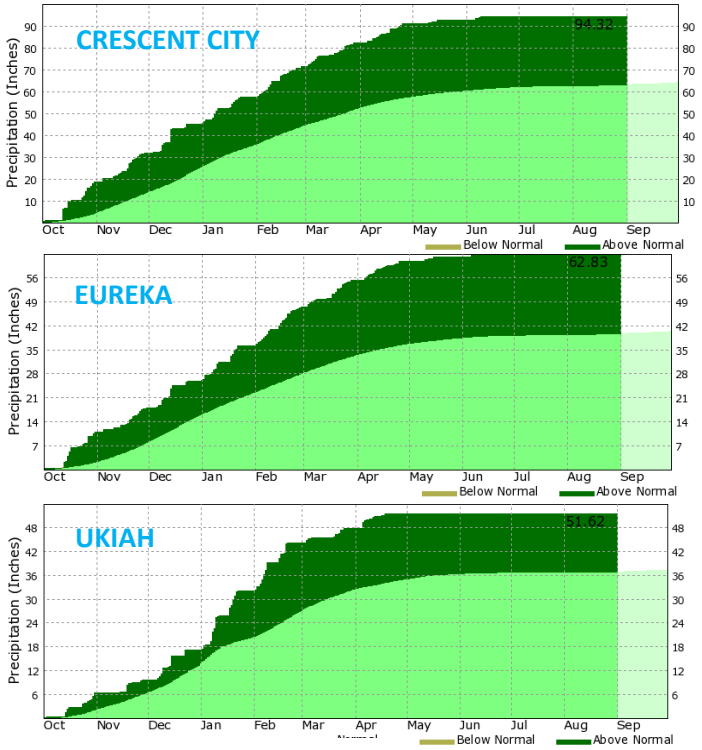
Climate Page *(continued)*
by Matthew Kidwell & Scott Carroll

Summer 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
Jun	60.3	50.4	1.64	62.4	51.7	.59	89.0	55.0	.04
Jul	60.2	51.2	0	62.7	52.7	.07	96.6	56.4	0
Aug	62.9	52.7	.03	64.1	54.2	.05	97.3	57.3	T

temperatures in °F, rainfall in inches

Water Year-to-Date Comparison click images for links



data through September 1st

Fall Outlook (Sep-Nov) click images for links

The Climate Prediction Center's fall outlook for NW California is calling for above normal temperatures (fig. 1) and equal chances of above or below normal precipitation (fig. 2).

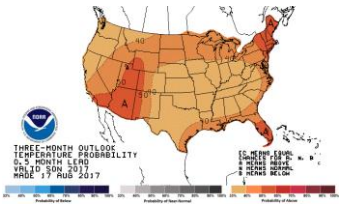


Figure 1

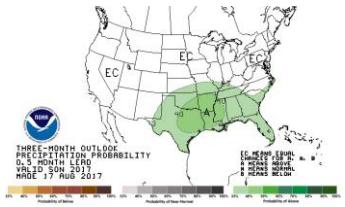
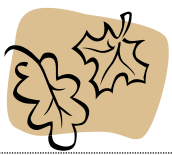


Figure 2



Northern California Coast Heat Wave September 1-5, 2017

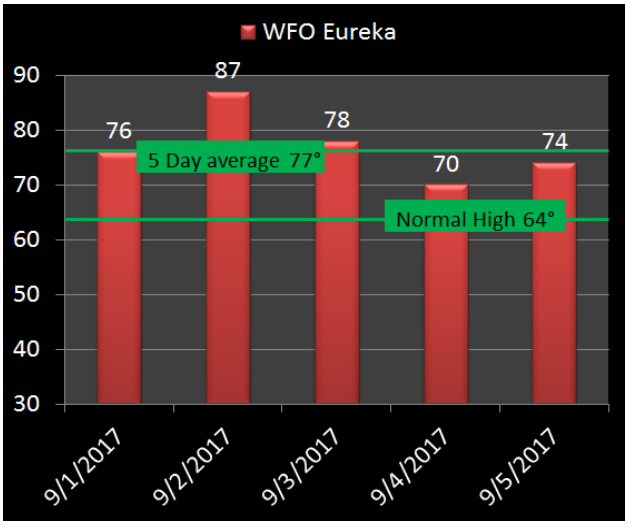
by Matthew Kidwell

A ridge of high pressure and very warm air aloft set the stage for a heat wave across Northern California. When this high pressure moved overhead, there were also very light easterly (or offshore) winds at the surface. This brought unusually warm temperatures to the coastal areas. The first 5 days of September saw an average high temperature of 77°F. This was more than a degree higher than any 5 day period in recorded history of Eureka. Also during this event, Eureka tied the highest temperature ever recorded of 87°F on the 2nd. This record was previously set on October 26th, 1993. Additional daily records were set during this period *(see table below)*. This heat event was not limited to the Eureka area. Crescent City topped out at 83°F on the 2nd, and Fort Bragg reached 86°F on the 1st and 2nd. Farther inland, Ukiah hit 111°F on the 2nd, setting a record as well.

Eureka Highest Historical 5-Day Averages		
Rank	**Temperature**	**Ending Date**
1	77.0	9/5/2017
2	75.6	10/29/1993
"	75.6	9/22/1939
4	75.0	10/30/1993
5	74.8	9/6/2017

New Eureka Daily High Temperature Records		
Date	**Temperature**	**Old Record**
9/1	76	75 in 1979
9/2	87*	75 in 1979
9/3	78	74 in 2003
9/5	74	72 in 2013

*Tied all-time highest temperature ever recorded in Eureka

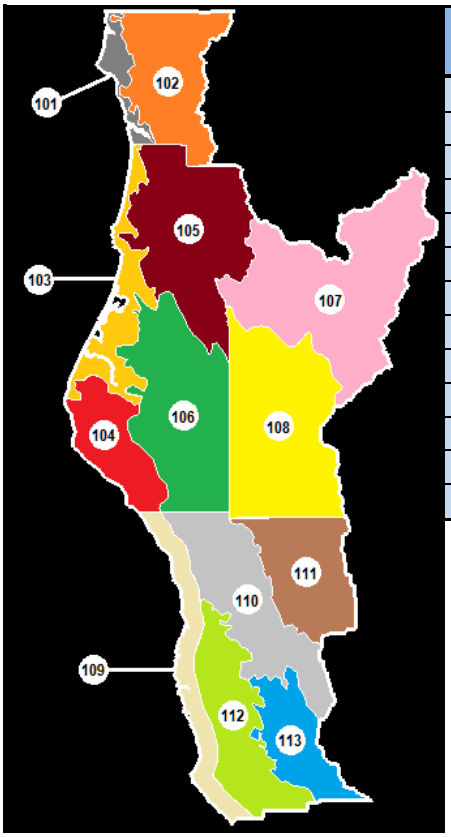


Growing Season Coming to an End

by Scott Carroll

The fall and winter seasons will soon be upon us once again, with the return of cold overnight temperatures and the potential for frost to develop. The National Weather Service in Eureka issues Frost Advisories, Freeze Warnings, and Hard Freeze Warnings during locally defined growing seasons *(see the chart below and associated zone map)*. These products are issued to alert you to the possibility of temperatures that can damage sensitive vegetation and be dangerous for animals left outdoors. Hard Freeze Warnings also indicate a more substantial threat to the freezing of exposed pipes. Now is the time to think about how you can be prepared and alerted for cold temperatures.

To determine if a statement has been issued for your area, visit weather.gov/eureka, follow us on Facebook or Twitter, download the FEMA app, or sign up to receive alerts through a private company. When a Frost Advisory, Freeze Warning, or Hard Freeze Warning is issued, be prepared to cover or move sensitive vegetation and provide pets with adequate shelter.



Zone	Growing Season	
	Begins	**Ends**
101	3/1	11/15
102	4/1	10/15
103	3/1	11/15
104	4/1	11/15
105	4/1	10/15
106	4/1	10/15
107	4/15	10/15
108	4/15	10/15
109	3/1	11/15
110	3/1	10/31
111	3/1	10/31
112	3/1	10/31
113	3/1	10/31

High Tides in a Historical Context & Highest Winter Tides

by Matthew Kidwell

High water levels on the coast of Northwest California and in Humboldt Bay occur a few times each winter. These high water levels occur for several reasons. First, there are the normal fluctuations of the tides on a monthly, seasonal, and annual basis due to the moon phase and the moon's distance from the earth, also known as the astronomical tides. Second, southerly winds and approaching storm systems can increase the water levels. The highest water levels occur when the highest astronomical tides of the winter, known as the perigean spring tides, coincide with southerly winds.

Table 1 *(below)* shows the highest tides recorded from the three main tide gauges around the area. Last winter, the North Spit tide gauge in Humboldt Bay peaked at 9.56 feet, which was the highest water level seen since 2006 but only the 7th highest ever recorded. There are two more factors that complicate these records: sea level rise and plate tectonics. According to the tide gauge at the North Spit, sea level is rising at nearly 5 mm per year. This is significantly more than most stations on the west coast due to another factor - subsidence from plate tectonics. The land around much of Humboldt Bay is subsiding due the Pacific plate pushing under the North American Plate. This will increase the likelihood of seeing flooding in the low lying areas along the coast around Humboldt Bay. Other areas including Crescent City are seeing sea levels fall. This is due to the land rising faster than the sea level. This will decrease the potential for major coastal flooding in these areas.

Table 1: Highest Recorded Area Tides

Rank	North Spit on Humboldt Bay	Arena Cove	Crescent City
1	9.887 (12/31/05)	8.658 (2/6/98)	10.66 (1/29/83)
2	9.847 (12/23/03)	8.612 (2/3/98)	10.11 (2/4/58)
3	9.828 (1/1/06)	8.596 (11/30/82)	10.09 (12/30/05)
4	9.723 (1/26/83)	8.537 (1/10/01)	10.01 (2/7/78)
5	9.677 (1/10/01)	8.514 (12/31/05)	10.01 (1/8/59)

Note: Data is since 1978 at North Spit and Arena Cove & since 1933 at Crescent City.

Table 2: Area Mean Sea Level Trends

Location	Trend (mm/year)	100-Year Change (feet)
Crescent City	-0.8	-0.3
North Spit	+4.7	+1.5
Arena Cove	+0.5	+0.2

High Tides in a Historical Context & Highest Winter Tides *(continued)*

by Matthew Kidwell

The National Weather Service in Eureka issues coastal flood advisories when the water levels are expected to exceed the highest astronomical tide, 8.9 and 7.9 feet in Crescent City and Arena Cove respectively. This indicates minor flooding is likely. If there is high surf in addition to the high tides, additional inundation is likely. Around Humboldt Bay, a coastal flood advisory will be issued if tides over 8.8 feet are expected. When more significant flooding is expected a couple days out, a watch will be issued, and, within 12 to 24 hours, a coastal flood warning will be issued. Flooding is most likely if a storm coincides with the perigean spring tides, which, for this winter, are shown in Table 2 *(left bottom)*. For more tide predictions, click here.

2017-18 Highest Predicted Area Astronomical Tides

Date	Crescent City	North Spit	Arena Cove
11/5/17	8.10	8.03	6.73
12/4/17	8.60	8.54	7.28
1/2/18	8.79	8.75	7.58
1/31/18	8.57	8.52	7.45

NWS Eureka Participates in Life Jacket Distribution Program

by Ryan Aylward

Thanks to a grant from the Sea Tow Foundation, the Water Safety Program in Humboldt County received 192 life jackets that were distributed to existing loan stations and new locations throughout the county. Life jackets from infant to adult sizes have been available this summer and will be available again during future summers. The National Weather Service, as a member of the Water Safety Coalition of Northwestern California, worked closely with Humboldt County Department of Health and Human Services to coordinate a ribbon cutting ceremony which included Cub Scout and Coast Guard participation. It was a great event for everyone! For more information about the life jacket loaner program, click here.

L to R: Holly Duffy, Jan Ostrom, Matt Cone, Ryan Aylward (NWS) & Pat Boyle.

NWS Eureka Participates in Redwood Environmental Educational Fair (REEF)

by Karleisa Rogacheski

Every summer, the National Weather Service (NWS) in Eureka, CA attends the Redwood Environmental Educational Fair (REEF) to provide intuitive and hands on science experiments for children of all ages. In the past, the NWS has only had one team of presenters attend REEF. This summer, we were able to send two teams that consisted of three people each. The first team was called "Hands on Weather", which was run by Mel Nordquist, Reginald Kennedy, and Ryan Aylward. The second team was called "Thunderstorms! Up Close and Personal" and was run by Karleisa Rogacheski, Patrick Doll, and William Iwasko.

The "Hands on Weather" team is the one that most people may have heard of when their children come home from the event. Mel, Reg, and Ryan talked about the scientific method and conducted an experiment, showed the effects and hazards of river flooding, and practiced sneaker wave safety. The "Thunderstorms! Up Close and Personal" team gave students a unique perspective on the different types of thunderstorms and how large hail stones can grow, vortex rings and tornadoes, and lightning generation and lightning safety.

NWS Eureka Open House Coming Soon!

by Scott Carroll

The National Weather Service office in Eureka is having an open house on Saturday, October 21st, from 10 am until 4 pm. Come find out how your local National Weather Service serves your community. We will have guided tours every 30 minutes along with hands on experiments for the kids and weather, water, earthquake, and tsunami information. Come meet the staff! We'll have more information on social media and NOAA Weather Radio leading up to the event. Hope to see you here!

NWS Eureka at the Humboldt County Fair

by Ricky Lam

The Humboldt County Fair took place in Ferndale from late August through the Labor Day Weekend. The Redwood Coast Tsunami Work Group from Humboldt State University organized a Tsunami Room to provide exhibits to visitors which enabled them to learn more about earthquakes and tsunamis. This year's theme was The 1992 Magnitude 7.2 Earthquake near Cape Mendocino. Visitors got to see pictures and documentations about the 1992 quake. National Weather Service Eureka sent forecasters to volunteer in the Tsunami Room. We were glad to see some of you this year in the Tsunami Room and hope to see more of you there next year.

The NWS Eureka Humboldt County Fair display.

Upcoming Events	
Date	**Event**
Sep 1	Meteorological autumn begins
Sep 22	Astronomical autumn begins at 1:02pm
Oct 18	Tsunami Warning test (11 am-noon)
Oct 19	The Great California ShakeOut (10:19am)
Oct 21	NWS Eureka open house (10 am-4 pm)
Oct 21-28	California Flood Preparedness Week
Nov 5	Daylight Saving Time ends
Dec 1	Meteorological winter begins

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