The North Coast Observer
NORTHWEST CALIFORNIA WEBLETTER
National Weather Service • Eureka, CA
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In this issue…

Regular Features…

Tsunami Warning Communications Test – March 28th

by Ryan Aylward

Part of ensuring the area's tsunami safety includes testing the emergency alert system. Testing the system allows us to be confident that our communication system is working and able to reach you with emergency information when it's needed most. On Wednesday, March 28th, there will be a test of the emergency alert system between 11am and Noon. This test will interrupt radio and television programming, activate NOAA weather radios, and turn on sirens in some areas. Please share this information with friends and family, and remember that ***this is only a test!***

Annual Meeting of the American Meteologist Society

by Ricky Lam

The 98th Annual Meeting of the American Meteorological Society was held in Austin, TX from January 7th to 11th, 2018. In this annual meeting, over 4,000 meteorologists, scientists, educators, students, and other professionals from across the weather, water, and climate community gathered to share, learn, and collaborate. The figure below shows some interesting statistics about this meeting.

Image courtesy of the American Meteorological Society

The following image is a snapshot of meteorologists reviewing posters created by their peers. These posters showcased cutting-edge research projects in different areas of meteorology, including: tropical, artificial intelligence, satellite, radar, operational, hydrology, fire, drought, ocean, and climate.

Image courtesy of the American Meteorological Society

Meteorologist **Richard Lam** of NWS Eureka attended this meeting to present a research project on "Rockslides Result in 12-Day Full Closure on US-101 Along North Coast of California During Late April 2017".

Sneaker Wave & Beach Safety
by Troy Nicolini

North Coast beaches are incredibly beautiful, but they can also be deadly. We have some of the biggest waves in the nation, and our rip currents are complex, powerful, and almost always present. Furthermore, our water is so cold that it can limit your ability to tread water within just a few minutes. Our beaches are clearly not the best place to go for a casual swim, and many people know to stay out of the surf zone. However, almost every year, someone gets pulled into the surf by accident. There are a few ways this can happen, such as being surprised by a sneaker wave or going in after a dog that gets caught in the surf, but the outcome is often fatal. The following safety tips can help you and your family remain safe while enjoying the beautiful beaches of our region.

First of all, **choose your beach wisely.** Steep beaches like those at Big Lagoon, Dry Lagoon, Stone Lagoon, and Freshwater Lagoon are particularly dangerous because the force of the ocean waves can reach much farther up the beach and pull you into the surf. Steep beaches also have courser sand that washes out from under your feet making it harder to resist being pulled into the water. For these reasons, avoid steep beaches, especially if you have children or dogs. Flatter beaches like those at Clam Beach and Moonstone beach are much better choices.

Stay back from the water, and never turn your back on the ocean. Don't be fooled by waves that look small. They can be small for up to twenty minutes before a big set of waves surprises you. The best approach is to stay farther back from the water than you might think is necessary – definitely way above the wet sand line - and never turn your back on the ocean. For many activities, like walking on the beach, this is the best protection. But if you have to be close to the water, and especially if you're going to be distracted, for example for surf fishing or agate hunting, wear a life vest.

Sneaker Wave & Beach Safety *(continued)*
by Troy Nicolini

Don't go in after dogs. Dogs that are pulled into the surf almost always get out on their own, so stay on dry land and wait for them to get out. Of course it's safer to keep them out of the water in the first place. Keeping them on a leash works, but, if they are off leash, stay very far from the water and don't throw sticks or balls in the water for them. If having your dog go in the water is important to you, consider getting them a dog life vest. They really do work and your dog can still run and play.

If a person is pulled into the surf, don't go in the water after them. Remember that you will likely also get in trouble so that when rescuers do arrive they will have to divide their time between multiple victims. It's much better to call 911 and be prepared to guide rescuers to the person in trouble. If you can, throw something buoyant to them.

And lastly: **Share this message** with your family, friends and co-workers, and even engage perfect strangers if you see them doing something dangerous. Make beach safety awareness part of our culture on the North Coast.

Follow Us on Social Media!

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

Climate Page
by Matthew Kidwell & Scott Carroll

Winter Summary

This winter was highlighted by dramatic pattern shifts. Temperatures at the coast ranged from 28°F near Fort Bragg to 76°F in Crescent City. Farther inland, the range was larger, with a low of 16°F in Weaverville to a high of 84°F in Ukiah. Rainfall ranged dramatically as well. Eureka saw a two day rainfall total of over 3 inches on January 24th and 25th, while in December, Eureka experienced a period of 15 days with almost no precipitation. Overall rainfall was well below normal for the period, although January was close to normal. Temperatures in general were above normal.

December

High pressure dominated the west coast for most of the month. This kept the majority of the rainfall out of the area, and only a few weak weather systems made it into California. This led to rainfall amounts ranging from 2 to 25 percent of normal. The clear skies and dry weather brought afternoon high temperatures that were above normal in most areas. These same conditions also produced chilly nights making low temperatures below normal.

January

More normal winter weather returned in January when a series of weather systems brought near normal rainfall to the coastal areas. Farther inland, rainfall was slightly below normal. Most of the weather systems were warm and kept temperatures slightly above normal. A couple of systems did have cooler air behind them bringing snow levels down to 2,500 feet and small hail to the coast.

February

High pressure dominated the west coast for first half of the month. The clear skies and dry weather brought afternoon high temperatures that were well above normal in most areas. Ukiah set daily high temperature records on 5 days during the first half of the month. Precipitation was nearly zero for this period. During the second half of the month, the pattern switched and an upper level trough settled over the west coast. This brought some precipitation to the north and much cooler temperatures to the area. The shift was most dramatic over the inland areas. Early in the month, high temperatures were in the 70s to lower 80s. Late in the month, high temperatures were in the upper 40s to lower 50s. Rainfall for the month ended up 10 to 50 percent of normal despite the increase late in the month.

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

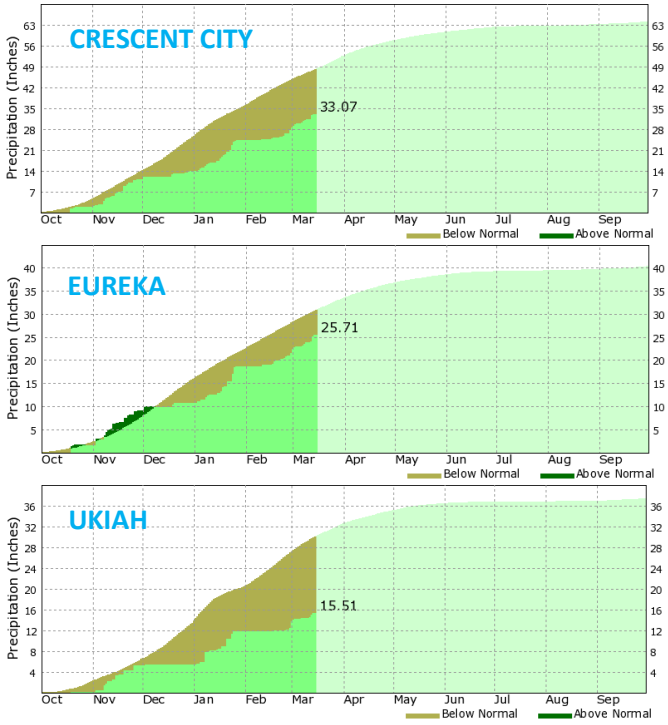
Winter 2017-18 Monthly Climate Comparison

	Crescent City			Eureka			Ukiah		
	Ave Hi	Ave Lo	Total Rain	Ave Hi	Ave Lo	Total Rain	Ave Hi	Ave Lo	Total Rain
Dec	57.4	41.6	2.74	55.7	38.8	1.94	60.5	31.9	0.15
Jan	57.7	46.6	10.60	56.1	43.3	7.86	57.7	40.5	6.42
Feb	55.8	41.5	3.21	53.8	37.8	2.87	64.4	33.5	0.55

temperatures in °F, rainfall in inches

Water Year-to-Date Precip Comparison

click images for links



data through March 15th

Spring Outlook (Mar-May)

click images for links

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

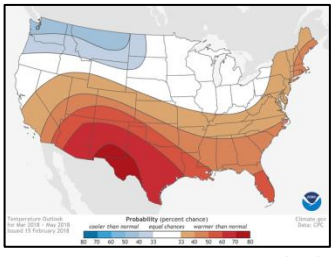


Figure 1 – Temperature Outlook

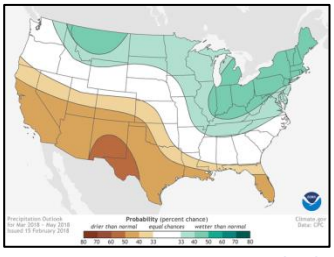


Figure 2 – Precipitation Outlook

Several Local Records Set in the Winter

by Scott Carroll

This winter, several records were either tied or broken across the area. Most of these records were maximum temperature records. Included in this list is the high temperature of 84°F in Ukiah on February 3rd, which was a whopping 9 degrees above the previous record set in 1954! This record was also just 2 degrees shy of the monthly high temperature record for February (86°F set on February 26th of 1932).

Winter Record Events

Date	Location	Record	Value	Previous Record
Jan 3	Crescent City	Max Temp	69	65 in 1985
Jan 4	Eureka	Max Temp	67	67 in 2006*
Jan 14	Crescent City	Max Temp	68	65 in 2009
Jan 17	Eureka	Max Temp	67	67 in 1981*
Feb 1	Ukiah	Max Temp	77	75 in 2005
Feb 2	Ukiah	Max Temp	77	77 in 1935*
Feb 3	Ukiah	Max Temp	84	75 in 1954
Feb 4	Ukiah	Max Temp	78	74 in 2001
Feb 7	Crescent City	Max Temp	76	72 in 1987
Feb 9	Ukiah	Max Temp	80	79 in 1954
Feb 23	Eureka	Min Temp	31	31 in 2008*

*record tied

Rain, Snow, & Hail Observers Still Needed!

by Scott Carroll

The rainy season isn't over yet! 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 help 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.

NWS Eureka Info Available Via Telephone

by Scott Carroll

Did you know that a variety of NWS Eureka products are also available via telephone? Land and marine forecasts, recreational forecasts with tides, land and marine observations, and climate information are all available along with our web addresses and NOAA Weather Radio transmitter information including SAME codes.

Out and about and don't have internet access or a NOAA Weather Radio? Call ***(707)443-7062*** and follow the menu options (also listed below). Long distance rates may apply.

✂CLIP & SAVE!

NWS Eureka Weather Line
(707) 443-7062

1 Land forecasts
- 1 Del Norte & Curry
- 2 Humboldt Bay & Eel River Delta
- 3 Interior Mendocino
- 4 E Humboldt & W Trinity
- 5 Mendocino Coast

2 Marine forecasts
- 1 Pt St George-Cape Mendo 10NM
- 2 Pt St George-Cape Mendo 10-60NM
- 3 Cape Mendo-Pt Arena 10NM
- 4 Cape Mendo-Pt Arena 10-60NM
- 5 Humboldt Bay Bar

3 Rec forecasts with tides
- 1 Del Norte & Humboldt coasts
- 2 Mendocino coast

4 Land observations

5 Marine observations

6 Climate info
- 1 Eureka
- 2 Crescent City
- 3 Ukiah

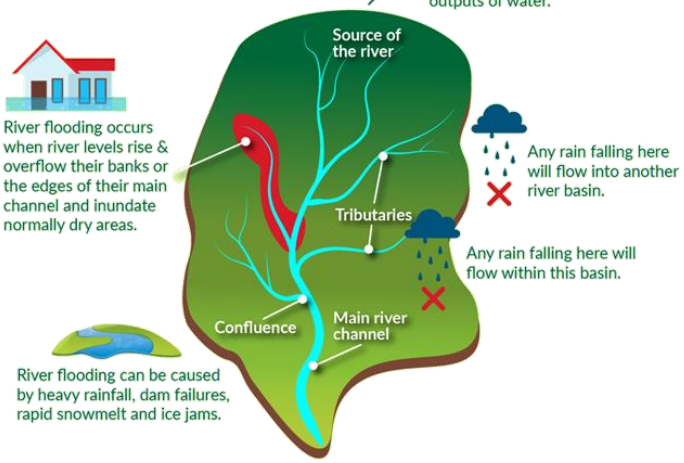
7 Social media/wx radio
- 1 Social media web addresses
- 2 Weather radio transmitter info
- 3 Weather radio SAME codes

✂CLIP & SAVE!

SCIENCE OF RIVER FLOODING

Water is essential for life on Earth. But in large enough quantities, the very substance we drink and use to grow crops can destroy homes, businesses and cause fatalities.

RIVER BASIN
The total area drained by a river and its tributaries. A river basin is an open system with inputs and outputs of water.



6 Steps to Create a Flood Model

HYDROLOGIC CYCLE
Hydrologists try to understand and simulate the natural hydrologic cycle, which is the intricate combination of many processes such as evaporation, transpiration, precipitation, infiltration, interflow, groundwater storage, and runoff.

PRECIPITATION
Precipitation is the primary input to basin hydrologic processes and serves as the primary driver of hydrologic models. Accurate representation of precipitation input is an important intial step. Small river channel systems are very sensitive to rainfall.

RUNOFF
The next step is to compute the amount of precipitation that appears in surface water within a relatively short time from the onset of a storm event. This is runoff. Runoff consists of 3 components: overland flow, rain falling directly on surface water bodies, and interflow.

UNIT HYDROGRAPH
After computing basin runoff, the next step is to calculate a forecast hydrograph in units of discharge. A hydrograph is a plot of the change of stage or discharge with respect to time. Discharge is the volume of water flowing past a location per unit time and is usually expressed in cubic feet per second (cfs).

STREAMFLOW DATA
Scientists use streamflow measurements to capture the vital relationship between discharge (volume flow rate) and stage (height) for a given location. This can only be done by taking streamflow measurements at different river levels and noting the corresponding stages. This relation is called a rating curve.

ROUTING
Hydrologists analyze and interpret how the water moves once it's in the river and how a flood wave is modified due to the effects of storage and friction as it moves downstream. So, what happens upstream affects the entire down-stream community.

weather.gov/flood

Night Sky Corner
by Scott Carroll

With spring arriving, the nights are getting shorter, and temperatures are gradually getting warmer. In addition, more clear nights are expected as the frequency of storm systems affecting the area decreases and we transition into the dry season. The exceptions are coastal locations and interior valleys, where nighttime low clouds and fog periodically obscure spring skies. Cool nights and occasional cold snaps make it important to dress warmly when venturing outside at night. A good source of sky cover forecasts is our graphical forecast. Sky cover and other forecast elements can also be displayed by selecting a point-and-click forecast from the area map on our homepage, then clicking the Hourly Weather Forecast graph.

Spring Moon Phases

March		April		May	
●	1st	☾	8th	☾	7th
☾	9th	●	15th	●	15th
●	17th	☽	22nd	☽	21st
☽	24th	○	29th	○	29th
○	31st				

Spring Night Sky Calendar

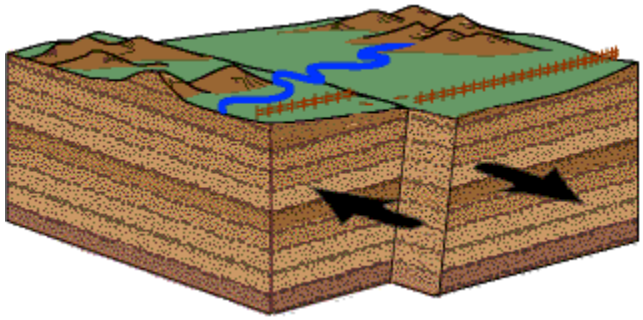
Date	Event
Mar 6	Moon-Jupiter conjunction
Mar 9	Moon-Mars conjunction
Mar 10	Moon-Saturn conjunction
Mar 18	Moon-Venus conjunction
Mar 19	Mercury-Venus conjunction
Apr 1	Mercury inferior conjunction
Apr 2	Mars-Saturn conjunction
Apr 3	Moon-Jupiter conjunction
Apr 7	Moon-Mars-Saturn conjunction
Apr 17	Moon-Venus conjunction
Apr 22	Lyrid meteor shower maximum
Apr 30	Moon-Jupiter conjunction
May 4	Moon-Saturn conjunction
May 5	Eta Aquarid meteor shower maximum
May 6	Moon-Mars conjunction
May 8	Jupiter opposition
May 13	Moon-Mercury conjunction
May 17	Moon-Venus conjunction
May 27	Moon-Jupiter conjunction
May 31	Moon-Saturn conjunction

moon phase and event information courtesy of NASA

Magnitude 7.9 Earthquake near Kodiak, Alaska

by Karleisa Rogacheski

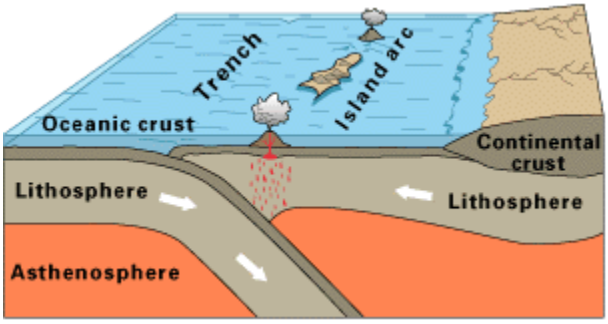
"Tsunami Watch cancelled." This is what many people woke up to on the morning of January 23, 2018 after a magnitude 7.9 earthquake occurred off the coast of Kodiak, Alaska. At 1:32 AM, the **Tsunami Warning Center** issued a Tsunami Watch for the coasts of Washington, Oregon, and California while a Tsunami Warning was issued for the coasts of Alaska and western Canada due to the proximity and magnitude of the earthquake. Luckily, the type of earthquake that occurred was a **strike-slip** quake *(image below)*, which is where two plates rub against each other in a horizontal direction. This meant that if a tsunami wave were to be generated, it would likely be small.



Strike-slip fault

The National Weather Service in Eureka was quick to respond when we received the alert during the early hours of the morning and started notifying partners, which included emergency managers, immediately. We also started sharing the information on social media, providing updates to everyone as often as possible. By 4:12 AM, the Tsunami Warning Center cancelled the Tsunami Watch for Washington, Oregon, and California.

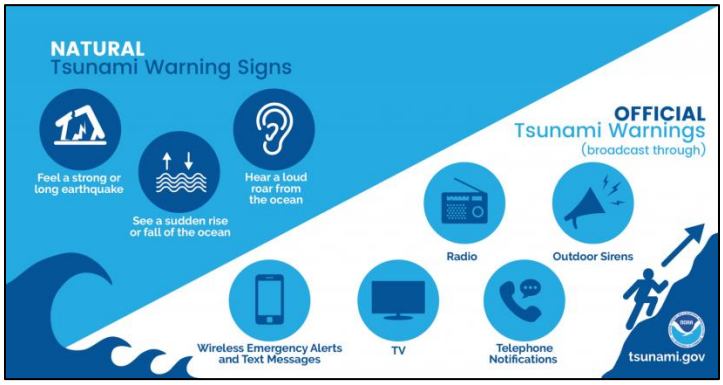
Normally, when people think of Alaskan earthquakes, they think of the 9.2 magnitude quake that happened in 1964 which generated a large tsunami wave and extensive of damage to the Alaskan mainland. The difference between the January 23 earthquake and the 1964 quake is the type of fault line that each occurred on. The 1964 quake was a **subduction** quake *(image below)*, which is where one plate of earth moves underneath another.

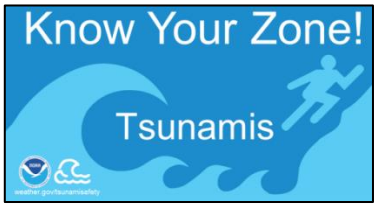


Subduction fault

Tsunami Safety

by NWS Public Information





Upcoming Events	
Date	**Event**
Mar 1	Meteorological spring begins
	Growing season begins (zones 101, 103, 109-113)
Mar 11	Daylight saving time begins at 2am
Mar 20	Astronomical spring begins at 9:15am
Mar 26-30	Tsunami Preparedness Week (Mar 26-30)
Mar 28	Tsunami warning communications test
Apr 1	Growing season begins (zones 102, 104-106)
Apr 15	Growing season begins (zones 107 & 108)
Apr 22	Earth Day
May 21-28	Safe Boating Cold Water Awareness Week
Jun 1	Meteorological summer begins

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