The North Coast Observer
NORTHWEST CALIFORNIA WEBLETTER
National Weather Service • Eureka, CA
WINTER 2021-2022
ISSUE #23

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Fields Landing is TsunamiReady!

by Ryan Aylward

Fields Landing community member advocates Maurice Viand and Kathy Moley (also with Pacific Watershed Associates) and members of the Redwood Coast Tsunami Work Group conducted a tsunami evacuation drill in October 2019 following the release of the new Tsunami Hazard Maps from the California Geological Survey. Participating agencies, including Humboldt County OES, Caltrans District 1, Humboldt Bay Fire, Humboldt Transit Authority, CERT, Humboldt Amateur Radio Club, PG&E, National Weather Service Eureka (NWS), U.S. Coast Guard Sector Humboldt Bay, and other Work Group members, all worked together to make the drill a success.

This drill was the culmination of outreach efforts to achieve TsunamiReady status for the community. The last step is to install the Tsunami Evacuation Route and TsunamiReady Community signs which should be installed soon.

Thanks to everyone involved in the planning and execution of the drill and the community members who participated!

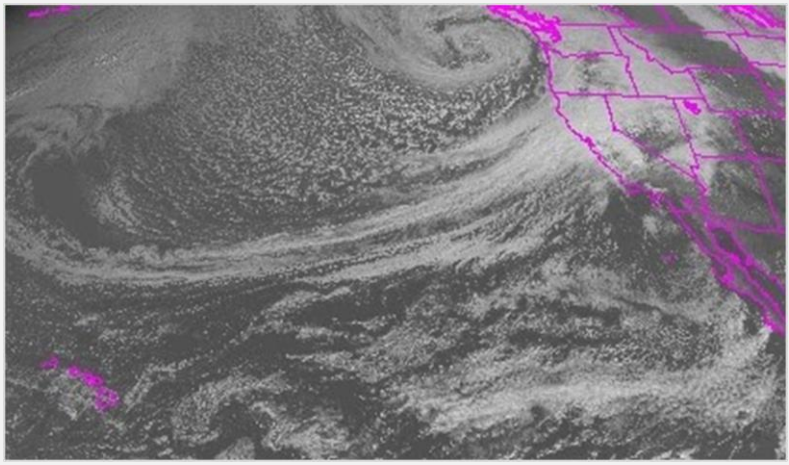
For more information about how to prepare for earthquakes and tsunamis on the North Coast, the Living on Shaky Ground website includes good advice and simple steps you can take. Another important step is to sign up for alerts with Humboldt County through Humboldt Alert so you can find out about an emergency right away using methods that you choose, such as email, phone, and text message.

Living on Shaky Ground | Humboldt County Alert | Tsunami Hazard Maps | Fields Landing Brochure

October Atmospheric River Drenches Lake & Mendocino Counties

by James White & Matthew Kidwell

Summer 2021 was hot, long, and, above all, dry. This is especially true for Mendocino and Lake counties, where only traces of precipitation were seen in May through August. While not necessarily unusual, these dry conditions followed a very dry winter and further worsened drought conditions. By October, most of the area was classified as extreme drought with impacts felt throughout the area. Many local rivers experienced extremely low flow, and many towns struggled to find enough water.

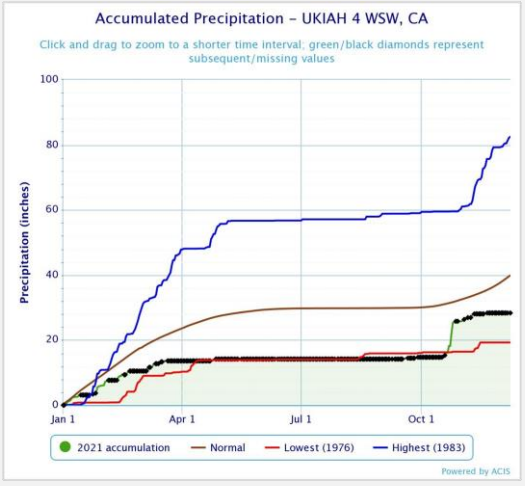


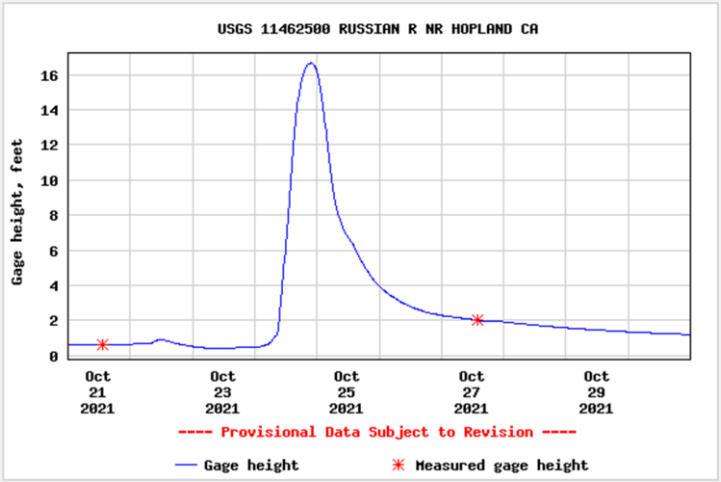
Visible satellite Image of the atmospheric river on Sunday, October 24th, 2021

Notable October Rainfall Totals	
Station	Rainfall (in.)
Fort Bragg	3.63
Lakeport	6.78
Middletown	10.82
Potter Valley	7.06
Ukiah	5.49
Willits	7.75

With this backdrop, the atmospheric river that hit the area late in October seems all the more unusual. Persistent high pressure through early October gave way to a series of weak cold fronts mid-way through the month that brought welcome precipitation along the North Coast. These showers effectively shut the door on fire season, but they ended up being mere precursors of what was to come. As the weekend of October 23 approached, a strong low pressure system swung down the Gulf of Alaska towards the Pacific Northwest. As it approached shore, this cyclone rapidly intensified into a "bomb cyclone".

As the low stalled just off of Washington, it pulled a steady conveyor belt of moisture into the coastal mountains of Northwest California *(above left image)*. This event represents a classic wintertime atmospheric river, although such events are rare in October- especially so far south. The conveyor belt was relatively compact, measuring about 100 miles across. The heaviest rainfall started early Sunday, October 24th, and continued through the day. Rainfall was concentrated in Lake and Mendocino counties. Over the course of about 48 hours, about 5.5 inches of rain fell in Ukiah. At high elevations, where orographic lifting aided in rain formation, many stations easily exceeded 7 inches. Middletown in Lake County topped the list with over 10 inches of rain! This alone made October 2021 the wettest month since records began there in 1939 and the 6th highest two day rain total ever.

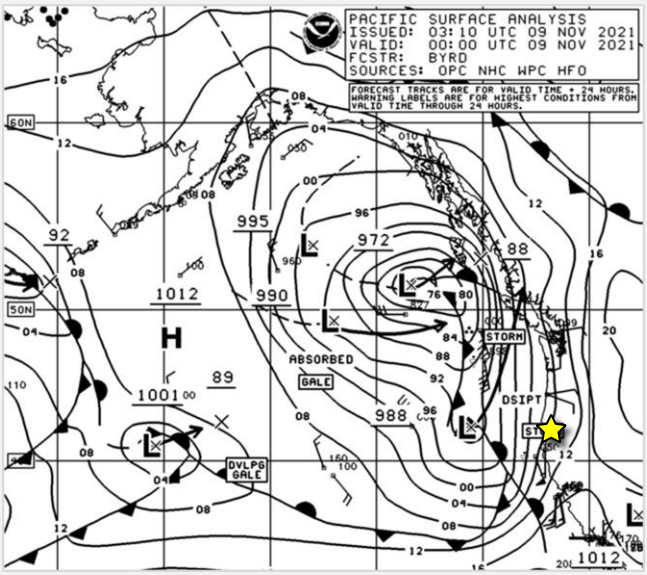




Thankfully, the rain turned out to be mostly beneficial. The event more than halved the year's water deficit in Ukiah, which, to that point, had been the driest on record *(above left image)*. Local reservoirs such as Ruth Lake and Lake Mendocino saw water level increases, though much more rainfall is still needed to alleviate long term drought. Some debris was reported on roadways, though urban flooding remained largely minor. River levels steadily rose throughout the event, and the Russian river at Hopland briefly reached flood stage, but no damage was reported. With such high rain rates, river rises were fairly rapid *(above right image)*. Had the rivers started at a higher level, much more flooding would have been possible. Rainfall rates were low enough over fresh burn scars that no major debris flows were triggered. Dry weather returned in the wake of the system, further highlighting the event's anomalous nature. Besides a couple of brief rain showers, little additional rain had fallen in Mendocino and Lake counties through early December.

High Wind Event – November 8th, 2021

by Matthew Kidwell



On November 8th, 2021, a strong frontal boundary approached the area. Along this boundary, a secondary low formed and the central pressure rapidly dropped to around 988 millibars (29.18 inches) as it moved northeast. This low remained well off the coast, but it still brought strong winds to Northwest California. A deep mixed layer allowed the stronger winds aloft to mix down to the surface. This brought strong winds to the coastal areas and the interior valleys *(peak wind gusts in table below)*.

The impacts from the storm were felt in many areas of Humboldt and Del Norte counties. The more widespread impacts occurred in the lower elevation areas that don't see winds this strong as often. For example, winds this strong last occurred in Eureka in January of 2021. In Hoopa, this was an even rarer event. The last time Hoopa saw wind gusts over 45 mph was in January of 2010. Since the station was commissioned in 1997, wind gusts of 45 mph or higher have only occurred 8 times. In contrast, Kneeland has seen wind gusts higher than 64 mph four times in the past year.

This storm knocked down numerous trees, especially around the Humboldt Bay area. These downed trees blocked roads and caused numerous power outages. By Tuesday morning, around 3,000 customers remained without power. There was also a report of a roof blown off a barn in Bayside.

Location	Wind Speed (mph)	Time	Elevation (feet)	County
Cresent City (Jack McNamara Airport)	70	813 PM 11/08	32	Del Norte
Ship Mountain RAWS	61	757 PM 11/08	5,150	Del Norte
Kneeland RAWS (airport)	63	755 PM 11/08	2,736	Humboldt
Scotia 4.3 SW	58	1110 PM 11/08	2,899	Humboldt
Bridgeville 4.7 N	54	520 PM 11/08	2,619	Humboldt
Arcata/Eureka Airport	52	809 PM 11/08	135	Humboldt
Fortuna (Rhonerville)	47	735 PM 11/08	230	Humboldt
Eureka (Woodley Island)	41	815 PM 11/08	22	Humboldt
Hoopa	45	930 PM 11/08	375	Humboldt
Buckingham Park	53	935 PM 11/08	1,997	Lake
Cobb Mountain RAWS	35	110 AM 11/09	4,724	Lake
Bell Springs	58	900 PM 11/08	3,842	Mendocino
Willits (Blosser Lane)	55	600 AM 11/09	1,423	Mendocino
Manchester 1.2 S	43	1030 PM 11/08	298	Mendocino
Ruth 3.9 E	42	450 PM 11/08	3,084	Trinity
Dinsmore 4 SE	36	553 PM 11/08	2,873	Trinity
Crescent City Harbor	65	1106 PM 11/08	Sea Level	Marine
North Jetty Eureka	56	824 PM 11/08	Sea Level	Marine
Pt Arena Buoy 14 NW	54	830 PM 11/08	Sea Level	Marine

Observations are collected from a variety of sources with varying equipment and exposures.

Fall Weather Summary

by Matthew Kidwell

September

Temperatures for the month continued the trend of being above normal across the inland areas. The coastal areas continued to see below normal temperatures in the north and above normal temperatures in the south. For some of the inland areas temperatures have been above normal each month for over a year. This has exacerbated the ongoing drought. Most areas saw some decent rain this month, with the exception of southern Mendocino and Lake counties. The percentage of normal was impressive, but the normal amounts in September are very low. This did lower fire danger significantly in the northern areas, however, overall it has not had much of an effect on the drought. This rain was due to several systems moving through the area. Crescent City did set a daily rainfall record on the 27th with 1.68 inches, breaking the old record of 1.57 inches set in 1940.

October

The month started off with dry weather and above normal temperatures across the interior. A couple of weak systems moved through, but most of the rain remained in the northern portions of the area. A pattern shift around the middle of the month brought wet weather to the region. Several weak systems moved through before a strong atmospheric river brought heavy rain on the 24th. Mendocino and Lake counties saw the heaviest rainfall. A weather station in Middletown saw 10.6 inches fall in nearly a 24-hour period. This caused rapid rises on the rivers and some minor flooding. The very dry conditions leading up to the event kept the flooding from being more severe. This is the first month since February of 2019 that saw above normal rainfall in Mendocino County.

November

Wet and active weather continued through the first nine days of November. The active pattern came to a climax with a potent low pressure system tracking into the Pacific Northwest on the 8th and 9th. Southerly wind gusts of 40 to 55 mph were fairly widespread along the Redwood Coast and ridgetops, with localized gusts reaching 70 mph in the most wind-prone locations. While another shot of rainfall passed by on the 15th, the rest of the month was otherwise unseasonably dry and quiet. A little more than a tenth of an inch of rain, mainly in the form of coastal drizzle, fell at Eureka over the 2nd half of November. Persistent high pressure over the eastern Pacific kept the jet stream and main storm track to our north. That high pressure only tended to build across California through month's end, resulting in much above normal high temperatures inland. The dry air in combination with occasionally clear skies allowed for frosty overnight lows, particularly from the 21st through the 26th, with freezing temperatures for interior valleys. Overall though, November ended up slightly above normal temperature-wise across Northwest California.

Fall Climate & Three Month Outlook

by Scott Carroll

Fall Record Events

Date	Location	Record	Value	Previous Record
Sep 27	Crescent City	Rainfall	1.68	1.57 in 1940
Oct 21	Eureka	Max Temp	73	73 in 1998
Oct 24	Ukiah	Rainfall	4.98	3.27 in 2010
Nov 28	Ukiah	Max Temp	75	75 in 1954

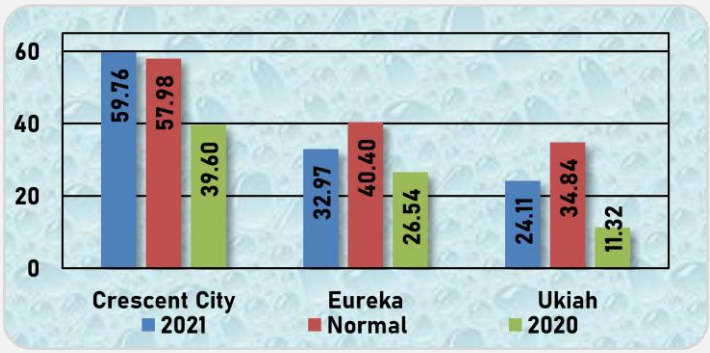
temperatures in °F, rainfall in inches

Fall 2021 Monthly Climate Comparison

	Crescent City			Eureka			Ukiah		
	Ave H	Ave Lo	Total Precip	Ave H	Ave Lo	Total Precip	Ave H	Ave Lo	Total Precip
Sep	63.5	48.9	3.51	63.0	49.4	1.24	91.7	53.1	.06
Oct	59.6	47.3	8.09	61.1	46.9	4.02	73.7	46.8	7.18
Nov	59.6	46.4	6.29	59.4	44.3	2.85	67.3	42.0	1.30

temperatures in °F, rainfall in inches

2021 Calendar Year Precipitation Comparison



rainfall in inches from Jan 1, 2021 through Dec 31, 2021

February-April Outlook

click images for links

The Climate Prediction Center's outlook for February through April for Northwest California is calling for slightly better chances for below normal temperatures *(figure 1 below)* and near equal chances of below or above normal precipitation *(figure 2 below)*. The eastern seaboard, Midwest, and southern states have better than even chances of above normal temperatures, while cooler than normal temperatures are expected for the Pacific Northwest. Wetter than normal conditions are predicted for the Pacific Northwest and the Midwest, while drier than normal conditions are anticipated for much of the South extending into the Central Plains.

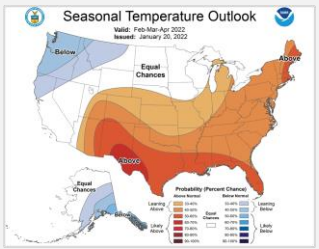


Figure 1 – Temperature Outlook

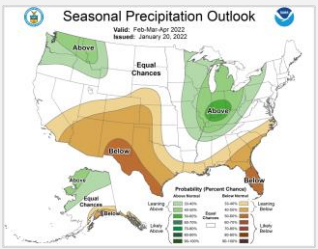
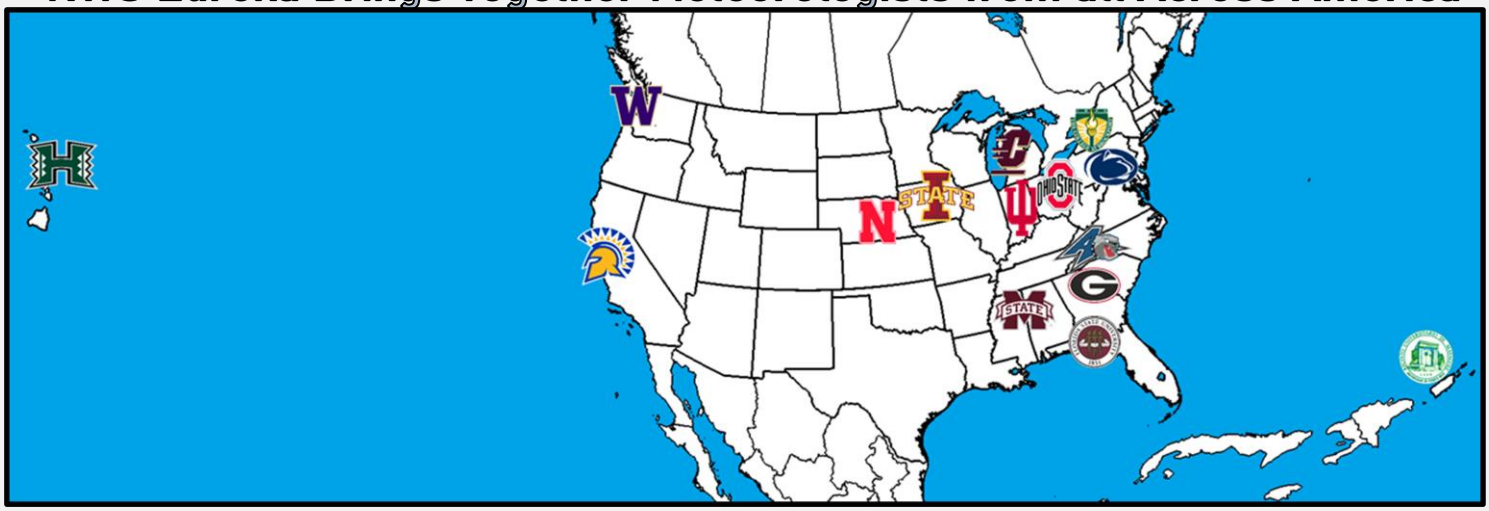


Figure 2 – Precipitation Outlook

NWS Eureka Brings Together Meteorologists from all Across America



Meteorologists at NWS Eureka come from across America, from the University of Hawaii to Universidad de Puerto Rico, to serve Northwest California! Pictured are the logos of the different colleges and universities represented by the current NWS Eureka staff. *–Josh Whisnant & Scott Carroll*

Astronomy Corner

by Scott Carroll

Moon Phases

February		March		April	
☽	8th	●	2nd	☽	8th
●	20th	☽	10th	●	16th
☾	28th	●	18th	☾	23rd
		☾	24th	●	30th
		●	31st		

Nght Sky Calendar

Date	Event
Feb 2	Moon-Jupiter conjunction
Feb 27	Moon-Mars conjunction
Feb 28	Moon-Saturn conjunction
Mar 15	Venus-Mars conjunction
Mar 27	Moon-Mars conjunction
Mar 28	Moon-Venus-Saturn conjunction
Apr 4	Mars-Saturn conjunction
Apr 22	Lyrid meteor shower maximum
Apr 24	Moon-Saturn conjunction
Apr 25	Moon-Mars conjunction
Apr 26	Moon-Venus conjunction
Apr 27	Moon-Jupiter conjunction
Apr 30	Venus-Jupiter conjunction