MWS Weather Forecast Office
Newport Beach, CA

Southern California Enters Wildfire Season

Southern California is bracing for an active wildfire season. Heavy wildfire activity usually follows years of drought, but this year may look different. After two back-to-back wet winters followed by a hot and dry summer, the vegetation in the region grew significantly in the spring. The overgrown vegetation dried out in the hot and dry summer, leaving large amounts of fuel for fires. In combination with predicted strong Santa Ana winds, an active wildfire season is on the horizon.

Fuel Analysis

Two back-to-back wet winters occurred in 2022-2023 and 2023-2024. The maps below show the total precipitation for each season as a percent of the average rainfall for the climatology period 1981-2010. Figure 1 shows this percentage comparision for winter 2022-23. Figure 2 shows this percentage comparison for winter 2023-24.

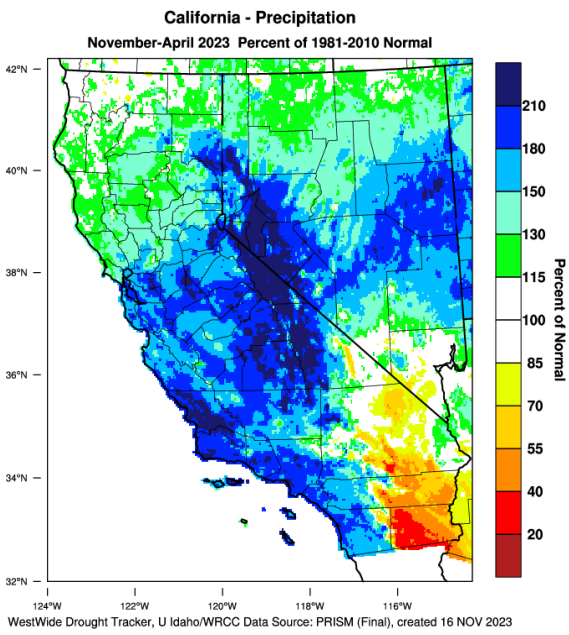


Figure 1

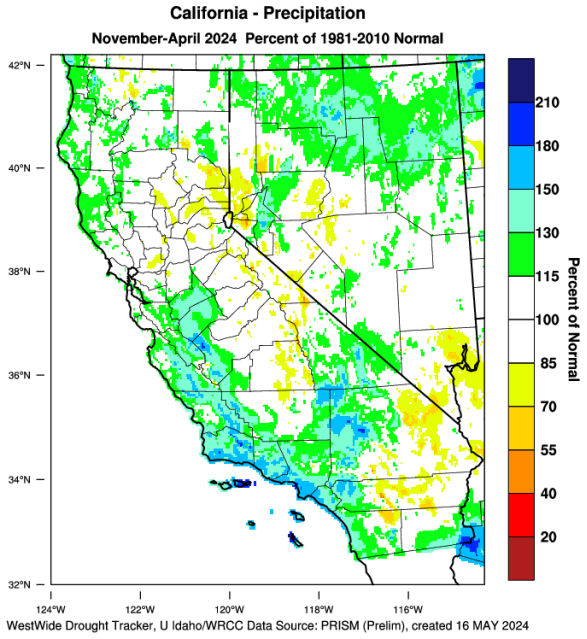
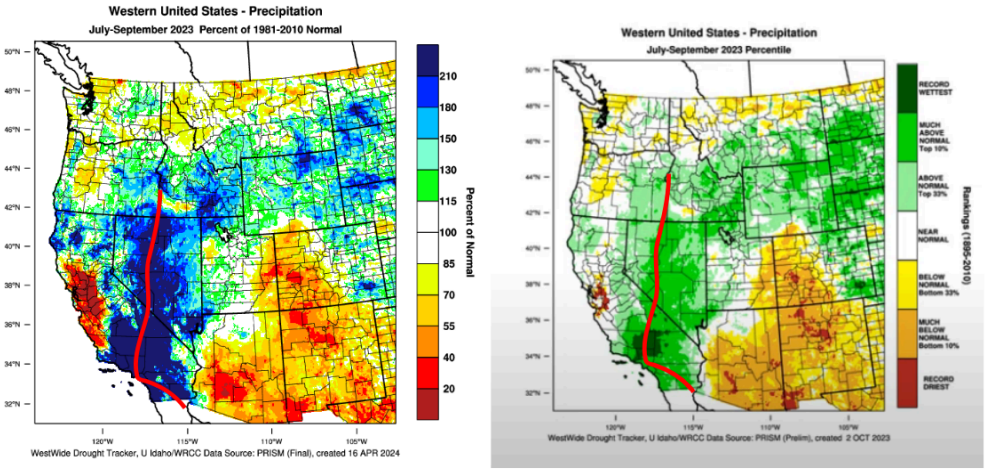


Figure 2

Additional precipitation occurred in the summer of 2023 from Tropical Storm Hilary. TS Hilary was the first tropical storm to landfall in Southern California since 1939. Hilary brought significant, above-average rainfall and broke numerous rainfall records. The maps below show the total precipitation as a percent of the average rainfall for climatology period 1981-2010 (left) and the total precipitation ranking (right) for July-September of 2023.



Total Precipitation Percent of Average

Total Precipitation Ranking

Red line denotes the track of the center of Hilary

Figure 3

Record levels of precipitation for the past two years resulted in substantial vegetation growths. Hot and dry summers dry out vegetation quickly, particularly grasses. In contrast, large trees retain moisture for longer because they have thick bark. As a result, they dry out slower than grass. Figure 4 shows above-average temperatures and below-average precipitation over the past three months. The orange lines in Figure 5 depict the rapid decrease in the moisture levels of vegetation.

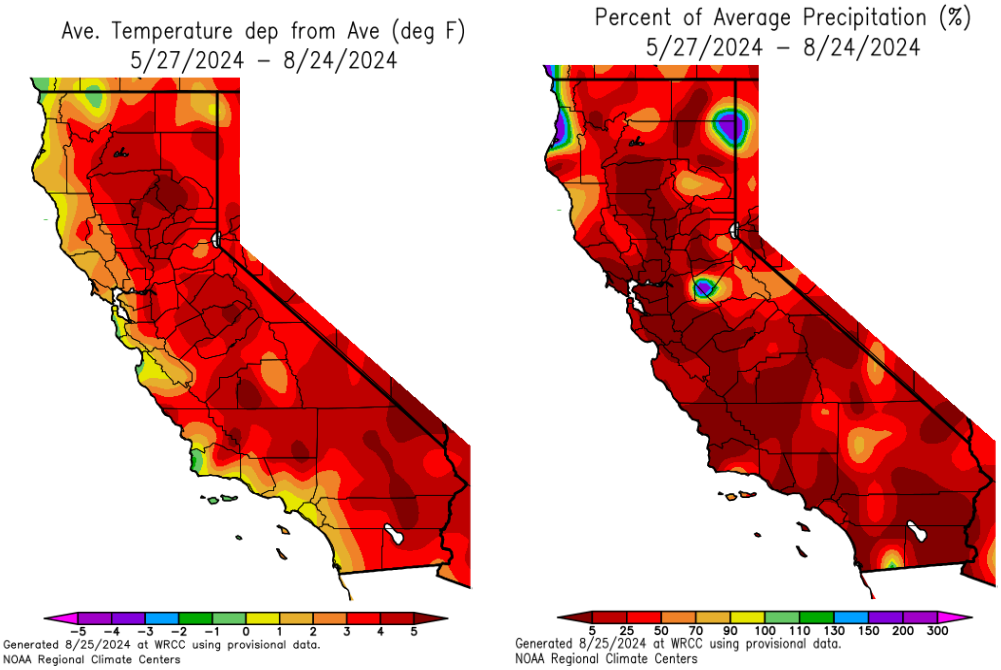
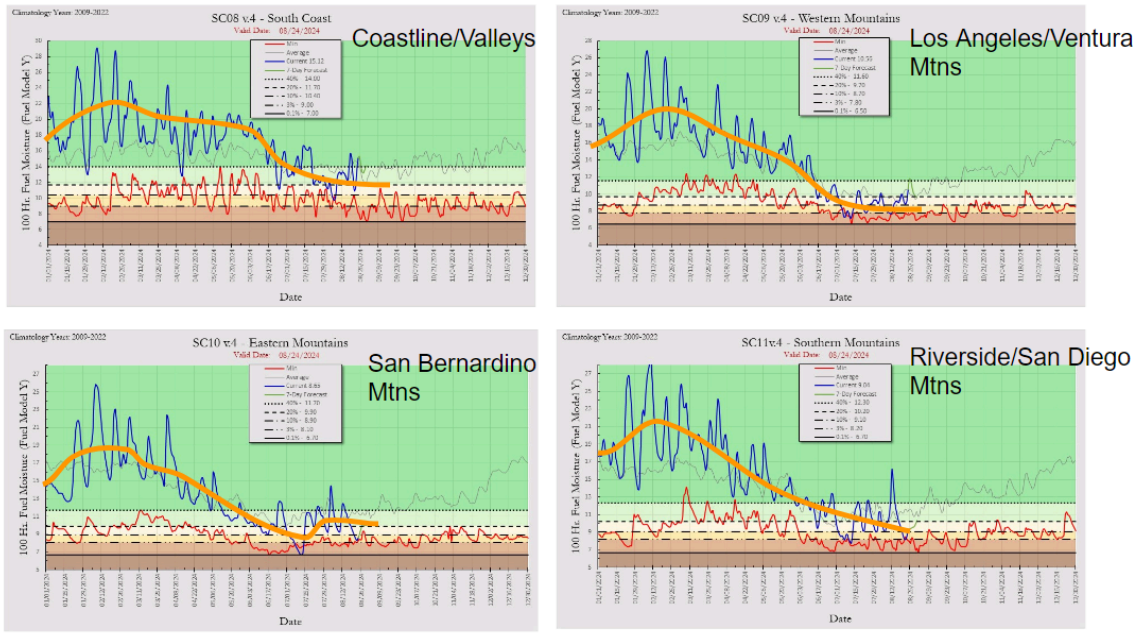


Figure 4



Orange line is the smoothed pattern. Figure 5

Weather Pattern Analysis

Given these dry conditions, if a strong storm system enters and drenches the region with moisture, does the fire danger lessen? The obvious answer is yes, however at the moment, this fall will not be favorable for strong storm systems.

As part of wildfire prediction, an analysis of the jet stream is needed to know if storms systems come ashore. Jet stream is a region of very strong winds that move storms over a wide geographical range. Figure 6 shows the forecasted average upper air pattern from September to November 2024. The blue arrow denotes the jet stream pointing toward portions of southwestern Canada and the Pacific Northwest. In this case, the storm systems will likely impact the Pacific Northwest and southwestern Canada.

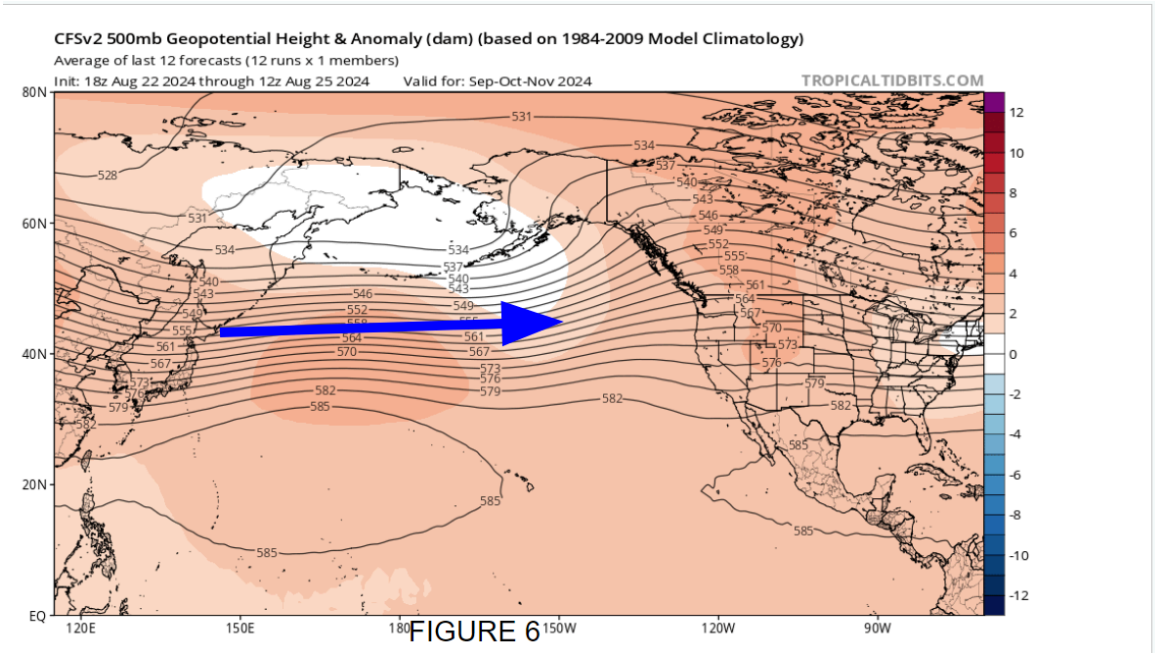


FIGURE 6

Figure 7 illustrates the three-month outlook by the NOAA/NWS Climate Prediction Center that shows above average precipitation in the Pacific Northwest and below-average precipitation and above-average temperatures in the Southwest.

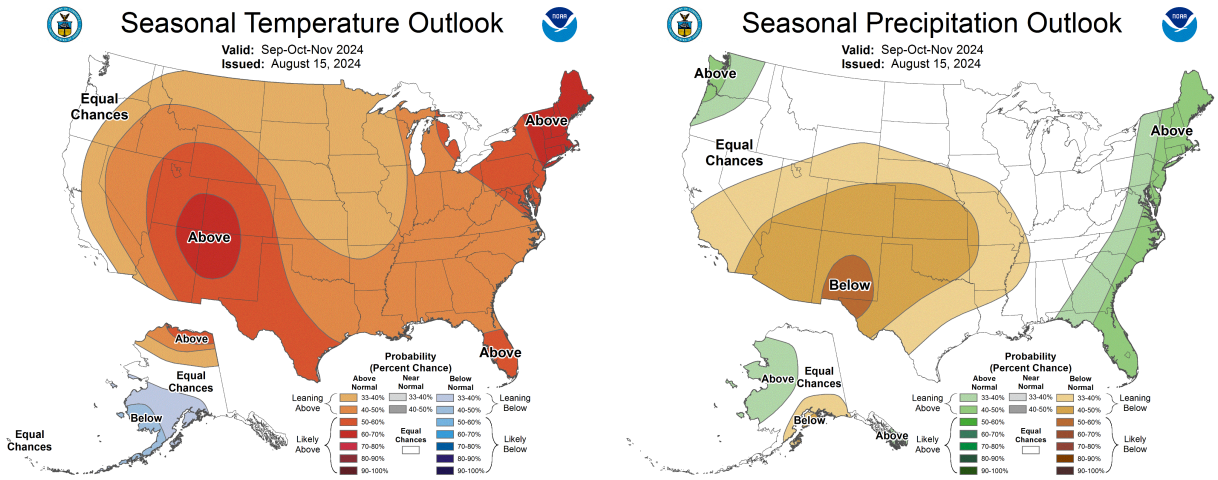


Figure 7

As a result of the air pressure differential brought about by storms, areas surrounding the storm will experience high winds. Air pressure differential occurs because storm systems bring very cold air. Since cold air is denser than warm air, a pressure differential forms between two regions. When this happens, southern California experiences a wind event known as Santa Ana winds.

Santa Ana winds are dry offshore winds that bring very dry air and eliminate the sea breeze. An example of such event is shown in Figure 8 of a forecast issued by MWS for the October 29, 2023 Santa Ana wind event. During this event, wind gusts exceeding 50 MPH along the Orange County coastline and 80 MPH in the Santa Ana Mountains. The large of red shaded area signals high pressure. The arrow shows the pressure gradient from the Pacific Northwest to the southern CA coastline. Therefore, when these winds occur during a fire event, the winds act like a fan, fueling and spreading the fire quickly.

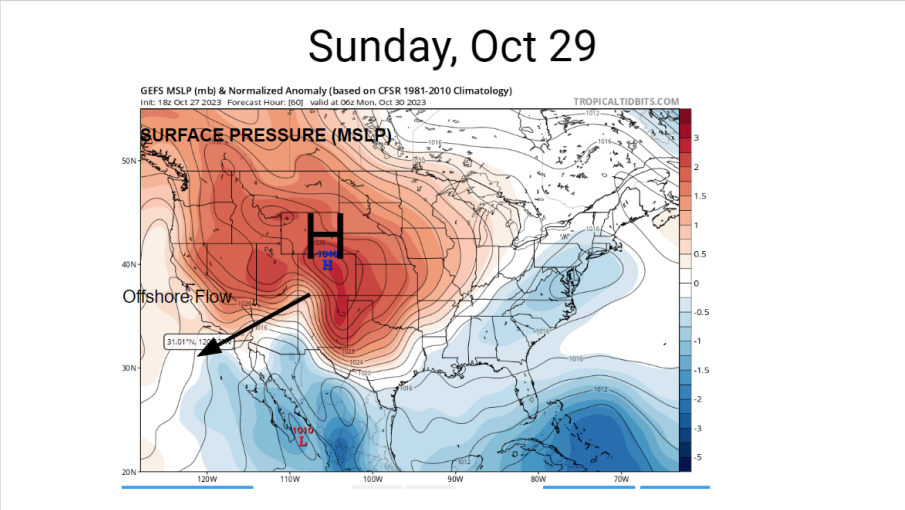


Figure 8

Wildfire Forecast

Given the current parameters, the likelihood for an above-average number of fires this fall is high. A combination of a large amount of dry fuels, dry air, strong Santa Ana winds, and above-average temperatures is the perfect recipe for an active wildfire season.

In Figure 9, the Four Month Outlook issued by the Wildfire Forecast & Threat Intelligence Integration Center (WFTIIC) shows an above-average wildfire season for all regions of southern California from September to November 2024.

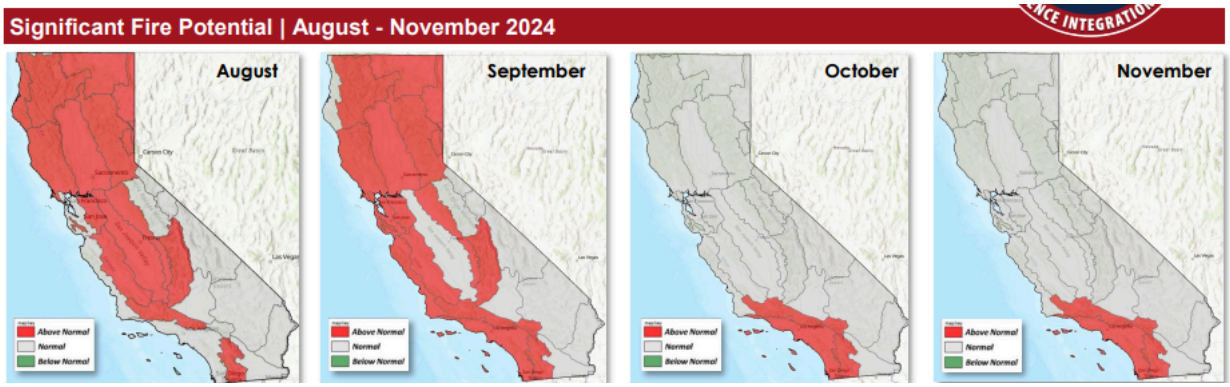


Figure 9

Fire Preparation Tips

1. Check the weather and understand fire weather-related alerts. A Red Flag Warning is issued when relative humidity is less than 25% for several hours, there are sustained winds of 15 MPH or greater for several hours, and when the fuels (particularly dead fuels) are very dry are

expected within the next 24 hours. A Fire Weather Watch is issued 24-72 hours prior to a Red Flag event.

2. During times of high fire danger, avoid campfires, barbecue, or any other types of outdoor burning.
3. Clear dead or dry grasses, twigs, branches, and leaves around homes.
4. Monitor wildfire statements and information posted by local officials.

References

NOAA Regional Climate Centers, West Wide Drought Tracker, University of Idaho
Figures 1-4 https://wrcc.dri.edu

Southern California Geographic Coordination Center
https://gacc.nifc.gov/oscc/fuelsFireDanger.php Figure 5

Tropical Tidbits - CFS forecast model Figure 6
https://tropicaltidbits.com

NOAA/NWS Climate Prediction Center
https://cpc.ncep.noaa.gov Figure 7

Slide from MWS Weather Forecast Presentation
Figure 8

Wildfire Forecast & Threat Intelligence Integration Center (WFTIIC) Four Month Outlook
https://hub.wftiic.ca.gov/pages/four-month-outlook Figure 9