The Inland Northwest Informer

Information For Storm Spotters, Cooperative Observers And Everyone

A Publication Of WFO Pendleton, Oregon

Spring/Summer 2015 - Volume 16

Windstorm Hits Pacific Northwest

By Stephen W. Bieda III, Ph.D., Acting Science and Operations Officer and Mary Wister, Meteorologist

A major wind storm occurred across much of eastern Oregon and southeast Washington on December 10th and 11th, 2014. The event occurred in two phases, with the first being due to a potent 968 millibar low pressure system moving onto the British Columbia Coast on December 10th, and the second resulting from another system undergoing rapid deepening along the Oregon Coast on December 11th. It was the second system that would take a similar track and be nearly on par with a storm system that struck the Pacific Northwest on December 12, 1995 (Figure 1). It was the path of the second system that would result in damaging winds in excess of 58 mph over much of the forecast area.

The first set of high wind reports in association with the storm systems occurred when a vigorous cold front approached the region. Strong southerly winds increased along the immediate foothills of the Blue Mountains, the northern slopes of the Wallowa Mountains, and in the Grande Ronde Valley. During the cold months when the atmosphere is moist and stable, a south or southeast wind direction tends to be a favorable direction for downslope winds in these areas which develop due to strong surface winds passing over a mountain ridge that accelerate down the lee slope. The cold front would rapidly move across the region during the afternoon and evening of December 10th, with a lull in winds during the early morning hours of December 11th.

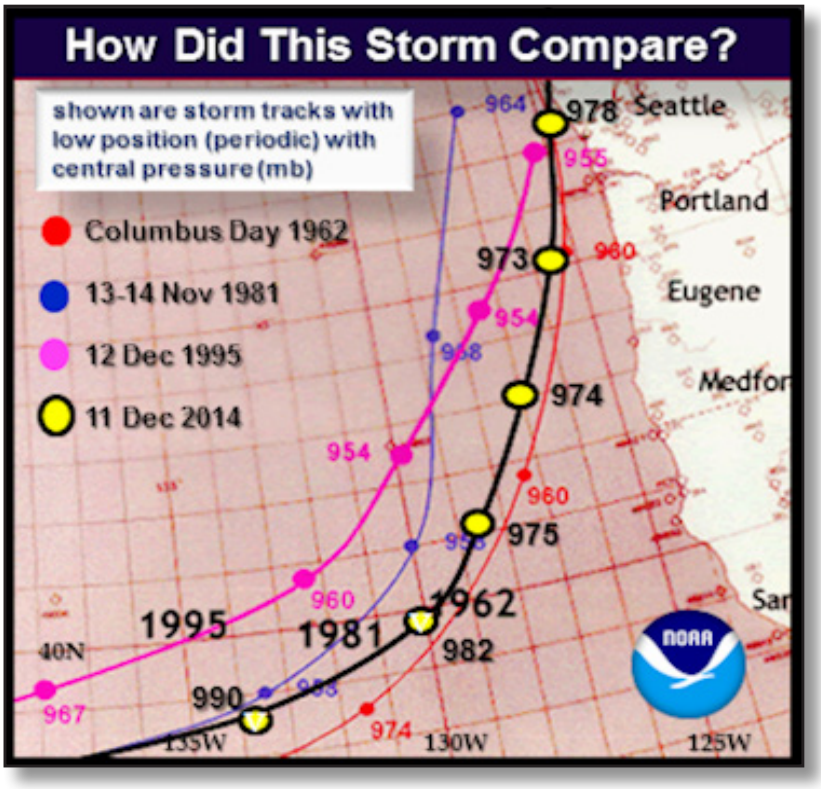

Figure 1. Storm track of the 11 Dec 2014 storm compared against prior windstorm-causing events. Source: NOAA National Weather Service Portland, OR

The second storm system to approach the region would start as a 991 millibar low over the eastern Pacific Ocean on the evening of December 10th. This low would undergo a rapid deepening cycle and even developed an eye-like feature as it approached the Oregon Coast, with an estimated central pressure of 973 millibar by the morning of December 11th (Figure 2, page 2). This was an estimated drop of 18 millibars over a 12-hour period!

Between damage reports and wind gusts in excess of 58 mph, over 50 High Wind Warning criteria local storm reports (LSR) were documented across eleven counties in NWS Pendleton's area of responsibility

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from as early as 9 AM December 10th through as late as 5 PM December 11th (Figure 3, page 2). The strongest wind gust was 95 mph in the Cayuse area of Pendleton, with another site over the northern Blue Mountains (Pikes Peak mesonet site at 3454 feet) gusting 91 mph. Also three other sites would gust over 80 mph. The average wind gust from 37 automated weather stations was 69.54 mph. ❖

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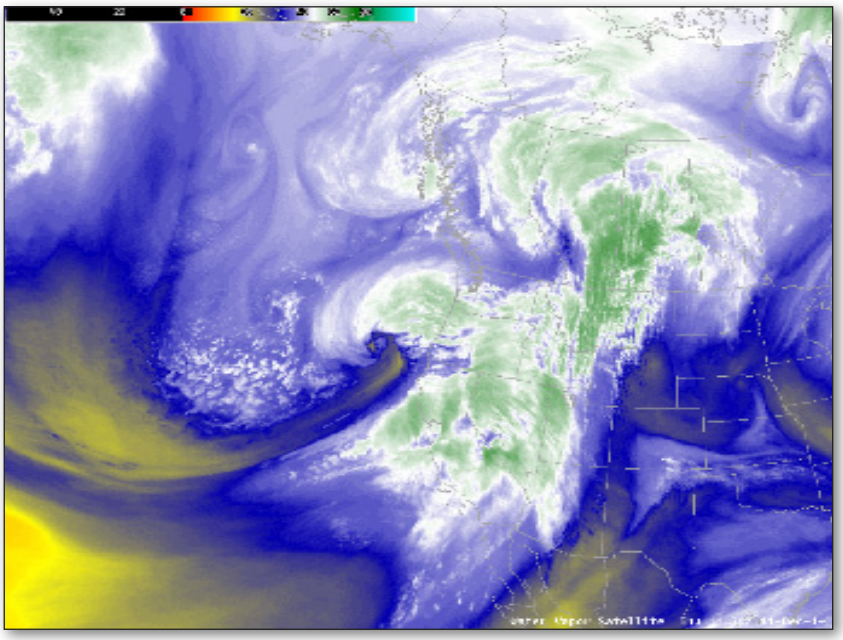

Figure 2. Water Vapor Satellite image showing a strong, upper level low off the Oregon Coast at 3:30 AM on December 11th. A powerful jet on this image is noted with a streak of drier air (yellow color) going into the cyclone.

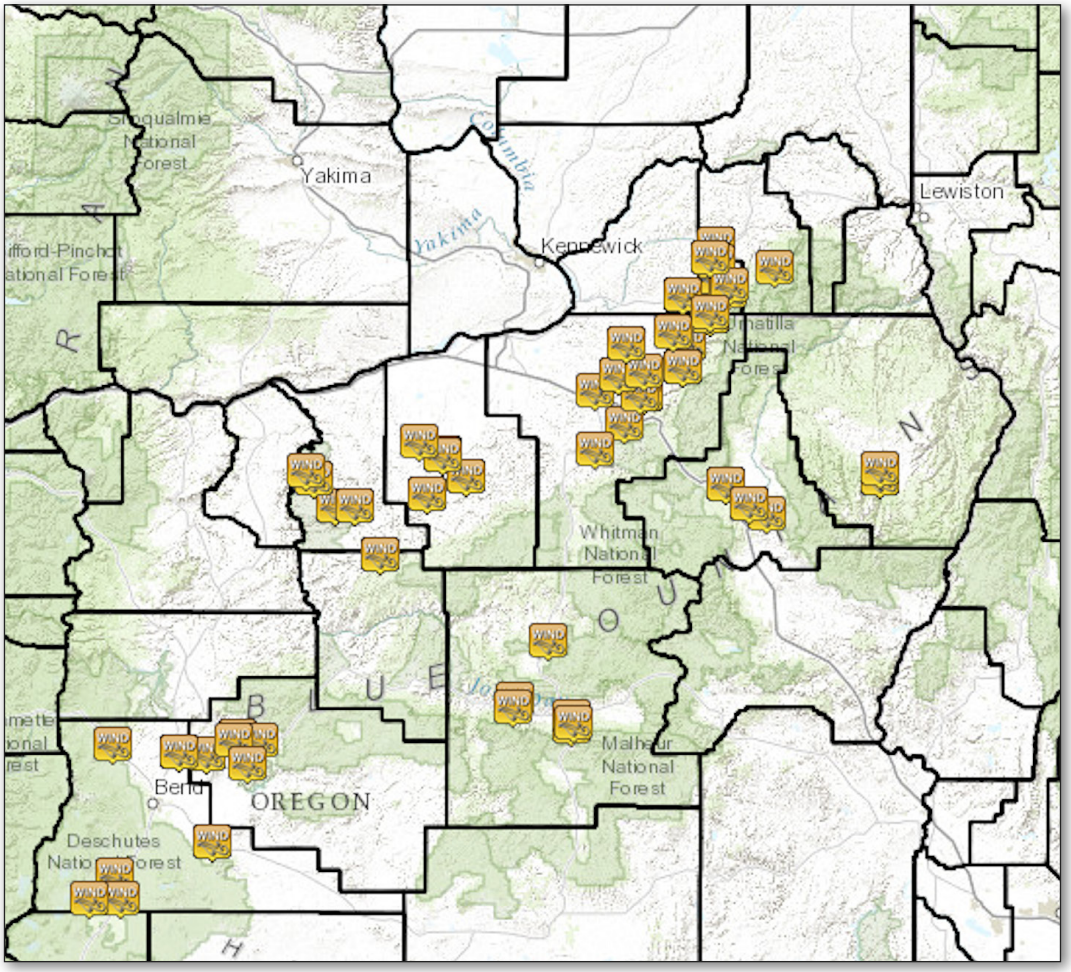

Figure 3. Severe Wind Reports for December 10 – 11, 2014. Locations with an icon denote damaging winds or wind gusts at 58 mph or greater. Source: NOAA Storm Prediction Center

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How to report winds if you do not have an anemometer

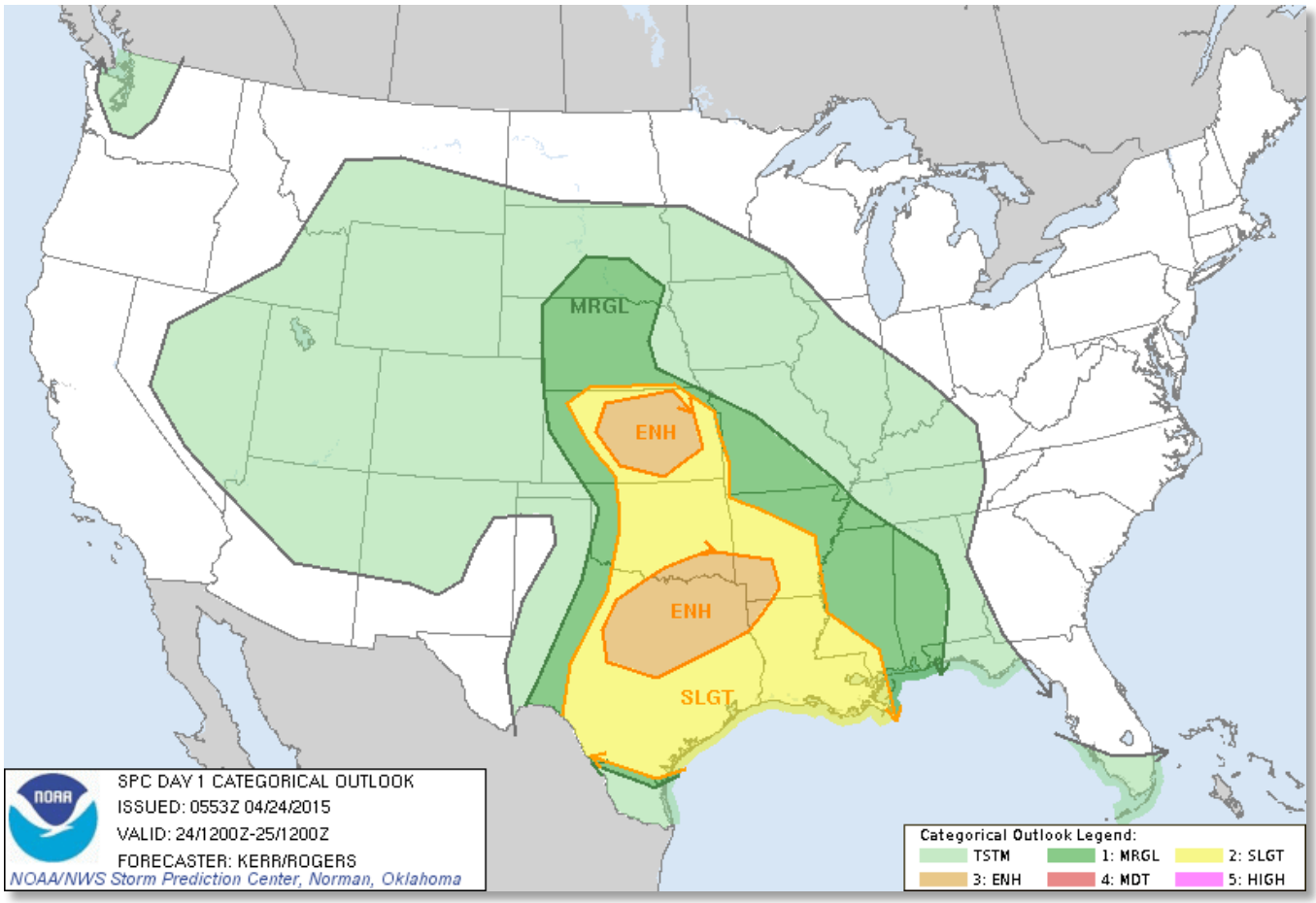
Many home weather stations are equipped with anemometers, but there is no need to rush out and buy an anemometer to report wind gusts when contacting the National Weather Service. The Beaufort Scale has been used since the early 19th century and is still utilized today. ❖

Beaufort Wind Force	Wind				Criterion			
	Speed		Descriptive term		Sea			Land
	Average	Range	American	British	State	Description	Wave Height	
0	0	<1 kt <1 mph <1 km/h	Light	Calm	Calm	Sea like a mirror.	0	Smoke rises vertically.
1	2 kt 2 mph 3 km/h	1-3 kts 1-3 mph 1-5 km/h	Light	Light air	Smooth	Ripples with the appearance of scales are formed, but without foam crests.	¼ ft 0.1 m	Direction shown by smoke but not by wind vanes.
2	5 kts 6 mph 9 km/h	4-6 kts 4-7 mph 6-11 km/h	Light	Light breeze	Smooth	Small wavelets, still short but more pronounced, crests have a glassy appearance and do not break.	½-1 ft 0.2 m	Wind felt on face; leaves rustle; ordinary vane moved by wind.
3	9 kts 10 mph 16 km/h	7-10 kts 8-12 mph 12-19 km/h	Gentle	Gentle breeze	Slight	Large wavelets. Crests begin to break. Foam of glassy appearance.	2-3 ft 0.6 m	Leaves and small twigs in constant motion; wind extends light flag.
4	13 kts 16 mph 24 km/h	11-16 kts 13-18 mph 20-28 km/h	Moderate	Moderate breeze	Moderate	Small waves, becoming longer.	3½-5 ft 1 m	Raises dust and loose paper; small branches are moved.
5	19 kts 22 mph 34 km/h	17-21 kts 19-24 mph 29-38 km/h	Fresh	Fresh breeze	Rough	Moderate waves, taking a more pronounced long form. (Chance of some spray).	6-8 ft 2 m	Small trees in leaf begin to sway.
6	24 kts 28 mph 44 km/h	22-27 kts 25-31 mph 39-49 km/h	Strong	Strong breeze	Very Rough	Large waves begin to form; the white foam crests are more extensive everywhere. (Probably some spray).	9½-13 ft 3 m	Large branches in motion; umbrellas used with difficulty.
7	30 kts 35 mph 56 km/h	28-33 kts 32-38 mph 50-61 km/h	Strong	Near gale	High	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.	13½-19 ft 4 m	Whole trees in motion; inconvenience felt when walking against the wind.
8	37 kts 43 mph 68 km/h	34-40 kts 39-46 mph 62-74 km/h	Gale	Gale	Very High	Moderately high waves of greater length; edges of crests begin to break into spondrift. The foam is blown in well marked streaks along the direction of the wind.	18-28 ft 5.5 m	Breaks twigs off trees; generally impedes progress
9	44 kts 51 mph 82 km/h	41-47 kts 47-54 mph 75-88 km/h	Gale	Strong Gale	Very High	High waves. Dense streaks of foam along the direction of the wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility.	23-32 ft 7 m	Slight structural damage; chimney-pots and slates removed.
10	52 kts 59 mph 96 km/h	48-55 kts 55-63 mph 89-102 km/h	Whole Gale	Storm	Phenomenal	Very high waves with long overhanging crests. The resulting foam in great patches is blown in dense white streaks along the direction of the wind. On the whole the surface of the sea takes a white appearance. Visibility affected.	29-41 ft 9 m	Trees uprooted; considerable structural damage.
11	60 kts 68 mph 110 km/h	56-63 kts 64-72 mph 103-117 km/h	Whole Gale	Violent Strom	Phenomenal	Exceptionally high waves. (Small and medium sized ships might be for a time lost to view behind the waves.) The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility affected.	39-46 ft 11.5 m	Widespread damage; very rarely experienced.

New SPC Convective Outlook Categories

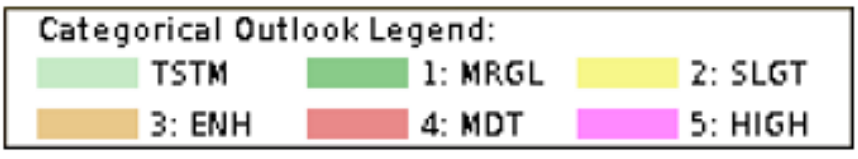
Say Goodbye to the "See Text!"

By Michael Vescio, Meteorologist In Charge



The Storm Prediction Center (SPC) has introduced new categories to their convective outlooks to better represent the threat for severe weather based on their probabilistic forecasts. The categories are "***Marginal***" and "***Enhanced***." For the Pacific Northwest, what we need to be mostly concerned with is the "***Marginal***" category. This replaces the old "*See Text*" label that we often saw in the summer which corresponds to the 5% probability of large hail or damaging wind with 25 miles of a point. On our most significant severe weather days we may still find ourselves in a "Slight Risk" of severe thunderstorms which correlates to the 15% probability of large hail and/or wind damage within 25 miles of a point. On rare occasions, usually about one time per year, a severe thunderstorm watch is issued for portions of the area. This is done when organized severe thunderstorms are expected. The graphic above is an example of a convective outlook with the new categories. ❖

For more information on the new categories,visit http://www.spc.noaa.gov/misc/SPC_probotlk_info.html

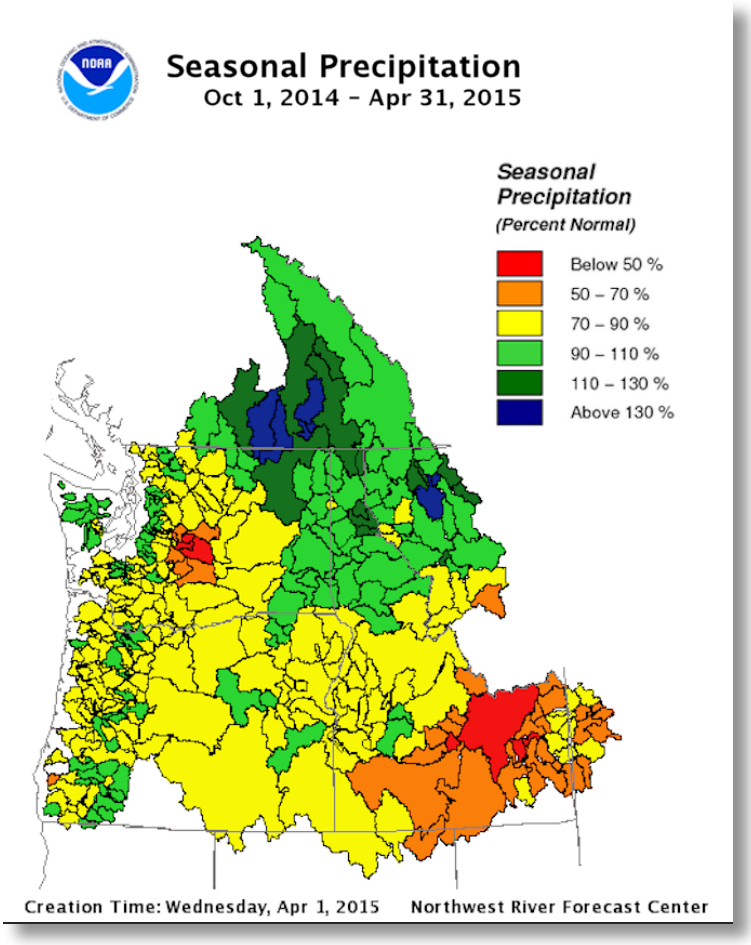


Water Year Precipitation
October 2014 - March 2015

By Marilyn Lohmann, Service Hydrologist

Location	Amount In Inches	Percent of Normal
Bend	8.09	107%
Condon	6.54	73%
Dayville	6.05	85%
Dufur	8.66	89%
Heppner	6.32	77%
John Day City	7.00	106%
La Grande	11.10	121%
McNary Dam	4.35	76%
Madras	5.43	83%
Meacham	25.19	113%
Milton-Freewater	7.67	75%
Mitchell	7.65	105%
Moro	7.44	95%
Pelton Dam	5.41	73%
Pendleton Airport	7.72	86%
Prineville	6.51	101%
Redmond Airport	5.66	112%
The Dalles	8.45	72%
Wallowa	9.53	98%
Wickiup Dam	12.82	82%
Cle Elum	17.33	100%
Dayton	12.81	102%
Ellensburg	5.46	90%
Hanford	3.87	82%
Mt Adams RS	35.01	91%
Prosser	3.55	60%
Selah	4.19	77%
Sunnyside	4.56	92%
Whitman Mission	9.51	105%
Yakima Airport	4.52	80%

The water year began in October with above normal precipitation over the Cascades and areas to the east, while amounts were below normal across northeast Oregon. In November, precipitation amounts were near to below normal with much colder than normal temperatures, with some early season snow across the region on the 12th. December was much warmer than normal. Central Washington had below normal precipitation, while near to above normal precipitation was reported in southeast Washington and across northern Oregon. January, February and March were much warmer and generally drier than normal. Looking at the overall station precipitation, a number of stations have above normal precipitation due the heavier precipitation during Fall and early Winter period, but the much warmer than normal temperatures caused the precipitation to fall as rain instead of snow, leading to very low snowpack and increasing drought concerns. ❖



Summer 2015 Outlook
June Through August

By Michael Murphy, Meteorologist

The Climate Prediction Center summer outlook for the interior Pacific Northwest is indicating a 60% probability of above normal temperatures along the East Slopes of the Cascades with a 50% probability of above normal temperatures elsewhere in Eastern Oregon and Washington. According to the outlook, precipitation totals have equal chances of being either above, below or near normal; except along the East Slopes of the Washington Cascades where there is a 33% probability for drier than normal conditions. Overall, much of the area will likely see above normal temperatures with near average precipitation amounts for the upcoming summer months.

The Climate Prediction Center issued an El Niño advisory due to warmer than normal sea surface temperatures across mainly the central tropical Pacific Ocean. Their forecast states that there is a 90 percent chance that El Niño conditions will persist through the Northern Hemisphere summer of this year and a greater than 80 percent chance it will last through 2015. El Niño conditions typically lead to near average temperatures over much of the area with below average precipitation from the Cascades west, above average precipitation over South-Central Oregon & near normal precipitation elsewhere. There are many other atmospheric parameters that go into the CPC summer outlook, including the position of the Southwest Monsoon, Pacific Decadal Oscillation and the mean storm track. See page 7 for more detailed analysis of this latest El Niño advisory. ❖

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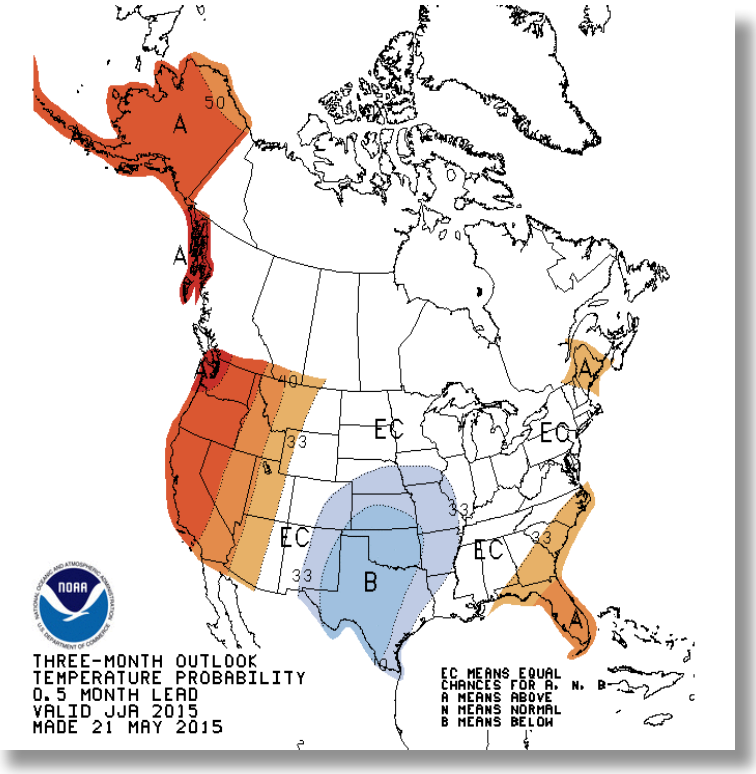

Figure 1: CPC 3 Month Temperature

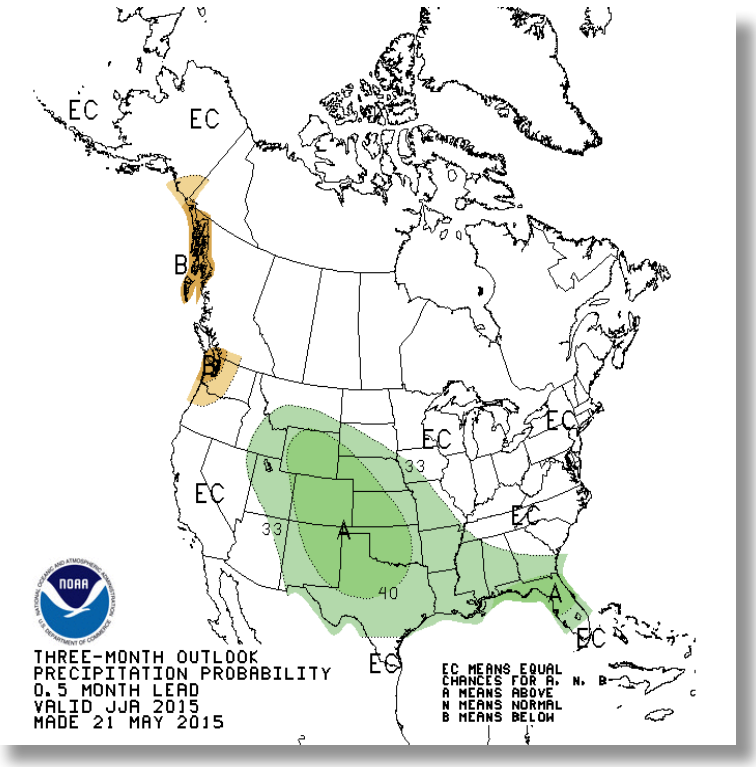

Figure 2: CPC 3 Month Precipitation

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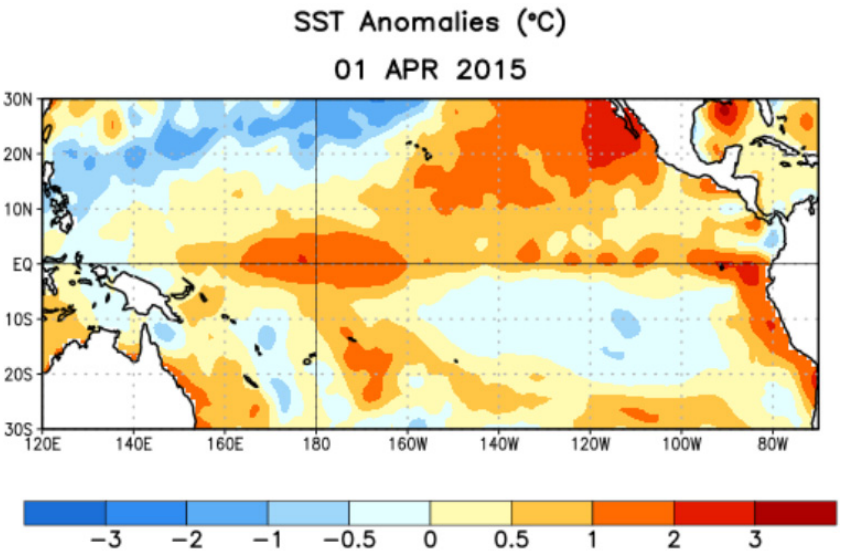
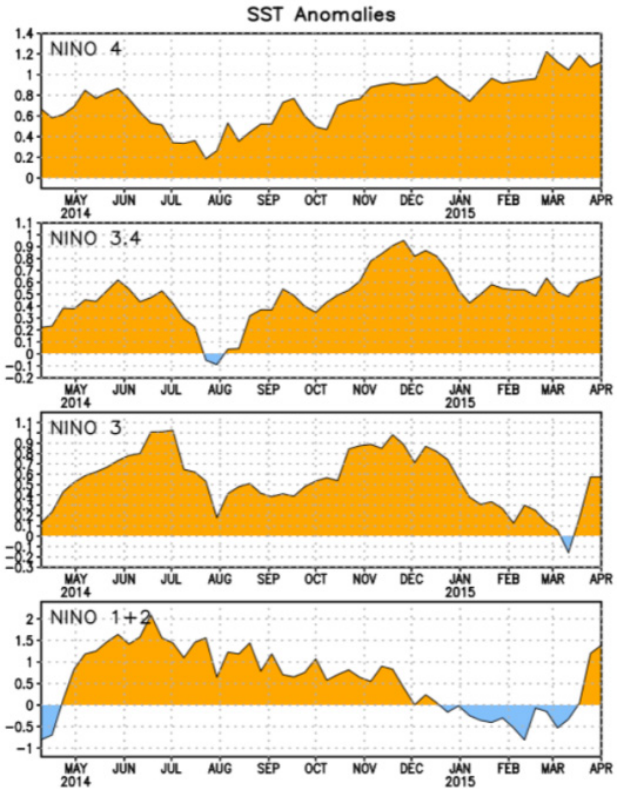


Figure 3 *(above) Shows Sea Surface Temperature Anomalies across the South-Central Pacific as of April 1st, 2015. Note the expansive area of above normal Sea Surface Temperatures along the equator, indicating a developing El Niño which may persist through at least the summer.*



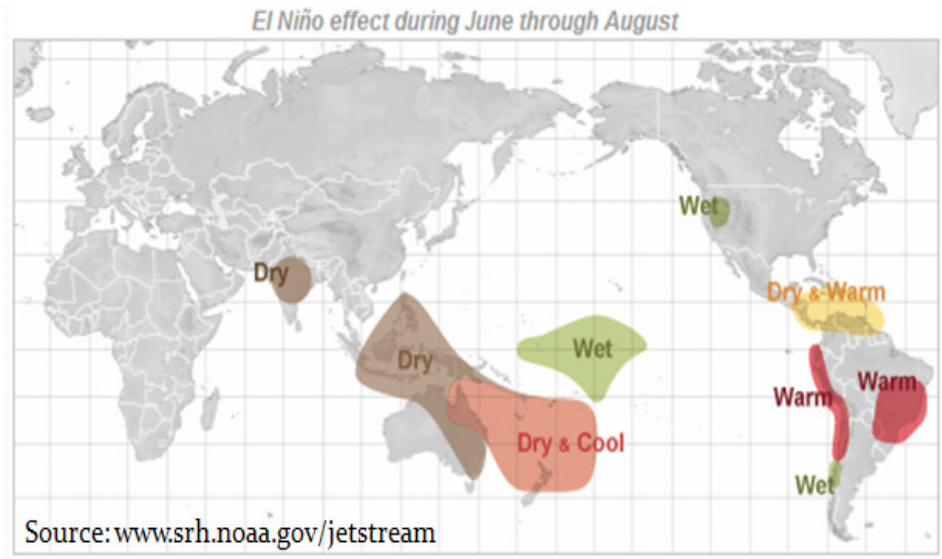
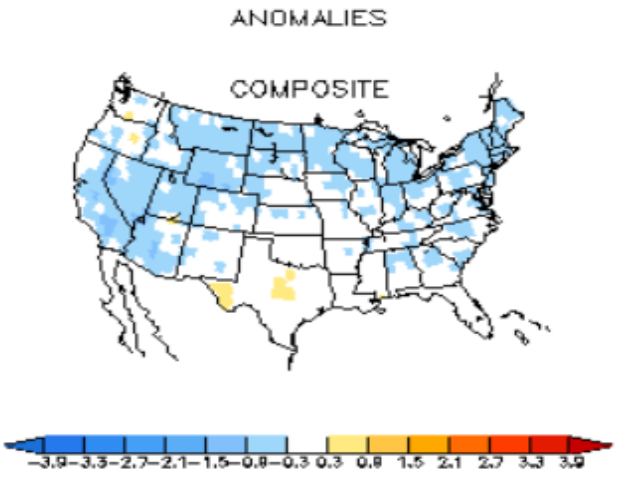
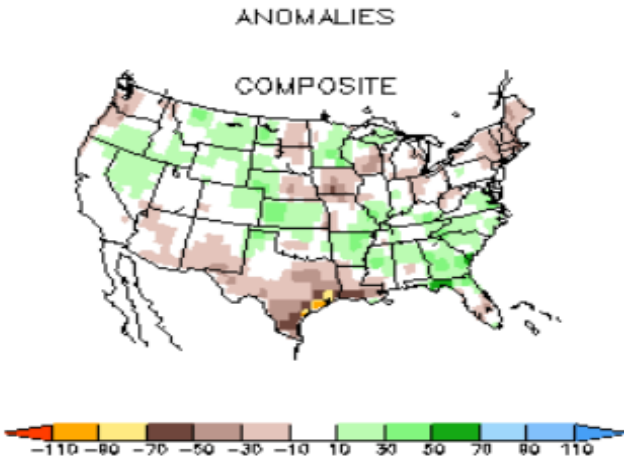


Figure 4 *(above) Shows SST anomalies for differently defined parts of the Equatorial Pacific Ocean. The Niño 3.4 region is where an official El Niño is typically defined.* ***Figure 5*** *(left) Shows usual effects of El Niño on the weather patterns across the globe during the months of June - August. Note the wetter than average conditions over parts of the Intermountain & Pacific Northwest.* ***Figures 6 & 7*** *(Below) Show temperature and precipitation anomalies during a classic El Niño summer on a more detailed United States scale.*



JJA EL NINO TEMPERATURE ANOMALIES (C)



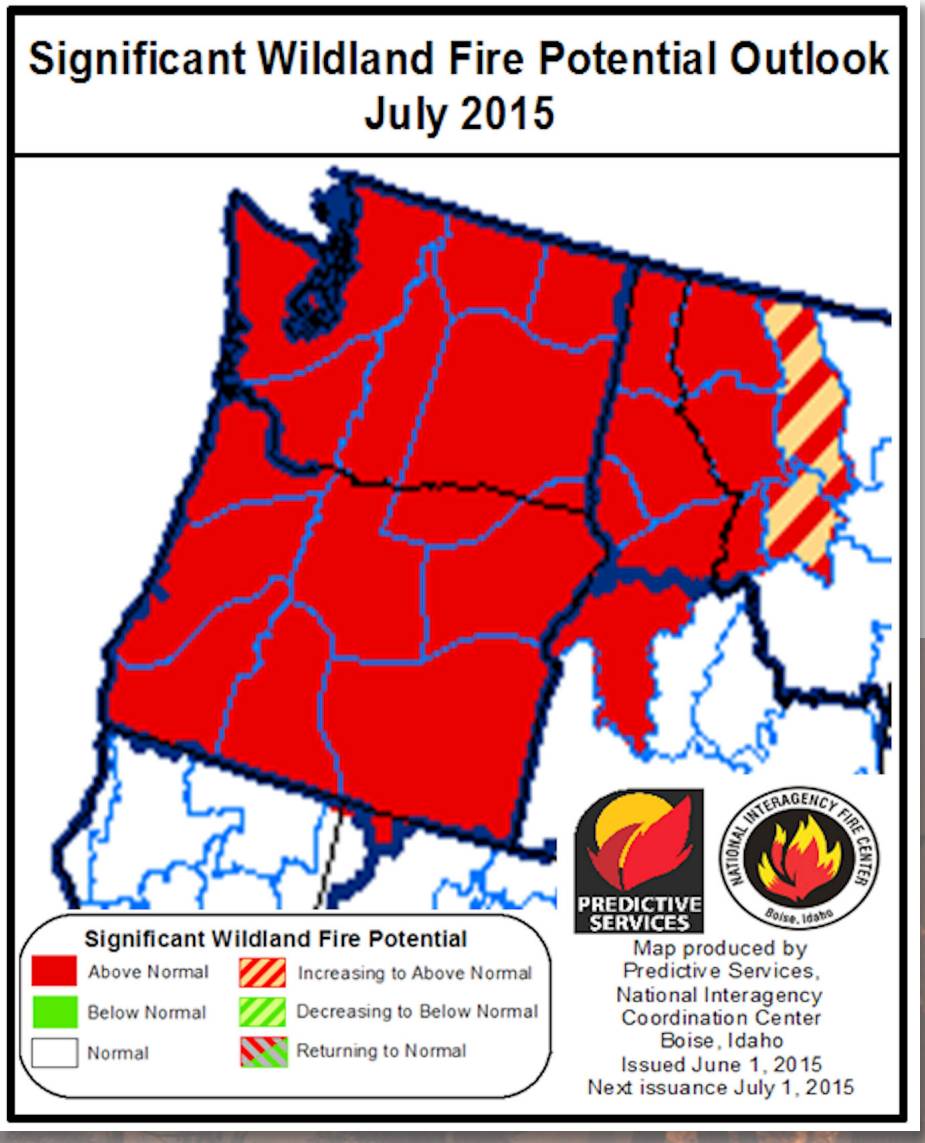
JJA EL NINO PRECIPITATION ANOMALIES (MM)

2015 Projected Fire Season

By Rachel Cobb, Incident Meteorologist / Fire Weather Program Leader

The fire season is greatly influenced by weather conditions in the preceding winter and spring. Temperatures have been above normal and the inland Northwest has had yet another dry winter. Some areas have received less than 70 percent of normal precipitation since January 1st.

The U.S. Drought Monitor continues to designate southeast Oregon as in an extreme drought, while the rest of eastern Oregon and south-central Washington are experiencing moderate to severe drought. However, spring rains should keep the area out of fire season through mid-June. The Climate Prediction Center is calling for temperatures to be above normal through the spring and summer, and possibly even through fall and winter, but the precipitation outlook is still uncertain. Because of the dry winter, with most areas receiving less than 25% of average snowpack, there have already been a few small lightning-caused wildfires in the Cascade Mountains. Portions of eastern Oregon and Washington saw significant rainfall in May, and will continue to see wet thunderstorms in June. But by July and August, typical summer heat and dryness, coupled with earlier exposure of higher elevation fuels during lightning events, could lead to the geographic area experiencing a greater risk of large, costly wildfires due to drought and low fuel moisture.

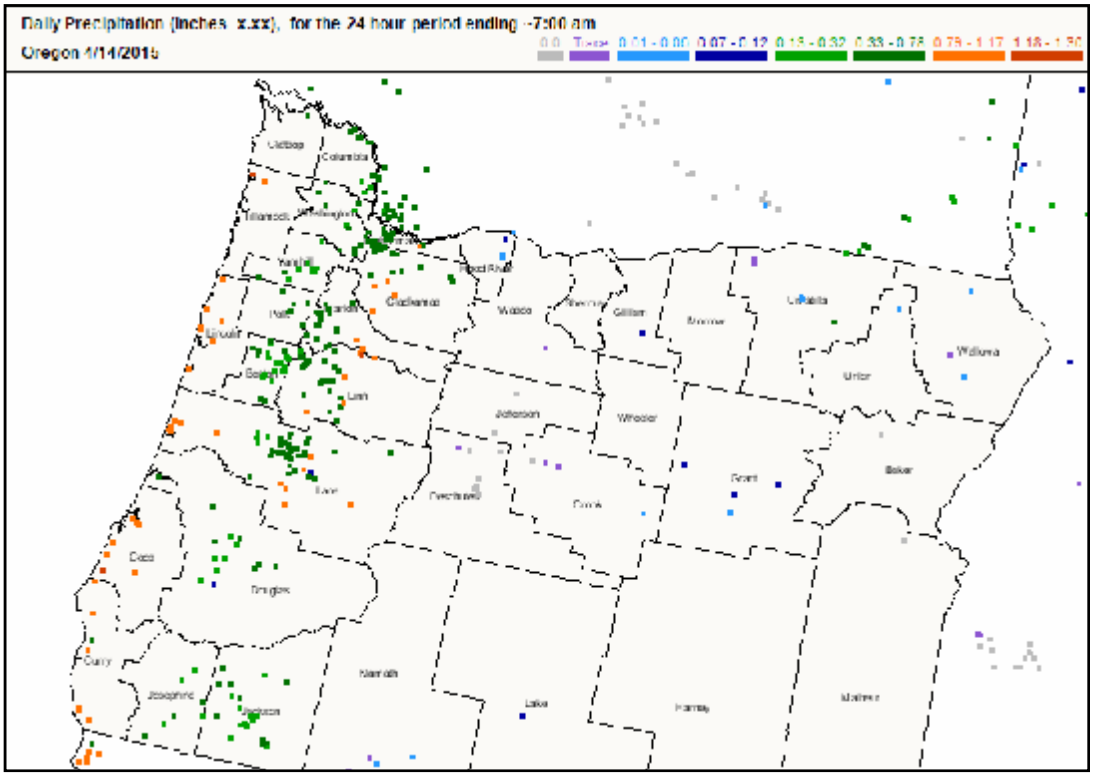


In summary, the 2015 fire season in the Pacific Northwest has the potential to be as active, or even more active, than the 2014 season, which saw many large wildfires in both Oregon and Washington. For more information about fire weather and wildland fire management please visit NWCC's website at www.nwccweb.us ❖

CoCoRaHS Program Update

By Rachel Cobb , Meteorologist

CoCoRaHS, the Community Collaborative Rain, Hail, and Snow Network, has been active in Washington and Oregon since 2008. Since then, there have been nearly 200 volunteer precipitation observers in WFO Pendleton's forecast area sign up for CoCoRaHS. However, less than 100 actively report their rain, hail and snow amounts. Therefore, we are always looking for more volunteers. We would like to achieve the national goal of 1 observer per square mile in urban areas, and 1 observer per 36 square miles in rural locations. If you have ever been interested in the weather, this is the best time of year to become involved with CoCoRaHS. Summer is fast approaching, and your rain and hail reports are incredibly important. And if you previously signed up for CoCoRaHS but haven't reported in a while, it's never too late to get back into it.



What is CoCoRaHS? It is a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow). Automated surface observations are everywhere these days, and far outnumber the amount of manual reports being taken. In a very real way, you could be acting to improve climatological data sets by taking, and reporting, your rain and snow observations!

Why is CoCoRaHS important? Precipitation is essential for life. As many of us know, it can vary greatly with topography, storm type and season. It really is true that it can pour on one side of the street and be dry on the other. Snowfall may pile up in one neighborhood and only dust another. Meteorologists, engineers, hydrologists, entomologists, insurance experts, and building contractors are all very interested in precipitation. And for some, like the many farmers of our region, it is their very livelihood.

How to become a volunteer? You can become a volunteer by signing up via our Web site: www.cocorahs.org Online training materials are available, as well as links to purchase the official 4" rain gauges. You may also inquire about upcoming local training sessions in your area by contacting your local coordinators at Rachel.Cobb@noaa.gov or Michael.Murphy@noaa.gov ❖

Photo Album

Sunshine piercing through a veil of smoke from a grass fire near Boardman, OR. Photo by M. Murphy

Cumulus and Stratocumulus clouds over the Ochoco Mountains. Photo by M. Murphy

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