December 2020, Climate Summary

December can be characterized as a month of greater than normal temperatures and mostly below normal precipitation. There were several events during the month, which brought moderate to heavy amounts of snow, and a high wind event on the 21\textsuperscript{st}. The snow events occurred mostly late in the month, near the Christmas holiday, and a mid month heavy snow event which occurred on the 12\textsuperscript{th}. These heavy snow events affected mainly the higher elevations of the Cascades and the Blue Mountains.

There were only 3 record events reported, which were all record maximum temperatures. These occurred on the 19\textsuperscript{th} and the 21\textsuperscript{st}. The stations which reported these record highs were at The Dalles, OR with a tied record high of 56 degrees on the 19\textsuperscript{th}, and Walla Walla, WA & Redmond, OR, with record highs of 65 and 60 degrees respectively. Below are some images of the typical conditions during the month.
Nearly all of Oregon and Washington had above normal temperatures, with departures from normal ranging from +3 to +6 degrees F. The exception is a very small portion of southern Grant County, Oregon, which had a departure from normal of 0 to -3 degrees F.
Just about all of the forecast area (northeast Oregon and southeast WA) had a percent of normal precipitation that was below normal, except for a small portion of the Northern Blue Mountains of Oregon. Departures ranged from 25 to 90 percent of normal.
All of the mean maximum, minimum, and mean average temperatures were above normal for the month. Precipitation totals were all below normal, except for Kennewick, WA and La Grande, OR, which were above normal by an amount of +0.04 and +0.42 inches respectively. Snowfall amounts were all missing, except for the Pendleton, OR Airport and La Grande, OR, of which both had below normal snowfall by an amount of -4.8 and -3.1 inches respectively.
The average 500 MB pattern was an overall ridging pattern over the Pacific Northwest. This pattern is consistent with the above normal temperatures and below normal precipitation that was shown in previous slides.
A westerly zonal flow dominated the first two periods, from late October through late November. Then an upper ridge pattern developed over the western USA during the last two periods, from late November through late December. The upper ridge patterns in the latter two images are consistent with the above normal temperatures and below normal precipitation during December.

These are more detailed semi-monthly average 500 mb pattern plots, which were from the following periods: Oct 27th to December 25th.

The land boundaries are shown in green. Yellow, orange, and red colors represent areas of high pressure at 500 mb and the cooler shades of blue color show areas of low pressure at 500 mb.
## Significant Weather Events for December, 2020

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Report</th>
<th>Where</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Snow</td>
<td>December 12, 2020</td>
<td>M 5.0 inches</td>
<td>3 S Heppner, OR</td>
<td>Public</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 12, 2020</td>
<td>E 5.0 inches</td>
<td>3 N Fossil, OR</td>
<td>Public</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 12, 2020</td>
<td>M 5.0 inches</td>
<td>4 SSW Heppner, OR</td>
<td>Trained Spotter</td>
</tr>
<tr>
<td>None TSTM Wind Gust</td>
<td>December 21, 2020</td>
<td>M 59 mph</td>
<td>3 NNE Walla Walla, WA</td>
<td>ASOS</td>
</tr>
<tr>
<td>None TSTM Wind Gust</td>
<td>December 21, 2020</td>
<td>M 65 mph</td>
<td>Pendleton, OR Airport</td>
<td>ASOS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 25, 2020</td>
<td>M 2.0 inches</td>
<td>4 SW Kennewick, WA</td>
<td>Trained Spotter</td>
</tr>
<tr>
<td>Snow</td>
<td>December 25, 2020</td>
<td>M 3.5 inches</td>
<td>The Dalles, OR</td>
<td>Public</td>
</tr>
<tr>
<td>Snow</td>
<td>December 25, 2020</td>
<td>M 4.0 inches</td>
<td>5 SSW Chenoeweth, OR</td>
<td>Trained Spotter</td>
</tr>
<tr>
<td>Snow</td>
<td>December 25, 2020</td>
<td>M 1.0 inches</td>
<td>1 NNW Hermiston, OR</td>
<td>Public</td>
</tr>
<tr>
<td>Snow</td>
<td>December 25, 2020</td>
<td>M 2.0 inches</td>
<td>Richland, WA</td>
<td>Public</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 26, 2020</td>
<td>M 10.0 inches</td>
<td>1 N Trout Lake, WA</td>
<td>Trained Spotter</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 7.1 inches</td>
<td>7 NE White Salmon, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 6.0 inches</td>
<td>1 WNW White Salmon, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 5.0 inches</td>
<td>4 ESE Mosier, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 4.5 inches</td>
<td>25 NNE Wallowa, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 4.5 inches</td>
<td>17 NW Roslyn, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 3.0 inches</td>
<td>7 SSW Richland, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.8 inches</td>
<td>Kennewick, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.5 inches</td>
<td>Prosser, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.4 inches</td>
<td>10 N Elgin, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.4 inches</td>
<td>1 WSW Umatilla, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.3 inches</td>
<td>1 WNW Yakima, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.3 inches</td>
<td>2 WSW Fruitville, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.2 inches</td>
<td>3 SSW Richland, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.1 inches</td>
<td>4 NW Selah, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.0 inches</td>
<td>2 SW Goldendale, WA</td>
<td>Co-Op</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.0 inches</td>
<td>4 WSW Pasco, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.0 inches</td>
<td>1 WSW Fruitville, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.0 inches</td>
<td>3 SE Lostine, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.0 inches</td>
<td>1 SW Richland, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.8 inches</td>
<td>2 NNE Granger, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.8 inches</td>
<td>3 SSW Wallowa, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.7 inches</td>
<td>1 NE Sunnyside, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.5 inches</td>
<td>8 WNW Roslyn, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.3 inches</td>
<td>9 NW Seneca, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.0 inches</td>
<td>2 NW Hermiston, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.0 inches</td>
<td>4 SSE Pendleton, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 1.0 inches</td>
<td>4 WNW Joseph, OR</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>M 2.5 inches</td>
<td>4 W Roslyn, WA</td>
<td>Co-Op</td>
</tr>
</tbody>
</table>

Significant weather events are continued on the next slide
Significant Weather Events for December, 2020 (continued)

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Report</th>
<th>Where</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Snow</td>
<td>December 26, 2020</td>
<td>M 12.0 inches</td>
<td>W Trout Lake, WA</td>
<td>Trained Spotter</td>
</tr>
<tr>
<td>Snow</td>
<td>December 26, 2020</td>
<td>E 4.0 inches</td>
<td>4 W Meacham, OR</td>
<td>NWS Employee</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 30, 2020</td>
<td>M 8.9 inches</td>
<td>2 SSE Snoqualmie Pass, WA</td>
<td>Co-Op</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 30, 3030</td>
<td>M 11.0 inches</td>
<td>6 NW Easton, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 31, 2020</td>
<td>M 12.0 inches</td>
<td>1 WSW Ski Bluewood, WA</td>
<td>Trained Spotter</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 31, 2020</td>
<td>M 14.0 inches</td>
<td>2 SSE Snoqualmie Pass, WA</td>
<td>Co-Op</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 31, 2020</td>
<td>M 14.0 inches</td>
<td>6 NW Easton, WA</td>
<td>CoCoRAHS</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 31, 2020</td>
<td>M 10.0 inches</td>
<td>Cle Elum, WA</td>
<td>Co-Op</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 31, 2020</td>
<td>M 11.0 inches</td>
<td>9 SW Ski Bluewood, WA</td>
<td>Meso-Net</td>
</tr>
<tr>
<td>Heavy Snow</td>
<td>December 31, 2020</td>
<td>E 14.0 inches</td>
<td>WNW Tollgate, OR</td>
<td>Trained Spotter</td>
</tr>
</tbody>
</table>

Most of the significant weather events for December were either snow or heavy snow events. There was also a high wind event, which produced high non-thunderstorm wind gusts on December 21\textsuperscript{st}, of 59 and 65 mph at Walla Walla, WA and Pendleton, OR respectively.

Record Weather Reports for December, 2020

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Where</th>
<th>Previous Record</th>
<th>New Record</th>
<th>Records Began</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temp</td>
<td>December 21, 2020</td>
<td>Walla Walla, WA</td>
<td>63 / 2019</td>
<td>65</td>
<td>1930</td>
</tr>
<tr>
<td>High Temp</td>
<td>December 21, 2020</td>
<td>Redmond, OR</td>
<td>59 / 2019</td>
<td>60</td>
<td>1941</td>
</tr>
<tr>
<td>High Temp</td>
<td>December 29, 2020</td>
<td>The Dalles, OR</td>
<td>56 / 1953</td>
<td>56 Tied</td>
<td>1929</td>
</tr>
</tbody>
</table>

All of the record weather reports were record high temperatures on December 21\textsuperscript{st}, and the 29\textsuperscript{th}. The highest record was at Walla Walla, WA on December 21\textsuperscript{st}, and the lowest record high was at The Dalles, OR on December 29\textsuperscript{th}, which was a tie with the previous record high in 1953.
Most of the stations in the list had a maximum monthly high temperature in the 50s to 60s, except for The Mt Adams Ranger Station, which had a highest maximum temperatures of 49 degrees. Most stations in the list has a monthly minimum temperature between 10 and 25 degrees, except for Redmond, OR with a lowest minimum of 9. These values are typical for December, and were near normal.
### December 2020, Monthly Precipitation and Snowfall/Hail Totals

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Monthly Precip (inches)</th>
<th>Total Snowfall/Hail (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pendleton, OR</td>
<td>1.01</td>
<td>1.2</td>
</tr>
<tr>
<td>Redmond, OR</td>
<td>0.36</td>
<td>M</td>
</tr>
<tr>
<td>Pasco, WA</td>
<td>0.63</td>
<td>M</td>
</tr>
<tr>
<td>Yakima, WA</td>
<td>0.58</td>
<td>M</td>
</tr>
<tr>
<td>Walla Walla, WA</td>
<td>1.82</td>
<td>M</td>
</tr>
<tr>
<td>Bend, OR</td>
<td>0.74</td>
<td>M</td>
</tr>
<tr>
<td>Ellensburg, WA</td>
<td>0.88</td>
<td>M</td>
</tr>
<tr>
<td>Hermiston, OR</td>
<td>0.63</td>
<td>M</td>
</tr>
<tr>
<td>John Day, OR (RAWS)</td>
<td>0.21</td>
<td>M</td>
</tr>
<tr>
<td>La Grande, OR</td>
<td>2.08</td>
<td>0.0</td>
</tr>
<tr>
<td>The Dalles, OR</td>
<td>1.66</td>
<td>M</td>
</tr>
<tr>
<td>Mt Adams RS, WA</td>
<td>7.19</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Precipitation amounts for the month were mostly below normal. However, a few early winter storms brought significant amounts of precipitation to mainly the Northern Blue Mountains and the Cascade east slopes. The greatest amount of precipitation was a whopping 7.19 inches at the Mt. Adams Ranger Station. The second highest was at La Grande, OR with 2.08 inches. The least amount of precipitation for the month was in Central OR, and the John Day Highlands, with Redmond, OR only reporting 0.36 inches, and La Grande, OR only reporting 0.21 inches. Snowfall was light at the only 3 stations which reported snowfall amounts, and they were below normal.
As of December 29th, there continued to be an “Extreme Drought” (D3) east of the OR Cascades and in north to south central Oregon. Also, “Extreme Drought” (D3) conditions existed over south central WA. Elsewhere, in northeast Oregon and extreme southeast Washington, “None” drought conditions existed. Elsewhere, D0 (“Abnormally dry”) to D2 (“Severe Drought” ) conditions existed.
The temperature outlook for the next 3 months (January – March, 2021) are near to below normal over northern and western Oregon and all of Washington, especially northwest WA.
The precipitation outlook for the next 3 months (January – March, 2021) shows the Pacific Northwest having mostly a 33 – 50 percent greater chance of being above normal, with only extreme southern OR having equal chances of above or below normal precipitation.
Sea Surface Temperatures (SST’s) were again below average in December over the central and eastern tropical Pacific by -0.5 degrees to -2 degrees C. The last 4 - 5 months of below normal SST’s are consistent with a La Nina event which is expected to continue this winter through March, 2021. La Nina conditions are expected to decrease in April through June.
All Nino Regions continued to show below normal SST’s again during the past 5 to 7 months. These continued cooler than normal SST’s in the eastern tropical Pacific, is consistent with an ongoing La Nina event which will continue through this winter into the spring of 2021. A La Nina Advisory has been in effect for the past several months, and will continue through the rest of this winter until early March of 2021.
The current ENSO status is still: “La Niña Advisory”, which is in effect from now through the rest of this winter, until March, 2021. Then there is a potential for a transition to neutral ENSO conditions in the spring of 2021. The chances for a La Nina event is still about a 95 percent chance through March, 2021, and then about a 50 percent chance of returning to neutral ENSO conditions from April through June, 2021.
Thank You!