

# Vintage 2020

## North Willamette Valley

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### Summary:

A mild and dry winter in 2019-20 was followed by a dry growing season continuing the ongoing drought concerns for Oregon and the majority of the western US. The spring was relatively cool with mild frosts in early April, then followed by wide swings between early season heat then cool, wet conditions leading up to and during flowering. The result was widespread issues with fruit set leading to generally high amounts of shatter, smaller berries and clusters for many in the region. A relatively heat stress free summer was leading into what looked like a decent September weatherwise until the Labor Day extreme wind event, which was followed by catastrophic fires and smoke for days. Growing degree-day totals for 2020 ended up similar to the 2004, 2006, 2013, and 2018 vintages. Across twelve sites in the region the phenological timing averaged April 11th for bud break, June 11th for bloom, August 17th for véraison, and September 27th for harvest. Growers reported generally low disease pressure, relatively low pest pressure, little to no bird pressure until later in the picking window, and a harvest that presented very good quality fruit at moderate to substantially lower yields.

### Background:

This vintage summary is derived from weather and phenological observations from twelve locations across the north Willamette Valley. The locations include one in the Chehalem Mountains AVA, two in the Dundee Hills AVA, four in the Eola-Amity Hills AVA, two in the Yamhill-Carlton AVA, and three in the Willamette Valley AVA. The locations average 529 ft. in elevation, ranging from 205 ft. to 841 ft. Additional comparisons are made with the long-term McMinnville weather station located at the McMinnville Municipal Airport (157 ft.), and other stations in other growing regions in Oregon.

### Climate:

#### ***Dormant Season***

The PNW experienced a relatively warm winter during 2019-2020, with temperatures in the region 2.5°F above the 1981-2010 climate normal<sup>1</sup> period. In Oregon, the winter averaged 2.4°F warmer than normal, with maximum temperatures much higher than minimum temperatures compared to averages. Spatially the winter ranged from 1.3°F above along the coastal climate division to 3.0°F above in the north central climate division. The McMinnville weather station had a November 2019 through March of 2020 that was 1.9°F above normal. The first three months of the winter at the station were quite mild with January seeing the warmest conditions, averaging 4.0°F above average (Figure 1), while February and March turned colder than average ending up -1.5°F below. The coldest periods of the winter were in

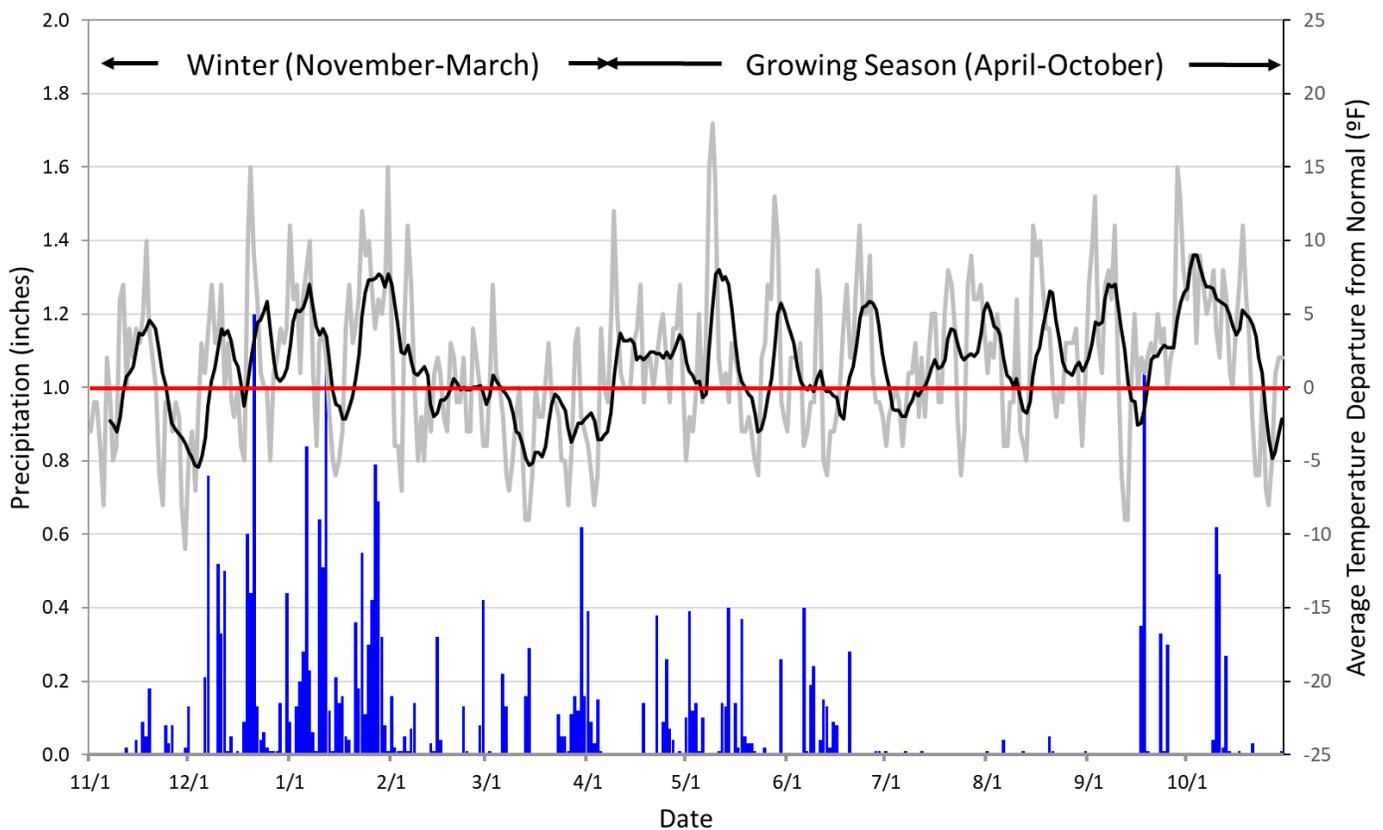
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<sup>1</sup> Climate normals are 30-year periods used by the global weather and climate services community for summarizing numerous weather variables. All references to 'normal' and 'average' for the McMinnville weather station in this report are with the 1981-2010 period, which will be replaced by the 1991-2020 period sometime during 2021.

late November, early February, and early March with the winter’s absolute minimum of 20.0°F observed on November 30th.

The twelve reference vineyards in the North Willamette Valley averaged 43.1°F during the winter of 2019-2020 (Table 1), which was 1.1°F warmer than the prior winter (Table 2). Average minimum temperatures during the winter ranged from 36.5 to 39.2°F over the sites with an absolute minimum of 22.3°F observed on November 30th. On average, the sites observed a total of 23 days below freezing during the winter, which was nine fewer than the previous winter.

Precipitation during the winter of 2019-2020 was below normal over the majority of the PNW, with the driest areas being southern and eastern Oregon, eastern Washington, and Idaho (50-80% of normal). Only portions of western Washington experienced normal winter precipitation (115-130%). The McMinnville weather station experienced winter precipitation of 15.54”, which was 11.91” below the 1981-2010 climate normals (43% below) with only January seeing slightly above normal precipitation (Figure 1). The greatest one-day precipitation amount at the McMinnville weather station occurred on December 21st with 1.20”.



**Figure 1** – Precipitation (blue bars) and temperature departure from normal for the McMinnville weather station from November 1, 2019 through October 31, 2020. The gray line represents the daily temperature departures from average, above and below the red line) and the black line represents the weekly moving average.

Over the winter the twelve reference vineyards averaged 18.60” of precipitation with the wettest period during the third week of December and across most of the month of January, which is the same pattern as can be seen in Figure 1 for the McMinnville weather station. Precipitation amounts ranged from 13.71” to 22.91” (Table 1) and the highest daily total experienced was 1.47” on December 21st. The

number of days experiencing light rainfall (<0.25”) averaged 66 across the sites (43% of the days), while heavier rainfall days (>0.25”) averaged 25 across the sites (16% of the days). Dry days during the 2019-2020 winter averaged 62 days or roughly 41% of the winter.

### **Growing Season**

While the 2020 vintage will long be remembered for the Labor Day wind event, fires, and smoke, the first part of this section will describe the overall conditions with a separate section below on the specific aspects of this extreme event. The 2020 growing season from April through October across the PNW was relatively warm, ending up 2.0°F above the long-term average from 1981-2010. Oregon was moderately warmer than the PNW average at 2.4°F above average with the regions ranging from the Willamette Valley +2.1°F, the Columbia Gorge and Columbia Valley +2.3°F, and Southern Oregon +3.5°F. The McMinnville weather station had a growing season that was 1.9°F above average with every month experiencing warmer than average departures (Figure 1). In spite of the impact of smoke on temperatures (see section below) the growing season ended relatively warm compared with recent years with both September (+3.5°F) and October (+2.4°F) much warmer than average. The warmest days at the McMinnville station during the growing season was 100.0°F on July 26th and August 15th with the station experiencing 17 days above 90°F and 5 days above 95°F, a significantly higher number compared to 2019 but similar to what was seen in 2018 (Table 2).

**Table 1** – Weather and climate characteristics from twelve vineyard locations in North Willamette Valley for the dormant season (November 1, 2019-March 31, 2020) and growing season (April 1-October 31, 2020). Growing degree-days are calculated with a base of 50°F with no upper cut-off.

| <b>Dormant Season (Nov 1 – Mar 31)</b>           | <b>Average</b>        | <b>Standard Deviation</b> | <b>Maximum</b> | <b>Minimum</b> | <b>Range</b> |
|--|-----------------------|---------------------------|----------------|----------------|--------------|
| Average Temperature (°F)                         | 43.1                  | 0.7                       | 43.8           | 41.5           | 2.2          |
| Average Maximum Temperature (°F)                 | 49.6                  | 1.0                       | 51.4           | 47.7           | 3.7          |
| Average Minimum Temperature (°F)                 | 37.7                  | 0.9                       | 39.2           | 36.5           | 2.7          |
| Absolute Minimum Temperature (°F)                | 25.9                  | 2.4                       | 29.3           | 22.3           | 7.0          |
| # of Days < 32°F                                 | 23                    | 11                        | 46             | 10             | 36           |
| Total Precipitation (inches)                     | 18.60                 | 2.42                      | 22.91          | 13.71          | 9.20         |
| Highest Daily Total (inches)                     | 1.35                  | 0.43                      | 2.31           | 0.98           | 1.33         |
| Number of Days Without Precipitation (days)      | 62                    | 5                         | 69             | 52             | 17           |
| Number of Days with Precipitation < 0.25” (days) | 66                    | 8                         | 77             | 52             | 25           |
| Number of Days with Precipitation > 0.25” (days) | 25                    | 5                         | 33             | 17             | 16           |
| <b>Growing Season (Apr 1 – Oct 31)</b>           | <b>Average-Median</b> | <b>Standard Deviation</b> | <b>Maximum</b> | <b>Minimum</b> | <b>Range</b> |
| Growing Degree-Days                              | 2299                  | 143                       | 2529           | 2075           | 453          |
| Growing Season Average Temperature (°F)          | 60.3                  | 0.7                       | 61.5           | 59.2           | 2.3          |
| Average Maximum Temperature (°F)                 | 71.9                  | 1.0                       | 74.1           | 70.3           | 3.8          |
| Absolute Maximum Temperature (°F)                | 99.3                  | 2.1                       | 101.1          | 94.2           | 6.9          |
| # of Days > 95°F                                 | 4                     | 1.9                       | 7              | 0              | 7            |
| Average Minimum Temperature (°F)                 | 50.4                  | 1.9                       | 52.4           | 46.5           | 5.9          |
| Absolute Minimum Temperature (°F)                | 30.3                  | 2.4                       | 33.5           | 25.3           | 8.2          |
| # of Days < 32°F                                 | 2                     | 2.3                       | 7              | 0              | 7            |
| Median Last Spring Frost (date or days)          | 3/26                  | 10 days                   | 4/13           | 3/14           | 30 days      |
| Median First Fall Frost (date or days)           | 10/26                 | 8 days                    | 11/9           | 10/22          | 18 days      |
| Median Frost-Free Period (days)                  | 223                   | 14 days                   | 239            | 192            | 47           |
| Total Precipitation (inches)                     | 9.53                  | 3.24                      | 18.13          | 4.84           | 13.29        |
| Highest Daily Total (inches)                     | 0.92                  | 0.46                      | 1.89           | 0.34           | 1.55         |
| Number of Days Without Precipitation (days)      | 154                   | 4                         | 160            | 148            | 12           |
| Number of Days with Precipitation < 0.25” (days) | 47                    | 6                         | 60             | 35             | 25           |
| Number of Days with Precipitation > 0.25” (days) | 13                    | 5                         | 22             | 4              | 18           |

Heat accumulation in the PNW started off near average to slightly below average in eastern and northern Oregon and eastern Washington, while moderately above average for southern Oregon. Even with a relatively warm growing season, growing degree-days (GDD) continued to track closer to average for the northern and eastern wine regions while remaining above average in the southern regions. In the end, the 2020 vintage GDD amounts over most of California, Oregon, and Washington ended up 5-20% above the 1981-2010 normals. Isolated areas in eastern Washington, eastern Oregon, and Idaho were closer to normal or as much as 5% down from average. For the McMinnville weather station 2020 GDD ended up at 2414, which was 6% above 2019 and 10% up from the 1981-2010 climate normal period. The vintage had similar GDD to that seen in the 2004, 2006, 2013, and 2018 vintages (+/- 3%).

The twelve reference vineyards averaged 2299 GDD during the 2020 growing season (Table 1), up 198 GDD from 2019 but down 73 GDD from 2018 (Table 2). The sites ranged from a low of 1910 GDD to a high of 2529 GDD for the vintage. Figure 2 shows that the average GDD accumulation at the twelve sites (red line) was 105 GDD lower than the McMinnville airport location (black line), which is similar to the differences seen the past two years. While subtle in Figure 1, each of the sites and the McMinnville airport station show the slow-down in accumulation from the onset of the smoke on September 11, and then essentially no further accumulation after October 15 (Figure 2). Figure 3 shows the same degree-day data but, instead of cumulative as in Figure 2, it gives the daily accumulation values. Evident in the figure are the wide swings in heat accumulation during May through June, with a heat event in early May followed by a cool period and low GDD amounts then another heat event in late May followed by unsettled conditions during early June and flowering (Figure 3). In addition, the significantly lower than average GDD accumulated during late June through mid-July is quite notable. Finally, the significant drop off from the smoke event in September is clearly evident, with little recovery in GDD accumulation until the beginning of October.

For the reference vineyards during 2020, the growing season average was 60.3°F during 2020 (Table 1), which was 1.0°F warmer than 2019 (Table 2). The warmer season came largely from maximum temperatures which were 1.6°F higher than in 2019, while minimum temperatures were only 0.2°F higher. The warmest periods during the growing season occurred in early May (with the greatest departures from average), late July, and mid-August (Figure 1) with an absolute maximum site temperature of 101.1°F observed on August 15th. During the vintage, the reference vineyards experienced only 4 days over 95°F on average (Table 1), two more than 2019 and two less than in 2018 (Table 2). The coldest periods during the growing season came during early April with site temperatures dropping to 31-36°F and late October when the absolute minimum of 25.3°F was observed on the 26th. The number of days below 32°F during the growing season ranged from none to seven across the sites, which was a few more than the last two vintages. The median last spring frost date across the sites in 2020 was March 26th, which was over two weeks later than 2019. The median first fall frost date across the sites occurred on October 26th (Table 1), over ten days earlier than the last two vintages. The overall frost-free period in 2020 averaged 223 days across the sites which was eight and nine days shorter than the last two vintages, respectively (Table 2).

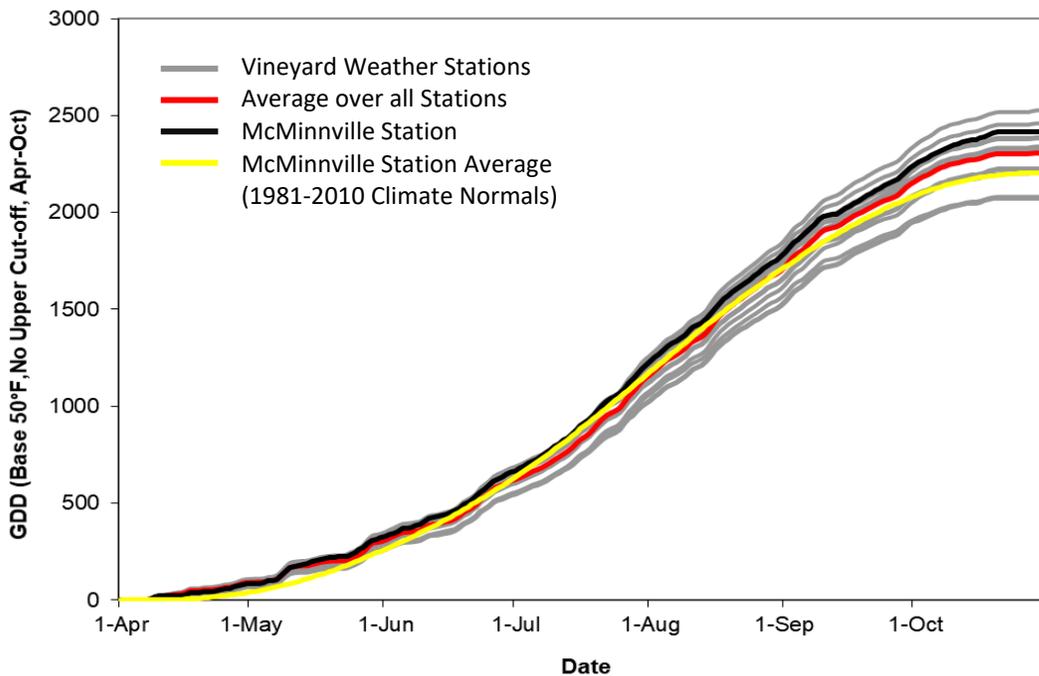
Growing season precipitation was near average to significantly below average over most of the western US in 2020, with drought conditions widespread and increasing over the year. The PNW ended the season down by approximately 5-10% for the April through October months, however much of the higher-than-average amounts came from western Washington, the northern Cascades, and Bitterroot Range in northern Idaho. Statewide Oregon saw between 20-35% below average precipitation, with

areas to the north seeing lower deficits and areas to the south seeing higher deficits. The McMinnville station ended the growing season 2.93” below average with the wettest periods coming during the first and last week in April, the first and third week in May, the second week in June, the third week of September, and the middle of October (Figure 1). The highest single day event for McMinnville during the growing season was 1.07” on September 18th, which came from a front that helped slow the fires and clear the smoke (see below).

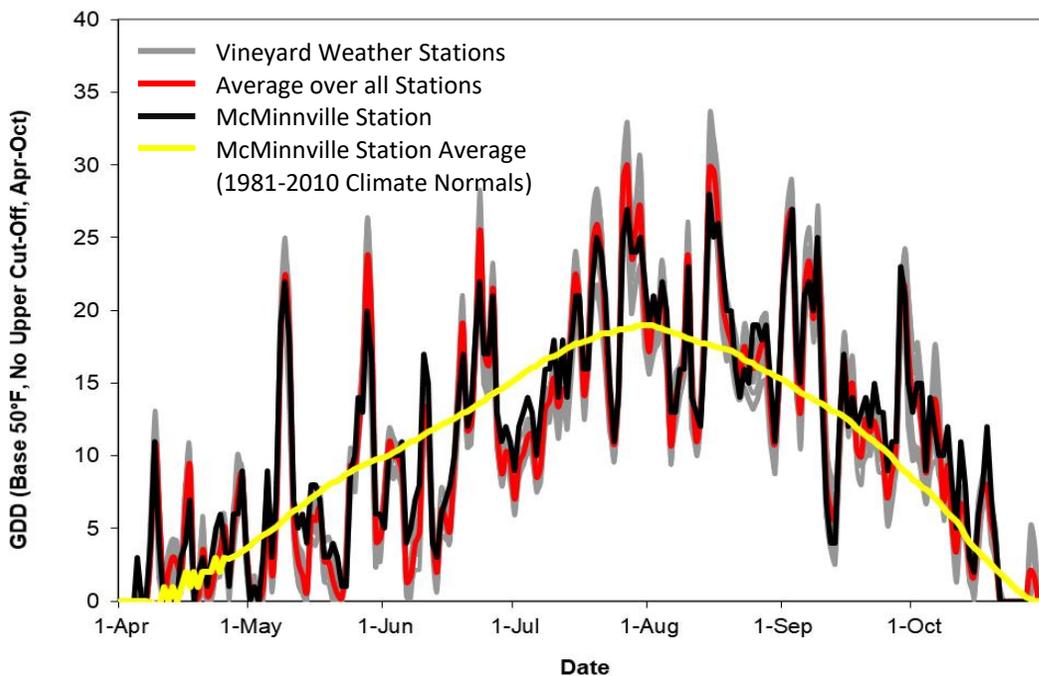
**Table 2** – Same weather station information as in Table 1, except for each year since 2018. \*Note that the winter of 2017-2018 data was not processed for these sites.

| <b>Dormant Season (Nov 1 – Mar 31)</b>           | <b>2017-18*</b> | <b>2018-19</b> | <b>2019-20</b> | <b>Average</b> |
|--|-----------------|----------------|----------------|----------------|
| Average Temperature (°F)                         |                 | 42.0           | 43.1           | 42.6           |
| Average Maximum Temperature (°F)                 |                 | 48.4           | 49.6           | 49.0           |
| Average Minimum Temperature (°F)                 |                 | 36.8           | 37.7           | 37.3           |
| Absolute Minimum Temperature (°F)                |                 | 23.4           | 25.9           | 24.7           |
| # of Days < 32°F                                 |                 | 32             | 23             | 28             |
| Total Precipitation (inches)                     |                 | 19.03          | 18.60          | 18.82          |
| Highest Daily Total (inches)                     |                 | 1.48           | 1.35           | 1.42           |
| Number of Days Without Precipitation (days)      |                 | 58             | 62             | 60             |
| Number of Days with Precipitation < 0.25” (days) |                 | 67             | 66             | 67             |
| Number of Days with Precipitation > 0.25” (days) |                 | 25             | 25             | 25             |
| <b>Growing Season (Apr 1 – Oct 31)</b>           | <b>2018</b>     | <b>2019</b>    | <b>2020</b>    | <b>Average</b> |
| Growing Degree-Days                              | 2372            | 2101           | 2299           | 2257           |
| Growing Season Average Temperature (°F)          | 60.7            | 59.3           | 60.3           | 60.1           |
| Average Maximum Temperature (°F)                 | 73.1            | 70.3           | 71.9           | 71.8           |
| Absolute Maximum Temperature (°F)                | 97.8            | 96.8           | 99.3           | 98.0           |
| # of Days > 95°F                                 | 6               | 2              | 4              | 4              |
| Average Minimum Temperature (°F)                 | 50.2            | 50.2           | 50.4           | 50.3           |
| Absolute Minimum Temperature (°F)                | 32.5            | 30.0           | 30.3           | 30.9           |
| # of Days < 32°F                                 | 0               | 1              | 2              | 1              |
| Median Last Spring Frost (date or days)          | 3/23            | 3/11           | 3/26           | 3/20           |
| Median First Fall Frost (date or days)           | 11/9            | 10/29          | 10/26          | 10/31          |
| Median Frost-Free Period (days)                  | 231             | 232            | 223            | 229            |
| Total Precipitation (inches)                     | 9.09            | 12.23          | 9.53           | 10.28          |
| Highest Daily Total (inches)                     | 1.17            | 0.96           | 0.92           | 1.02           |
| Number of Days Without Precipitation (days)      | 167             | 150            | 154            | 157            |
| Number of Days with Precipitation < 0.25” (days) | 35              | 46             | 47             | 43             |
| Number of Days with Precipitation > 0.25” (days) | 12              | 18             | 13             | 14             |

For the twelve reference vineyards, precipitation during April through October averaged 9.53”, ranging from a low of 4.84” to a high of 18.13” (Table 1) with the highest amounts coming from the more elevated sites. The 2020 vintage experienced similar rainfall amounts as observed in 2018 (Table 2). The highest single amount received at any one site was 1.89” which occurred on September 18th. The total number of days without precipitation during the growing season added up to 154 during 2020, 13 days fewer than experienced in 2018. The number of days with precipitation amounts less than 0.25” was 47, while the number of days with greater than 0.25” was 13 (Table 1), overall similar to the prior vintages (Table 2).



**Figure 2** – Growing degree-day accumulation during April-October 2020 from each of the vineyard weather stations (grey lines), the average over all vineyard weather stations (red line), and the McMinnville Airport weather station (black line). The long-term average (yellow line) is from the 1981-2010 climate normals for the McMinnville weather station. Calculated from daily Tmax and Tmin observations for April 1<sup>st</sup> through October 31<sup>st</sup> using a base of 50°F with no upper cut-off.



**Figure 3** – Same data as in Figure 2, but shown as daily growing degree-day values during April-October 2020 from each of the vineyard weather stations (grey lines), the average over all vineyard weather stations (red line), and the McMinnville Airport weather station (black line). The long-term average (yellow line) is from the 1981-2010 climate normals for the McMinnville weather station. Calculated from daily Tmax and Tmin observations for April 1<sup>st</sup> through October 31<sup>st</sup> using a base of 50°F with no upper cut-off.

The McMinnville weather station experienced seven record weather events in the period from November 1, 2019 through October 31, 2020. This is fewer than what has been experienced over the past five years at the site. These included record maximum temperatures on January 31st (61°F) and September 3rd (99°F); and record warm nighttime temperatures on February 1st and May 10th (52°F and 59°F, respectively). Record events also occurred in minimum temperatures with 31°F on November 1st, 26°F on March 9th, and 25°F on October 26th. There were no record precipitation events during this period at the McMinnville weather station.

### **Labor Day Wind Event, Fires, and Smoke:**

In late August and the first couple of days of September, the forecast was pointing to a heat extreme event for the coming week with some concern for plant stress and fruit dehydration. However, as the very large high-pressure area responsible for the heat event grew, stretching from the desert SW to Alaska, the forecast started calling for an extreme east wind event. This was largely due to the size of the high-pressure area and that it was pushing the jet stream into northern Canada and forcing the cold air southward into the Rockies and the central US; with Denver forecast for snow. By September 7th temperatures in NE Oregon and SW Oregon were 50-70 degrees apart creating the gradient that would enhance the strong winds (30-60 mph) from the east. As the east wind developed further it moved over numerous mountainous areas, warming, drying, and increasing in wind speed. The result was a dramatic drop in dew points (as much as 30 degrees in an hour) and lowering relative humidity to desert-like conditions even to the coast (to 8-15%). This same event brought very cold air to the Rockies with temperatures dropping 60 degrees or more in one day and significant snow to the mountains and the Front Range.

This wind event was extremely rare, with only a couple of similar events in our data record. Others have noted that this was the strongest 2-day easterly wind event during fire season since at least September of 1950, but that event came during a cooler period and after some significant precipitation earlier in the month. Another somewhat similar event occurred during the initial Tillamook Burn fire in 1933, but prior to that there is no evidence of events of this magnitude in the 1800s.

In addition, the Labor Day weather event arrived at the worst possible time; woody material (fuels) west of the Cascades and Sierra Nevada mountains were ready to burn and burn quickly. Up and down the western US fires that had been smoldering from a lightening event in mid-August exploded while new fires erupted around them from numerous trees and power lines being toppled. Unrivaled destruction spread while the winds continued to whip the fires out of control. From the fires came smoke, and a lot of it, which the east winds pushed over 1000 miles out over the Pacific. Then the circulation in the atmosphere shifted with high-pressure building in from the east, first pulling the smoke from the Pacific back over the western US, then dropping the wind speeds, which provided a modicum of advantage to firefighters. However, the declining wind speeds, stable air from the high pressure, and lower solar radiation reaching the surface brought mid to high-level smoke down to the surface in many regions. The smoke lowered daytime temperatures significantly (5-25°F or more) from what would have been seen under clear skies, and over a few days, the lack of solar radiation hitting the surface caused nighttime temperatures to drop significantly (5-10°F or more). The high pressure and smoke together created a strong inversion holding smoke near the surface until westerly airflow and rain events during September 16-18 (1.43" on average from the reference vineyard locations) brought some reprieve 11-13 days after the wind event started.

While September 2020 will long be remembered for the east wind event, catastrophic fires, and days of suffocating smoke, it also ended up being one of the top 5 warmest Septembers on record for most of the west (4.0-6.0°F warmer than average). From looking at upper air data and other regional weather station data from outside the smoke areas, I believe that without the smoke it would have likely been the warmest September on record over most of the west. Using the twelve reference vineyard stations as an example, for the seven days prior to the event (September 1-7) the maximum temperatures were 20-25 degrees higher than the days during the main smoke period (September 10-18), and I firmly believe the macro-scale conditions would have likely held to clear skies, warm, and dry conditions through mid-month at the minimum, without the smoke.

**Phenology:**

Plant growth timing was observed at each of the locations with bud break, bloom, and véraison recorded at 25-50% occurrence and harvest as the date that picking started for each location. Summarizing the phenological observations for the locations and averaged across all varieties for 2020 shows an average bud break of April 11th (Table 3), which is 5-6 days earlier on average than the past two vintages but similar to the longer-term averages (Table 4). The sites also showed a similar range with ten-days across sites, reported as early as April 5th and as late as April 15th. The average date of flowering was June 11th which was a few days later than flowering in 2019 but similar to that observed in 2018. The range across sites in flowering during 2020 saw the earliest occurring on June 7th and the latest on June 16th. Véraison and the start of the ripening phase during 2020 occurred over a 6-day period from mid to late August, averaging August 17th across the sites, which was few days later than the last two harvests (Table 4). The earliest véraison in 2020 was observed on August 15th while the latest was observed on August 21st. In 2020, harvest at these sites occurred over a 28-day period from September 14th to October 11th with an average date of September 27th (Table 3). Across these sites and varieties, harvest dates were similar to the 2018 and 2019 vintages.

**Table 3** – Phenological date (25-50% occurrence) and interval characteristics for the 2020 vintage averaged over all sites and varieties.

| <i>Event/Interval</i>  | <i>Average</i> | <i>Standard Deviation</i> | <i>Latest or Longest</i> | <i>Earliest or Shortest</i> |
|------------------------|----------------|---------------------------|--------------------------|-----------------------------|
| Bud Break              | April 11       | 3 days                    | April 15                 | April 5                     |
| Flowering              | June 11        | 3 days                    | June 16                  | June 7                      |
| Véraison               | August 17      | 2 days                    | August 21                | August 15                   |
| Harvest                | September 27   | 7 days                    | October 11               | September 14                |
| Bud Break to Flowering | 61 days        | 4 days                    | 68 days                  | 56 days                     |
| Flowering to Véraison  | 68 days        | 3 days                    | 74 days                  | 63 days                     |
| Véraison to Harvest    | 41 days        | 7 days                    | 56 days                  | 30 days                     |
| Flowering to Harvest   | 108 days       | 8 days                    | 122 days                 | 96 days                     |
| Bud Break to Harvest   | 170 days       | 7 days                    | 182 days                 | 158 days                    |

Average intervals between phenological events show that bud break to flowering during 2020 had an average interval across these sites of 61 days; that flowering to véraison was 68 days on average; and that véraison to harvest was 41 days on average (Table 3). These intervals had 3 to 7-day standard deviations across sites, but a wide range between the shortest and longest intervals due to site elevation/temperature differences and timing to the fire and smoke period. For 2020, the length of flowering to harvest averaged 108 days while the length of the bud break to harvest period averaged

170 days with 24 days between vineyard sites with the shortest and longest intervals. For the 2018, 2019, and 2020 vintages the intervals have fluctuated a few days each year with 2020 seeing a slightly longer bud break to flowering period, average flowering to véraison, shorter véraison to harvest and flowering to harvest periods, and a three day longer bud break to harvest period.

**Table 4** – Same phenological information as in Table 1, except for each year since 2018. § The earlier vintage average comes from Results Partners and a summary of North Willamette Valley sites for a 17-year average prior to 2018. The average\* comes from the 2018-2020 vintage data.

| <i>Event/Interval</i>  | <i>Earlier Vintages §</i> | <i>2018</i>  | <i>2019</i>  | <i>2020</i>  | <i>Average*</i> |
|------------------------|---------------------------|--------------|--------------|--------------|-----------------|
| Bud Break              | April 10                  | April 17     | April 16     | April 11     | April 14        |
| Flowering              | June 15                   | June 12      | June 8       | June 11      | June 10         |
| Véraison               | August 20                 | August 15    | August 14    | August 17    | August 15       |
| Harvest                | NA                        | September 29 | September 27 | September 27 | September 27    |
| Bud Break to Flowering | 65 days                   | 56 days      | 53 days      | 61 days      | 57 days         |
| Flowering to Véraison  | 66 days                   | 65 days      | 67 days      | 68 days      | 67 days         |
| Véraison to Harvest    | NA                        | 45 days      | 45 days      | 41 days      | 44 days         |
| Flowering to Harvest   | NA                        | 110 days     | 111 days     | 108 days     | 110 days        |
| Bud Break to Harvest   | NA                        | 167 days     | 164 days     | 170 days     | 167 days        |

NA = Not Available

### **Impacts and Influences:**

Weather-related impacts (from above) combined with numerous grower comments provide a general summary for the 2020 vintage include: 1) leading up to flowering there were major swings between abnormally high and low temperatures, followed by bloom to fruit set period with overall higher cloud cover, showers, lower maximum temperatures, and higher humidity. These conditions likely played a role in fruit set being significantly down for many (smaller clusters, smaller berries, and hens and chicks prevalent); 2) a relatively cool early July with slower than average heat accumulation and relatively low summer heat stress; 3) Labor Day wind event and then smoke presented challenges for many (described above), slowed ripening, but many report fruit quality was very good; 4) disease pressure average to significantly down across the region; and 5) average to lower than average bird pressure due to harvest timing, with later varieties and sites experiencing higher bird pressure.

### **Current Conditions:**

Unfortunately, the prolonged dry conditions over the western US have continued, even in the PNW and Northern California where near seasonally average precipitation amounts in November and early December have not fully alleviated drought concerns. Nearly 90% of the western US is in some category of drought with over 60% in severe to exceptional drought conditions. The only areas not exhibiting drought are western Washington, a small area of coastal Southern California, and scattered small areas in the northern Rockies. The longer-term outlook for the US through February continues to show the forecasted dry conditions for much of the west with further development expected in Southern California, the southern Plains, Texas, and even the southeast. The PNW is expected to see some improvement in drought conditions with the winter precipitation forecast as detailed below. The Four Corners region continues to be the bullseye for the western drought, with the extreme drought

conditions being the result of a weak monsoon season, record-high temperatures year to date, and now what looks like a dry winter.

While there are numerous factors that drive our regional weather and climate, the two broader influences that are very prominent are North Pacific and Tropical Pacific sea surface temperatures.

The Tropical Pacific has clearly strengthened further into La Niña conditions. The Climate Prediction Center (CPC) has reported that SSTs in the east-central Pacific are approximately 2-3°F below average, with patterns in all key atmospheric variables consistent with La Niña conditions. Most model forecasts point to the Tropics exceeding the threshold of La Niña SST conditions through winter and dissipating next spring. The official CPC/IRI outlook and other agency outlooks are consistent with these model forecasts, calling for an 95% chance of La Niña for winter. Therefore, a La Niña advisory is in effect. Now with meteorological winter in place and La Niña conditions, the forecast leads me to believe that we will likely see a pattern that is consistent with historical analogs where the PNW has a greater chance of being wetter than average (roughly 70%), while California and the southwest have a greater chance to remain dry. However, contrary to average La Niña conditions, which are typically much cooler than average over the entire west, the current forecast is calling for warmer than average to average conditions, except for the PNW and across the northern Rockies, which I think reflects more influence from the North Pacific (see below).

The North Pacific continues to show a large area of anomalously warm water running 2-5°F above average. Although there has been some surface cooling in the last few weeks and some coastal cooling along the California coast, the North Pacific remains much warmer than average. The North Pacific is currently closer to neutral or the warm phase of the Pacific Decadal Oscillation, which would put it out of phase with the Tropics, which is colder than average (see above). The effect here is that the current warmth in the North Pacific will likely mute the La Niña effect, making the magnitude of the impact lower. The result is that the PNW will likely be in for slightly warmer winter than expected with a normal La Niña but is likely to stay wet over the course of the winter, while California would likely be warm and dry.

Further updates will be provided in monthly Weather and Climate Summary and Forecasts on my webpage and regional presentations over the coming months.

### **Acknowledgements**

This report was made possible by data provided by Results Partners and the participating vineyards.

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