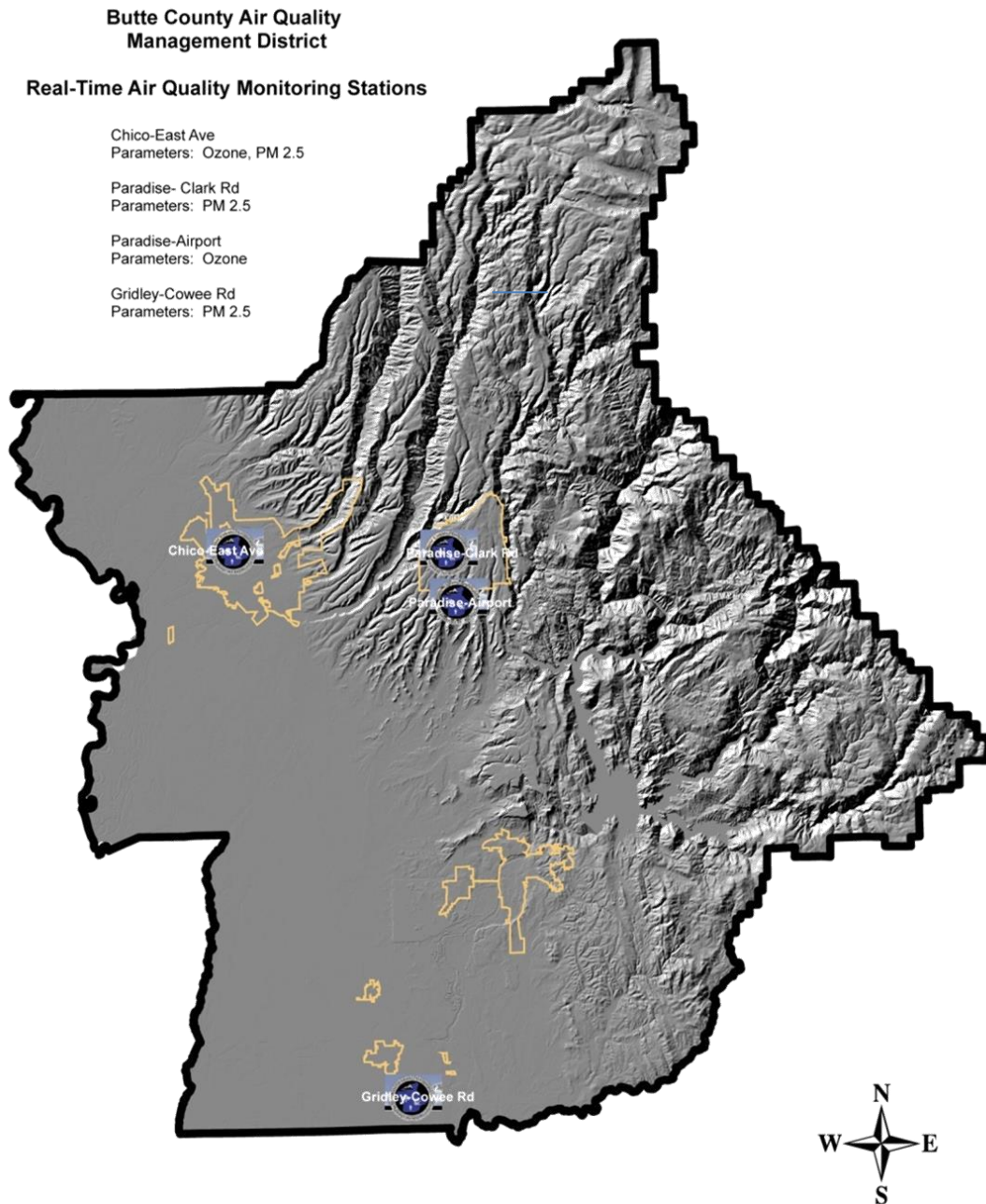


BUTTE COUNTY AIR QUALITY MANAGEMENT DISTRICT

Air Quality Summary for 2019 and 2019 – 2020 Check Before You Light Program Summary

The following is a summary of Butte County's air quality for 2019 and a summary of the 2019-2020 Check Before You Light Program. This document gives the reader an overview of the two (2) criteria pollutants of greatest concern - ozone (O₃) and particulate matter (PM_{2.5} and PM₁₀). The data was obtained from the official air monitoring sites located within Butte County. PM_{2.5} is monitored in Chico, Gridley, and Paradise. Ozone is monitored in Chico and Paradise. PM₁₀ is only monitored in Chico. Official air monitoring in Butte County is conducted by the California Air Resource Board (CARB).



The **Ambient Air Quality Standards** establishes the concentration at which a pollutant is known to cause adverse health effects to sensitive groups within the population, such as children and the elderly. Both the California and federal governments have adopted health-based standards for the *criteria pollutants*, which for this report include Ozone and PM_{2.5}. In general, the air quality standards are expressed as a measure of the amount of pollutant per unit of air. For example, the ozone standards are expressed as parts per million (ppm) and the particulate matter standards are expressed as micrograms of particulate matter per cubic meter of air (ug/m³).

Ozone

Ozone is a colorless gas with a pungent odor. It is the chief component of urban smog. The name “smog” was created from the words smoke and fog. Ozone is not directly emitted as a pollutant but is formed in the atmosphere when reactive organic gases (ROG) and nitrogen oxides (NO_x) precursor emissions react in the presence of sunlight. Meteorology and terrain play major roles in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and cloudless skies provide for the optimum conditions. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often impacts a widespread area. The largest contribution of ozone-forming pollution that is transported to Butte County comes from vehicle emissions in urban areas to the south. Wildfires can also create emissions that increase ozone concentrations. Ozone concentrations tends to peak where the subsidence inversion above the Sacramento Valley meets the foothills of the Sierra Nevada mountains. This is the reason why ozone concentrations at the Paradise monitoring station are historically higher than the Chico monitoring station.

Ozone impacts lung function by irritating and damaging the respiratory system. In addition, ozone causes damage to vegetation, buildings, rubber, and some plastics. Recognizing the health impacts of daylong exposure, the United States Environmental Protection Agency (U.S. EPA) promulgated an 8-hour ozone standard in 1997 as a successor to the 1-hour standard, which was established in 1979. EPA revised the 8-hour federal standard in 2008 and again in 2015. The CARB approved an 8-hour ozone state standard on April 28, 2005 which became effective in early 2006. Table 1 shows the State and National Ozone Standards effective in 2019.

TABLE 1 AMBIENT AIR QUALITY STANDARDS - OZONE	
State Ozone Standard: 0.09 ppm for 1 hour, not to be exceeded. 0.07 ppm for 8 hours, not to be exceeded.	National Ozone Standards: --- 0.070 ppm for 8 hours, not to be exceeded. Based on the fourth highest concentration averaged over three years.* * Federal 8-hour ozone standard revised October 2015.

In October 2016, CARB recommended to the U. S. EPA that Butte County be designated nonattainment for the 2015 federal ozone standard. Butte County was officially designated nonattainment for the 2015 federal ozone standard in 2018 by the U. S. EPA; however, the U. S. EPA projects that Butte County will attain the 2015 federal ozone standard by 2025 with current emission trends.

Table 2 shows the ozone air quality summary for 2019 and Figure 1 (attached) graphically shows the maximum 8-hour measurement for each day in Chico and Paradise. Based on preliminary data, no ozone monitors in Butte County exceeded the 2015 federal 8-hour ozone standard. This was the first time since 1984 that an ozone monitor in Butte County did not exceed an 8-hour average of 70ppb. 2019 also the first

year since ozone monitoring began in Paradise (2000) that the federal 8-hour ozone standard was not exceeded.

TABLE 2 BUTTE COUNTY OZONE AIR QUALITY DATA SUMMARY 2019 <i>(data is still preliminary as of April 2020)</i>		
	Chico	Paradise
Max. 1-Hour Ozone Measurement Date	.072 ppm 6/19/2019	.073 ppm 6/13/2019
Days Above State Std. (0.09ppm)	0	0
Max. 8-Hour Ozone Measurement	.063 ppm 6/19/2019	.069 ppm 6/13/2019
4th Highest 8-Hour Ozone Measurement (used for calculating Design Value)	0.060 ppm	0.063 ppm
Days Above State Std. (0.07ppm) – rounding differs from Fed. Std.)	0	0
Days Above 2015 Fed. Std. (0.07ppm)	0	0

It should be noted that the Paradise ozone monitor was offline for 26 days between April 2019 and September 2019. The downtime was primarily due to repairs to equipment after the Camp Fire and PG&E Public Safety Power Shutoff events. During the 26 days when the Paradise monitor was offline, the Chico ozone monitor and the nearest foothill ozone monitor to the north (Tuscan Buttes) did not measure an exceedance of the standard. The nearest foothill ozone monitor to the south (Grass Valley) did measure an exceedance on one (1) day (76 ppb on August 16, 2019).

Particulate Matter (PM_{2.5})
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Particulate Matter (PM_{2.5}) refers to particles with an aerodynamic diameter of 2.5 microns or smaller. For comparison, the average diameter of a human hair is about 70 microns. PM_{2.5} is a mixture of substances that can include elements such as carbon, lead, and nickel; compounds such as nitrates, organic compounds, and sulfates; and complex mixtures such as diesel exhaust and soil. These substances occur in the form of solid particles or as liquid droplets. Some particles are emitted directly into the atmosphere. Other particles, referred to as secondary particles, result from gases that are transformed into particles through physical and chemical processes in the atmosphere. Emissions are dominated by contributions from area-wide sources, primarily fugitive dust from construction and demolition, residential fuel combustion (woodstoves and fireplaces), and open burning.

Particulate matter can be directly emitted into the air (primary PM) or, similar to ozone, it can be formed in the atmosphere (secondary PM) from the reaction of gaseous precursors such as NO_x, sulfur oxides (SO_x), ROG, and ammonia. On an annual average basis, directly emitted PM_{2.5} emissions contribute approximately 70 percent of the ambient PM_{2.5} in the Sacramento Valley Air Basin.

The fine particles pose an increased health risk because they can deposit deep in the lung and contain substances that are particularly harmful to human health; therefore, this report will look at PM_{2.5} data and trends. Table 3 shows the State and National PM_{2.5} standards.

TABLE 3 AMBIENT AIR QUALITY STANDARDS – PM_{2.5}	
State PM_{2.5} Standards: 12 µg/m ³ annual arithmetic mean not to be exceeded	National PM_{2.5} Standards: 35 µg/m ³ for 24 hours, not to be exceeded, based on the 98 th percentile concentration averaged over three years and 12 µg/m ³ annual arithmetic mean averaged over 3 years

Butte County has continued to meet the federal PM_{2.5} standard since 2013 when the U. S. EPA officially recognized that Butte County’s monitoring data showed attainment of the standard. In October 2017, the District submitted a PM_{2.5} Redesignation Request and Maintenance Plan to CARB which was approved in November 2017 and submitted to the U.S. EPA. The U. S. EPA approved the Redesignation Request and Maintenance Plan effective August 2018.

Table 4 shows the Chico, Gridley, and Paradise PM_{2.5} monitoring summary for 2019. The Chico air monitoring station includes a continuous PM_{2.5} monitor known as a Beta Attenuation Monitor (BAM). This monitor has been approved as a federal equivalency method (FEM) monitor and therefore can be used for determining attainment with the federal PM_{2.5} standards. Paradise and Gridley monitor PM_{2.5} using a non-FEM BAM. This data is useful for public reporting and understanding diurnal and episodic behavior of fine particles, background monitoring, and transport assessment. Continuous monitors also provide 24-hour average data for the days when filter-based samplers are not operating.

TABLE 4 BUTTE COUNTY PM_{2.5} AIR QUALITY DATA 2019 (data is still preliminary as of April 2020)			
	Chico (FEM)	Paradise (Non-FEM)	Gridley (Non-FEM)
Max 24-Hour PM_{2.5} Measurement Date	34.6 ug/m3 1/3/2019	13.9 ug/m3 9/12/2019	37.2 ug/m3 11/22/2019
98th Percentile 24-Hour PM_{2.5} Value (used for calculating Design Value)	24.4 ug/m3	n/a	n/a
Days Above Fed. Std. (35 ug/m3)	0	0	2
Annual Average	9.7 ug/m3	n/a	n/a

Figure 2 (attached) charts the PM_{2.5} 24-hour average data for Chico, Paradise, and Gridley. The Chico and Paradise PM_{2.5} monitoring locations did not exceed the federal 24-hour PM_{2.5} standard in 2019. The Gridley monitoring station recorded two (2) unofficial exceedances of the 24-hour PM_{2.5} standard in 2019 (11/11/19 and 11/22/19). The exceedances were likely caused by localized open burning impacts.

The District has also deployed unofficial and experimental Purple Air particulate sensors at several locations in Butte County to assist with near real-time evaluation of air quality trends. Purple Air sensors are currently installed in Paradise, Magalia, Oroville, Thermalito, Palermo, Biggs, Durham, Nord, and Chico. Data from Purple Air sensors can be viewed at www.purpleair.com/map.

Particulate Matter (PM₁₀)

Particulate Matter (PM₁₀) refers to particles with an aerodynamic diameter of ten (10) microns or smaller. This measurement of particulate matter captures PM_{2.5} discussed above as well as coarser particulates that may still pose risks to human health at elevated concentrations. PM₁₀ includes larger particulates like dust from disturbed soil, rock crushing, traffic on dirt roads, or high wind events. Table 5 shows the State and National PM₁₀ standards.

TABLE 5 AMBIENT AIR QUALITY STANDARDS – PM₁₀	
State PM₁₀ Standards: 20 µg/m ³ annual arithmetic mean not to be exceeded. 50 µg/m ³ for a 24-hour average not to be exceeded.	National PM₁₀ Standard: 150 µg/m ³ not to be exceeded more than once per year on average over 3 years.

The Chico monitoring location has the only permanent PM₁₀ monitor in Butte County. Table 6 shows the Chico PM₁₀ monitoring summary for 2019. The Chico air monitoring station includes a continuous PM₁₀ BAM that has been approved as a federal equivalency method (FEM) monitor, and therefore can be used for determining attainment with the federal PM₁₀ standards.

TABLE 6 BUTTE COUNTY PM₁₀ AIR QUALITY DATA 2019	
	Chico (FEM)
Max 24-Hour PM₁₀ Measurement Date	53 µg/m ³ 5/9/2019
Days Above Fed. Std. (150 µg/m³)	0
Days Above State Std. (50 µg/m³)	1
Annual Average	20 µg/m³

2019-2020 Check Before You Light Program Season
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The 2019-2020 Check Before You Light (CBYL) Program was effective November 1, 2019 through February 29, 2020. The CBYL Program requests that the public voluntarily refrain from using woodstoves and fireplaces when an area in Butte County is expected to exceed the federal 24-hr PM_{2.5} health standard (35µg/m³). These conditions generally occur on cold winter nights with little air movement and strong inversions. The federal standard is also the threshold for the Air Quality Index (AQI) level of 101 which is considered Unhealthy for Sensitive Groups. People with respiratory or heart disease, the elderly and children are the groups most at risk. Advisories are issued for the following day based on air quality and meteorological data measured in Chico, Gridley, and Paradise. When advisories are issued for the Chico area a mandatory no-burn ordinance adopted by the Chico City Council restricts burning in non-EPA certified wood burning devices within the city limits.

There were no advisories issued for the 2019-2020 CBYL season. There were no exceedances of the 24-hr PM_{2.5} standard in Chico or Paradise during the 2019-2020 CBYL season. There were two (2) exceedances of the 24-hr PM_{2.5} standard in Gridley during the 2019-2020 CBYL season (11/11/19 and 11/22/19) which were likely caused by localized impacts from open burning.

Figure 1 - 2019 Air Quality Summary: 8-hour Average Ozone Measurements

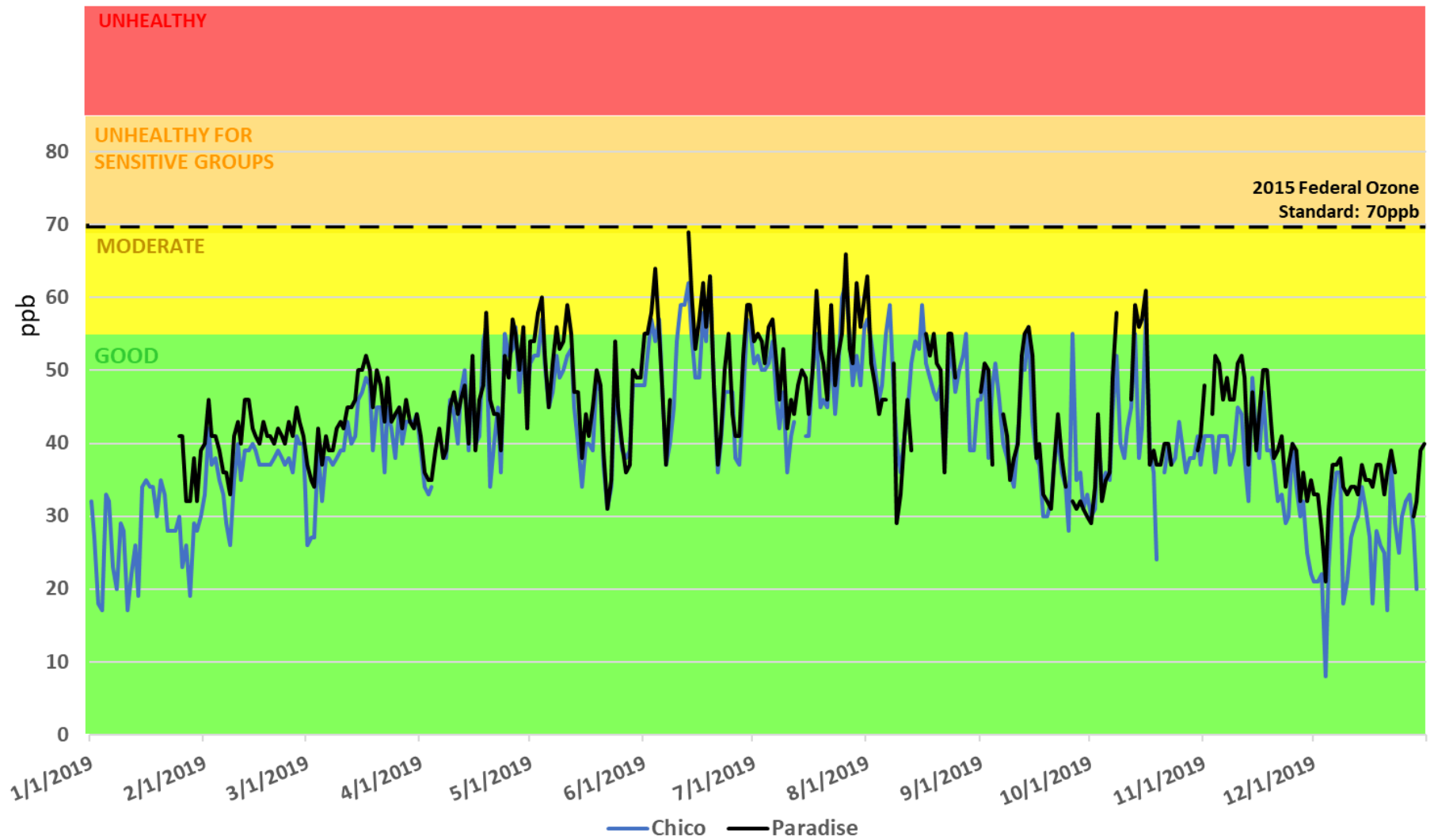


Figure 2 - 2019 Air Quality Summary: 24-hour Average PM2.5 Measurements

