

# Technical Support Document for 2008 Ozone NAAQS Designations

## California Area Designations for the 2008 Ozone National Ambient Air Quality Standards

### Technical Analysis for Chico (Butte County)

Figure 1 is a map of the Chico (Butte County), CA nonattainment area. The map provides other relevant information including the locations and design values of air quality monitors, county names and boundaries, and indicates EPA's "nonattainment" designation for Butte County. Also shown is the boundary of the existing area that is designated nonattainment for the 1997 ozone NAAQS.

### Chico (Butte County), CA

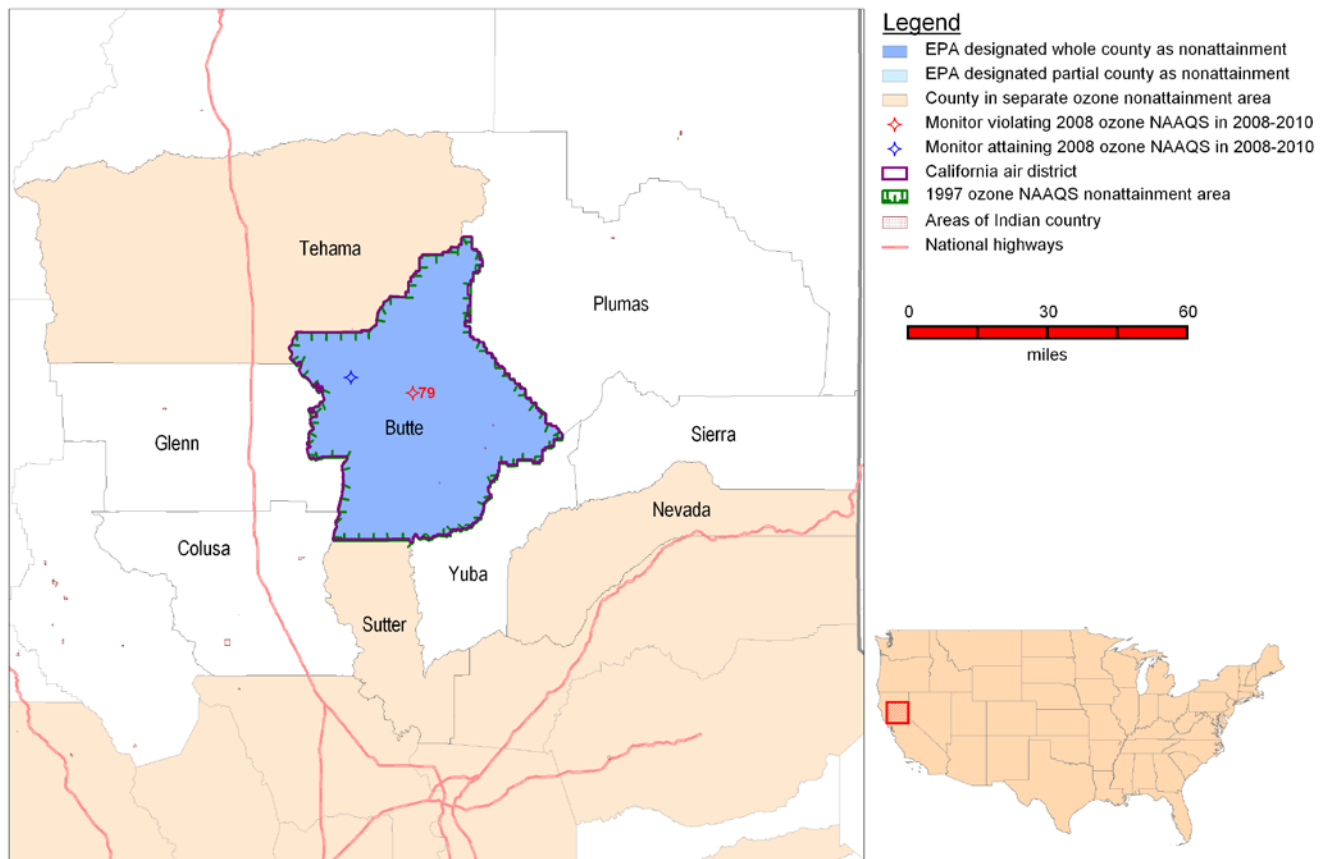


Figure 1

Note: The map shown in Figure 1 provides 8-hour ozone design values in parts per billion (ppb) based on data from 2008-2010 (i.e., the 2010 design value, or DV), which are the most recent years with fully-certified air quality data. Factor 1 and Appendix 3 describe the air quality data relevant for our nonattainment decisions.

For purposes of the 1997 8-hour ozone NAAQS, this area was designated nonattainment. The boundary for the nonattainment area for the 1997 ozone NAAQS included the entirety of Butte County. Several areas of Indian country of federally recognized tribes were included in the nonattainment area. These are the same tribes that are listed in Table 1, below.

In March 2009, California recommended that the same county be designated as “nonattainment” for the 2008 ozone NAAQS based on air quality data from 2006-2008 (letter from James Goldstene, Executive Officer, California Air Resources Board, to Laura Yoshii, Acting Regional Administrator, U.S. EPA Region IX, dated March 11, 2009). California provided an update to the original recommendation in October 2011 based on air quality data from 2008-2010 and preliminary 2009-2011 data, but did not revise its recommendation for Butte County. These 2009 and 2011 recommendations are based on data from Federal Equivalent Method (FEM) monitors sited and operated in accordance with 40 CFR Part 58 (letter from Lynn Terry, Deputy Executive Officer, California Air Resources Board, to Deborah Jordan, Director, U.S. EPA Region IX Air Division, dated October 12, 2011).

After considering these recommendations and based on EPA's technical analysis described below, EPA is designating Chico (Butte County), California, and areas of Indian country (identified in Table 1 below) as “nonattainment” for the 2008 ozone NAAQS as part of the Butte County multi-jurisdictional nonattainment area.

Table 1. State’s or Tribe’s Recommended and EPA’s 2008 ozone NAAQS Nonattainment Counties or Areas of Indian Country for Chico (Butte County).

Butte County	State or Tribe-Recommended Nonattainment Counties or Areas of Indian Country	EPA’s Nonattainment Counties or Areas of Indian Country
Butte County, CA	Butte County	Butte County
Berry Creek Rancheria of Maidu Indians of California	N/A	Berry Creek Rancheria of Maidu Indians of California
Enterprise Rancheria of Maidu Indians of California	N/A	Enterprise Rancheria of Maidu Indians of California
Mechoopda Indian Tribe of Chico Rancheria	N/A	Mechoopda Indian Tribe of Chico Rancheria
Mooretown Rancheria of Maidu Indians of California	N/A	Mooretown Rancheria of Maidu Indians of California

N/A = Tribe did not submit a recommendation

## **Factor Assessment**

### ***Factor 1: Air Quality Data***

For this factor, we considered 8-hour ozone design values for air quality monitors in the existing Butte County nonattainment area, based on data from the 2008-2010 period (i.e., the 2010 design value, or DV), which are the most recent years with fully-certified air quality data. A monitor’s DV is the metric or statistic that indicates whether that monitor attains a specified air quality standard. The 2008 ozone NAAQS are met at a monitor when the annual fourth-highest daily maximum 8-hour average concentration, averaged over 3 years, is 0.075 parts per million (ppm) (75 parts per billion (ppb)) or less. A DV is only valid if minimum data completeness criteria are met. See 40 CFR part 50 Appendix P. Where several monitors are located in a county (or a designated nonattainment area or maintenance area), the DV for the county or area is determined by the monitor with the highest level.

[Note: Monitors that are eligible for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) that are sited in accordance with 40 CFR Part 58, Appendix D (Section 4.1) and operating with a federal reference method (FRM) or federal equivalent method (FEM) monitor that meets the requirements of 40 CFR part 58, Appendix A. All data from a special purpose monitor (SPM) using an FRM or FEM which has operated for more than 24 months is eligible for comparison to the NAAQS unless the monitoring agency demonstrates that the data came from a particular period during which the requirements of Appendix A (quality assurance requirements) or Appendix E (probe and monitoring path siting criteria) were not met.]

The existing Butte County nonattainment area comprises Butte County (see Map 2a in Appendix 2). The 2010 DV for the ozone NAAQS for Butte County is shown in Table 2.

Table 2. Air Quality Data.

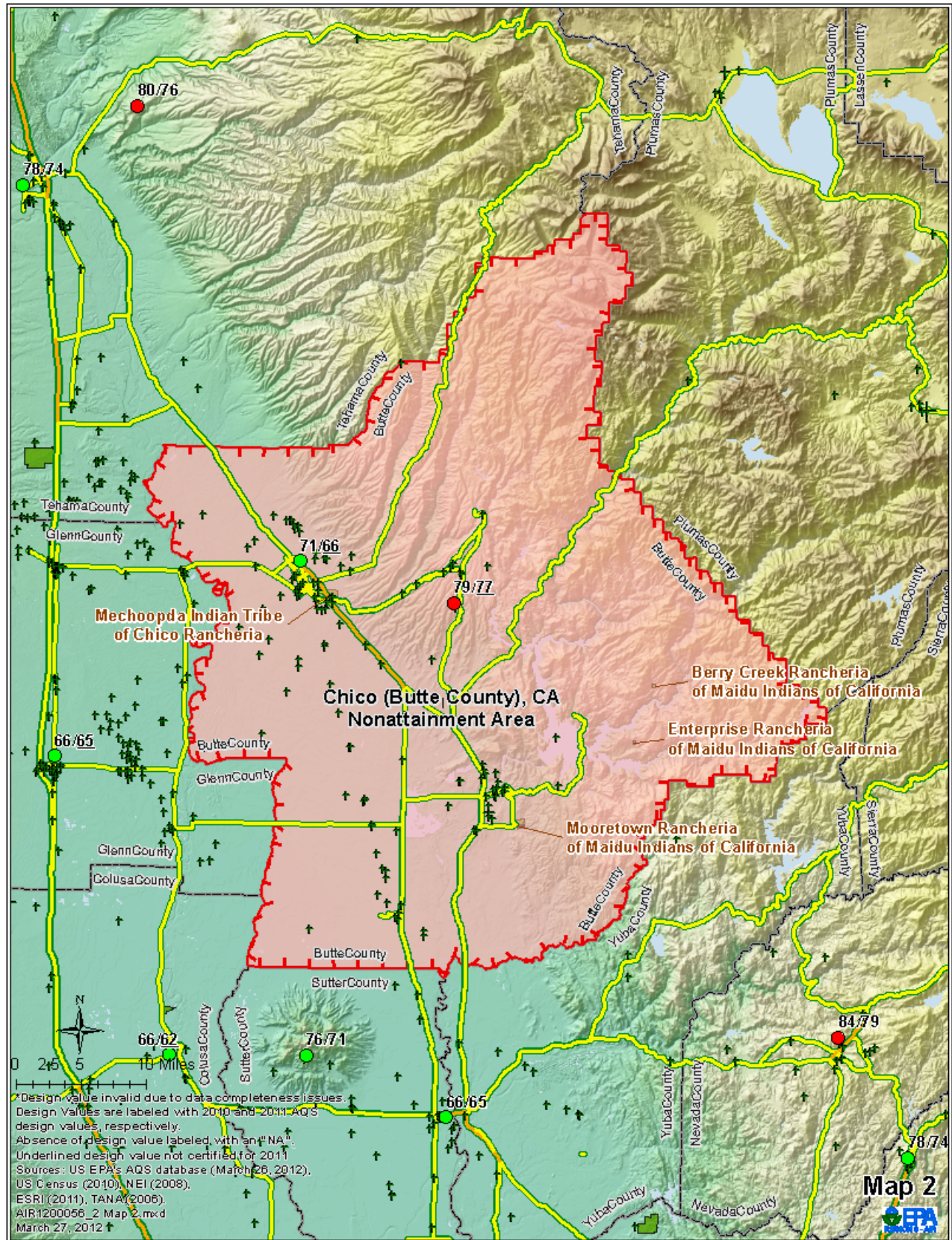
County	State Recommended Nonattainment?	2008-2010 Design Value (ppb)
Butte, CA	Yes	79

Ozone monitors relevant for comparison to the NAAQS and information from additional data sources within the existing Butte County nonattainment area are shown in Appendix 1, Map 2. California’s ozone season encompasses the entire year. Certified, quality assured data are available in EPA’s Air Quality System (AQS) for all areas through calendar year 2010. Map 2 in Appendix 1 includes preliminary 2011 DVs for the existing Butte County nonattainment area for informational purposes only. For each monitor, Appendix 1 lists the monitor, the 2008-2010 DV (certified and quality assured in AQS), and the 2009-2011 DV (data that are not yet certified and quality assured in AQS are denoted with an underline). Absence of a DV is symbolized with an “x”.

Appendix 3 lists the DVs for monitors in the existing Butte County nonattainment area. Monitors shown in bold are the DV monitors (i.e., the monitor with the highest DV) for each individual county. Monitors shown in red font are the DV monitor for the nonattainment area. Values with an asterisk do not meet data completeness, and therefore those DVs are not relevant for comparison to the NAAQS and are solely provided for informational purposes.

A monitor in Butte County shows a violation of the 2008 8-hour ozone standard based on 2008-2010 ambient air quality monitoring data. Therefore, this area is included in the Chico (Butte County) 2008 ozone NAAQS nonattainment area (as listed in Table 1, above).





From Appendix 1, Map 2: For map legend describing monitors, emissions, traffic, population, and boundaries, see Appendix 1.

## ***Factor 2: Emissions and Emissions-Related Data***

EPA evaluated emissions of ozone precursors, nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC), and other emissions-related data that provide information on areas contributing to violating monitors.

### **Emissions data**

EPA evaluated county-level emission data for NO<sub>x</sub> and VOC derived from the 2008 National Emissions Inventory (NEI), version 1.5. This is the most recently available NEI (see <http://www.epa.gov/ttn/chief/net/2008inventory.html>). Emissions in a nearby area indicate the potential for the area to contribute to observed violations. Table 3 shows emissions of the ozone precursors NO<sub>x</sub> and VOC (given in tons per year) for Butte County.

Table 3. Total 2008 NO<sub>x</sub> and VOC Emissions.

County	State Recommended Nonattainment?	NO <sub>x</sub> (tpy)	VOC (tpy)
Butte, CA	Yes	8,640	7,581
	Areawide:	8,640	7,581

Stationary sources are generally located along the major roadway running north-northwest through Butte County, generally clustered in the two denser population centers (see Maps 2 and 2a in Appendices 1 and 2).

### **Population density and degree of urbanization**

EPA evaluated the population and vehicle use characteristics and trends of the area as indicators of the probable location and magnitude of non-point source emissions. These include ozone-creating emissions from on-road and off-road vehicles and engines, consumer products, residential fuel combustion, and consumer services. Areas of dense population or commercial development are an indicator of area source and mobile source NO<sub>x</sub> and VOC emissions that may contribute to ozone formation in an area of interest. Rapid population or growth in vehicle miles traveled (VMT) (see below) in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that it may be appropriate to include the area associated with area source and mobile source emissions as part of the nonattainment area. Table 4 shows the population, population density, and population growth information for Butte County.

Table 4. Population and Growth.

County	State Recommended Nonattainment?	2010 Population	2010 Population Density (1000 pop/sq mi)	Absolute change in population (2000-2010)	Population % change (2000-2010)
Butte, CA	Yes	220,000	0.13	16,093	+8%
	Areawide:	220,000	0.13	16,093	+8%

Sources: U.S. Census Bureau population estimates for 2010 as of August 4, 2011

([http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC\\_10\\_PL\\_GCTPL2.STO5&prodType=table](http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_PL_GCTPL2.STO5&prodType=table))

Although the county has experienced population growth in terms of a percentage, the actual number of people in the county is low. The population is centered in several urban areas that are well within the county boundaries (Chico and Paradise, for example). Maps 2 and 2a in Appendices 1 and 2, respectively, show population in the area.

**Traffic (VMT) data**

EPA evaluated the commuting patterns of residents in the area, as well as the total VMT for each county. In combination with the population/population density data and the location of main transportation arteries (see above), this information helps identify the probable location of non-point source emissions. A county with high VMT indicates the presence of motor vehicle emissions that may contribute to ozone formation and nonattainment in the area. Rapid population or VMT growth in a county on the urban perimeter signifies increasing integration with the core urban area, and indicates that the associated area source and mobile source emissions may be appropriate to include in the nonattainment area. Table 5 shows total 2008 VMT for Butte County.

Table 5. Traffic (VMT) data

County	State Recommended Nonattainment?	2008 VMT* (million miles)
Butte, CA	Yes	1,925
	Areawide:	1,925

\* MOBILE model VMTs are those inputs into the NEI version 1.5.

Map 2 in Appendix 1 shows non-truck traffic volumes through Butte County. Heaviest non-truck traffic volumes occur over a 15-mile stretch of Highway 99 that runs through Butte County from the northwest to southeast. Roadways that link Butte County with the neighboring counties of Plumas, Yuba, Sutter, Glenn, and Tehama show lower annual average daily non-truck traffic volumes than the 15-mile stretch of Highway 99 through Butte County.

***Factor 3: Meteorology (weather/transport patterns)***

EPA evaluated available meteorological data to help determine how meteorological conditions, such as weather, transport patterns and stagnation conditions, would affect the fate and transport of precursor emissions contributing to ozone formation.

The western portion of Butte County is in the broad, flat, Sacramento Valley, and shares the valley’s hot and dry summer conditions. This is conducive to ozone formation, although the relatively small emissions inventory numbers suggests there may also be ozone transport from the more populous areas to the west and south.

Butte County air flow is most frequently from the south-southwest according to the 30-year average direction frequencies computed by EPA, as shown in the “radar”-style wind rose diagram below (Figure 2). This is consistent with the orientation of the river valleys and ridges in the mountainous eastern portion of the county, and with flow northward in the Central Valley of California. There is also a north-northwest component, which may reflect along-valley flow in the flatter western portion of the county.



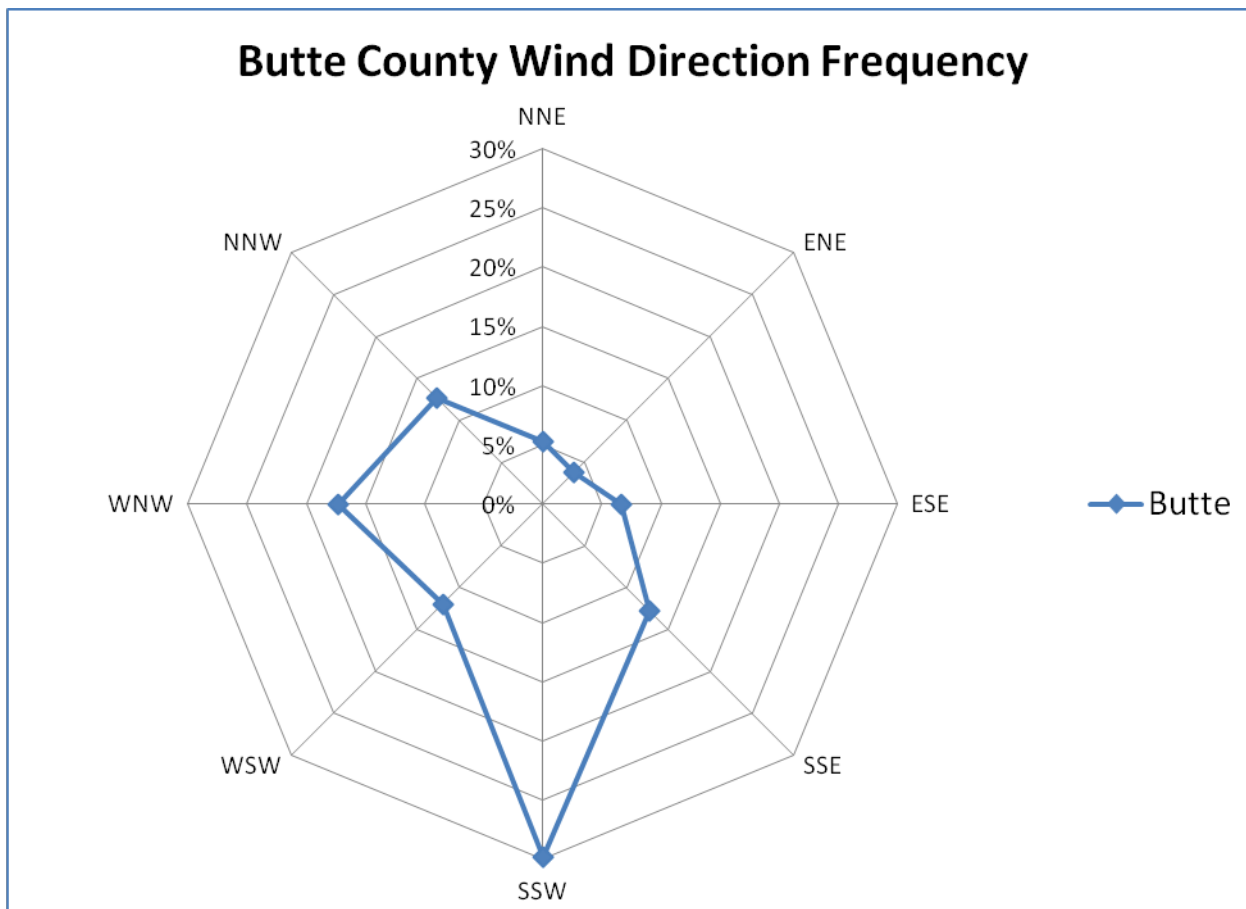


Figure 2

The western portion of the county is likely subject to the meteorology conditions of, and flow from, the neighboring Sacramento Valley to the west and south. Previous assessments of pollution transport found that the broader Sacramento area (which is about the same as the non-mountainous portions of the Sacramento Metropolitan ozone nonattainment area) can have an overwhelming impact on counties of the Upper Sacramento Valley, including Butte County.<sup>1</sup> However, the middle and eastern portions of the county are within the foothills of the Sierra Nevada mountain range, rather than in the flats of Sacramento Valley. These portions would tend to be more dominated by upslope and downslope flows of the strongly sloped landscape, as well as enhanced dispersion due to turbulence in the rough terrain.

***Factor 4: Geography/topography (mountain ranges or other air basin boundaries)***

The geography/topography analysis evaluates the physical features of the land that might affect the airshed and, therefore, the distribution of ozone over the area.

The Butte County area does not have any geographical or topographical barriers that would prevent air pollution transport within its airshed. Therefore, this factor did not play a substantial role in this evaluation.

<sup>1</sup>“Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California.” California Environmental Protection Agency, Air Resources Board, March 2001, p.7.

<http://www.arb.ca.gov/aqd/transport/assessments/assessments.htm>

The western portion of Butte County is part of the broad, flat Sacramento Valley, which is the northern half of California's Central Valley. Other than distance, in this western portion there is little barrier to the transport of pollutants from areas farther south. The eastern portion of Butte County is characterized by river valleys running roughly east-northeast to west-southwest, separated by mountain ridges. This tends to inhibit north-south flow, but allow east-west upslope and downslope flow. The increasing elevations eastward are likely a partial barrier to transport of pollutants to the less-populated eastern part of the county.

### ***Factor 5: Jurisdictional boundaries***

For each potential nonattainment area, we considered existing jurisdictional boundaries to provide a clearly defined legal boundary and to help identify the areas appropriate for carrying out the air quality planning and enforcement functions for nonattainment areas. Examples of jurisdictional boundaries include existing/prior nonattainment area boundaries for ozone or other urban-scale pollutants, county lines, air district boundaries, township boundaries, areas covered by a metropolitan planning organization, state lines, areas of Indian country, and urban growth boundary. Where existing jurisdictional boundaries were not adequate or appropriate to describe the nonattainment area, other clearly defined and permanent landmarks or geographic coordinates were considered.

Butte County has previously-established nonattainment boundaries associated with the 1997 8-hour ozone NAAQS. The state has recommended the same boundary for the 2008 ozone NAAQS. The state's recommended nonattainment area boundary is the County boundary, as well as the jurisdictional boundary for the local air planning agency, the Butte County Air Quality Management District. This boundary also represents the jurisdictional boundary of the local transportation planning agency, the Butte County Association of Governments (BCAG). The County also represents the entirety of the Chico metropolitan statistical area (MSA), named after its most populous city, Chico. The MSA is not associated with a larger CSA. As noted in Factor 1 above, Butte County is part of the Sacramento Valley Air Basin.

Butte County also includes areas of Indian country. As defined at 18 U.S.C. 1151, "Indian country" refers to: "(a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same." EPA recognizes the sovereignty of tribal governments, and has attempted to take the desires of the tribes into account in establishing appropriate nonattainment area boundaries.

### **Conclusion**

Based on the assessment of factors described above, EPA is designating Chico (Butte County), CA and all areas of Indian country located in Butte County, nonattainment because it is violating the 2008 ozone NAAQS. This area includes Indian country of four tribes: Berry Creek Rancheria of Maidu Indians of California, Enterprise Rancheria of Maidu Indians of California, Mechoopda Indian Tribe of Chico Rancheria, and Mooretown Rancheria of Maidu Indians of California.

The Clean Air Act requires EPA to designate any area as nonattainment if it violates a NAAQS or if it contributes to a violation in a nearby area. Air quality data (Factor 1) show that Butte County is



violating the 2008 8-hour ozone standard based on 2008-2010 data. Therefore, based on Factor 1, this area should be designated nonattainment.

EPA's review of emissions and emission related data (Factor 2), as well as meteorology and weather or transport patterns (Factor 3), geography and topography (Factor 4), and jurisdictional boundaries (Factor 5) support the nonattainment boundaries recommended by the state. The Chico (Butte County), CA nonattainment area has previously established nonattainment boundaries associated with the 1997 8-hour ozone NAAQS, based on the Butte County boundary. The state has recommended the same boundary for the 2008 ozone NAAQS. Given the preceding analysis, EPA concurs with the state's recommendation to designate the same area as nonattainment for the 2008 ozone NAAQS that is currently nonattainment for the 1997 ozone NAAQS.