

Technical Support Document for 2008 Ozone NAAQS Designations

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

Technical Analysis for Kern County (Eastern Kern)

Figure 1 is a map of Kern County. The map provides relevant information including the locations and design values of air quality monitors, county names and boundaries, and indicates EPA’s partial county nonattainment designation for Kern County (Eastern Kern), CA. See Map 4 in Appendix 1 (and included in Factor 1, below) for a detailed map of the partial county boundary that EPA is designating nonattainment.

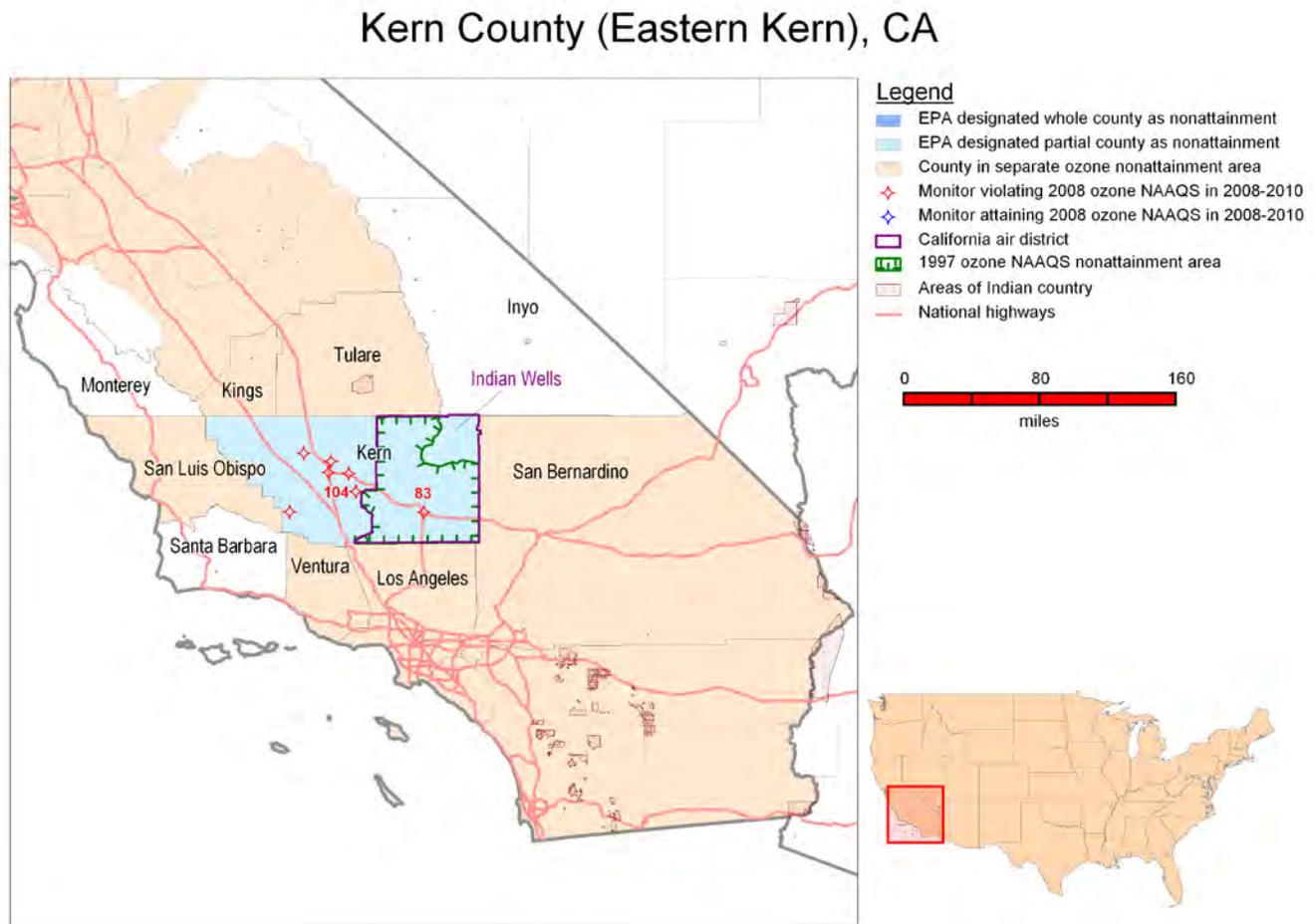


Figure 1

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. For each particular area, 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 same eastern portion of Kern County.

In March 2009, California recommended a larger partial-county area 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 and revised its recommendation for Kern 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).

In the 2009 recommendation, the state expanded the recommended area to include the northeast corner of the county, Indian Wells Valley. The state indicated that it had monitoring data from the Indian Wells Valley that exceeded the 2008 ozone NAAQS. The data came from a monitor in the China Lake portion of Indian Wells Valley at a monitor that is not reported to EPA. At the time, there was also a violating monitor to the east at Trona, in San Bernardino County, and to the north in Death Valley, in Inyo County. In the state’s 2011 update to their recommendations, based on more recent air quality data, the state has asked EPA not to include the previously-recommended Indian Wells Valley and instead maintain the existing 1997 ozone NAAQS nonattainment area. Neither the Death Valley nor the Trona monitors are violating with 2008-2010 or preliminary 2009-2011 air quality data, and the state no longer recommends the areas around these monitors to be designated nonattainment.

After considering these recommendations and based on EPA's technical analysis described below, EPA is designating Kern County (Eastern Kern), excluding Indian Wells Valley, in California (identified in Table 1 below) nonattainment for the 2008 ozone NAAQS as part of the Kern County (Eastern Kern) nonattainment area.

Table 1. State's Recommended and EPA’s 2008 ozone NAAQS Nonattainment Counties or Areas of Indian country for Kern County (Eastern Kern).

Eastern Kern	State-Recommended Nonattainment Counties or Areas of Indian country	EPA’s Nonattainment Counties or Areas of Indian country
Kern County, CA	Kern County (p)	Kern County (p)
No areas of Indian country in the nonattainment area		

p = partial

Factor Assessment

Factor 1: Air Quality Data

For this factor, we considered 8-hour ozone design values for air quality monitors in the existing Eastern Kern nonattainment area, based on data from the 2008-2010 (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 Eastern Kern nonattainment area comprises the eastern portion of Kern County (see Map 4a in Appendix 2). The 2010 DV for the ozone NAAQS for the entirety of Kern County is shown in Table 2.

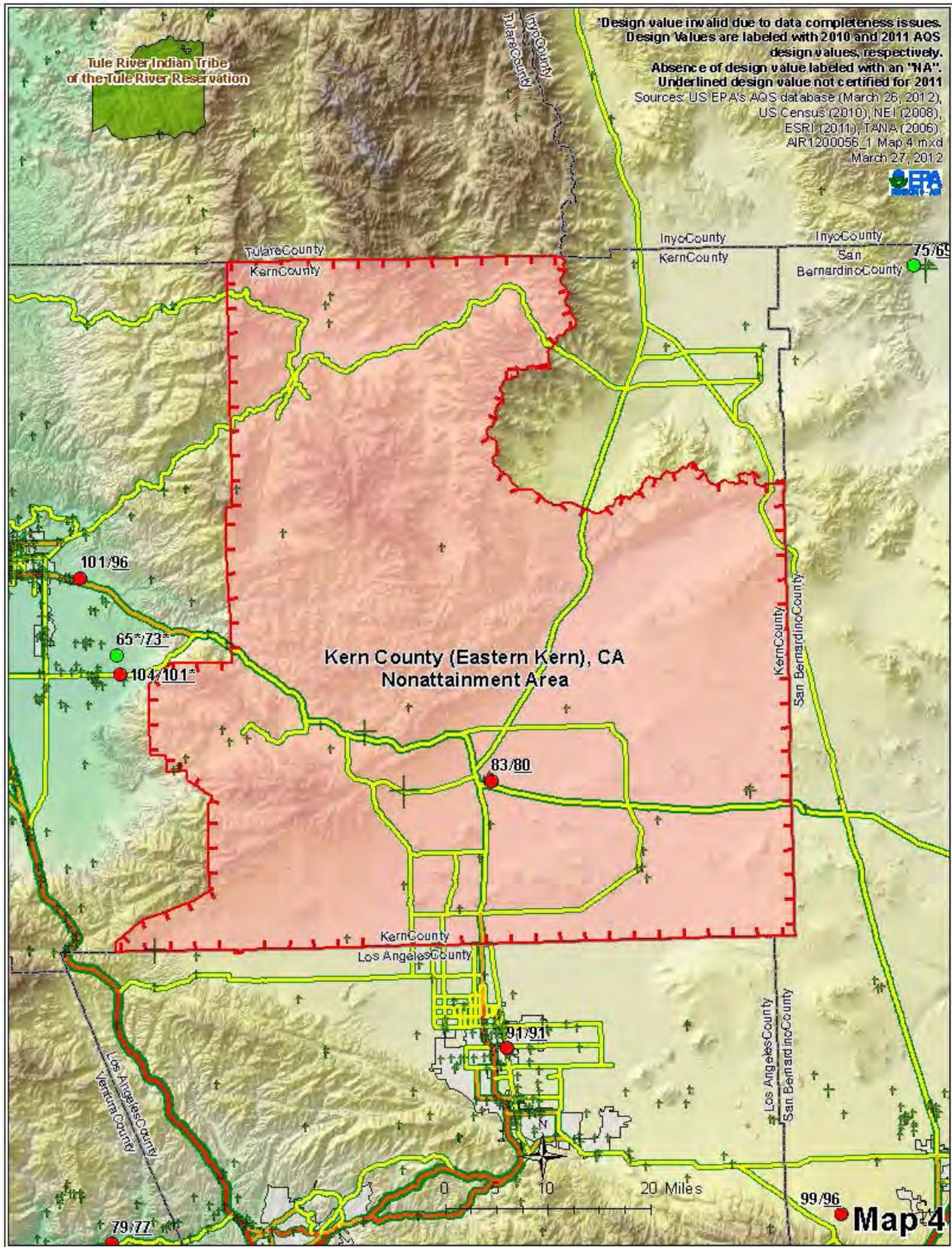
Table 2. Air Quality Data.

County	State Recommended Nonattainment?	2008-2010 Design Value (ppb)
Kern, CA	Yes (partial)	104

Ozone monitors relevant for comparison to the NAAQS and information from additional data sources within the existing Kern County (Eastern Kern) nonattainment area are shown in Appendix 1, Map 4 (inserted below). EPA is designating the western part of Kern County as part of the San Joaquin Valley nonattainment area. The design value shown in Table 2 is from a monitor located within this western portion of Kern County. As shown in Appendix 1, Map 4, there is one ozone monitor within the existing Eastern Kern nonattainment area with data in EPA’s Air Quality System (AQS); this monitor has a 2010 DV of 83 ppb. The existing nonattainment area excludes the northeastern corner of Kern County, also known as the Indian Wells Valley. The closest monitor to this part of Kern County is the Trona monitor in San Bernardino. Located approximately 21 kilometers from Kern County, this monitor is attaining the standard based on 2008-2010 data. A monitor to the north, in Inyo County, is also attaining the standard based on 2008-2010 data.

California’s ozone season encompasses the entire year. Certified, quality assured data are available in AQS for all areas through calendar year 2010. Map 4 in Appendix 1 includes preliminary 2011 DVs for the existing Kern County (Eastern Kern) 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 Kern County (Eastern Kern) 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.



From Appendix 1, Map 4: For map legend describing monitors, emissions, traffic, population, and boundaries, see Appendix 1

The monitor in the existing Kern County (Eastern Kern) nonattainment area (which includes the eastern portion of Kern County and excludes the portion of Kern in the existing San Joaquin Valley nonattainment area and Indian Wells Valley) shows a violation of the 2008 8-hour ozone standard based on 2008-2010 data. Therefore, this area is included in the Kern County (Eastern Kern) nonattainment area. A county (or partial county) must also be designated nonattainment if it contributes to a violation in a nearby area. Each county without a violating monitor that is located near a county with a violating monitor has been evaluated based on the weight of evidence of the five factors to determine whether it contributes to the nearby violation.

Factor 2: Emissions and Emissions-Related Data

EPA evaluated emissions of ozone precursors, nitrogen oxides (NO_x) 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_x 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 NO_x and VOC (given in tons per year) for Kern County.

Table 3. Total 2008 NO_x and VOC Emissions.

County	State Recommended Nonattainment?	NO _x (tpy)	VOC (tpy)
Kern, CA	Yes (partial)	70,256	32,300
Areawide:		70,256	32,300

Kern County is geographically large, covering over 8,000 square miles. Most of the stationary sources of ozone precursor emissions are located on the western side of Kern County within the San Joaquin Valley nonattainment area (see Map 13 in Appendix 1). In the eastern portion of Kern County, there are two very large sources of ozone precursors (greater than 500 tons per year), however, overall, there are very few stationary sources located in the eastern portion of Kern County compared to the western portion of Kern County (see Map 4 in Appendix 1 for Eastern Kern; see Map 13 in Appendix 1 for the western portion of Kern County).

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_x and VOC emissions, which may contribute to ozone formation. Rapid population or vehicle miles traveled (VMT) growth (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 each county in the area.

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)
Kern, CA	Yes (partial)	839,631	0.10	176,121	+27%
Areawide:		839,631	0.10	176,121	+27%

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)

Maps 4 and 4a in Appendices 1 and 2, respectively, show population for the area. Overall, from 2000 - 2010, Kern County has experienced a high level of population growth. Its population is split between the western portion in the San Joaquin Valley and the eastern portion. In terms of population centers, Eastern Kern is distinct from the western portion of Kern County because it does not contain large population centers (see Map 4a of Appendix 2).

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 Kern County.

Table 5. Traffic (VMT) data.

County	State Recommended Nonattainment?	2008 VMT* (million miles)
Kern, CA	Yes (partial)	8,578
Areawide:		8,578

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

Kern County has a high VMT compared to other counties in the San Joaquin Valley (see Map 4 versus Map 14 of Appendix 1). Traffic volume in the eastern portion of Kern County is light compared to traffic in the western portion of Kern 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 State has presented the following information for Eastern Kern County.¹

“Kern County is located in two different air basins: the San Joaquin Valley Air Basin and the Mojave Desert Air Basin. The eastern portion, located in the Mojave Desert Air Basin, falls under the jurisdiction of the Kern County Air Pollution Control District. Previous state implementation plans and transport studies have addressed the formation [of] ozone in the Mojave Basin and transport of ozone to the Mojave Basin.”

The “Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)” includes a discussion of the ozone formation and transport patterns in the Western Mojave Air Basin.² The “Assessment and Mitigation of the Impacts of Transported Pollutants on Ozone Concentrations within California” (California Air Resources Board, 1990)³ and the second triennial update to that report (1996) also discuss transport to the Western Mojave Air Basin, including Eastern Kern County. Excerpts from these documents are presented below:

“Ozone concentrations in the Western Mojave Desert are impacted by transport from both the South Coast and San Joaquin Valley. Therefore, transport must be considered in evaluating the prospects for attainment. Several mountain passes provide transport routes into the Western Mojave Desert from the South Coast. Soledad Canyon on the eastern edge of the San Gabriel Mountains and Cajon Pass between the San Gabriel and San Bernardino mountains are the two major transport corridors from the South Coast to the Western Mojave Desert. A third transport corridor runs through the Tehachapi Pass in the Tehachapi Mountains and provides an outlet for emissions and pollutants from the southern San Joaquin Valley to the Western Mojave Desert. Previous ARB transport assessments concluded that during 1-hour State ozone exceedances, the transport contribution from the South Coast to ozone in the Western Mojave Desert could be overwhelming. The transport assessments also found there could be a shared impact between the South Coast and Western Mojave Desert, meaning ozone exceedances could be caused by a combination of transport and local emissions (ARB 1990; ARB 1996)^{4,5}. In addition to the South Coast impact, the ARB transport assessments found an overwhelming transport impact from the San Joaquin Valley to the Western Mojave Desert.”

¹ “Recommended Area Designations for the 2008 Federal 8-Hour Ozone Standard Staff Report”, State of California Air Resources Board, Revised: March 3, 2009.

² “Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)”, Adopted on: June 9, 2008 Mojave Desert Air Quality Management District.
<http://www.arb.ca.gov/planning/sip/planarea/wmdaqmp/wmd2008ozone.pdf>

³ Air Resources Board, 1990: “Assessment and Mitigation of the Impacts of Transported Pollutants on Ozone Concentrations within California.” ARB Staff Report prepared by the Technical Support Division and the Office of Air Quality Planning and Liaison, June 1990.

⁴ Air Resources Board, 1990: “Assessment and Mitigation of the Impacts of Transported Pollutants on Ozone Concentrations within California.” ARB Staff Report prepared by the Technical Support Division and the Office of Air Quality Planning and Liaison, June 1990.

⁵ Air Resources Board, 1996: “Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California (Revised).” ARB Staff Report prepared by the Technical Support Division, November 1996.

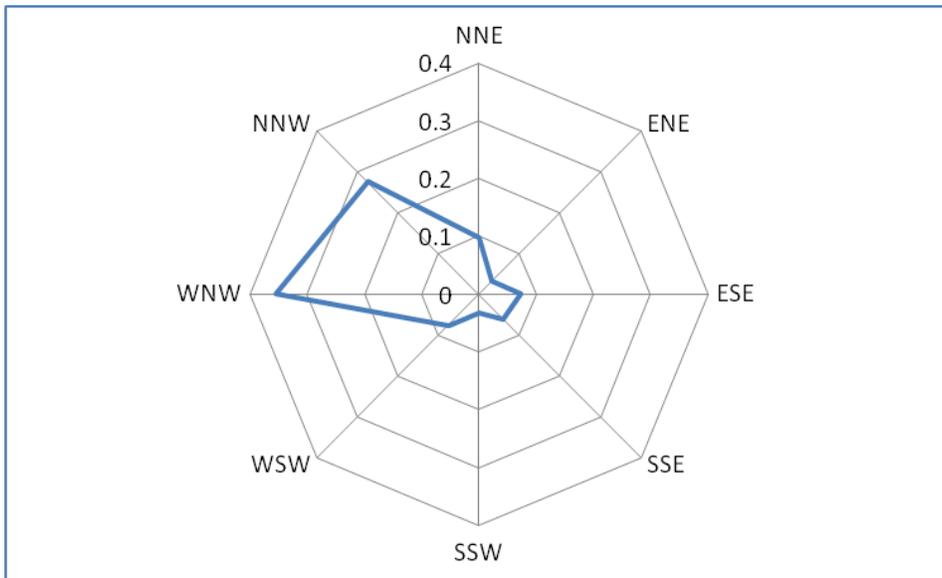


Figure 2: Eastern Kern County – Summer Wind Frequency Distribution

The wind frequency distribution of wind direction data in Figure 2, above, is based on an average of 30 years of National Weather Service information for the months of June, July, and August. The prevailing winds during the ozone season have a strong northwesterly component.

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 Kern County (Eastern Kern) nonattainment area is shown in Appendix 2, Map 4a.

The Tehachapi Mountains to the northwest, separate Kern County (Eastern Kern), part of the Western Mojave Air Basin, from the San Joaquin Valley Air Basin. The Tehachapi’s crest varies in height from approximately 4,000–8,000 feet. Kern County (Eastern Kern) is bounded by Antelope Valley to the south and West Mojave Desert to the east.

The nonattainment area excludes the northeastern corner of Kern County, also known as the Indian Wells Valley. The Indian Wells Valley is separated from the rest of Kern County (Eastern Kern) by mountain ranges. These mountain ranges are to the west: the peaks of the eastern slopes of the Sierra Nevada mountains are 6,000 to 7,000 feet in elevation along the western boundary of Indian Wells Valley; to the south, the El Paso mountains which are approximately 4,000 to 5,000 feet in this area; and also the Rand mountains which rise above 4,000 feet. These mountain barriers form the north and east boundaries of the airshed of the violating Kern County (Eastern Kern) area.

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, Reservation boundaries, 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.

The Kern County (Eastern Kern) area has previously-established nonattainment boundaries associated with both the 1-hour and the 1997 8-hour ozone NAAQS. The state has recommended the same boundary for the 2008 ozone NAAQS as the existing boundary for the 1997 ozone NAAQS. Air quality is managed by the Eastern Kern Air Pollution Control District (APCD). The Eastern Kern APCD has jurisdiction over the eastern portion of the county, while the larger western portion of the county is under the jurisdiction of the San Joaquin Valley Air Pollution Control District. The entirety of Kern County is defined by the Office of Management and Budget as the Bakersfield-Delano metropolitan statistical area (MSA). The MSA is not part of a larger combined statistical area (CSA). The majority of the population in the MSA is located in the San Joaquin Valley, on the other side of the Sierra Nevada mountains from the eastern portion of Kern County.

Conclusion

Based on the assessment of factors described above, EPA is designating the eastern part of Kern County as the Kern County (Eastern Kern), CA nonattainment area because it is violating the 2008 ozone NAAQS.

The monitor within the existing Kern County (Eastern Kern) nonattainment area shows a violation of the 2008 8-hour ozone standard based on 2008-2010 data. Therefore, based on air quality data (Factor 1), the eastern portion of Kern County should be designated nonattainment. The closest monitor to Indian Wells Valley is attaining the standard based on 2008-2010 data.

Evaluation of emissions and emission sources (Factor 2) shows that sources of ozone precursor emissions are concentrated on the western side of Kern County, which EPA is designating nonattainment as part of the San Joaquin Valley nonattainment area. The eastern portion of Kern County is distinguished from the western portion in its relatively few stationary sources and population centers, and lower volumes of non-truck traffic. Therefore, Factor 2 supports the state's recommendation.

Meteorology and weather or transport patterns (Factor 3) and geography and topography (Factor 4) show potential pollution transport from neighboring areas, which EPA is designating as separate nonattainment areas. The eastern portion of Kern County is separated from the western portion by a mountain range. EPA is designating the western portion of the county as part of the San Joaquin Valley nonattainment area. Topography also supports separating Indian Wells Valley from the nonattainment area.

In considering jurisdictional boundaries (Factor 5), EPA notes that the Eastern Kern APCD has air quality planning jurisdiction over the eastern portion of the county, while the larger western portion of

the county is under the jurisdiction of the San Joaquin Valley Air Pollution Control District. EPA's boundary for the Kern County (Eastern Kern) nonattainment area is the same as the 2008 8-hour ozone NAAQS boundary recommended by the state, as well as the 1997 8-hour ozone nonattainment boundary.

Because Kern County (Eastern Kern) has a violating monitor, is an existing nonattainment area under the 1997 8-hour ozone NAAQS with its own air pollution control district, and based on the emission sources and air pollutant transport patterns, EPA's is concurring with the state's recommendation and is designating the eastern portion of Kern County, excluding Indian Wells Valley, as the Kern County (Eastern Kern), CA nonattainment for the 2008 ozone NAAQS.