

4.0 Analyses of Individual Nonattainment Area

4.9 Region 9 Nonattainment Areas

4.9.1 Arizona

Arizona Area Designations for the PM_{2.5} 24-Hour Fine Particle National Ambient Air Quality Standards

The table below identifies the county in Arizona that EPA has designated as not attaining the 2006 24-hour fine particle (PM_{2.5}) standard.¹ A county (or part thereof) is designated as nonattainment if it has an air quality monitor that is violating the standard or if the county is determined to be contributing to the violation of the standard.

Area	Arizona Recommended Nonattainment Counties	EPA's Final Designated Nonattainment Counties
Nogales	Santa Cruz County (partial)	Santa Cruz County (partial)

EPA has designated the remaining counties in the state as “unclassifiable/attainment.” EPA designated a county as “unclassifiable” when: one or more of its monitors recorded a violation in 2004-2006; all monitors in the county with complete 2005-2007 data showed attainment; and one or more other monitors in the county had 2005-2007 monitoring data that was not complete and could not be used for determining compliance with the standard.

EPA Technical Analysis for Nogales

Pursuant to section 107(d) of the Clean Air Act, EPA must designate as nonattainment those areas that violate the NAAQS and those nearby areas that contribute to violations. This technical analysis for the Nogales area identifies the county with monitors that violate the 24-hour PM_{2.5} standard and evaluates the counties that potentially contribute to fine particle concentrations in the area. EPA has evaluated these counties based on the weight of evidence of the following nine factors recommended in EPA guidance and any other relevant information:

- pollutant emissions
- air quality data
- population density and degree of urbanization
- traffic and commuting patterns
- growth
- meteorology

¹ EPA designated nonattainment areas for the 1997 fine particle standards in 2005. In 2006, the primary and secondary 24-hour PM_{2.5} standards were revised from 65 micrograms per cubic meter (average of 98th percentile values for 3 consecutive years) to 35 micrograms per cubic meter; the level of the primary and secondary annual PM_{2.5} standards remained unchanged at 15 micrograms per cubic meter (average of annual averages for 3 consecutive years).

- geography and topography
- jurisdictional boundaries
- level of control of emissions sources

Figure 1 is a map of Santa Cruz County which encompasses the nonattainment area. The map includes other relevant information such as the locations and design values of air quality monitors, the metropolitan area boundary, and other nearby counties.

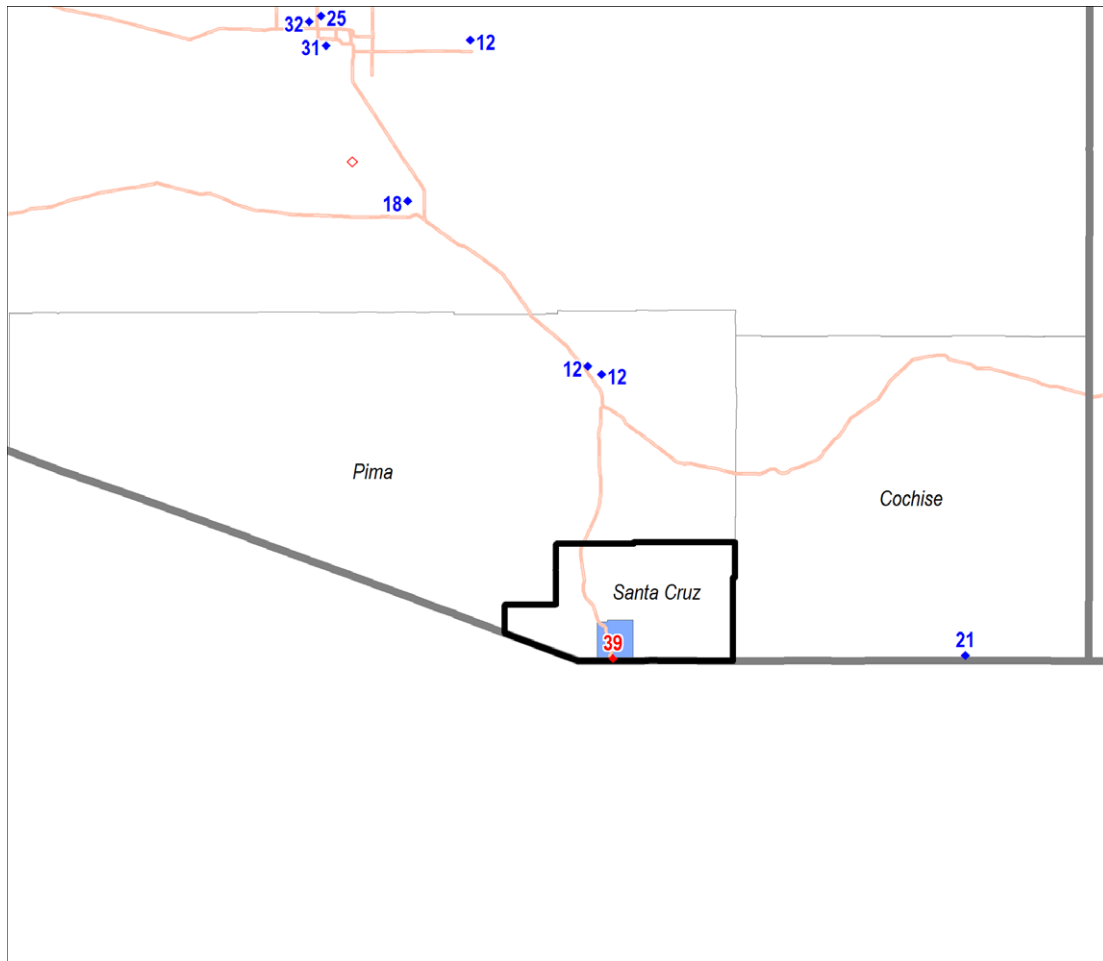


Figure 1

In a letter dated December 19, 2007, Arizona recommended that a portion of Santa Cruz County be designated as “nonattainment” for the 2006 24-hour $PM_{2.5}$ standard based on air quality data from 2004 - 2006. These data are from Federal Reference Method (FRM) monitors located in the state. The Nogales area did not previously violate the 1997 $PM_{2.5}$ NAAQS, but now has one monitor that violates the 2006 24-hour $PM_{2.5}$ NAAQS.

The Arizona Department of Environmental Quality (ADEQ) noted that the monitor located at the Nogales Post Office in Nogales, Arizona has recorded two exceedances of the 24-hour $PM_{2.5}$

NAAQS in 2006, and ADEQ recommended that the area be designated as nonattainment based on the most recent three years of air quality data. The term “nonattainment” means an area is violating the PM_{2.5} standards or contributing to violations of the standards. A “not classifiable” designation is appropriate for areas where monitors have insufficient data, but where available data support attainment of standards. A State submittal that only addressed whether monitored violations are occurring in an area does not suffice as the sole justification for designating the boundaries of a nonattainment area.

The Nogales Arizona Area is already designated as a PM₁₀ nonattainment area and ADEQ has recommended that the boundaries of the 2006 24-hour PM_{2.5} nonattainment area coincide with the existing PM₁₀ nonattainment area boundaries. The Nogales Arizona area was not previously designated nonattainment for the 1997 PM_{2.5} standards.

Based on EPA's technical analysis described below and currently available information, EPA has designated a portion of Santa Cruz County, the Nogales area, as nonattainment for the 24-hour PM_{2.5} air-quality standard. This county is listed in the table below.

Nogales Area	State-Recommended Nonattainment Counties	EPA’s Designated Nonattainment Counties
Arizona	Santa Cruz County (partial)	Santa Cruz County (partial)

The following is the technical analysis for the Nogales, Arizona 24-hour PM_{2.5} nonattainment area.

Factor 1: Emissions data

For this factor, EPA evaluated county level emission data for the following PM_{2.5} components and precursor pollutants: “PM_{2.5} emissions total,” “PM_{2.5} emissions carbon,” “PM_{2.5} emissions other,” “SO₂,” “NO_x,” “VOCs,” and “NH₃.” “PM_{2.5} emissions total” represents direct emissions of PM_{2.5} and includes: “PM_{2.5} emissions carbon,” “PM_{2.5} emissions other”, primary sulfate (SO₄), and primary nitrate. (Although primary sulfate and primary nitrate, which are emitted directly from stacks rather than forming in atmospheric reactions with SO₂ and NO_x, are part of “PM_{2.5} emissions total,” they are not shown on the template or data spreadsheet as separate items). “PM_{2.5} emissions carbon” represents the sum of organic carbon (OC) and elemental carbon (EC) emissions, and “PM_{2.5} emissions other” represents other inorganic particles (crustal). Emissions of SO₂ and NO_x, which are precursors of the secondary PM_{2.5} components sulfate and nitrate, are also considered. VOCs (volatile organic compounds) and NH₃ (ammonia) are also potential PM_{2.5} precursors and are included for consideration.

Emissions data were derived from the 2005 National Emissions Inventory (NEI), version 1. See http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.

EPA also considered the Contributing Emissions Score (CES) for each county. The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Note that this metric is not the exclusive manner for consideration of data for these factors. A summary of

the CES is included in attachment 2, and a more detailed description can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.

Table 1 shows emissions of PM_{2.5} and precursor pollutant components (given in tons per year) and the CES for violating and potentially contributing counties in the Nogales area. Potentially contributing counties are listed in descending order by CES.

Table 1. PM_{2.5} Related Emissions and Contributing Emissions Score

County	State Recommended Non-attainment	CES	PM _{2.5} emissions total (tpy)	PM _{2.5} emissions carbon (tpy)	PM _{2.5} emissions other (tpy)	SO ₂ (tpy)	NOx (tpy)	VOCs (tpy)	NH ₃ (tpy)
Pima	No	66	4,220	1,678	2,542	6,133	30,326	32,966	1,947
Santa Cruz	Yes, P	18	631	287	344	116	1,520	3,156	466
Cochise	No	7	1,691	496	1,195	3,712	16,151	7,123	3,404

Based on emission levels and CES values only, Pima, and Cochise Counties in Arizona are candidates for a 24-hour PM_{2.5} nonattainment designation. Santa Cruz County has a violating monitor so it is a candidate for a nonattainment designation despite the low emission levels and low CES value.

It is interesting to note that Santa Cruz County has much lower PM_{2.5} and precursor emissions than either Pima County or Cochise County where there are no PM_{2.5} violations. ADEQ provided summary information from a winter 2005 study by Arizona State University (ASU), which indicated that the majority of PM_{2.5} concentrations in Nogales, Arizona are a result of transport from Nogales, Sonora, Mexico, via nighttime drainage flows. The ASU study identified wood burning, food cooking, open burning, dust emissions, and tailpipe emissions from on-road and off-road vehicles as the primary sources. The Sonora, Mexico side has 94% of the total emissions, i.e. its emissions are some 15 times higher than the U.S. side, according to PM₁₀ and PM_{2.5} emission inventories developed by ADEQ for the 1993 Nogales PM₁₀ SIP. Since the CES tool does not include these Mexican emissions, the CES county results above are not conclusive for purposes of identifying relative contributions to total PM_{2.5} levels on days with high PM_{2.5} levels.

With respect to the CES values, Pima County has the highest CES score of 66, followed distantly by the violating county, Santa Cruz, and Cochise County. Tucson, Arizona, in Pima County, is located approximately 60 miles north of Nogales and does not appear to contribute to the PM_{2.5} air quality problems in Nogales, due to topography and meteorologic conditions during wintertime exceedances of the 24-hour PM_{2.5} NAAQS, and this is discussed under factors 6 and 7 below. In addition, there is no commuting relationship between Tucson and Nogales, and there are no violating monitors in Pima County, or in Green Valley to the south of Tucson. Based on these factors, EPA eliminated Pima County from consideration as part of the 24-hour PM_{2.5} nonattainment area. As indicated by the very low CES, Cochise County does not impact

Nogales at all and is, in fact, separated from Nogales by the Patagonia Mountains. Considering several factors, including low emissions, low CES score, and the topographical barriers, EPA also eliminated Cochise County from consideration in the nonattainment area.

Although it has low emissions and a low CES value, Santa Cruz County has a violating monitor. Emissions sources in the part of Santa Cruz County where the violating monitor is located are concentrated along Interstate 19, in the valley formed by the Nogales Wash (see population factor below).

Based on emissions information, including consideration of the information provided by the State of Arizona documenting substantial emissions from Nogales, Sonora, Mexico, EPA's nonattainment area designation of a part of Santa Cruz County includes the population (and thus, the population-associated emissions), as well as major nearby highways and stationary sources, taking into account the topographical separation of the Nogales area from part of the county.

Factor 2: Air quality data

This factor considers the 24-hour PM_{2.5} design values (in µg/m³) for air quality monitors in counties in the Nogales area based on data for the 2005-2007 period. A monitor's design value indicates whether that monitor attains a specified air quality standard. The 24-hour PM_{2.5} standards are met when the 3-year average of a monitor's 98th percentile values are 35 µg/m³ or less. A design value is only valid if minimum data completeness criteria are met.

The 24-hour PM_{2.5} design values for counties in the Nogales area are shown in Table 2.

Table 2. Air Quality Data

County	State Recommended Nonattainment	24-hr PM _{2.5} Design Values, 2004-2006 (µg/m ³)	24-hr PM _{2.5} Design Values, 2005-2007 (µg/m ³)
Santa Cruz County, AZ	Yes, P	38	39
City of Nogales	Yes	38	39
P = partial			

The City of Nogales in Santa Cruz County, Arizona shows a violation of the 24-hour PM_{2.5} standard, and so, Santa Cruz County is included in the nonattainment area. There are no monitors with violating values elsewhere in Santa Cruz County or in Pima County to the north, therefore it is appropriate to include Santa Cruz County in the nonattainment area. The absence of a violating monitor alone is not sufficient to eliminate a portion of Santa Cruz County as a candidate for nonattainment status. EPA considered eight other factors (plus other relevant factors or circumstances) when determining the boundaries of the Nogales nonattainment area and, as further explained below and based on the weight of evidence, concurs with the State's recommendation.

Air quality monitoring data on the composition of fine particle mass are available from the EPA Chemical Speciation Network and the IMPROVE monitoring network. Analysis of these data indicates that the days with the highest fine particle concentrations occur in cool seasons, and the average chemical composition of the highest days is typically characterized by high levels of organic carbon.

High PM_{2.5} values in Nogales generally occur under stagnant, light wind conditions during winter, and are associated with southerly flow (i.e., from the direction of Mexico). Measurements of PM_{2.5} composition during an Arizona State University study during the winter of 2005-2006 (quoted in ADEQ recommendation), showed that the main emission sources are wood burning, food cooking, open burning, dust emissions, and tailpipe emissions from on-road and off-road vehicles. Carbonaceous emissions with about 15% EC are consistent with wood burning or food cooking, and not consistent with diesel emissions, although diesel emissions are important at the U.S.-Mexico border crossing and elsewhere in the Nogales area.

Note: Eligible monitors for providing design value data generally include State and Local Air Monitoring Stations (SLAMS) at population-oriented locations with an FRM monitor. All data from Special Purpose Monitors (SPM) using an FRM is eligible for comparison to the relevant NAAQS, subject to the requirements given in the October 17, 2006 Revision to Ambient Air Monitoring Regulations (71 FR 61236). All monitors used to provide data must meet the monitor siting and eligibility requirements given in 71 FR 61236 to 61328 in order to be acceptable for comparison to the 24-hr PM_{2.5} NAAQS for designation purposes.

Factor 3: Population density and degree of urbanization (including commercial development)

Table 4 shows the 2005 population for each county in the area being evaluated, as well as the population density for each county in that area. Population data gives an indication of whether it is likely that population-based emissions might contribute to violations of the 24-hour PM_{2.5} standards.

Table 4. Population

County	State Recommended Nonattainment	2005 Population	2005 Population Density (pop/sq mi)
Santa Cruz County, AZ	Yes, P	46,907	38
City of Nogales	Yes	21,746	1,046
Pima County	No	925,000	101
Cochise County	No	126,153	20

These data show that the City of Nogales is densely populated, but that Santa Cruz County is sparsely populated. In the entire County, there are only 47,000 people, or 38 people per square mile. Based solely on this factor, Santa Cruz County would not be considered as high-ranking for designation as nonattainment. The figures supplied by ADEQ indicate that the population density in Nogales, Sonora in Mexico is 17,411 people per square mile. This supports the contention that the major portion of PM_{2.5} emissions in the City of Nogales, Arizona comes from Nogales, Sonora, Mexico, which has a large metropolitan population of approximately 200,000 people.

Based on this factor, the Nogales area is a candidate for a nonattainment status for PM_{2.5} and the rest of Santa Cruz County is not. Pima and Cochise Counties are included for comparison. Their population densities are very low, and these counties were previously eliminated from inclusion in the nonattainment area.

Factor 4: Traffic and commuting patterns

This factor considers the number of commuters in each county who drive to another county within the Nogales area, the percent of total commuters in each county who commute to other counties within the Nogales area, as well as the total Vehicle Miles Traveled (VMT) for each county in millions of miles (see Table 5). A county with numerous commuters is generally an integral part of an urban area and is likely contributing to fine particle concentrations in the area.

Table 5. Traffic and Commuting Patterns

County / City	State Recommended Nonattainment	2005 VMT (millions of mi)	Number Commuting to any violating counties	Percent Commuting to any violating counties	Number Commuting to and Within Statistical Area	Percent Commuting to and Within Statistical Area
Santa Cruz	Yes, P	464	10,960	87%	10,960	87%
City of Nogales	Yes					
Pima County	No	8,759	1,420	0	1,420	0%
Cochise County	No	1,906	130	0	130	0%

Major highways in the Nogales, Arizona area are Arizona State Route 82, which connects Nogales, Arizona with Patagonia, Arizona (19 miles) and Sonoita (31 miles) to the northeast, and US Interstate 19 which connects Tucson, Arizona to Nogales, Arizona and continues south into Mexico. The numbers above indicate that most traffic is local and stays within Santa Cruz County. There is no commuting pattern between the City of Nogales and the City of Tucson, in Pima County to the north, as indicated by a value of 0% for people commuting to any violating counties from Pima County. Rather, most of the traffic is personal or commercial coming to and

from the ports of entry. Since truck traffic is an integral part of the Nogales Area, this information has been included as well.

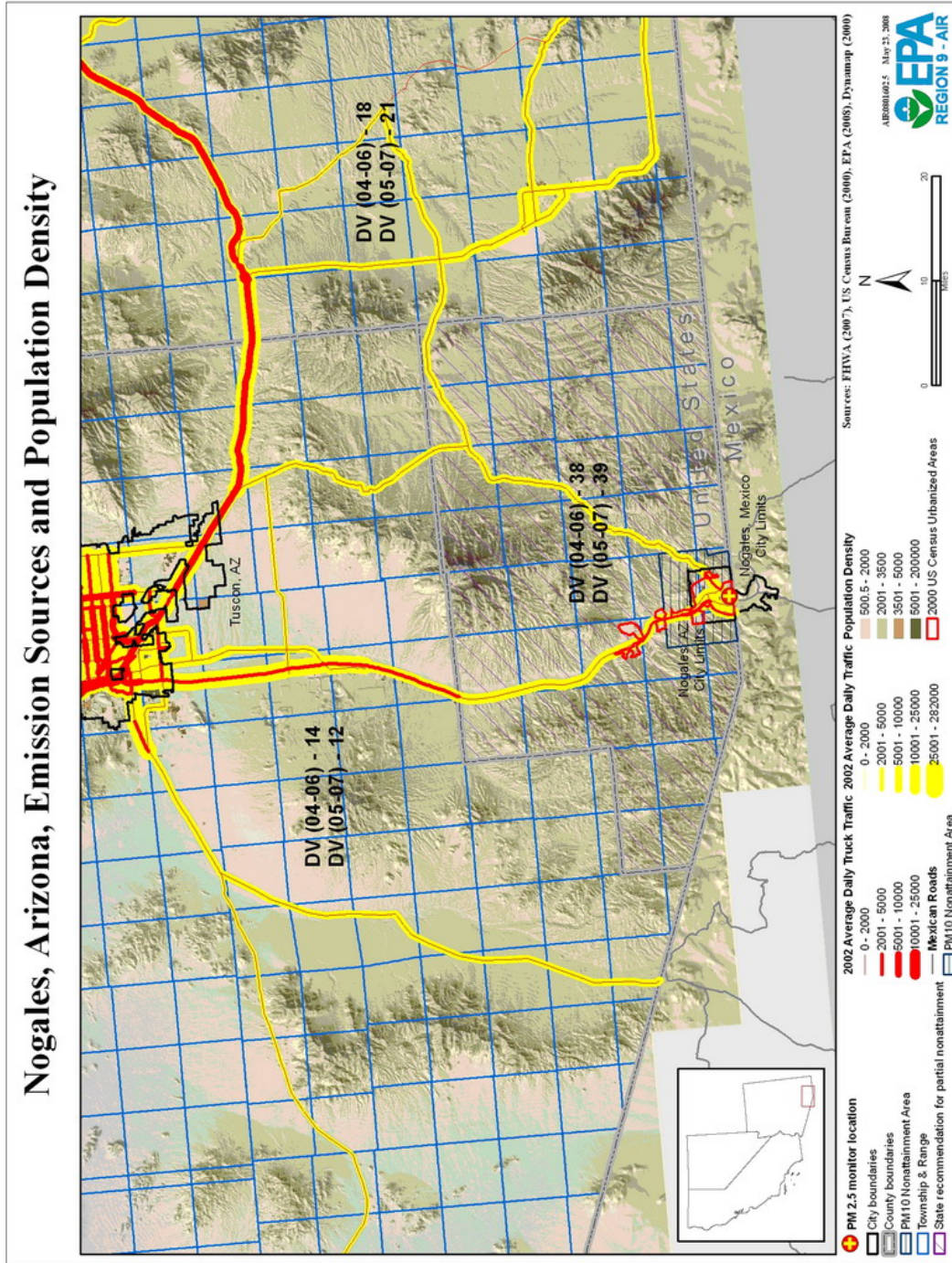


Figure 2

Two ports of entry connect the Nogales, Arizona area with Sonora, Mexico. These ports of entry are the Mariposa Port of entry, which handles primarily commercial truck traffic, and the DeConcini Port of Entry, which primarily handles passenger cars, buses and non-commercial trucks. In 2006, approximately 3.2 million personal vehicles, 289,000 trucks, and 11,500 buses used the Nogales ports of entry. This traffic is the major commuting pattern in the Nogales Area and in Santa Cruz County. The average daily truck traffic is approximately 2001-5000 trucks. (See map (Figure 2) “Nogales, Arizona, Emission Sources and Population Density” which shows the major highways in the Nogales area.)

There are a significant number of vehicles traveling from within Santa Cruz County to the City of Nogales. In addition, there is significant traffic from the Mexican border to beyond the city limits of the City of Nogales. The Figure 2 map indicates that the heaviest truck and daily traffic is on Interstate 19 that winds from the Mexican border to the City of Nogales and through Santa Cruz County to Tucson. ADEQ indicates the possibility of high levels of mobile source PM_{2.5} emissions due to the high level of car and truck traffic within the Nogales area.

Because the truck traffic goes beyond the city limits of the City of Nogales, and with the analysis of geography and topography described in factor 7 below, we agree with the recommendation of Arizona that the northern border of the PM_{2.5} nonattainment area should be drawn coincident with the the current northern border of the PM₁₀ nonattainment area in order to capture the contributing transportation-related emissions from the Interstate 19 corridor. This area extends beyond the City of Nogales, north into Santa Cruz County, as shown in Figure 3.

The 2005 VMT data used for tables 5 and 6 of the technical analysis have been derived using methodology such as that described in "Documentation for the 2005 Mobile National Emissions Inventory, Version 2," December 2008, prepared for the Emission Inventory Group, U.S. EPA.

This document may be found at:

ftp://ftp.epa.gov/EmisInventory/2005_nei/mobile_sector/documentation/2005_mobile_nei_version_2_report.pdf

Factor 5: Growth rates and patterns

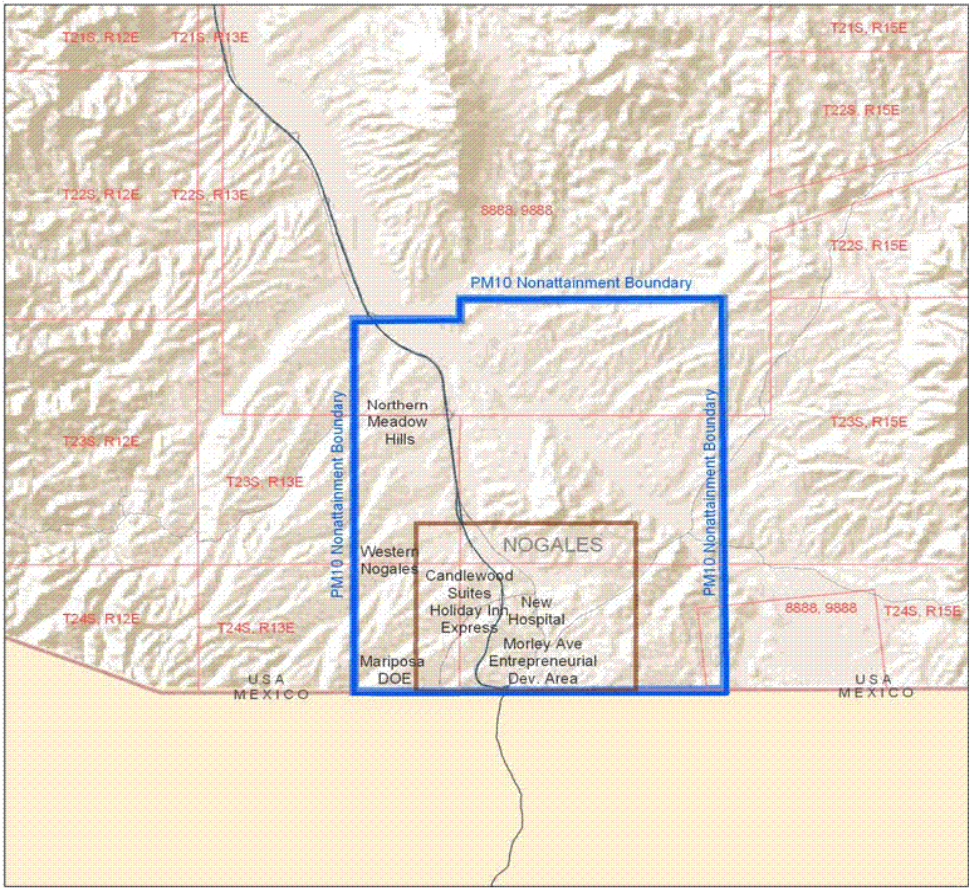
This factor considers population growth for 2000-2005 and growth in vehicle miles traveled for 2000-2005 for counties in Nogales area, as well as patterns of population and VMT growth. A county with rapid population or VMT growth is generally an integral part of an urban area and likely to be contributing to fine particle concentrations in the area. Table 6 below shows population, population growth, VMT and VMT growth for Santa Cruz, Pima, and Cochise Counties, as well as the 2005 population for the City of Nogales.

Table 6. Population and VMT Values and Percent Change.

County	Population (2005)	Population % change (2000 - 2005)	2005 VMT (million)	VMT Growth (% 2000 to 2005)
Santa Cruz County	42,012	9 %	464	1%

City of Nogales	21,746			
Pima County	925,000	9%	8,759	52%
Cochise County	126,153	7%	1,906	29%

**Planned Developments
Nogales, AZ PM10 Nonattainment Area**



- Nogales
- Township/Range
- PM10 Nonattainment



November 2007 Author - N Caroli

Figure 3

map source: ADEQ Technical Support Document for Nogales Recommendation

ADEQ estimates that population growth for Nogales, Arizona and the Nogales PM₁₀ nonattainment area will be small, and the population growth for Santa Cruz County is projected to be moderate. Between 2007 and 2015, the population of Santa Cruz County is projected to increase 20% to 56,144 residents, compared to a significantly slower growth rate of 10% or 23,858 residents for the City of Nogales. However, Nogales, Arizona will still represent a plurality of the population of Santa Cruz County.

With regard to VMT, Santa Cruz County shows a 1% decrease in VMT from 2000 to 2005. According to ADEQ, there will be moderate population growth in Santa Cruz County from 2007 and 2015 and the number of registered vehicles in Santa Cruz County has grown from 41,527 in January 2004 to 47,460 in July 2007. There are no statistics for what proportion of the vehicles are owned by residents of the City of Nogales, but since 50% of the total county population resides in the City of Nogales, a large proportion of VMT is within the City of Nogales.

While there is population growth, it is contained within the boundaries of the area proposed by ADEQ which coincides with the existing PM₁₀ nonattainment area. There is no evidence of significant population growth or high VMT anywhere else in Santa Cruz County.

Factor 6: Meteorology (weather/transport patterns)

For this factor, EPA considered data from National Weather Service instruments in the area. Wind direction and wind speed data for 2004-2006 were analyzed, with an emphasis on “high PM_{2.5} days” for each of two seasons (an October-April “cold” season and a May-September “warm” season). These high days are defined as days where any FRM or FEM air quality monitors had 24-hour PM_{2.5} concentrations above 95% on a frequency distribution curve of PM_{2.5} 24-hour values.

EPA developed a “pollution rose” to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. The pollution rose for Nogales, Arizona, site 040230004, shown in Figure 4, indicates that elevated levels of particulate matter occur during the cool season during time periods when prevailing winds are light, consistent with the analysis submitted by Arizona.

Note: the meteorology factor is also considered in each county’s Contributing Emissions Score because the method for deriving this metric included an analysis of trajectories of air masses for high PM_{2.5} days.

Nogales, AZ [Santa Cruz County, AZ]
Pollution Rose, 2005-2007

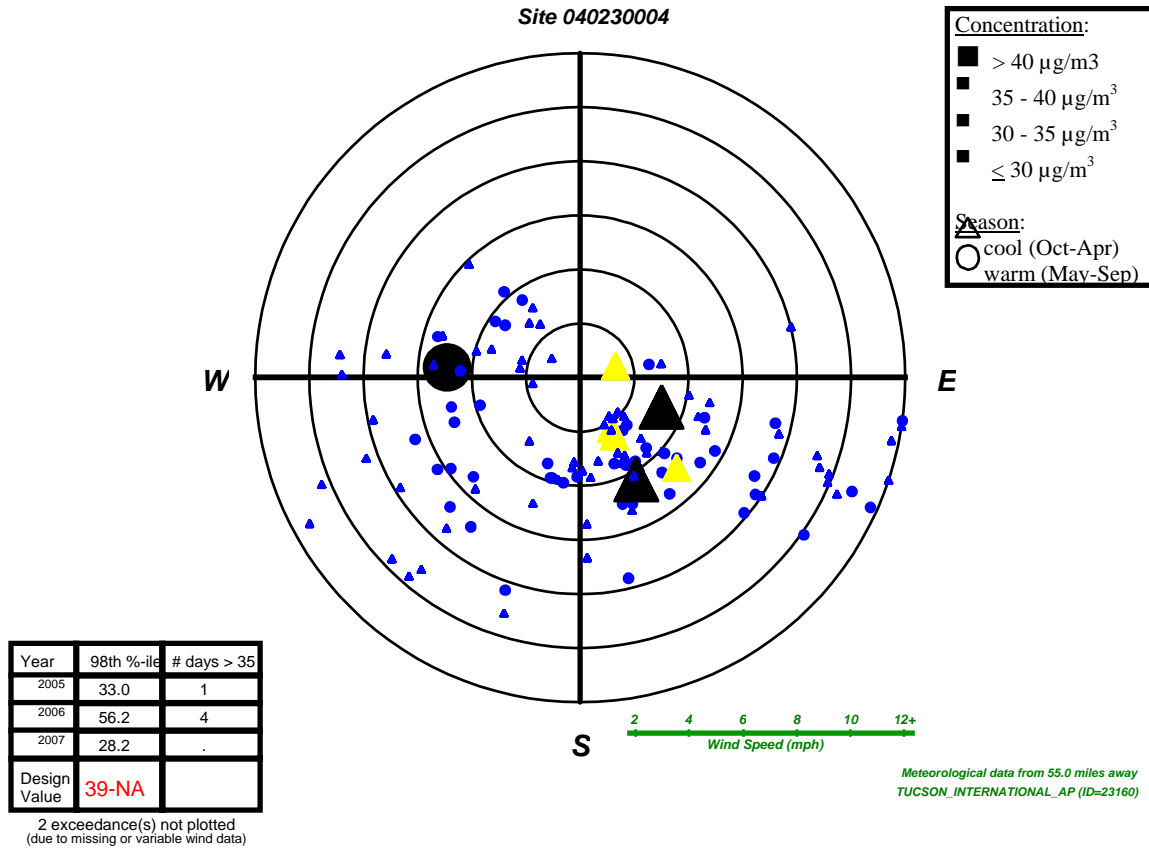


Figure 4

EPA also directly examined exceedance day backward wind trajectories from the HYSPLIT model, based on Eta Data Assimilation System (EDAS) gridded meteorological data. These trajectories were not conclusive. However, that is not surprising given that EDAS has a 40 km grid resolution, whereas the valley containing Nogales is at most 20 km wide: the data were not resolved enough to portray the south-north valley drainage flows that are a key feature of local Nogales meteorology.

The Arizona Department of Environmental Quality maintains a meteorological site located at the Nogales Post Office. Review of four years of hourly wind data, from the meteorological site at the Nogales Post Office, indicates that 47% of the time winds were out of the south (between 145 and 225 degrees). Winds out of the north (315 to 45 degrees) occurred 18% of the time, east (45 through 145 degrees) 20% of the time, and west (225 through 315 degrees) occurred 15% of the time. These data show a definite south to north wind flow along the Nogales Wash, likely aided by the decrease in elevation from the south to the north.

The 2005 study by Arizona State University (ASU) mentioned above confirmed that PM_{2.5} crosses the border from Mexico to Arizona, primarily via southerly drainage flow during the evening hours. This drainage flow is strongest during the winter months when there are strong temperature inversions and light to no winds. Air quality modeling performed in 1999 found that PM₁₀ concentrations drop to low levels by the time they reach the northern boundary of the PM₁₀ nonattainment area. A similar pattern would hold for PM_{2.5}, though concentrations would be expected to drop off more slowly due to its smaller diameter and lower deposition rate. The information provided by ADEQ indicates that there is transport from Mexico to the Nogales area, and that concentrations decline with distance from the border.

Factor 7: Geography/topography (mountain ranges or other air basin boundaries)

The geography/topography analysis looks at physical features of the land that might have an effect on the air shed and, therefore, on the distribution of PM_{2.5} over the Nogales area.

The Nogales area is situated between three mountain ranges located east, west, and north of the city. (See terrain shown in Figures 2 and 3.) The City of Nogales, Arizona encompasses 21 square miles and lies 3,865 feet above sea level. With the Pajarito, Atascosa, and Tumacacori Mountains about 7 miles to the west and the Patagonia Mountains roughly 13 miles east, Nogales rests between the two mountain ranges in the Nogales Wash. While the crests of these ranges are roughly 20 miles apart, the intervening high terrain makes for a narrow north-south valley. This valley contains the Nogales Wash, Interstate 19, and the anthropogenic sources in the southern portion of the county.

To the north and northeast are the Santa Rita mountains, including Mount Wrightson at 9,432 feet. This range forms a partial barrier to northward flow; after angling to the west, the main north-south valley continues northward. This partial barrier is a reasonable northern edge to the PM_{2.5} area; the range separates the Nogales area, on the north, from the rest of the county.

The elevation decreases from south of the US/Mexico border heading north toward Tucson, Arizona. Thus, nighttime drainage flow is typically from south to north along the Nogales Wash. According to ADEQ, the narrow valley topography can trap air pollutants, especially during the evening hours when the diurnal flow is from the south, out of Nogales, Sonora.

While it is possible that some PM_{2.5} may travel beyond the northern edge, the PM_{2.5} nonattainment area includes the portions with high concentrations, and includes nearly all of the U.S. sources that contribute to PM_{2.5} levels on days with exceedances of the standard (see factors 3-5). Considering these factors together, EPA believes that the State's recommended PM_{2.5} nonattainment boundary, which coincides with the existing PM₁₀ nonattainment area, is justified.

Factor 8: Jurisdictional boundaries (e.g., existing PM and ozone areas)

The analysis of jurisdictional boundaries considered the planning and organizational structure of the Nogales Area to determine if the implementation of controls in a potential nonattainment area

can be carried out in a cohesive manner. Santa Cruz County has no air quality planning agency. Consequently, the Arizona Department of Environmental Quality is responsible for developing any state implementation plans that are required for the Nogales Area.

Santa Cruz County is an existing nonattainment area for the 24-hour PM₁₀ standard and is in attainment for the 8-hour ozone standard. ADEQ is the air quality agency responsible for preparing the PM₁₀ Plan, and is also responsible for preparing any PM_{2.5} plan that is required. EPA believes that the boundaries established for implementing the existing PM₁₀ standards are appropriate for implementing the new 24-hour PM_{2.5} standard. Establishment of the same boundaries for nonattainment of both PM standards facilitates overall air quality planning for attaining both standards.

Factor 9: Level of control of emission sources

This factor considers emission controls currently implemented for major sources in the Nogales PM_{2.5} nonattainment area. In considering county-level emissions, EPA used data from the 2005 National Emissions Inventory version 1, the most current version of the national inventory available at the beginning of the designations process in late 2007. However, EPA recognized that for certain counties, emissions may have changed significantly since 2005. For example, certain power plants or large sources of emissions in or near an area may have installed emission controls or otherwise significantly reduced emissions since 2005.

For the Nogales nonattainment area, there are no large contributing sources for which this factor would apply.

Conclusion

EPA agrees with the State's nonattainment area boundary recommendation and is, therefore, designating part of Santa Cruz County, the same part that comprises the existing PM₁₀ nonattainment area, as nonattainment for the 2006 24-hour PM_{2.5} standard. This is the Nogales area within Santa Cruz County. EPA believes that the emissions data, air quality data, population data, growth patterns, traffic and commuting patterns, meteorology, and topography all support establishing a smaller nonattainment area than the whole county. Taking into account the topography in this area, the nonattainment area boundary includes nearly all of the U.S. sources that contribute to PM_{2.5} levels on days with exceedances of the standard.

Additional information regarding responses to specific State comments can be found in EPA's Response to Comments document at <http://www.epa.gov/pmdesignations/2006standards/tech.htm>

Description of the Contributing Emissions Score

The CES is a metric that takes into consideration emissions data, meteorological data, and air quality monitoring information to provide a relative ranking of counties in and near an area. Using this methodology, scores were developed for each county in and around the relevant metro area. The county with the highest contribution potential was assigned a score of 100, and other county scores were adjusted in relation to the highest county. The CES represents the relative maximum influence that emissions in that county have on a violating county. The CES, which reflects consideration of multiple factors, should be considered in evaluating the weight of evidence supporting designation decisions for each area.

The CES for each county was derived by incorporating the following significant information and variables that impact PM_{2.5} transport:

- Major PM_{2.5} components: total carbon (organic carbon (OC) and elemental carbon (EC)), SO₂, NO_x, and inorganic particles (crustal).
- PM_{2.5} emissions for the highest (generally top 5%) PM_{2.5} emission days (herein called “high days”) for each of two seasons, cold (Oct-Apr) and warm (May-Sept)
- Meteorology on high days using the NOAA HYSPLIT model for determining trajectories of air masses for specified days
- The “urban increment” of a violating monitor, which is the urban PM_{2.5} concentration that is in addition to a regional background PM_{2.5} concentration, determined for each PM_{2.5} component
- Distance from each potentially contributing county to a violating county or counties

[A more detailed description of the CES can be found at http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html#C.]