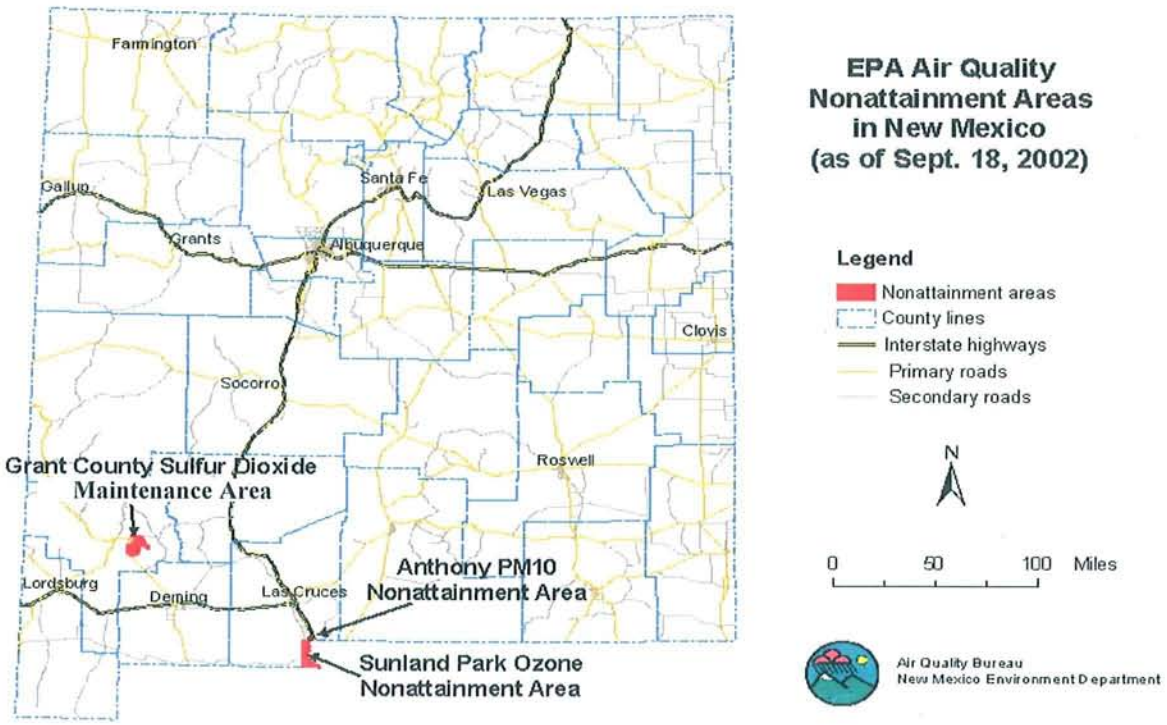
New Mexico Air Quality Technical Note 1
Air Quality Assessment Tool

This assessment tool should help field offices determine whether or not they have air quality/atmospheric resource issues/concerns and then how to address that issue concern.

1. Is the Conservation Treatment Unit (CTU) in a non-attainment area?

☐ **PM10 (Anthony) (Sunland Park)** ☐ **PM2.5 (None identified)** ☐ **Ozone**

☐ **Other**



PM10 – Assessment and Treatment Alternatives

A criteria air pollutant consisting of inhalable coarse particles such as those found in fugitive dust near roadways and industrial operations. PM10 particles have an aerodynamic diameter smaller than 10 micrometers in diameter (about 1/7 the diameter of the average human hair).

Deposition in the lungs may cause adverse health effects and can aggravate autoimmune diseases. Common agricultural sources are smoke, dust, and dirt from field wind erosion, debris and residue burning, fugitive dust, animal feeding operations, heavy use areas, and unpaved roads. PM10 can travel up to 30 miles from the source.

Agricultural emissions may vary by type of operation, time of year and other conditions such as humidity, soil moisture and equipment speed.

Are there unpaved roads and equipment areas?

Yes or No. Up to 1 ton of PM10 per year may be generated from unpaved farm roads. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as:

- **Synthetic/organic materials such as gums, polyacrylamide, and polymers used as PM10 suppressants**
- **Water sprinkling or misting**
- **Speed or traffic reduction techniques (speed bumps, speed limits, gates)**
- **Mulches (hulls, wood chips) (NCPS No. 484)**
- **Paving or washed gravel surfaces (NCPS No. 560, 561)**
- **Restricted access to limit public use of private roads.**

Is there any planned surface disturbance?

Yes or No. Evidence of undesirable PM10 levels may be fence line soil drifts, blowouts, public complaints, and haze on windy days. Use 30/30 rule: Dust is produced when wind speed is 30 miles per hour (mph) or greater and relative humidity is 30 percent of less. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as: (on the fields)

- **Residue management practices (NCPS No. 329, 344, 345,346)**
- **Limit tillage activity during windy periods (>10 mph)**
- **Vegetative barriers (NCPS No. 311, 327, 332,601,386,603,393,342)**
- **Irrigation management (NCPS No.449)**
- **Land reconstruction (NCPS No. 572, 543, 466, and 544)**
- **Cover Crop (NCPS No. 340).**

Are there any timber or harvest operations?

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as:

- **Forest management (NCPS No. 666 and 660).**
- **Grinding, chopping or shredding residues instead of burning**
- **Hayland, Pasture and Rangeland Harvest Management (NCPS No. 511)**
- **Mulching (NCPS No. 484)**
- **Green chop harvesting**
- **Baling/large bales to reduce travel trips**

Is there any track-out (to paved roads) from unpaved roads?

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as:

- **Access Road (NCPS No. 560)**
- **Gravel stabilized construction entrance**

- **Shaker plates, rumble tracks and other sediment track-out control devices such as automated wheel-wash stations**
- **Synthetic/organic materials such as gums, polyacrylamide, and polymers used as PM10 suppressants.**

Does wind contribute to PM generation and/or transport? Determine if the CTU is in a high risk area for wind erosion. Tools: evaluate for Highly Erodible Soils; assess, document and plan for the prevailing wind direction, and calculate average annual wind erosion estimate. Determine severity compared to soil loss tolerance (T) value. High risk>2T. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as:

- **Wind modification practices – windbreaks (NCPS No. 380, 650)**
- **Vegetative barriers (NCPS No. 601), Cross Wind Ridges (589a), Cross Wind Trap Strips (589c), Stripcropping (585), Herbaceous Wind Barriers (603)**
- **Mulching (NCPS No. 484)**
- **Cover Crop (NCPS No. 340)**
- **Land retirement/fallowing**
- **Surface roughening**

Are there any feedlots or Animal Feeding Operations? Consider the size and location characteristics relative to prevailing winds. Large, >1000-head open cattle feed lots in exposed locations can be a locally important source of PM10 emissions.

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as:

- **Corral dust control (frequent manure scraping – Manure Transfer NCPS No. 634) or misting/spraying to maintain desired moisture content**
- **Heavy Use Area Protection (NCPS No. 561)**
- **Waste Storage Facility (solids) (NCPS No. 313)**
- **Mix, grind, and deliver animal feeds during low-wind activity**
- **Construction of living and/or artificial windbreaks, herbaceous wind barriers, and/or hedgerow plantings (NCPS No. 380,386,561,589,603), that will disturb air flow patterns thereby serving to increase or decrease air flow and reduce energy costs, as needed**
- **Construct permanent or temporary fabricated shelters.**

Is there any on-farm dry materials handling/storage activity (grain elevator, bulk fertilizers, manure)?

Yes or No. Depending on criteria, a commercial grain elevator is one of the rare agricultural sources that may be subject to regulation. Grain elevator dust is usually larger than PM10 but may aggravate a localized particulate issue. If yes, consider practices/techniques that reduce or eliminate PM10 generation such as:

- **Waste utilization, transfer, and management (NCPS No. 313,359,633,365,317, and 364)**

- **Construction of living and/or artificial windbreaks, herbaceous wind barriers and/or hedgerow plantings (NCPS No. 380,386,561,589,603), that will disturb air flow patterns thereby serving to increase or decrease air flow and reduce energy costs, as needed**
- **Utilize tarps, covers, or enclosed loading and transport facility to decrease incidental losses.**

PM2.5 – Assessment and Treatment Alternatives

Fine particles, such as those found in combustion products, smoke, and haze, are 2.5 micrometers in diameter and smaller. Due to their small size, they behave more like a gas and may easily be inhaled deeply into the lungs. PM2.5 particles (primary) can be directly emitted from sources such as forest fires and field operations or they can form as secondary particles when gases (NOx and SO2) emitted from power plants, industries and automobiles react in the air to form SO4, NO3 and acid mists. Particles can be directly toxic (heavy metals and organic compounds) or aggravate pre-existing heart and respiratory conditions. Particles can be solid or liquid. Primary agricultural sources are animal feeding operations, combustion of petroleum products, and debris and residue burning. PM2.5 particles deposit at an extremely slow rate and can travel many hundreds of miles from the source.

Is this an Animal Feeding Operation?

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM2.5 generation such as:

- **Waste utilization, handling and management (NCPS No. 313, 359, 633, and 317)**
- **Frequent manure removal/scraping (NCPS No. 634)**
- **Sprinkler irrigation (NCPS No. 442)**
- **Waste facility cover (NCPS No. 367)**
- **Biofilter installation (Amendments for Treatment of Ag Waste (NCPS No. 591))**
- **Feed management (NCPS No. 592)**
- **Comprehensive Nutrient Management Plan (CNMP)**

Is any agricultural or prescribed burning done?

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM2.5 generation such as:

- **Consider non-burning alternatives**
- **Utilize emission reduction techniques in burn plan (NCPS No. 338)**
- **Follow smoke management/burn plan (NCPS No. 338).**

Are diesel engines used in the operation?

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM2.5 generation such as:

- **Switch combustion engines out to electric motors**
- **Utilize newer certified engines – diesel, natural gas or propane**

- **Retrofit existing engine – add-on technologies to reduce emissions**
- **Alternative fuel blends**

Is there any on-farm materials handling?

Yes or No. If yes, consider practices/techniques that reduce or eliminate PM2.5 generation such as:

- **Waste utilization, transfer, and management (NCPS No. 313, 359, 633, 365, 317, and 364)**
- **Construction of living and/or artificial windbreaks, herbaceous wind barriers and/or hedgerow plantings (NCPS No. 380,386,561,589,603) that will disturb air flow patterns thereby serving to increase or decrease air flow and reduce energy costs, as needed**
- **Utilize tarped or enclosed loading facility and/or transport to decrease incidental loss**

Ozone (Ozone precursors are both VOCs and NOx) – Assessment and Treatment Alternatives

Ozone is harmful to both human health and vegetation. Ozone in the lower atmosphere is formed when volatile organic compounds (VOC) and oxides of nitrogen (NOx) react in the presence of sunlight. Agricultural practices such as burning of agricultural wastes, application of pesticides, livestock and livestock waste contribute to VOC. Agricultural practices such as burning, farm equipment, and use of stationary and portable agricultural engines contribute to NOx.

Is any agricultural or prescribed burning done?

Yes or No. If yes, consider practices/techniques that reduce or eliminate both NOx and VOC generation such as:

- **Consider non-burning alternatives (chipping, grinding or shredding residues)**
- **Utilize emission reduction techniques and follow smoke management/burn plan (NCPS No. 338).**

Are nitrogen fertilizers used in the operation?

Yes or No. If yes, consider practices/techniques that reduce or eliminate VOC generation such as:

- **Reduce volatility - consider N formulation of fertilizer (NCPS No. 590)**
- **Fertilizer incorporation (NCPS No. 590)**
- **Application rate, method and timing (NCPS No. 590)**

Is animal waste generated or utilized on the farm?

Yes or No. If yes, consider practices/techniques that reduce or eliminate VOC generation such as:

- **Liquid waste injection and solid waste incorporation (NCPS No. 633)**

- **Composting (NCPS No. 317)**
- **Anaerobic Digester (NCPS No. 365,366)**
- **Agricultural bagging or Waste Facility Cover (NCPS No. 367)**
- **Comprehensive Nutrient Management Plan (CNMP)**

Are pesticides used on the farm?

Yes or No. If yes, consider practices/techniques that reduce or eliminate VOC generation such as:

- **Consider different formulations (low volatility, flowables, pellets, powders, oils, etc. and application techniques to reduce drift - Pest management (NCPS No. 595).**
- **Adopt integrated pest management practices to reduce or eliminate pesticide use (NCPS No. 595)**
- **Incorporate recapture techniques and equipment**
- **Agricultural chemical handling facility (NCPS No. 309)**

Are diesel engines used on the farm?

Yes or No. If yes, consider practices/techniques that reduce or eliminate NOx generation such as:

- **Switch combustion engines out to electric motors**
- **Utilize newer certified engines – diesel, natural gas or propane**
- **Retrofit existing engine – add-on technologies to reduce emissions**
- **Alternative fuel blends to utilize lower sulfur diesel fuel.**

Odor – Assessment and Treatment Alternatives

Odor affects air quality through emissions of specific odorous gases (odorants), odor-carrying particulates (including organic, inorganic and biological particulate matter), and volatile organic compounds (VOCs). Agricultural sources of odor come primarily from the uncontrolled decomposition of animal waste. As experienced by humans, odor is the composite of 170 or more gases in trace concentrations. Odorous gases of primary concern often include: hydrogen sulfide (H2S), ammonia (NH3), methane (CH4), and VOCs, including volatile fatty acids. Odor is measured in terms of dilutions to threshold (odor units per cubic meter). Odor from CAFOs can cause direct or indirect (physiological or psychological) health responses in people with regard to frequently exposed neighbors at high concentrations, and certain people with particular sensitivities for whom the health effects are of greater concern. Factors affecting odor are: moisture content, pH, temperature, and oxygen availability. Currently, there are no federal or state specific statutes or rules that directly regulate or control odors or establish setback limits.

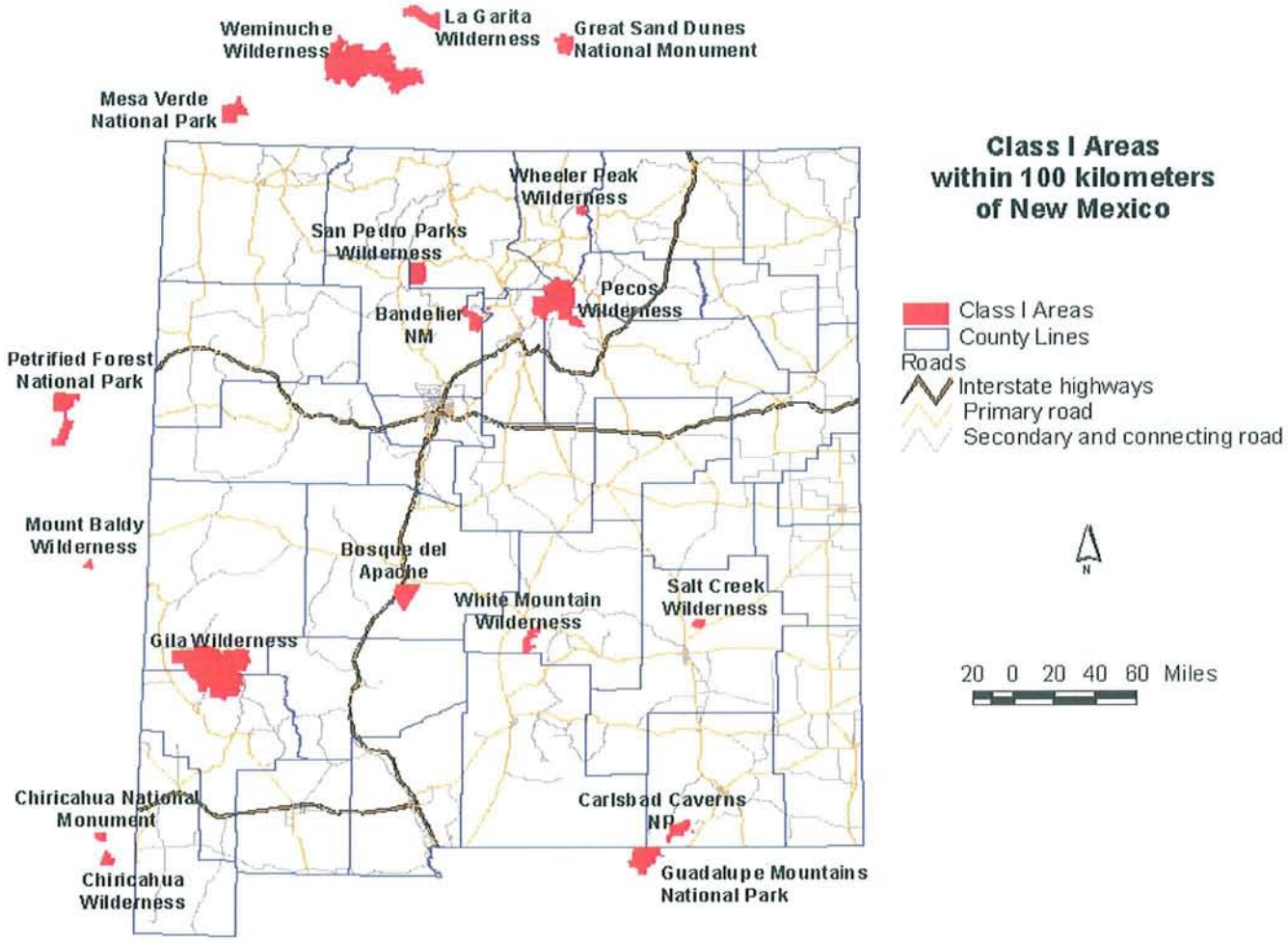
Is the CTU within 10 miles (upwind) of a neighbor, concentrated population (1 house per acre), a city or town or a major transportation facility (freeway, interstate highway, state highway, or commercial airport)?

Yes or No. This question addresses concerns with safety factors and nuisance odors, so proximity, prevailing wind direction and speed are considerations in determining if odor is a resource concern. If yes, consider practices/management techniques that will reduce or eliminate generation of gases associated with nuisance odors (H2S, NH3, CH4, etc.) such as:

- **Feed management (NCPS No. 592)**
- **Biofilter installation on building exhaust and Amendments for Treatment of Agricultural Wastes (NCPS No. 591)**
- **Control manure moisture**
- **Manure management (NCPS No. 590, 313, 359, 633)**
- **Slurry injection (Waste Utilization, NCPS No. 633), timing and notification**
- **Composting (NCPS No. 317)**
- **Same day solid waste incorporation (Waste Utilization, NCPS No. 633)**
- **Frequent manure transfer/removal/scraping (NCPS No. 634)**
- **Comprehensive Nutrient Management Plan (CNMP)**
- **Construction of living and/or artificial windbreaks, herbaceous wind barriers and/or hedgerow plantings (NCPS No. 380,386,561,589,603) to benefit air flow patterns as needed**
- **Anaerobic Digester (NCPS No. 365 and 366)**
- **Constructed wetlands for wastewater treatment.**

Haze – Assessment and Treatment Alternatives

Haze – Traditionally, haze is an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky and hence affect visibility. These pollutants include fine particulate matter (PM 2.5), and compounds which contribute to PM 2.5 formulation such as NOx, SO2, certain VOCs and NH3. Sources for the fine particles that create haze include soil tillage, transportation, manufacturing, and forest fires. The Regional Haze Rule, instituted in 1999 by the EPA, calls for state and federal agencies to work together to improve visibility in 156 National Parks, wilderness areas and designated portions of Indian Reservations. Such areas are known as Class 1 airsheds. The Clean Air Act defines mandatory Class 1 Federal airsheds as certain national parks (over 6,000 acres), wilderness areas (over 5,000 acres), national memorial parks (over 5,000 acres), and international parks (over 5,000 acres), and international parks that were in existence as of August 1977.



2. Is the CTU within 50 km (~31 miles) of a Class I area? (smoke/visibility, NOx, O3, VOC, NH3)

Yes or No. If yes, consider practices/techniques that reduce or eliminate the potential for smoke and haze precursor generation

- **Emission reduction techniques**
- **Use of non-burning alternatives (i.e., chipping, debris removal, and refuse disposal or burial)**
- **Crop Residue Management (NCPS No. 329, 344, 345, and 346)**
- **Smoke management plan (NCPS No. 338).**
- **No-till or Minimum Tillage (NCPS No. 329, 344, 345, and 346).**

Greenhouse Gases (GHGs) – Assessment and Treatment Alternatives

GHGs – Greenhouse gases are a very important part of the Earth's environment, keeping our atmosphere about 33 degrees C warmer than it would be otherwise. An array of gases, dominated by water vapor, serves to preserve the greenhouse-like atmosphere and warmth associated with life on Earth. Other GHGs in descending order of magnitude in the atmosphere are carbon dioxide, methane, nitrous oxide, ozone, and chlorinated

fluorocarbons (CFCs). GHGs are formed by natural and anthropogenic processes. A build up of excessive levels of GHGs can cause the atmosphere to aggressively trap the sun's energy and warm to undesirable levels. Potential impacts of a warmer atmosphere are changes in climate and other environmental conditions. Anthropogenic sources of GHGs are burning fossil fuels, deforestation, livestock production, cement production, and manufacturing facilities (a primary source of CFCs).

3. Are greenhouse gases (ghgs) regulated? (CH4, N2O, CO2, CFCs,).

Yes or No. Not yet in New Mexico, but to be proactive, consider practices/techniques that will offset or reduce generation of CH4 such as:

- **Digesters for electricity generation (NCPS No. 365, 366)**
- **Feed management (NCPS No. 592)**
- **Solid/liquid waste separation (NCPS No. 632)**
- **Increase carbon sequestration in organic matter and soil**
- **Reduce frequency and intensity of tillage operations (NCPS No. 329,344, 345, and 346)**
- **Increased utilization of renewable energy sources (wind, solar, geothermal, etc.)**

Consider practices/techniques that will offset or reduce generation of N20 such as:

- **Fertilizer formulation and application method (NCPS No. 590)**
- **Soil quality management**
- **Slurry injection**

Consider practices/techniques that will offset or reduce generation of CO2 such as:

- **Reduced tillage (NCPS No. 329,344,345,346)**
- **Combined operations to reduce equipment passes**
- **Use of renewable energy**
- **Reduce or Eliminate open burning**
- **C-sequestration practices to offset CO2 emissions**

4. Are plant and animal health and productivity, and human comfort adversely affected by excessive or reduced air circulation?

Yes or No. If yes, consider practices that either reduce or improve air circulation, as required:

- **Construction of living and/or artificial windbreaks, herbaceous wind barriers (NCPS No. 380,386,561,603) and/or hedgerow planting will alter existing air flow patterns serving to increase/decrease air flow and reduce energy costs.**
- **Use of fans and air dams**
- **Improved building and siting design to improve air flow characteristics.**