

4 Corners Air Quality Task Force Emissions Inventories Summary May 2006

Overview of Current Air Quality in the Four Corners Region

In the Four Corners region, the air quality currently meets all National Ambient Air Quality Standards, or NAAQS. See <http://www.epa.gov/air/criteria.html>. The monitoring shows that the region is very close to exceeding the health-based standard for ozone. According to data from Mesa Verde National Park, the ozone trend is increasing; ammonium is increasing; there is no trend (as of 2004) in nitrates; and sulfates are decreasing. Mercury advisories have been issued for lakes in all four of the states in the region. Visibility is degraded throughout the region. All four states are currently working on plans to improve visibility. These plans will be submitted to the U.S. Environmental Protection Agency in January 2008. The purpose of the Four Corners Air Quality Task Force is to develop strategies to improve the air quality in the region.

There are multiple jurisdictions in the region. The Four Corners states include New Mexico, Colorado, Utah and Arizona. Tribal lands in the Four Corners region include the Navajo Nation, Ute Mountain Ute, Southern Ute, and Jicarilla Apache. Federal lands in the region are managed by the U.S. Department of Interior, Bureau of Land Management, National Park Service and Bureau of Reclamation, and the U.S. Department of Agriculture, Forest Service.

Existing Emission Inventories

The U.S. EPA prepares the national emissions inventories with input from numerous state and local air agencies. These data are used for air dispersion modeling, regional strategy development, regulation setting, air toxics risk assessment, and tracking trends in emissions over time. Criteria pollutant emissions data for 1990, 1996 through 2000, and 2002 are available in the National Emissions Inventory (NEI) database. Hazardous air pollutant (HAP) emissions data are available for 1999. All Four Corner states' inventories are available in the NEI. Go to: <http://www.epa.gov/ttn/chief/net/>

In addition, New Mexico has prepared a special inventory for the Ozone Early Action Compact. See Emissions Inventory Report: Development of the 2002 Base Case Modeling Inventory for San Juan Basin http://www.nmenv.state.nm.us/aqb/ozonetf/NMED%20EI%20report_1003.pdf. A New Mexico study for ozone precursors is currently being prepared for non-permitted point and area sources in San Juan and Rio Arriba Counties. This study is scheduled to be completed by July 1, 2006.

Table 3-2 2002 San Juan Early Action Compact Development of the 2002 Base Case Modeling Inventory - Summary of Oil and Gas VOC emissions for the San Juan Basin (tpy). Oil and Gas NO_x emissions for the entire basin totaled 28,234 tons/yr.

Table 3-2. Summary of oil and gas emissions for the San Juan Basin (tpy).

| County | Loading | Flash | Working & Standing | Venting | Fugitive | Total |
|------------|---------|-------|--------------------|---------|----------|--------|
| San Juan | 193 | 197 | 3,518 | 16,775 | 2,073 | 22,756 |
| Rio Arriba | 167 | 189 | 2,416 | 13,687 | 1,424 | 17,883 |
| Sandoval | 17 | 22 | 107 | 103 | 63 | 312 |
| Total | 377 | 408 | 6,041 | 30,565 | 3,560 | 40,951 |

Table 4-1. Weekday NO_x (Tons/day) emission summary by major source for New Mexico counties

| County | Area | On-Road | Off-Road | Points | Biogenic |
|------------|------|---------|----------|--------|----------|
| San Juan | 2.18 | 8.16 | 3.33 | 248.15 | 20.57 |
| Rio Arriba | 0.35 | 5.14 | 1.34 | 8.40 | 23.32 |
| Sandoval | 1.25 | 10.18 | 0.30 | 13.85 | 13.72 |

Table 4-2. Weekday VOC (Tons/day) emission summary by major source for New Mexico counties

| County | Area | On-Road | Off-Road | Points | Biogenic |
|------------|-------|---------|----------|--------|----------|
| San Juan | 14.54 | 4.75 | 2.07 | 14.67 | 241.54 |
| Rio Arriba | 2.98 | 2.68 | 2.06 | 7.45 | 341.63 |
| Sandoval | 5.80 | 7.44 | 1.35 | 0.02 | 125.99 |

Table 4-3. Weekday CO (Tons/day) emission summary by major source for New Mexico counties

| County | Area | On-Road | Off-Road | Points | Biogenic |
|------------|------|---------|----------|--------|----------|
| San Juan | 5.10 | 47.47 | 30.13 | 14.67 | 35.73 |
| Rio Arriba | 2.27 | 27.62 | 8.71 | 7.45 | 50.63 |
| Sandoval | 5.57 | 85.21 | 17.45 | 0.02 | 21.74 |

Area sources: Sources that are not point, mobile, on-road or off-road. One example of area sources are dry cleaners.

On-road: Mobile sources that operate on roads and highways

Off-road: Mobile source engines that do not operate on roads and highways.

Points: Sources with a stack such as compressors, power plants, refineries, etc.

Biogenic: Emissions coming from vegetation.

The Colorado Department of Public Health and Environment emissions inventories have been prepared since the 1970's, with more robust inventories prepared for the last five years. In addition, Colorado prepares area source emission inventories. Go to: Colorado 2002 Area Source Emissions Inventory [CO, NO_x, PM10 SO₂, VOC, benzene (Ton/Yr)] by County <http://emaps.dphe.state.co.us/APIInv/viewer.htm>. Colorado also prepared a Prevention of Significant Deterioration (PSD) Periodic Assessment of Increment Consumption and Expansion for Nitrogen Dioxide in 1999. That report is available on Colorado's web site at <http://apcd.state.co.us/permits/psdinc/>.

Utah Department of Environmental Quality Division of Air Quality emissions inventories are available for years 1992-1996, 1999 Area, Mobile, and Point Source Emissions Inventory [CO, NO_x, PM10, PM2.5, SOX, VOC] including Hazardous Air Pollutants by county. Go to: http://www.airquality.utah.gov/Planning/Emission-Inventory/Availbe_inventory.htm

The San Juan Basin Health Department in Durango is currently working on an emissions inventory for a 240-square mile area around Durango. Additional information about this effort is on their web site at http://www.sjbhd.org/environmental_health/air_quality/index.html.

The Durango/La Plata County emissions inventory area includes the following areas of La Plata County:

- Inner- City Durango
- Durango West Subdivision
- Bayfield/Vallecito
- Hermosa

The total area within the D/LPC study area is 240 square miles.

Previously the D/LPC area had no air quality emissions inventory. As the county began to grow and community concerns about visibility and air pollution began to increase, the need for an air quality study became imperative.

For both of the emission source categories, emission factors and emission equations were used to derive the total PM10 emissions (calculated in tons per season). Detailed calculations are supplied in the main report to illustrate how the emission results were obtained. The estimated total PM10 emissions in the D/LPC study area are summarized for each source category.

Total PM10 (tons/season):

- Mobile source emissions - *964 tons/season
- Area Source emissions - 452 tons/season
- Wood and Coal burning emissions - 111 tons/season
- Point Source emissions - 53 tons/season
- Non-Road emissions - 14 tons/season

*Inner- City Durango has almost half of the PM10 emissions in the D/LPC study area. As Durango continues to grow, the effects of mobile emissions on this area in particular will need to be addressed in order to stay in compliance with EPA regulations and/or the standards the Durango community desires as shown by the Community Attitudes Survey.

The Western Regional Air Partnership (WRAP) is a collaborative effort of tribal governments, state governments and various federal agencies to implement the Grand Canyon Visibility Transport Commission's recommendations and to develop the technical and policy tools needed by western states and tribes to comply with the U.S. EPA's regional haze regulations. Other common air quality issues raised by WRAP members may also be addressed. All Four Corner states and tribes are included in WRAP inventories. WRAP has also prepared a Mobile Source Emissions Inventory dated January 27, 2006 for on-road and off-road mobile source emissions inventories for 14 Western states for the 2002 base year and for three future years - 2008, 2013, and 2018.

Go to: WRAP Point and Area Source Emissions Inventory, dated January 27, 2006, <http://www.wrapair.org/forums/ssjf/documents/eictts/index.html>. This includes 2002 point and area source emissions inventory data as reported by WRAP region air quality agencies.

2002 WRAP Point and Area Source Inventory

ERG has completed a quality assurance review and revision of the 2002 point and area source inventory. This review and subsequent revisions to the inventory addressed completeness (i.e., geographic coverage, pollutant coverage, and control device information), and possible outliers (i.e., identified facility-, source category-, and county-level problems by comparing to other similar inventories). Also, changes submitted by state, local, and tribal agencies to U.S. EPA in June 2005 as part of the NEI review process have been incorporated. Other work conducted by ERG and ENVIRON have been incorporated into the revised inventory, including new tribal point source emissions and new/revised area source emissions for oil and gas exploration. Please contact [Tom Moore](#) with questions and comments. [PDF](#) (1/27/06)

2002 WRAP Area Sources, by County [XLS](#)

http://www.wrapair.org/forums/ssjf/documents/eictts/docs/2002Area_CountyTotals.xls

2002 WRAP Point Sources, by County [XLS](#)

http://www.wrapair.org/forums/ssjf/documents/eictts/docs/2002Point_CountyTotals.xls

WRAP 2002 Area Sources for NW New Mexico

| County Name | NOX (Tons) | SO2 (Tons) | VOC (Tons) | CO (Tons) | PM10-PRI (Tons) | PM25-PRI (Tons) | NH3 (Tons) |
|-------------------|------------|------------|------------|-----------|-----------------|-----------------|------------|
| Rio Arriba County | 13,051 | 321 | 21,142 | 1,682 | 908 | 347 | 18 |
| Sandoval County | 832 | 445 | 1,867 | 4,108 | 6,446 | 1,686 | 47 |
| San Juan County | 19,421 | 522 | 36,080 | 2,586 | 8,613 | 1,998 | 55 |

WRAP 2002 Point Sources for NW New Mexico

| County Name | NOX (Tons) | SO2 (Tons) | VOC (Tons) | CO (Tons) | PM10-PRI (Tons) | PM25-PRI (Tons) | NH3 (Tons) |
|-------------------|------------|------------|------------|-----------|-----------------|-----------------|------------|
| Rio Arriba County | 2,933 | 1 | 2,607 | 4,064 | 72 | 12 | 0 |
| Sandoval County | 186 | 0 | 62 | 346 | 96 | 91 | 2 |
| San Juan County | 44,297 | 17,933 | 4,941 | 10,983 | 1,887 | 490 | 2 |

WRAP 2002 Area Sources Emissions Inventory

| Tribe | Tribal FIPs | NOX (Tons) | SO2 (Tons) | VOC (Tons) | CO (Tons) | PM10-PRI (Tons) | PM25-PRI (Tons) | NH3 (Tons) |
|---|-------------|------------|------------|------------|-----------|-----------------|-----------------|------------|
| Navajo Nation, Arizona, New Mexico & Utah | 780 | 1,167 | 2 | 2,344 | 101 | | | |
| Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico & Utah | 751 | 540 | 0 | 793 | 13 | | | |

WRAP 2002 Point Sources Emissions Inventory

| Tribe | Tribal FIPs | NOX (Tons) | SO2 (Tons) | VOC (Tons) | CO (Tons) | PM10-PRI (Tons) | PM25-PRI (Tons) | NH3 (Tons) |
|---|-------------|------------|------------|------------|-----------|-----------------|-----------------|------------|
| Navajo Nation, Arizona, New Mexico & Utah | 780 | 83,387 | 37,028 | 915 | 4,621 | 4,115 | 2,929 | 125 |
| Ute Mountain Tribe of the Ute Mountain Reservation, Colorado, New Mexico & Utah | 751 | | | | | 23 | 7 | |

2002 and 2018 Point Source and Oil & Gas Area Source Inventory for Tribes

On behalf of the SSJF and the TDDWG, ERG and Environ have developed point and oil and gas area source emission inventories for seven Native American Reservations (NARs) and/or tribal lands in the WRAP region (Arapahoe and Shoshone Tribes of the Wind River Reservation, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Warm Springs Reservation, Navajo Nation, Tohono O'Odham Nation, Ute Mountain Ute Tribe of the Ute Mountain Reservation, and Confederated Tribes and Bands of the Yakama Nation). The report contains methods, data, and results pertaining to point source and oil and gas area source emissions for 2002 and 2018 for these tribal entities.

http://www.wrapair.org/forums/ssjf/documents/eictts/docs/Point_AreaO&G_Source_EIs_on_NARs-Final_Report.pdf

WRAP Oil/Gas Work Group Emissions Inventory

The objective of this project was to develop and implement a uniform procedure for estimating area source emissions from oil and gas production operations across the western region. Emphasis was placed on estimating emissions of pollutants with the potential to impair visibility near Class I areas in the west, in particular NOx emissions. The inventory procedure was applied to develop oil and gas emissions estimates for the 2002 base year; the resulting inventory added over 115 thousand tons of NOx emissions to the existing WRAP inventory. Projection factors were developed for estimating emissions from oil and gas operations in the year 2018; "on the books" controls were incorporated into the projected emissions. An additional task in this project was the development of new spatial allocation surrogates for generating gridded oil and gas emissions for use in regional visibility modeling.

Final Project Report: Oil And Gas Emission Inventories For The Western States [PDF](#) (12/27/05, 3.4 MB)

http://www.wrapair.org/forums/ssjf/documents/eictts/OilGas/WRAP_Oil&Gas_Final_Report.122805.pdf

Also See ENVIRON Oil and Gas Emissions Inventory Presentation for 4CAQTF Cumulative Effects work group: An Introduction to the 2002 and 2018 WRAP Inventories:

http://www.nmenv.state.nm.us/aqb/4C/ceffects_workgroup.html

For the mobile sources inventory, go to: <http://www.wrapair.org/forums/ef/UMSI/index.html>

Maps of the Four Corners Region

These maps of the region of concern for the Four Corners Air Quality Task Force is from the Memorandum of Understanding dated signed by the federal and state agencies coordinating this project.

