

# Analysis of NO<sub>x</sub> and Related Data in San Juan County, New Mexico

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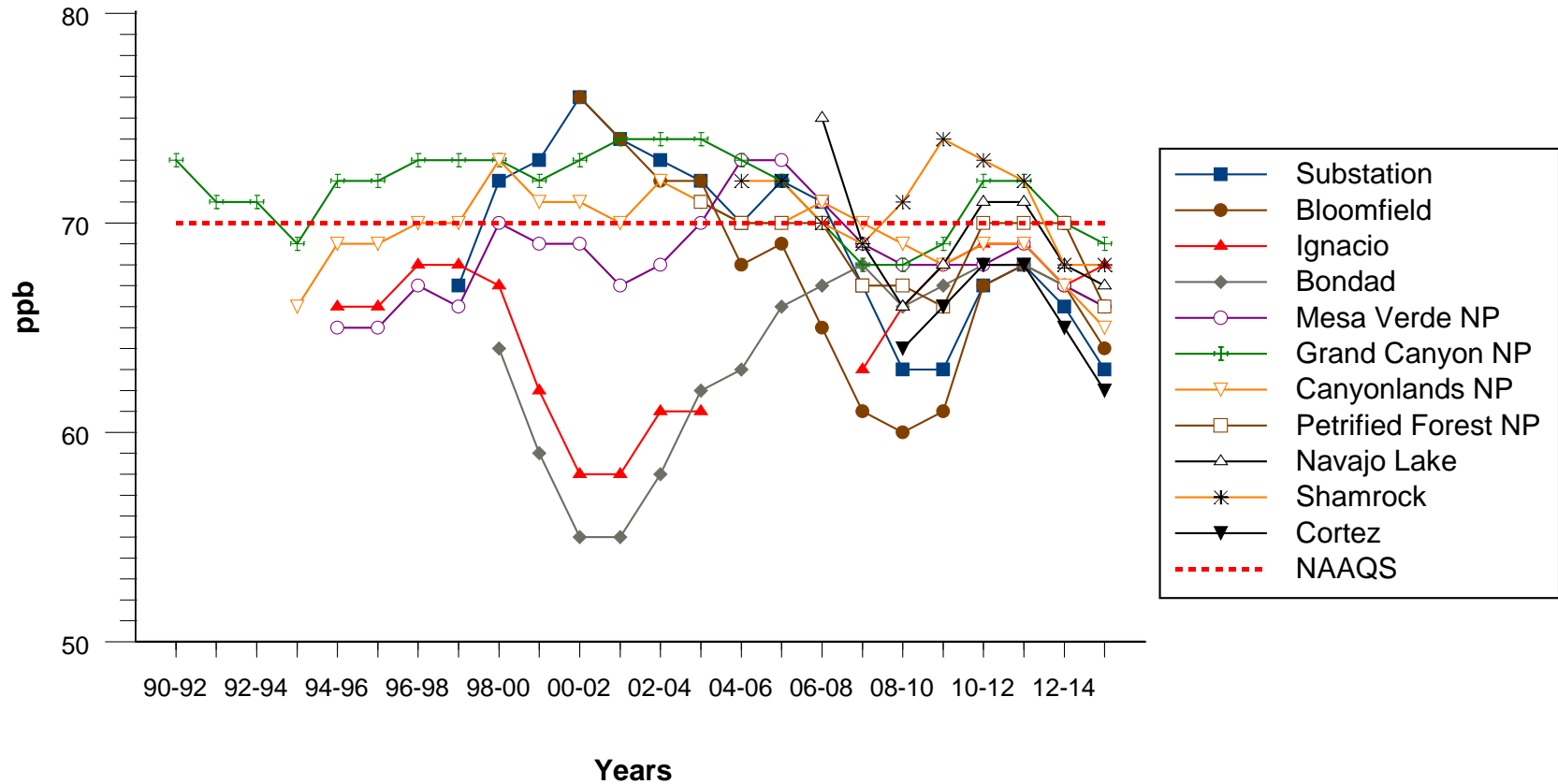
Air Quality Analysis Section

Dallas, Texas

September 24, 2015 update

# 8-hour Ozone Trends

Four Corners Area; 3-year running design values

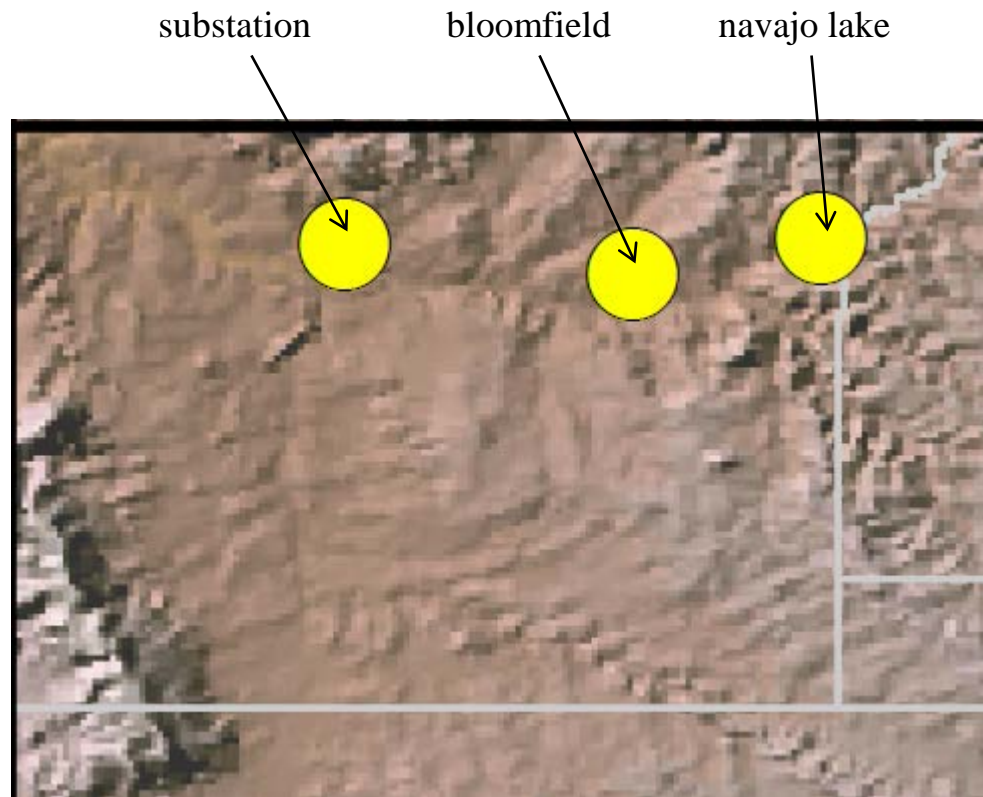


8-hour ozone design values have been declining recently in the Four Corners Area.

2013-2015 values are preliminary and only through 9/23/15.

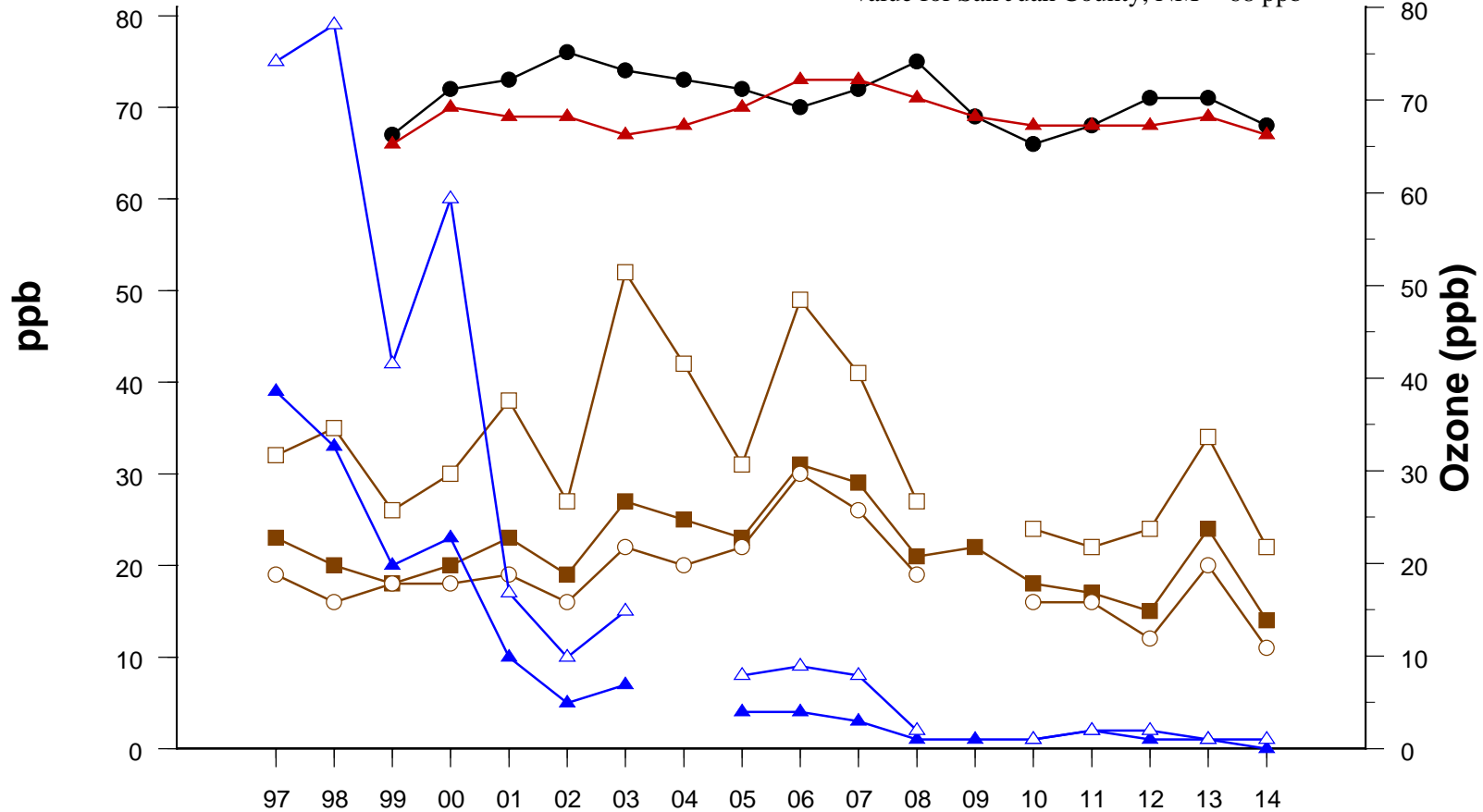
2013-2015 preliminary 8-hour ozone design values range from 62 ppb at Cortez, CO to 69 ppb at Grand Canyon NP. Highest 8-hour ozone design value in San Juan County, NM is 67 ppb at Navajo Lake.

# San Juan County, NM Monitoring Sites



# Substation Site Mean Morning NOx/SO2 Concentrations June-August weekday 0600-0900 LST

Current 2012-2014 8-hour ozone design value for San Juan County, NM = 68 ppb



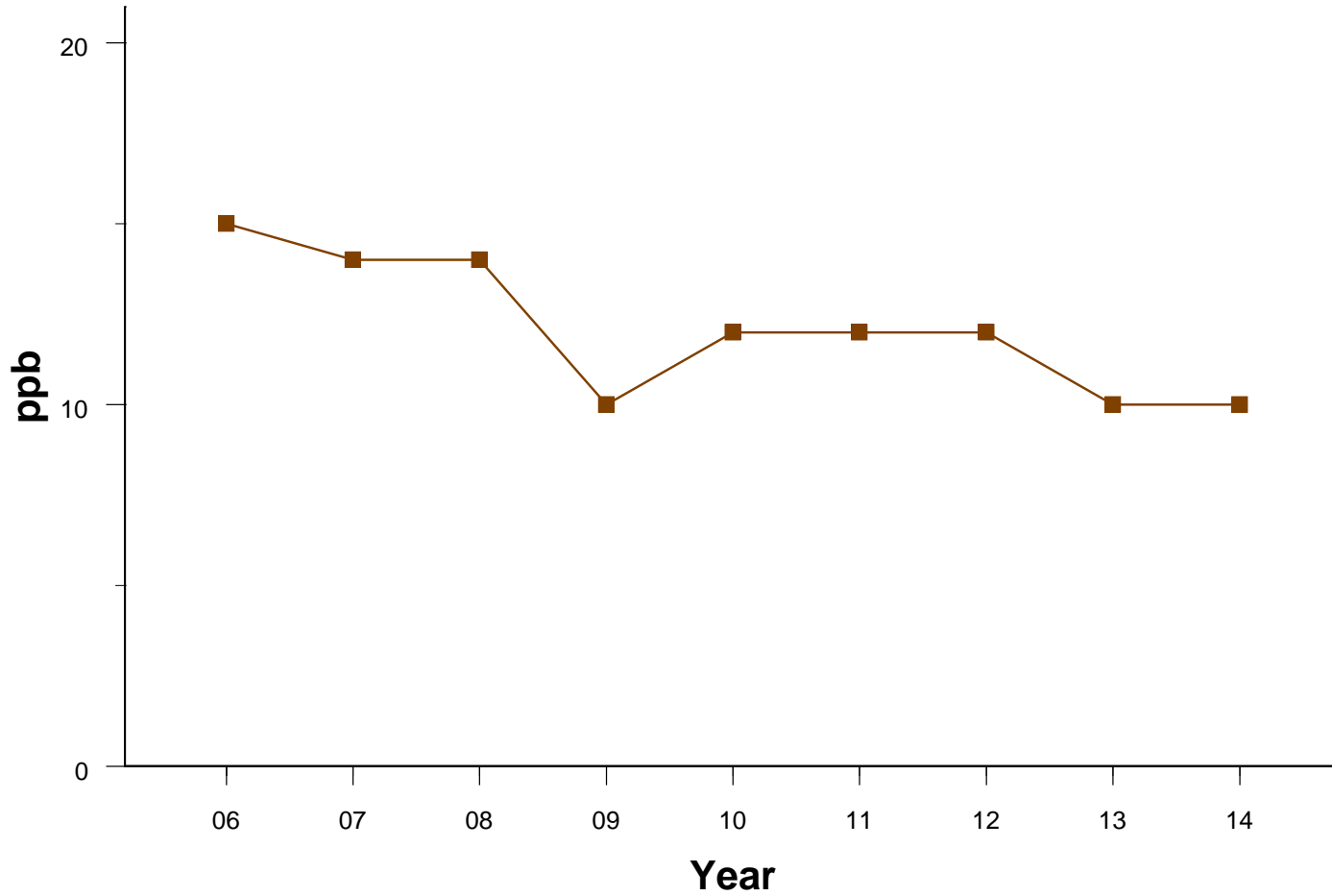
san juan pp dominated nox and so2 uses hourly wind direction data from 70-90 compass degrees;  
not enough so2 data in 2004;  
no wind direction data in 2009;  
8-hour ozone design values are depicted with end year of 3-year average.

- all nox
- san juan pp dominated nox (ws>2mph)
- nox from all other areas (ws>2mph)
- ▲— all so2
- △— san juan pp dominated so2 (ws>2mph)
- San Juan County, NM 8-hour O3 design value
- ▲— Mesa Verde NP 8-hour O3 design value

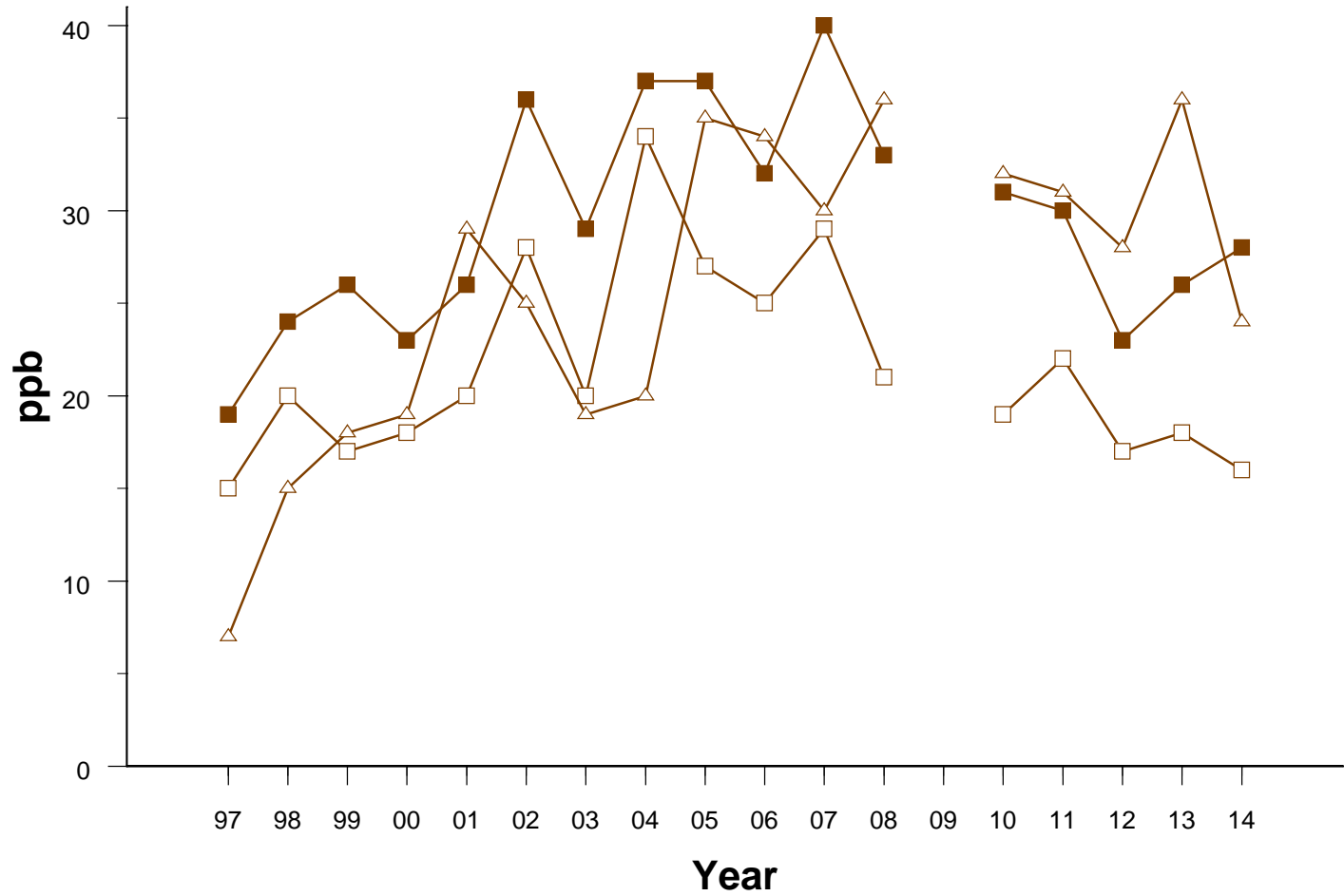
# Substation Site Mean Morning NO<sub>x</sub>/SO<sub>2</sub> Concentrations

- The Substation monitoring site is only about 2.5 miles west of the San Juan Power Plant, an ideal location to monitor air pollutants coming from this facility. Pollutant data gathered when the hourly wind directions are between 70 and 90 compass degrees, and when the hourly wind speeds are above 2 mph (i.e. when the wind speeds are not very light and variable), are used to assess concentrations that would be dominated by San Juan Power Plant emissions.
- Regarding the recent environmental upgrades conducted at the San Juan Power Plant, the ambient NO<sub>x</sub> and SO<sub>2</sub> data show a notable decline in concentrations from 2007 to 2008 (statistically significant). This ambient concentration decline took place when some low-NO<sub>x</sub> burners were being installed and when the efficiency of the limestone SO<sub>2</sub> scrubbers was increased from the addition of dibasic acid to the scrubbing process. An additional decline in ambient NO<sub>x</sub> concentrations took place between 2009 and 2012 before a significant uptick in ambient NO<sub>x</sub> concentrations was recorded in 2013. On December 31, 2013 the Four Corners Power Plant, located about 7 miles to the south of the Substation monitoring site, permanently shut down units 1,2 and 3 (of 5 total units). This resulted in ambient NO<sub>x</sub> emission reductions which contributed to the decrease in ambient NO<sub>x</sub> concentrations recorded at the Substation monitoring site in 2014. Ambient NO<sub>x</sub> concentrations recorded from the direction of the San Juan Power Plant also notably decreased from 2013 to 2014.
- SO<sub>2</sub> concentrations have dropped dramatically from the late 1990's to the present, with a current 2014 concentration of only 1 ppb.

# Navajo Lake Site Mean Morning NOx Concentrations June-August weekday 0400-0700 LST



# Bloomfield Site Mean Morning NOx Concentrations June-August weekday 0400-0700 LST



- all nox
- mobile dominated nox (ne+nw+sw; ws>2mph)
- △ mobile+industry nox (se; ws>2mph)

no NOx data in 2009

# Navajo Lake and Bloomfield Sites Mean Morning NO<sub>x</sub> Concentrations

- Both the Bloomfield and Navajo Lake sites exhibit summer weekday NO<sub>x</sub> diurnal profile peaks during the morning hours 0400-0700 LST. The Substation site, located furthest west, exhibits its summer weekday NO<sub>x</sub> diurnal profile peak two hours later from 0600-0900 LST.
- The Navajo Lake site, a rural site, is impacted primarily from area emissions such as those from oil/gas production. Ambient NO<sub>x</sub> concentrations at this site have decreased from 2006 to 2014, with the 2013-2014 ambient concentrations statistically significantly lower than those recorded from 2006-2008.
- The Bloomfield site is influenced by both mobile source (car/truck) and industry (local refinery) emissions, with the wind sectors to the NE, NW, and SW dominated by mobile source emissions and the SE sector dominated by both industry and mobile source emissions. Overall ambient NO<sub>x</sub> concentrations at this site have significantly decreased since a 2007 peak, with the mobile source dominated wind sectors (i.e. NE, NW, and SW) also showing a decrease in ambient NO<sub>x</sub> concentrations since 2007.
- Similar to the assessment of the NO<sub>x</sub> data at the Substation site, NO<sub>x</sub> pollutant data at the Bloomfield site gathered from the four different wind sectors (i.e. NE, SE, SW and NW) when the hourly wind speeds were above 2 mph (i.e. when the wind speeds were not very light and variable) were used to assess concentrations that would be dominated by mobile sources or a mobile/industrial sources combination. The “all NO<sub>x</sub>” trend used all data and all wind speeds for the time periods specified for analyses.



# Annual and Monthly Mean NO<sub>2</sub> Trends

- Overall long-term trends are down at all three sites in San Juan County. There was a notable decrease in annual NO<sub>2</sub> concentrations at the Substation site from 2013-2014 during the shutdown of Units 1, 2 and 3 at the Four Corners Power Plant.

