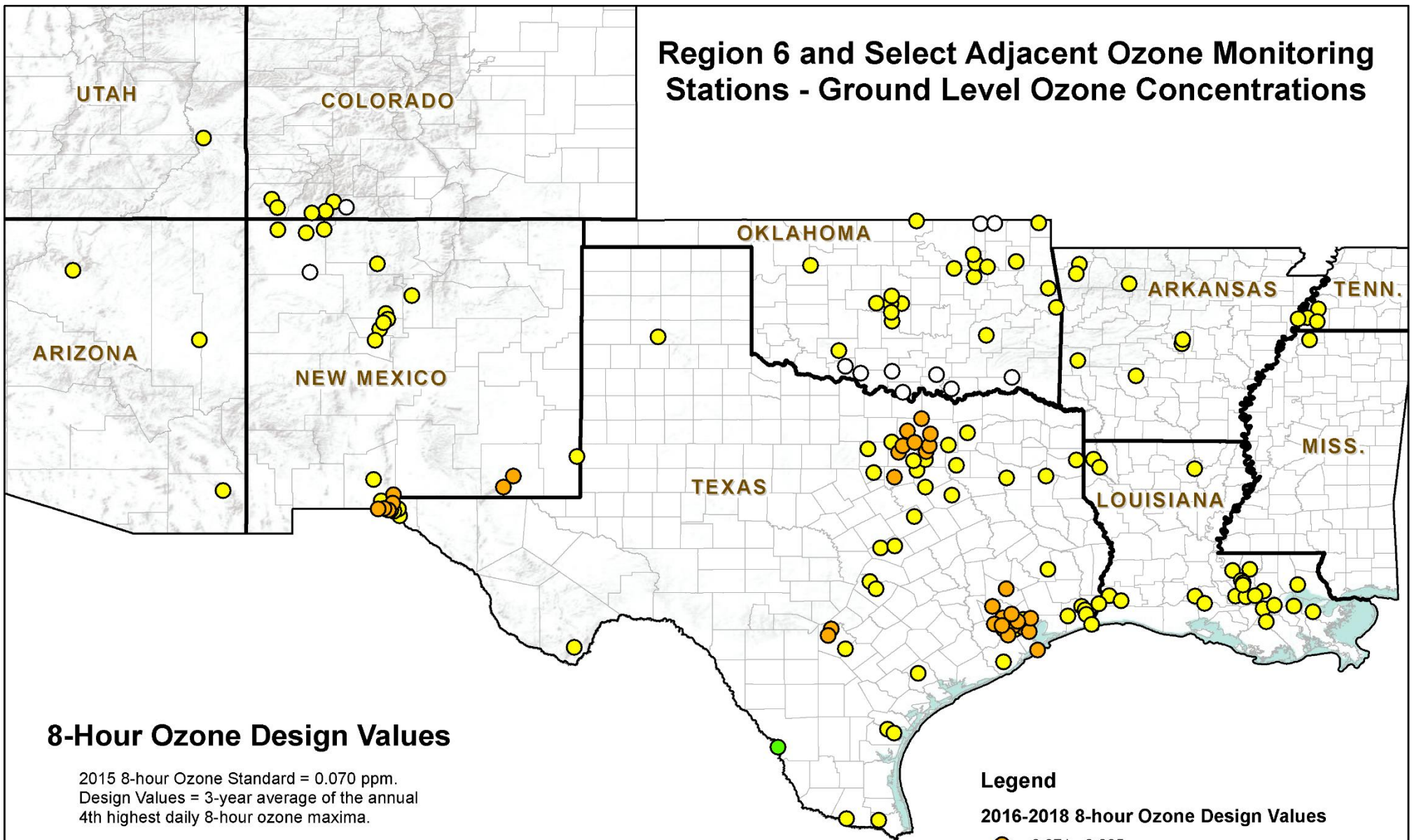


# Four Corners Area O<sub>3</sub>/NO<sub>x</sub>/NH<sub>3</sub>/SO<sub>2</sub> Monitoring Trends Analysis

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Presented at the Four Corners Air Quality Group Meeting  
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# Region 6 and Select Adjacent Ozone Monitoring Stations - Ground Level Ozone Concentrations



## 8-Hour Ozone Design Values

2015 8-hour Ozone Standard = 0.070 ppm.  
 Design Values = 3-year average of the annual  
 4th highest daily 8-hour ozone maxima.

Sources: U.S. EPA AQS Database and State Agency Monitors;  
 USGS National Atlas of the U.S.

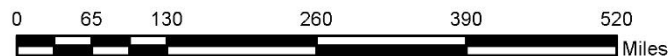
### Legend

#### 2016-2018 8-hour Ozone Design Values

- 0.071 - 0.085 ppm
- 0.055 - 0.070 ppm
- < 0.055 ppm
- Not Enough Data to compute a  
3-year 8-hour ozone design value

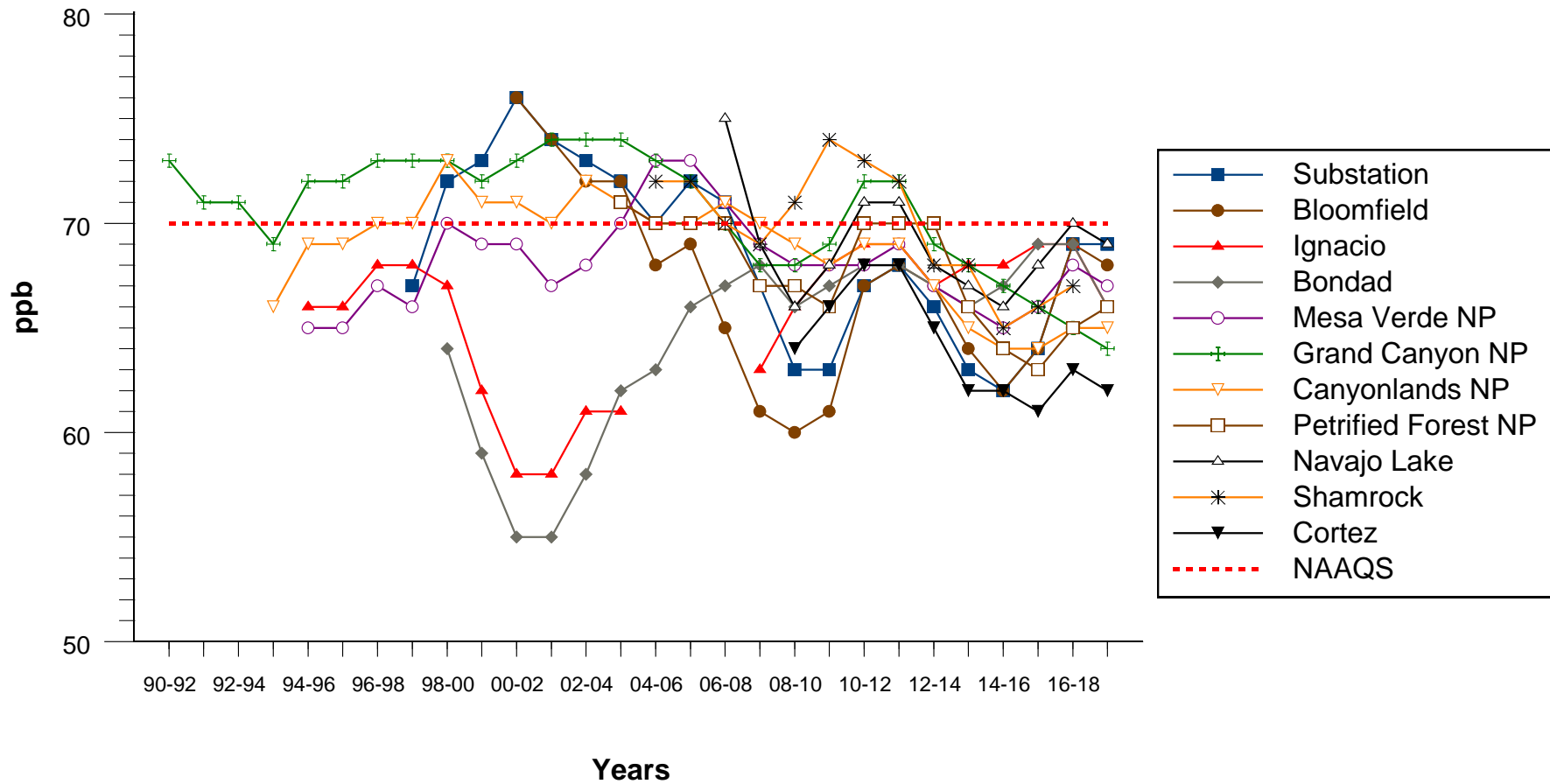


EPA Region 6  
 GIS LCR Division  
 June 12, 2019  
 20190612DEG



# 8-hour Ozone Trends

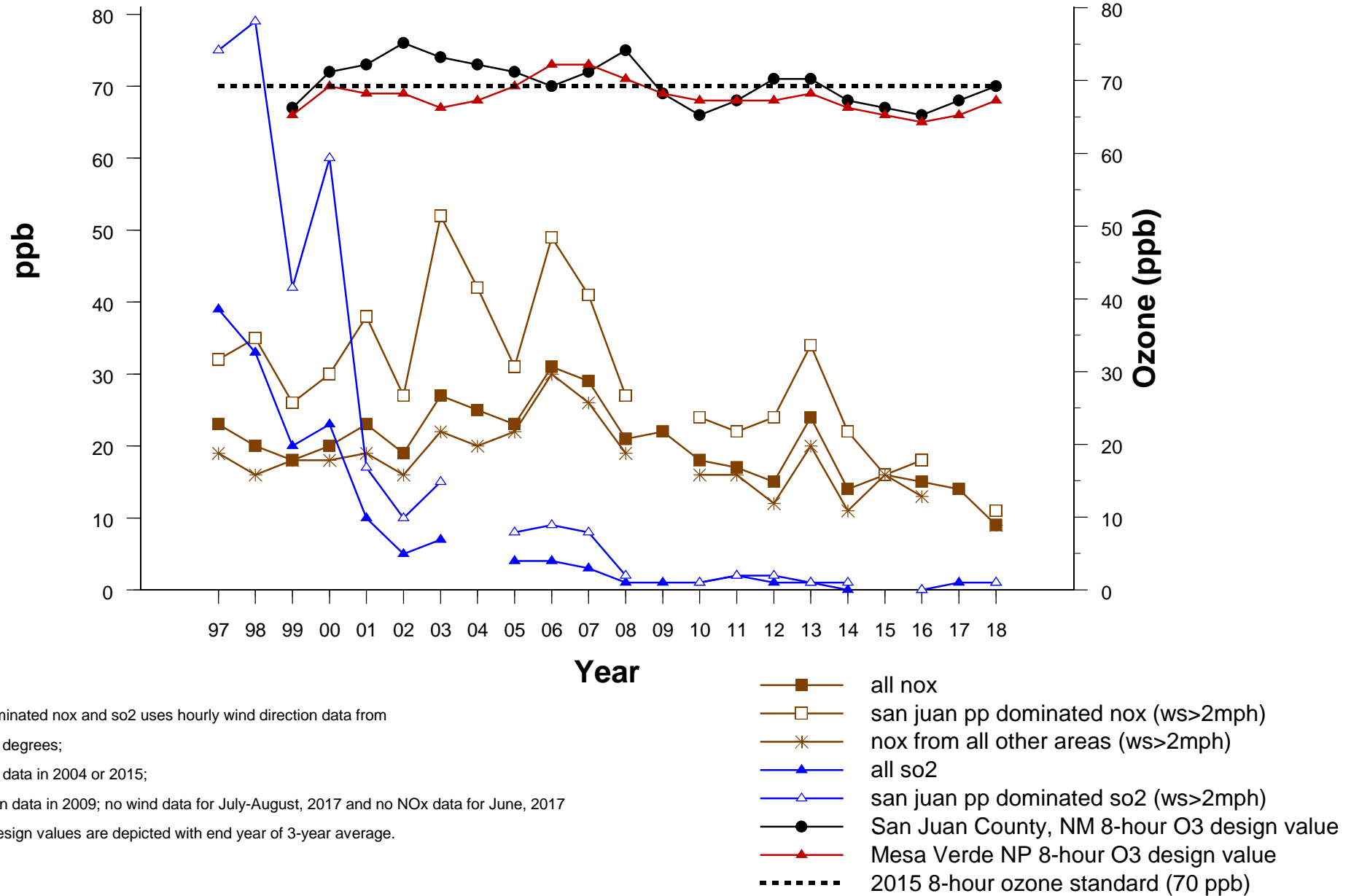
Four Corners Area; 3-year running design values



8-hour ozone design values in the Four Corners Area generally declined in 2019 after an uptick in 2017 and 2018. Preliminary 2017-2019 8-hour ozone design values range from 62 ppb at Cortez, CO to 69 ppb at Navajo Lake and Substation. Initial preliminary 2017-2019 8-hour ozone design values at Pagosa Springs, CO = 63 ppb and at Chaco Culture NHP, NM = 65 ppb.

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

## June-August weekday 0600-0900 LST



san juan pp dominated nox and so2 uses hourly wind direction data from

70-90 compass degrees;

not enough so2 data in 2004 or 2015;

no wind direction data in 2009; no wind data for July-August, 2017 and no NOx data for June, 2017

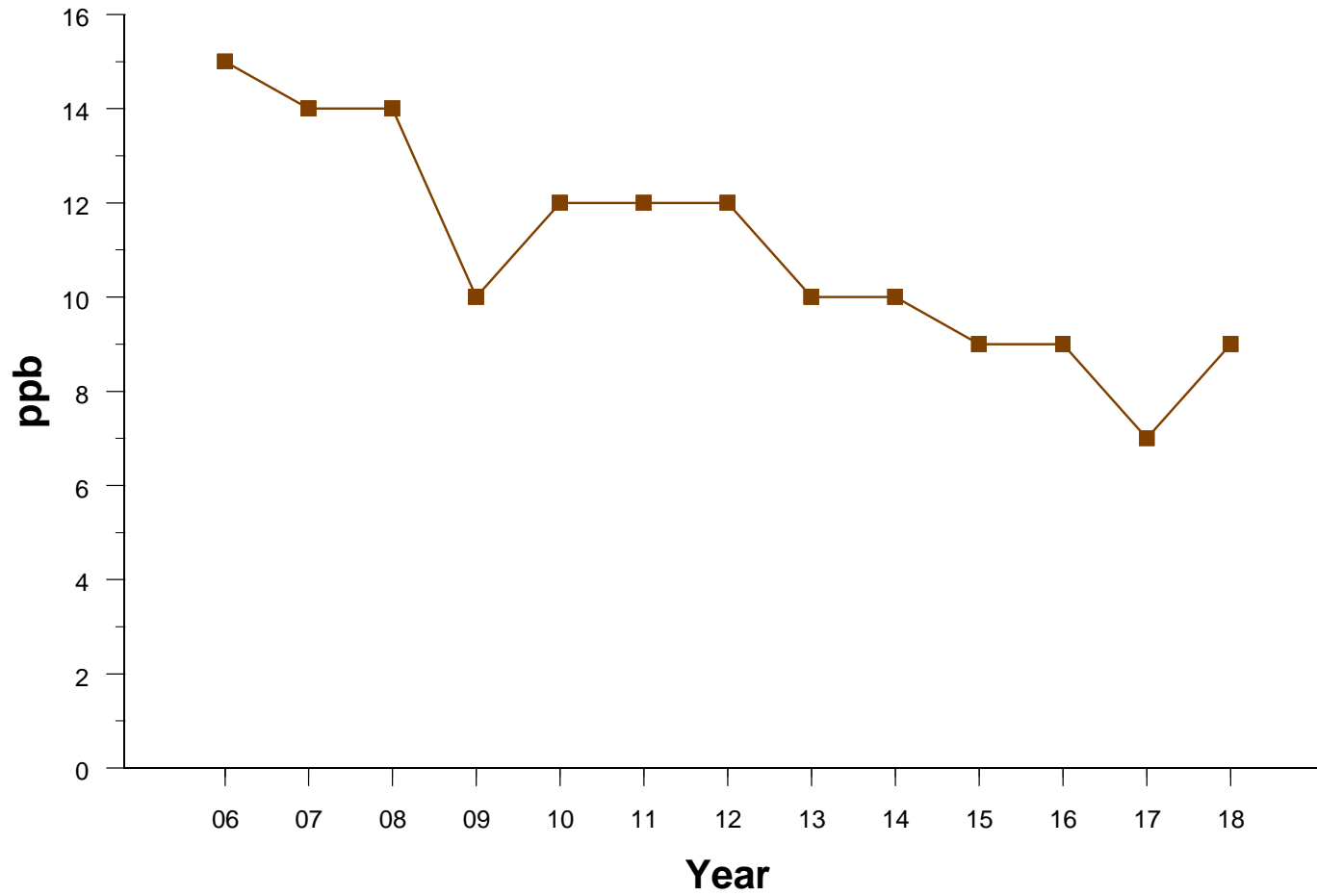
8-hour ozone design values are depicted with end year of 3-year average.

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

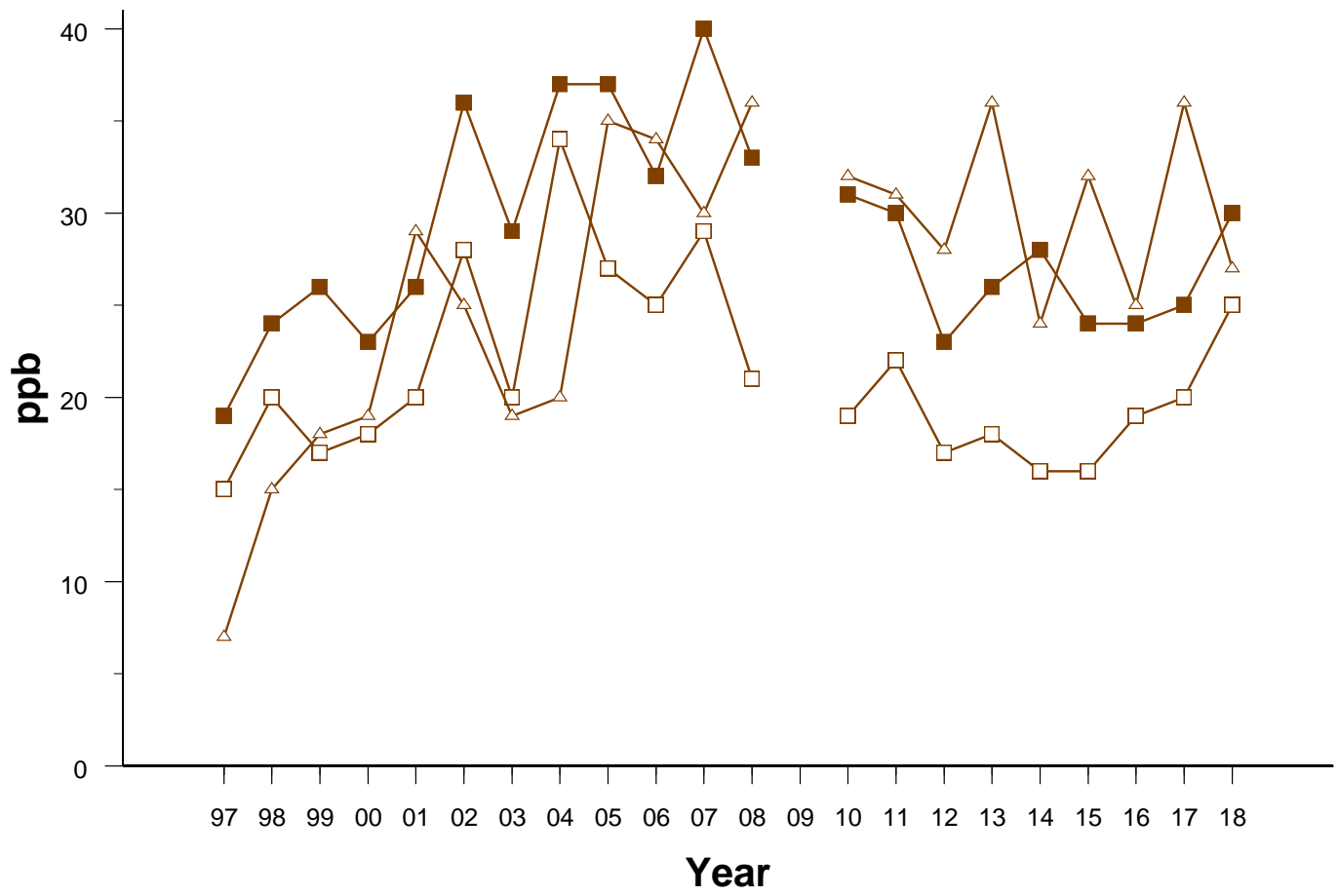
- The Substation monitoring site is about 2.5 miles west of the San Juan Power Plant, an ideal location to monitor air pollutants coming from this facility. Pollutant data gathered when the hourly wind directions are between 70 and 90 compass degrees, and when the hourly wind speeds are above 2 mph (i.e. when the wind speeds are not extremely light and variable), are used to assess concentrations that would be dominated by San Juan Power Plant emissions.
- Regarding 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 in 2018 after the shutdown of two units in December, 2017.
- SO<sub>2</sub> concentrations have dropped dramatically from the late 1990's to the present, with current summer weekday morning concentrations at very low levels.

# Navajo Lake Site Mean Morning NO<sub>x</sub> Concentrations

## June-August weekday 0400-0700 LST



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

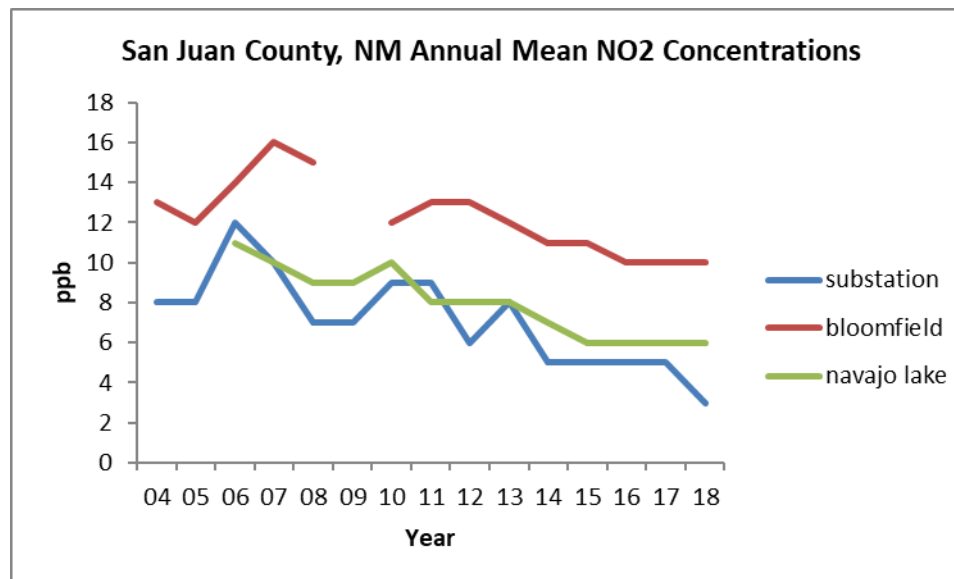


- all nox
- mobile dominated nox (ne+nw+sw; ws>2mph)
- △— mobile+industry nox (se; ws>2mph)

no NOx data in 2009

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

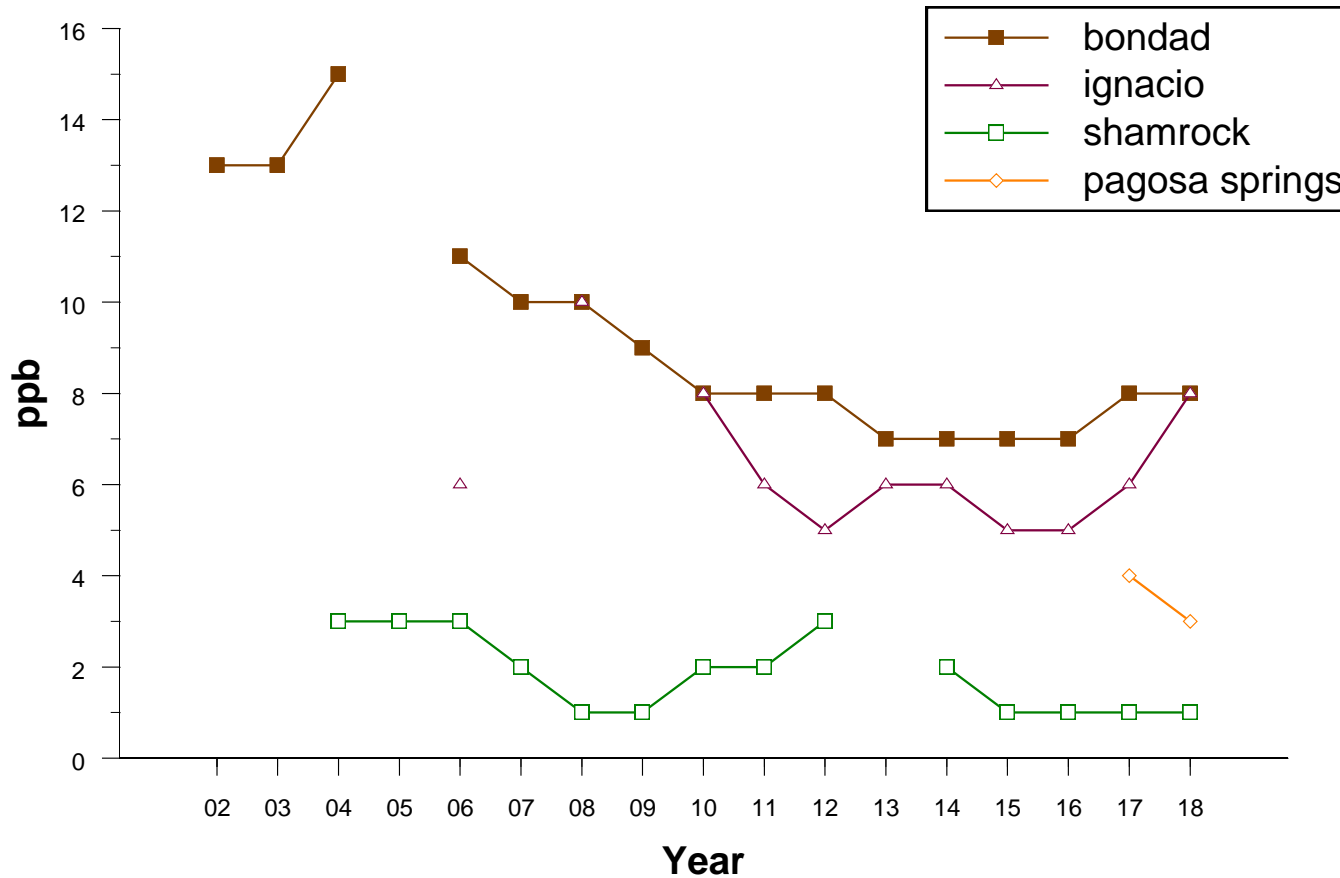
- Overall long-term trends are down at all three sites in San Juan County. There was a notable decrease in annual NO<sub>2</sub> concentrations at the Substation site from 2013-2014 during the shutdown of Units 1, 2, and 3 at the Four Corners Power Plant, and another notable decrease in annual NO<sub>2</sub> concentrations at the Substation site from 2017-2018 during the shutdown of two units at the San Juan Power Plant.





# Southern Colorado Sites Mean Morning NO<sub>x</sub> Concentrations

## June-August weekday; >70% data capture



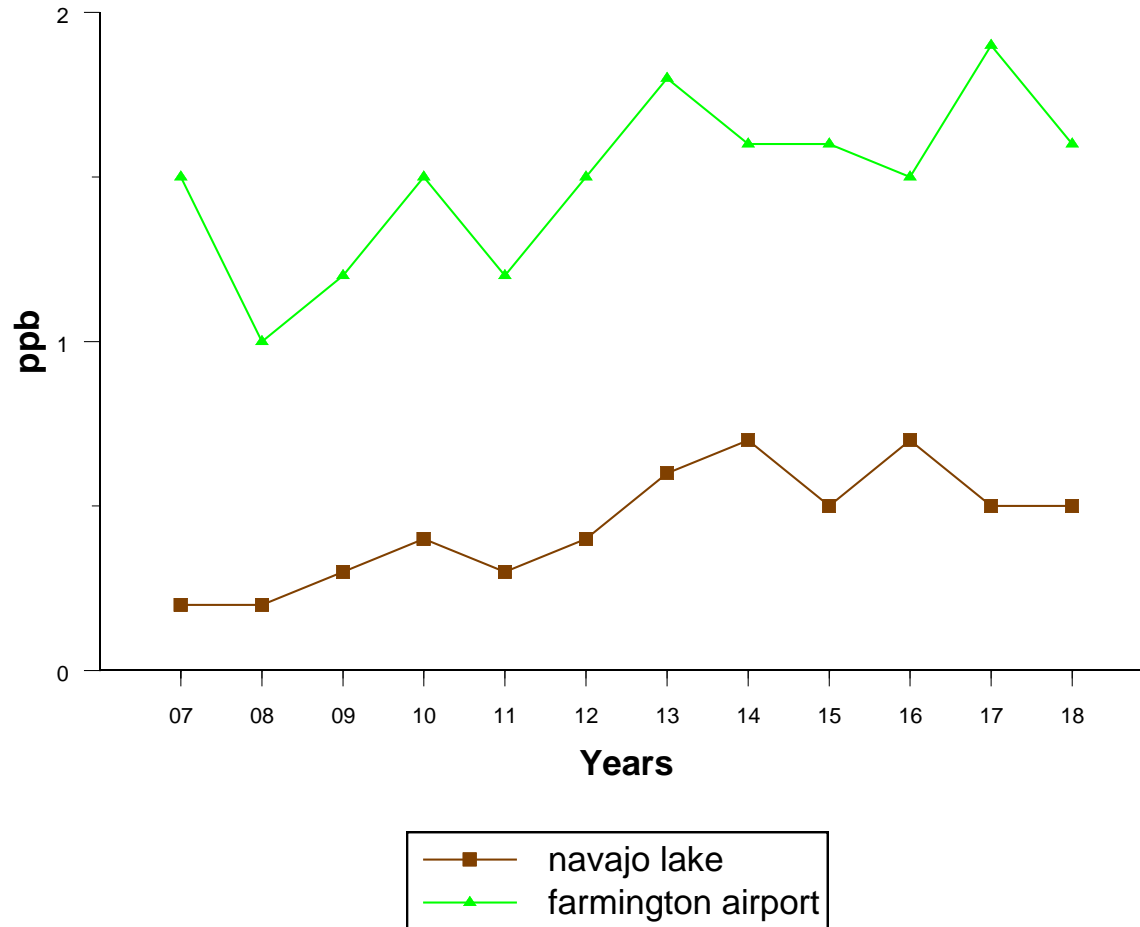
0400-0700 LST for bondad

0500-0800 LST for pagosa springs

0600-0900 LST for ignacio and shamrock

NO<sub>x</sub> concentrations have also been declining in southern Colorado except for a recent uptick at the ignacio site.

**NH<sub>3</sub> Concentration Trends (integrated two-week means over calendar year)**



Ambient ammonia concentrations increased at the navajo lake site with statistical significance from 2007/2008 to 2013/2014, and have remained at generally the same level from 2014-2018.

Similarly, ambient ammonia concentrations increased at the farmington airport site with statistical significance from 2008 to 2013, and have remained at generally the same level from 2013-2018.