

A Preliminary Analysis of New NO_x Data in the DFW Area for 2010

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**DFW Photochemical Modeling Technical Committee
November 5, 2010**

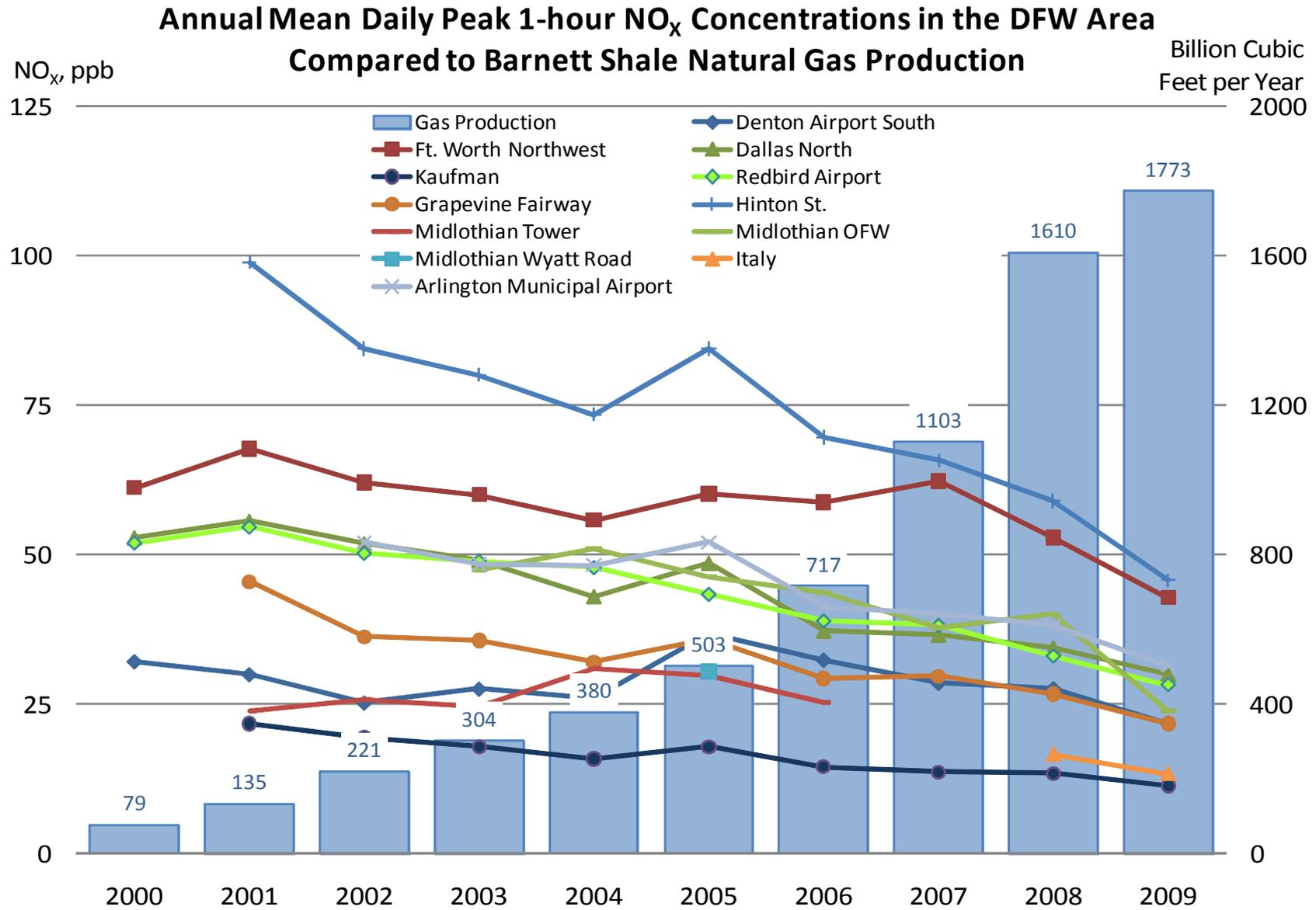


Preliminaries

- This survey reviews the current concentrations of the new NO_x monitors in the Barnett Shale region.
- Data for new monitors are available from early March through early September at the time this document was written. This document only considers data from the above dates.
- All data are derived from the TCEQ-LEADS database as 1-hour averages.
- With less than one years worth of data from the new monitors preliminary conclusions are subject to change as more data is collected in the future.



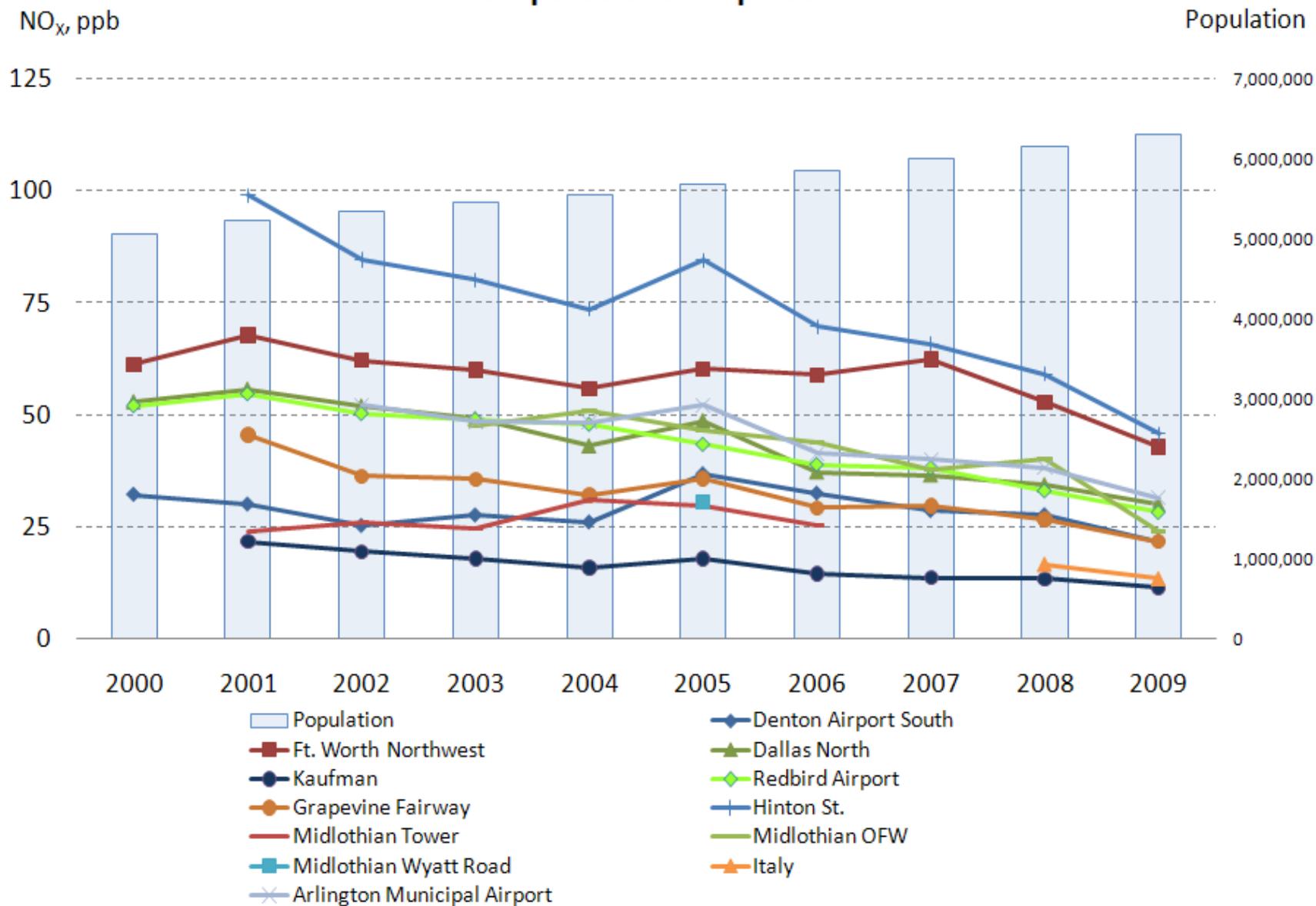
NOx Trends for DFW Area





NOx Trends for DFW Area

Annual Mean Daily Peak 1-hour NO_x Concentrations in the DFW Area Compared DFW Population



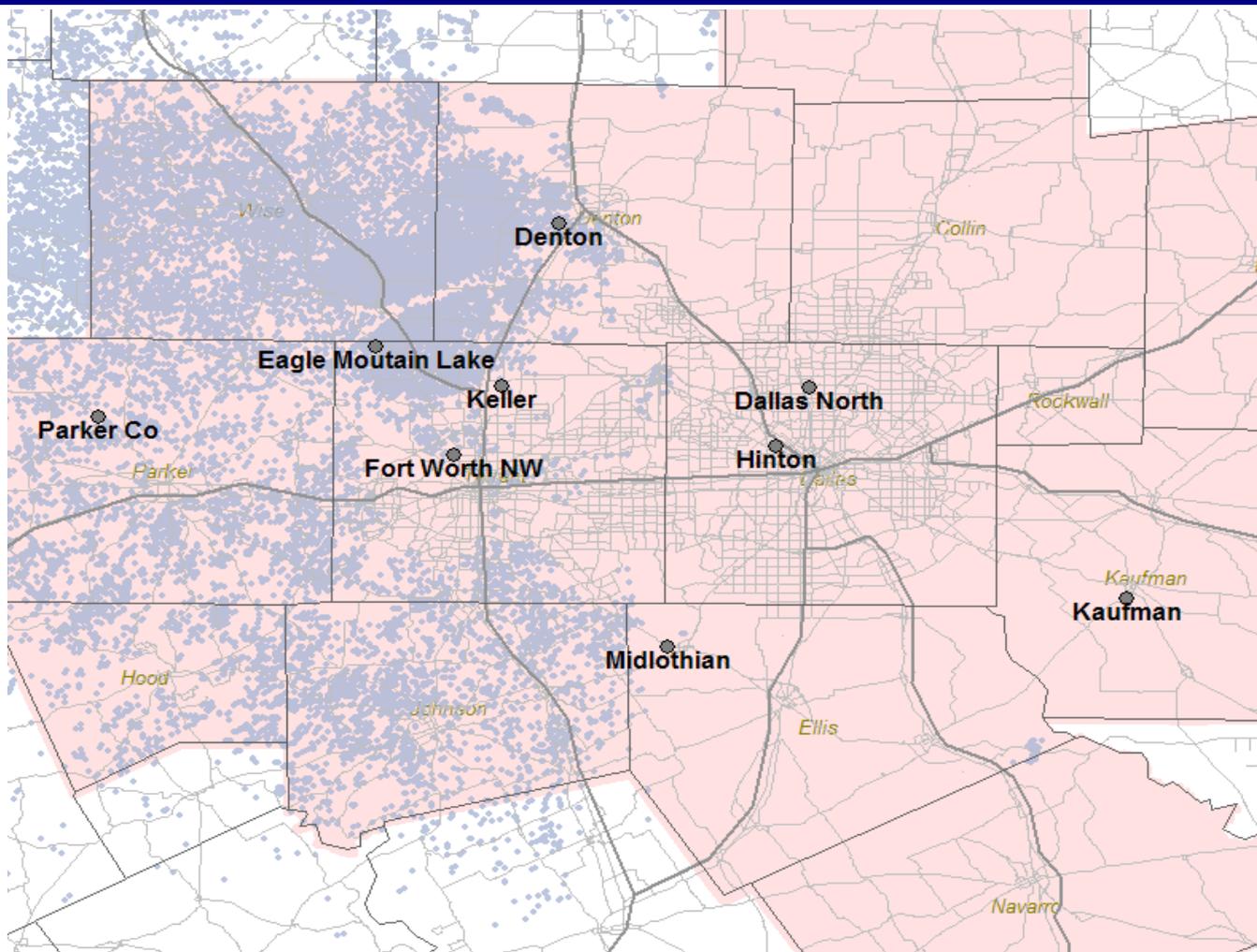


Monitors

Monitor	EPA ID	Description
Fort Worth Northwest	48-439-1002	Urban, heavily populated, mostly automobile emissions with some oil and gas.
Hinton	48-113-0069	Urban, heavily populated, dominated by urban emissions which are mostly automobile.
Dallas North	48-113-0075	Heavily dominated by urban emissions which are mostly automobile.
Eagle Mnt Lake	48-439-0075	Rural with nearby oil and gas activity.
Denton	48-121-0034	Rural with nearby oil and gas activity and small population.
Keller	48-439-2003	Suburban emissions from automobiles and oil and gas.
Midlothian	48-139-001	Rural with nearby cement kilns.
Parker	48-367-0081	Very rural with oil and gas emissions.
Kaufman	48-257-0005	Rural emissions with small local urban emissions.



NOx Monitor Locations



- Gray lines represent major roads
- Blue dots represent oil and gas activity
- Round gray dots represent monitors used in this document

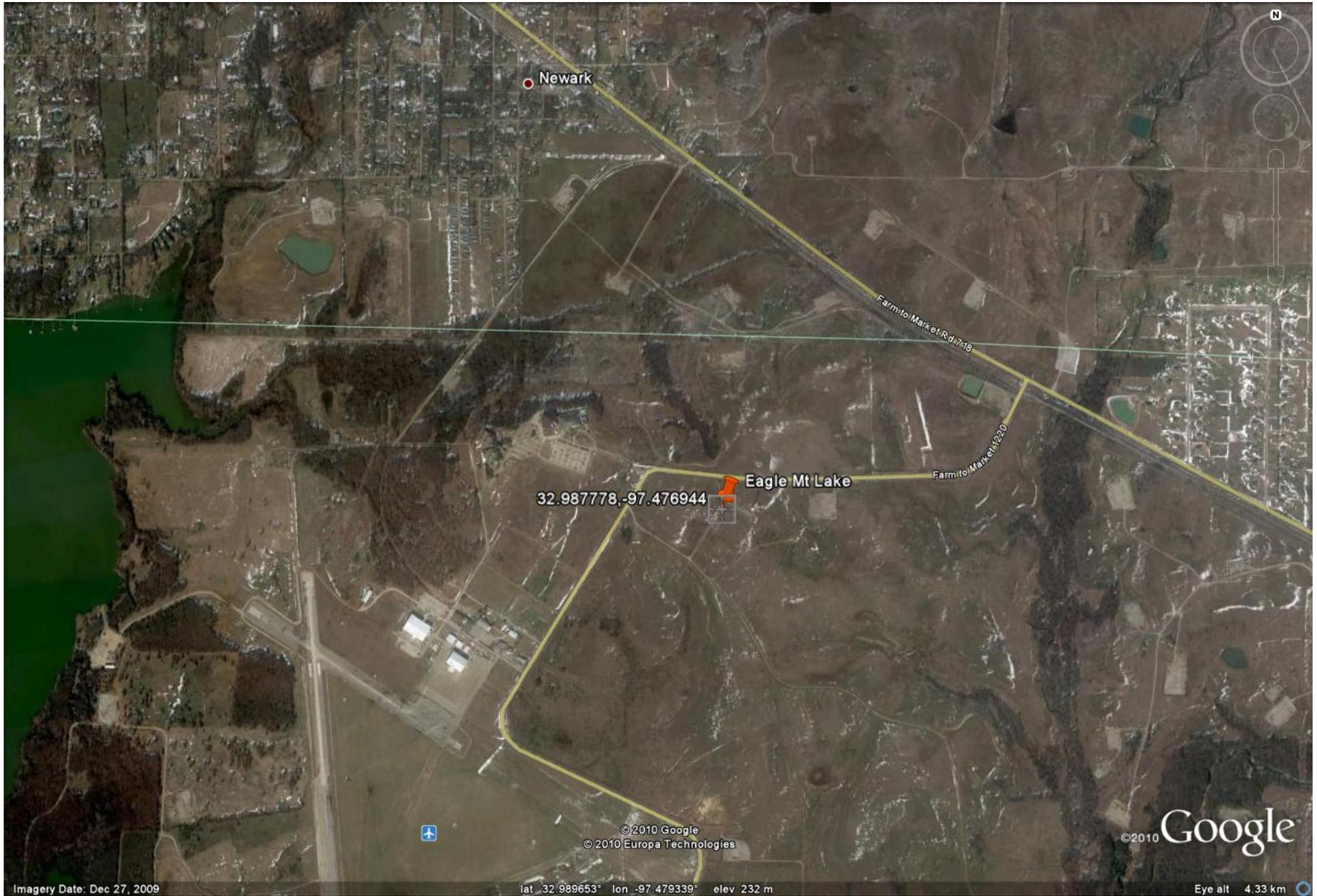


Parker Co NOx Monitor Location



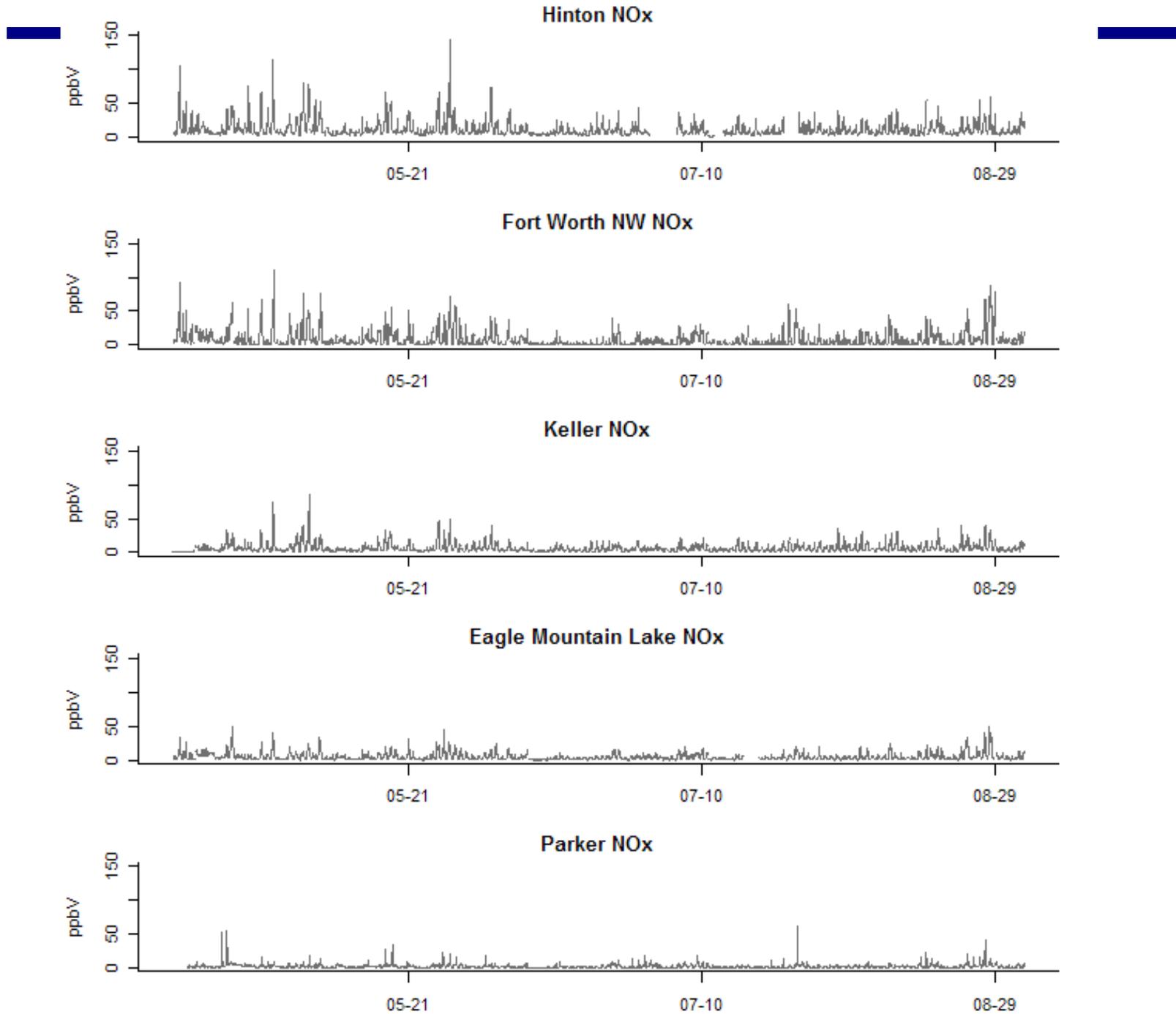


Eagle Mt Lake NOx Monitor Location





Time Series, March 2010 to Present





NOx Averages by Monitor

Ordered by the Mean Concentration

Rank by Mean	Monitor Name	Mean, ppb	Nearby Emission Types
1	Hinton	15	Urban/Auto
2	Fort Worth North West	10	Urban/Auto
3	Dallas North	10	Urban/Auto
4	Midlothian	7	Rural/Kiln
5	Denton	6	Small Population/Auto/Oil & Gas
6	Keller	6	Suburban/Oil & Gas
7	Eagle Mountain Lake	5	Rural/Oil & Gas
8	Kaufman	4	Small Population
9	Parker	2	Rural/Oil & Gas

Values have been rounded.



NOx 90th Percentile by Wind Direction

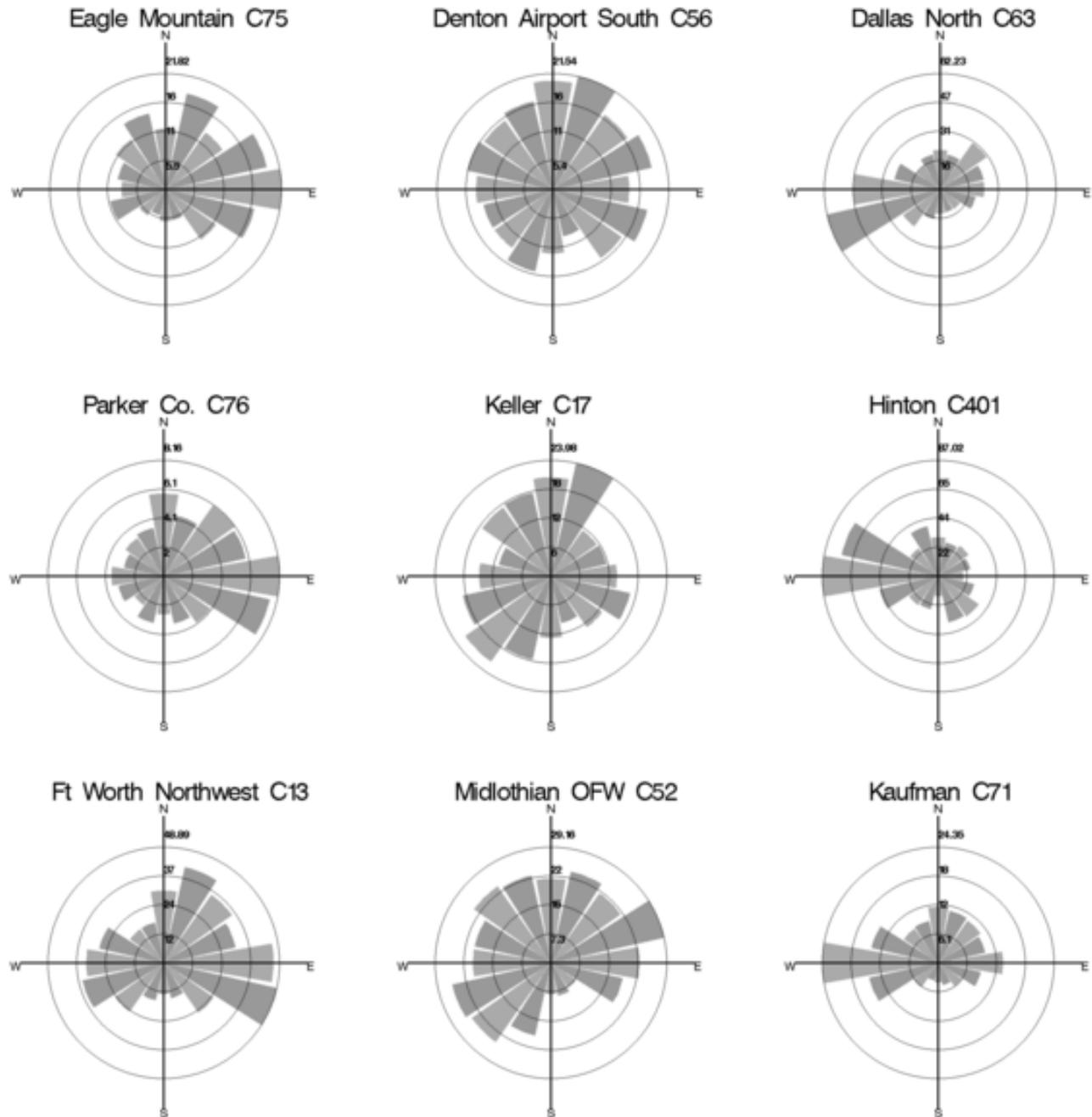
Hourly NO_x data by 22.5 deg wind bins.

Note:
The response axes are not uniform from monitor to monitor.

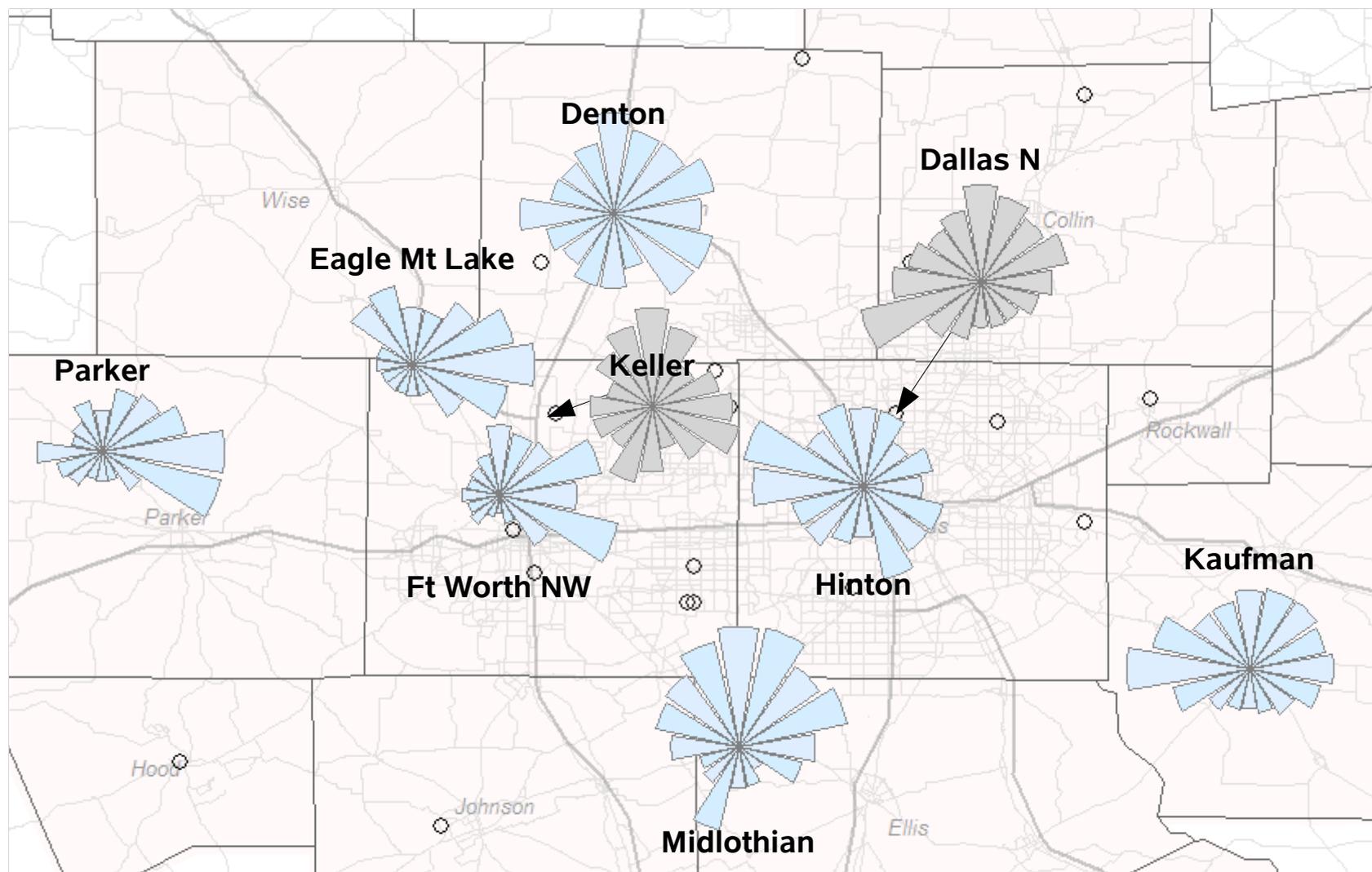
The NO_x 90th percentile in units of ppb.

Similar results for other percentiles such as 75th and 50th for all monitors.

Parker Co and Eagle Mt Lake show the strongest concentrations from the east.



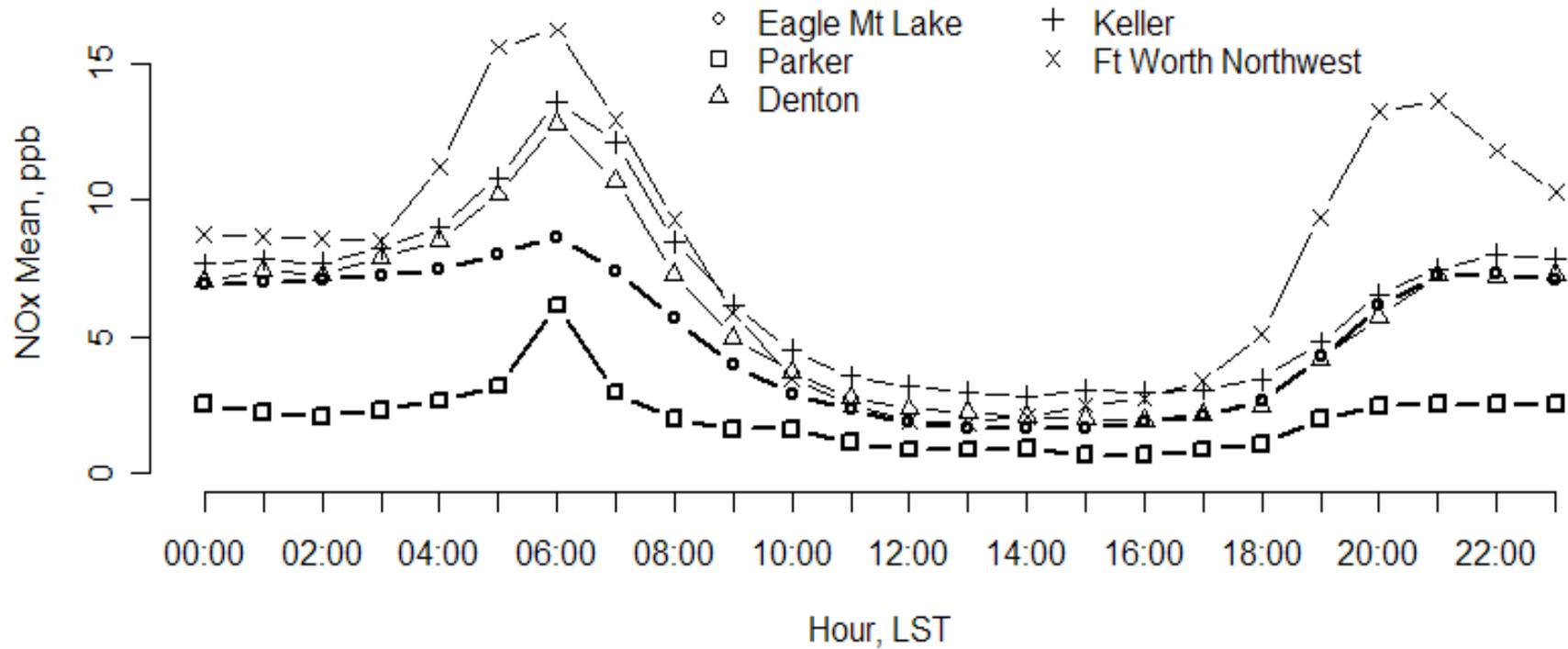
NOx 90th Percentile by Wind Direction



Note that the pollution-roses are not uniformly scaled and the colors do not have meaning other than to indicate that the pollution-rose is not centered over the monitor (in gray; Dallas N and Keller). This is intentionally done to show the detail in the pollution-roses. The purpose is to show the wind directions with the largest concentrations.



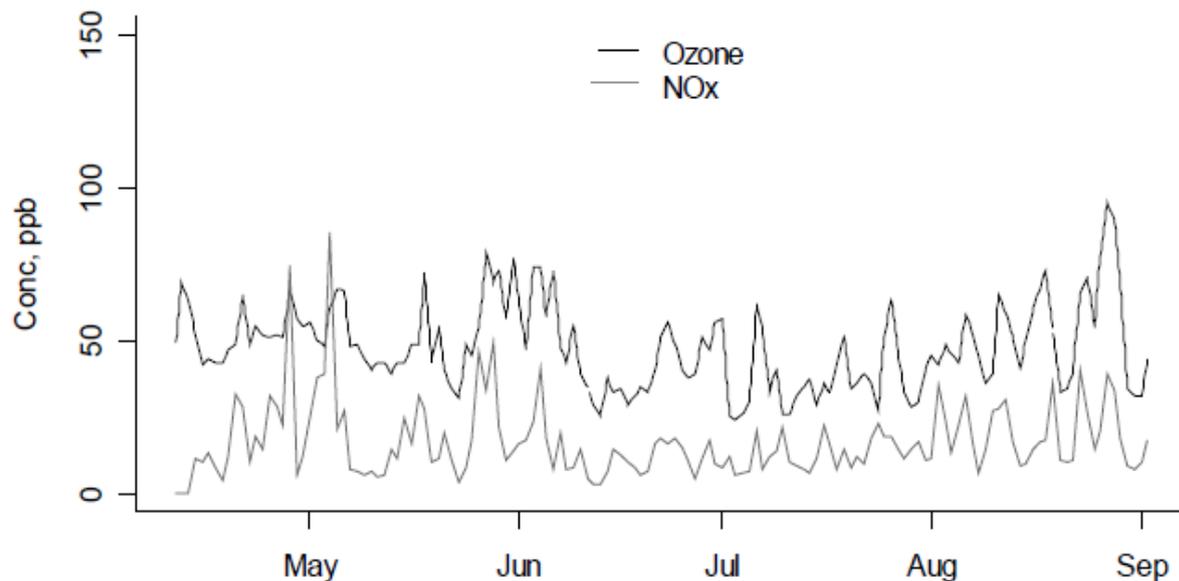
Diurnal NO_x Mar-Aug, 2010





Daily NO_x Association to Daily Ozone

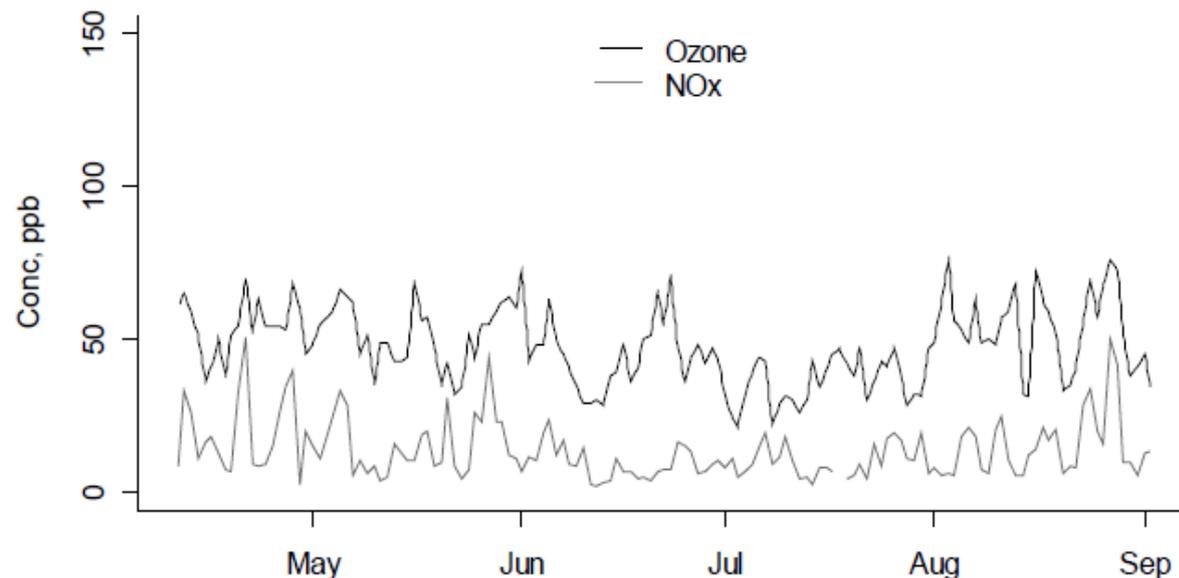
Parker Daily Max NO_x and Ozone



The time-series plots do show some association between NO_x and ozone, but only some of the time.

Possibly, the differences are due to local NO_x sources.

Eagle Mt Lake Daily Max NO_x and Ozone



For the monitors of Parker Co, Eagle Mt Lake, Keller and Denton the correlation of NO_x to ozone was quantified and found to have R² ~ 0.25 at best. This was done using the daily max of ozone and NO_x.



Preliminary Observations

- NO_x monitors in the urban DFW area have downward trends.
- **Monitors in the oil and gas fields, such as Parker Co and Eagle Mt Lake do not show higher NO_x averages than urban monitors.**
- The maximum concentration of Parker Co and Eagle Mt Lake are at least half of urban sites as defined in this document.
- Parker Co and Eagle Mt Lake NO_x averages are similar to Kaufman, which are all considered to be rural sites.
- Parker Co and Eagle Mt Lake show that winds from the east carry the higher NO_x concentrations.



Questions/Comments

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