

NETWORK ASSESSMENT & DESIGN

Darren Palmer

US EPA Region 4

Region 4 Air Monitoring QA Training

September 19, 2019

GOALS

WHAT DO WE HOPE TO ACCOMPLISH?

- 5-year Network Assessment
- Network Design

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum**, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum, if the network meets the monitoring objectives defined in appendix D to this part**, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum**, if the network meets the monitoring objectives defined in appendix D to this part, **whether new sites are needed**, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum**, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, **whether existing sites are no longer needed and can be terminated**, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum**, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, **and whether new technologies are appropriate for incorporation into the ambient air monitoring network**. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum**, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. **The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals** (e.g., children with asthma), and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies. The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

40 CFR PART 58.10(D)

The state, or where applicable local, agency shall perform and submit to the EPA Regional Administrator an assessment of the air quality surveillance system every 5 years to **determine, at a minimum**, if the network meets the monitoring objectives defined in appendix D to this part, whether new sites are needed, whether existing sites are no longer needed and can be terminated, and whether new technologies are appropriate for incorporation into the ambient air monitoring network. The network assessment must consider the ability of existing and proposed sites to support air quality characterization for areas with relatively high populations of susceptible individuals (e.g., children with asthma), **and, for any sites that are being proposed for discontinuance, the effect on data users other than the agency itself, such as nearby states and tribes or health effects studies.** The state, or where applicable local, agency must submit a copy of this 5-year assessment, along with a revised annual network plan, to the Regional Administrator. The assessments are due every five years beginning July 1, 2010.

NETWORK ASSESSMENTS

THE OLD (AND STILL CURRENT)...

- 40 CFR Part 58.10(d)
- Due every 5 years – July 1, 2020
- Can be submitted along with the annual plan or separately
- Region 4 Guidance

NETWORK ASSESSMENT TECHNICAL GUIDANCE

<https://www3.epa.gov/ttn/amtic/network-assessment.html>

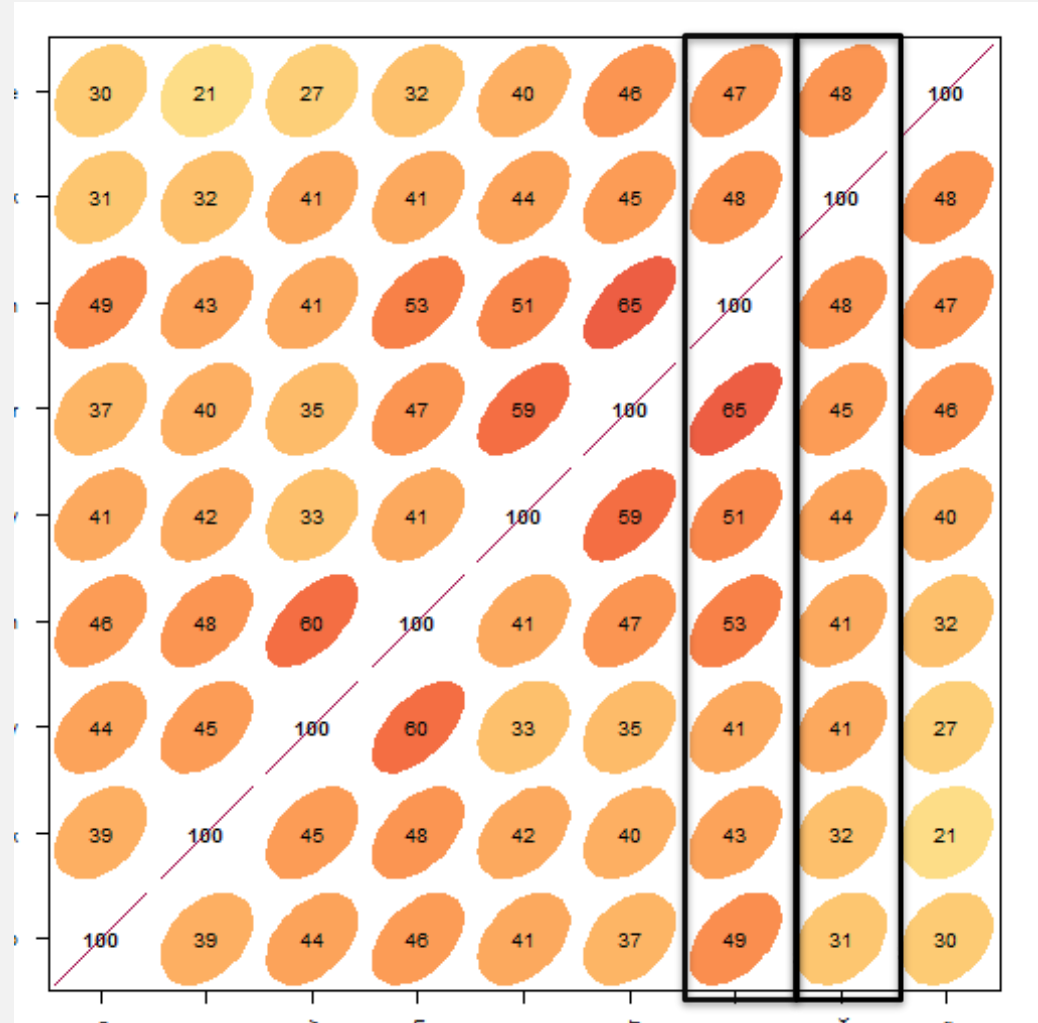
STEP	DESCRIPTION	EXAMPLES
1	Prepare or update a regional description, discussing important features that should be considered for network design.	Topography, climate, population, demographic trends, major emissions sources, and current air quality conditions
2	Prepare or update a network history that explains the development of the air monitoring network over time and the motivations for network alterations, such as shifting needs or resources.	Historical network specifications (e.g., number and locations of monitors by pollutant and by year in graphical or tabular format); history of individual monitoring sites
3	Perform statistical analyses of available monitoring data. These analyses can be used to identify potential redundancies or to determine the adequacy of existing monitoring sites	Site correlations, comparisons to the NAAQS, trend analysis, spatial analysis, and factor analysis

NETWORK ASSESSMENT TECHNICAL GUIDANCE

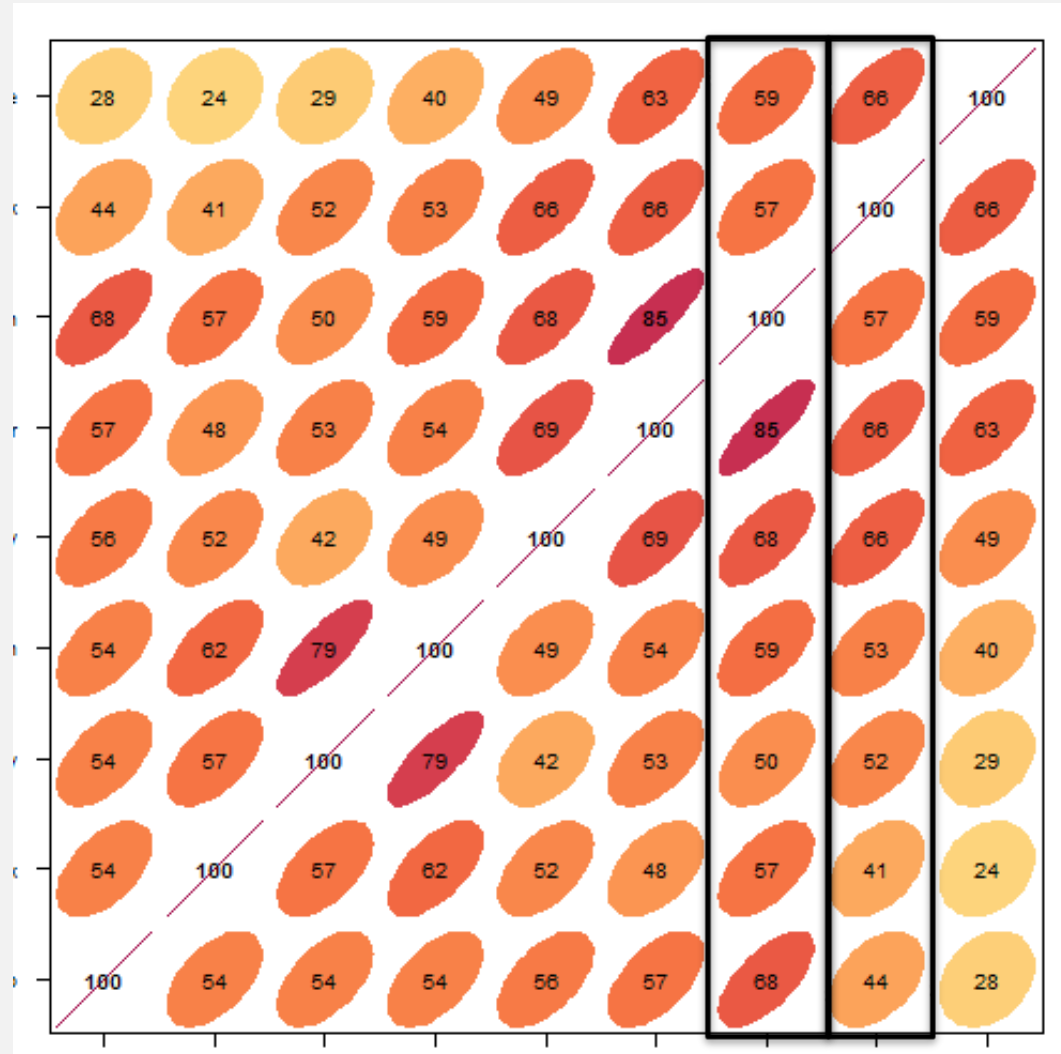
STEP	DESCRIPTION	EXAMPLES
4	Perform situational analyses, which may be objective or subjective. These analyses consider the network and individual sites in more detail, taking into account research, policy, and resource needs.	Risk of future NAAQS exceedances, demographic shifts, requirements of existing SIP or maintenance plans, density or sparseness of existing networks, scientific research or public health needs, and other circumstances (such as political factors)
5	Suggest changes to the monitoring network on the basis of statistical and situational analyses and specifically targeted to the prioritized objectives and budget of the air monitoring program.	Reduction of number of sites for a selected pollutant, enhanced leveraging with other networks , and addition of new measurements at sites to enhance usefulness of data
6	Acquire the input of state and local agencies or stakeholders and revise recommendations as appropriate	

EXAMPLES OF VISUAL STATISTICAL ANALYSES

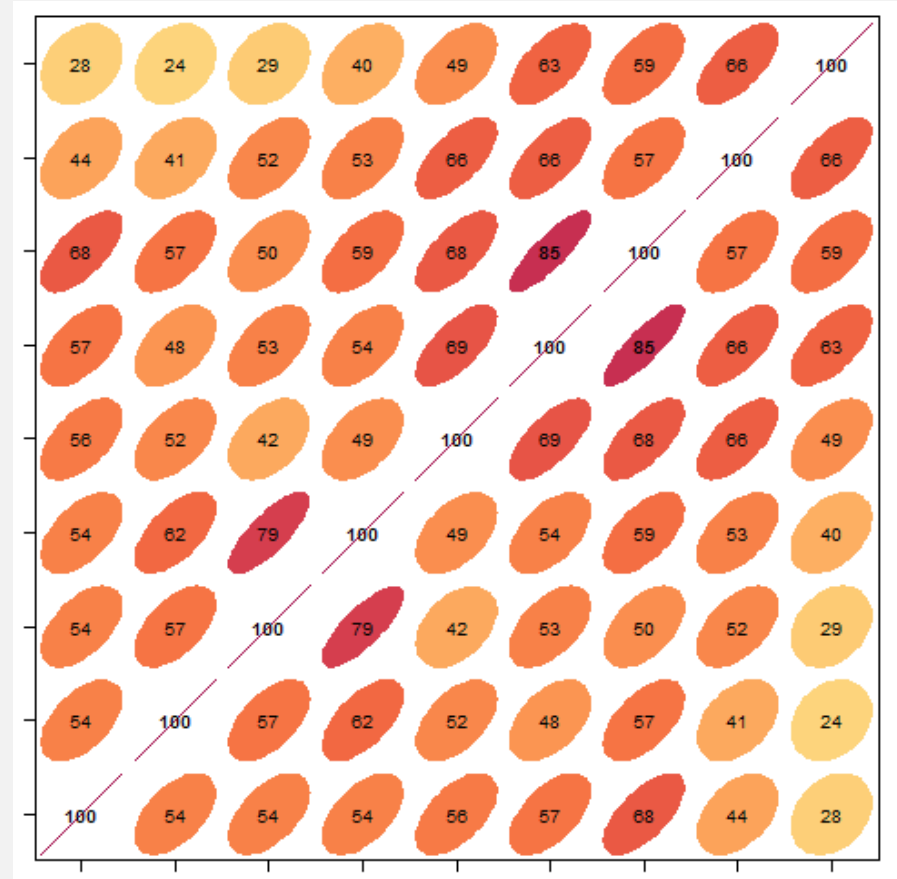
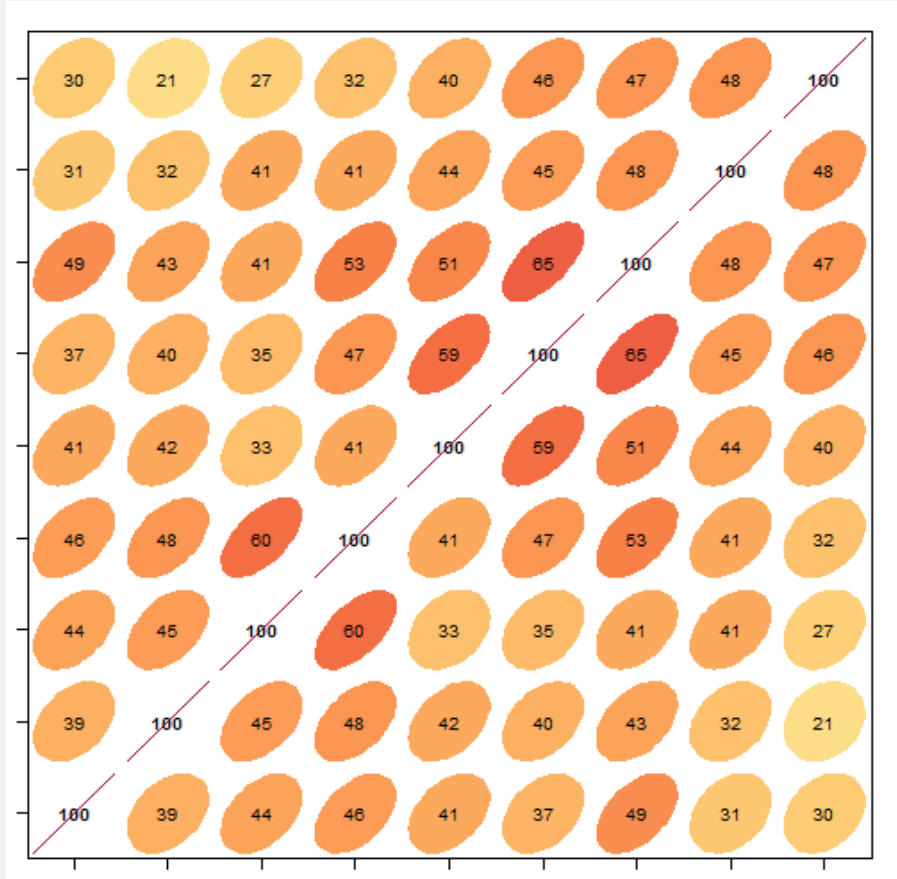
CORRELATION PLOT FOR HOURLY OZONE DATA GREATER THAN 60 PPB, 2011-2014



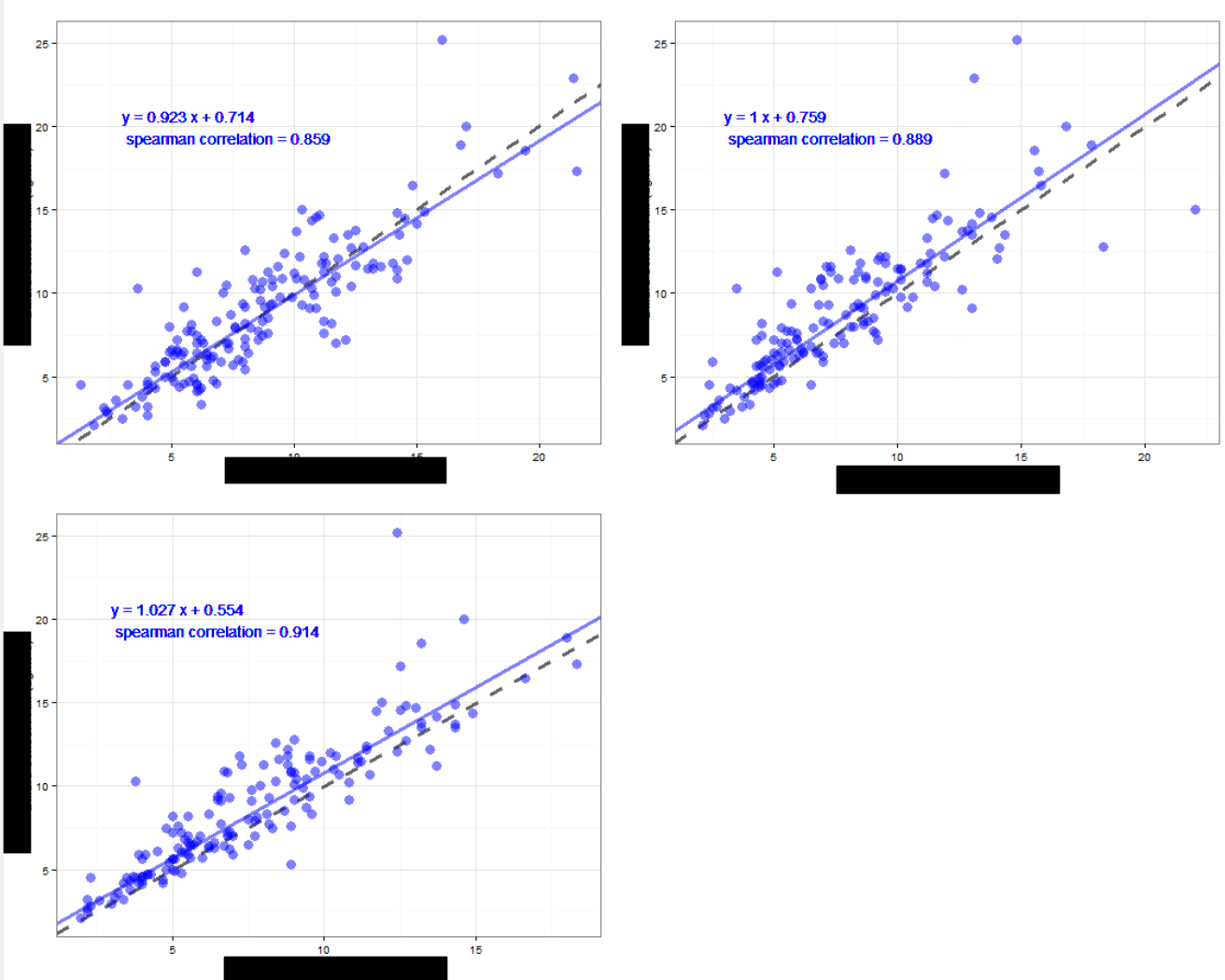
CORRELATION PLOT FOR MAX DAILY 8-HR OZONE DATA GREATER THAN 60 PPB, 2011-2014



CORRELATION PLOTS – 1HR & 8HR OZONE DATA > 60 PPB, 2011-2014



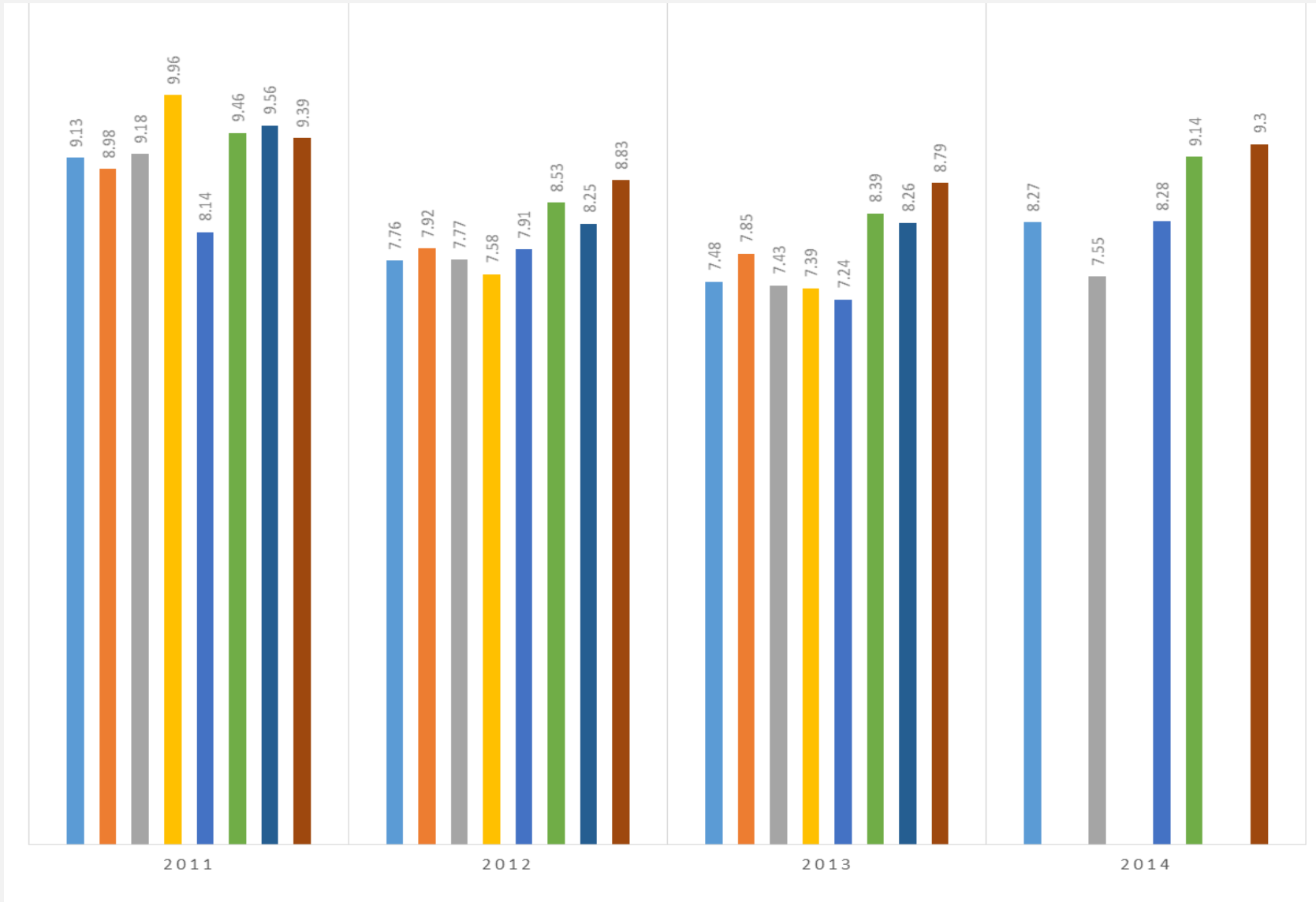
SIMPLE REGRESSION ANALYSES



Linear model of data using a Theil-Sen regression (a non-parametric model which is not as affected by outliers)

We can assist agencies in creating these plots.

SITE COMPARISON – DATA HISTORY



NETWORK ASSESSMENTS

THE NEW ...

- Network Assessments
 - New regulatory requirements
 - Pb source waivers (40 CFR Part 58 App. D 4.5(a)(ii))
 - New regional requirements - waivers
 - Siting Criteria
 - Minimum Monitoring Requirements
 - QA related
 - Delay seasonal monitoring start day
 - Others?

QUESTIONS?

???

NETWORK DESIGN ADEQUATE VS. MINIMUM

- 40 CFR Part 58 Appendix D
 - Population
 - Concentration
 - Emissions
 - Upwind / Downwind
 - Background / Transport
- 40 CFR Part 58 Appendix A
 - PQAQ Collocation

NETWORK DESIGN ADEQUATE VS. MINIMUM

- Largest MSA/CBSA's
 - Relative to Population
 - Relative to Area
 - Relative to Distribution
 - Relative to Topography
 - Relative to Meteorology

NETWORK DESIGN ADEQUATE VS. MINIMUM

“...The total number of monitoring sites that will serve the variety of data needs **will be substantially higher** than these minimum requirements provide. The optimum size of a particular network involves trade-offs among data needs and available resources.”

40 CFR Part 58 App. D 1.1.2

QUESTIONS?

Darren Palmer

palmer.darren@epa.gov