



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF  
AIR QUALITY PLANNING  
AND STANDARDS

July 24, 2023

**MEMORANDUM**

**SUBJECT:** Correction to Errors in Six Figures of Chapter 6 of the *Policy Assessment for the Review of the Secondary National Ambient Air Quality Standards for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter, External Review Draft*

**FROM:** Erika N. Sasser, Director  
Health and Environmental Impacts Division  
Office of Air Quality Planning and Standards  
United States Environmental Protection Agency

**TO:** Aaron Yeow, Designated Federal Officer  
Clean Air Scientific Advisory Committee  
EPA Science Advisory Board Staff Office

On June 1, 2023, the EPA released the *Policy Assessment for the Review of the Secondary National Ambient Air Quality Standards for Oxides of Nitrogen, Oxides of Sulfur and Particulate Matter, External Review Draft* (draft PA), which was the subject of the June 28-29, 2023 public meeting of the Clean Air Scientific Advisory Committee (CASAC) Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter Secondary National Ambient Air Quality Standards (NAAQS) Panel. Analyses by EPA staff in consideration of comments made by the Panel during the public meeting identified an error in a data file that affected six of the figures in Chapter 6 of the draft PA.

Following identification and correction of the data file error, EPA staff have completed additional quality assurance reviews to ensure that the impact of the error was limited to the six figures. No other figures or analyses in Chapter 6 were affected.

Consistent with suggestions made by Panel members during the public meeting, we have further investigated the relationships of the variables graphed in the affected figures to better understand key influences on the patterns observed. For example, the second attachment includes versions of each of the corrected figures presenting only East and only West locations. These figures are consistent with observations noted in Chapters 2 and 6 regarding distinctions between the eastern and western U.S. in PM<sub>2.5</sub> composition. More specifically, these figures indicate the stronger influence of nitrogen species on PM<sub>2.5</sub> concentrations in the eastern as compared to the western U.S.

Additionally, while the corrected figures differ from those in the June 2023 draft PA, the overarching observations made from the figures that informed conclusions reached in Chapter 7 regarding N deposition, NO<sub>2</sub> and PM<sub>2.5</sub> were not significantly affected. These observations were summarized in the slides presented to the Panel by EPA staff on the morning of June 29 and the conclusions are summarized on pages 7-29 through 7-30 of the draft PA.

With regard to NO<sub>2</sub> and PM<sub>2.5</sub>, trajectory analyses examined relationships between N deposition and annual average NO<sub>2</sub> and PM<sub>2.5</sub> (3-year average metrics). Correlation between NO<sub>2</sub> metric and N deposition was somewhat low, while correlation between PM<sub>2.5</sub> metric and N deposition was stronger, although with considerable scatter, particularly in the more recent time periods. In consideration of the limitations of the available information, the draft PA identifies three options for consideration with regard to protection from effects of N oxides and N deposition depending on the judgments made concerning limitations and associated uncertainties of the available information. The options include retaining the existing NO<sub>2</sub> and PM<sub>2.5</sub> standards without revision; revision of the level of the PM<sub>2.5</sub> annual secondary standard within a range from the current level of 15 ug/m<sup>3</sup> down to a level as low as 12 ug/m<sup>3</sup>, recognizing increasing uncertainty with lower levels; and, consideration of revision to the level of the existing secondary NO<sub>2</sub> annual standard within a range from the current level of 53 ppb down to a level as low as 40 ppb.

I am requesting that you forward this memorandum and attachments to the CASAC and CASAC Panel for their consideration ahead of the public meeting to be held on September 5-6, 2023.

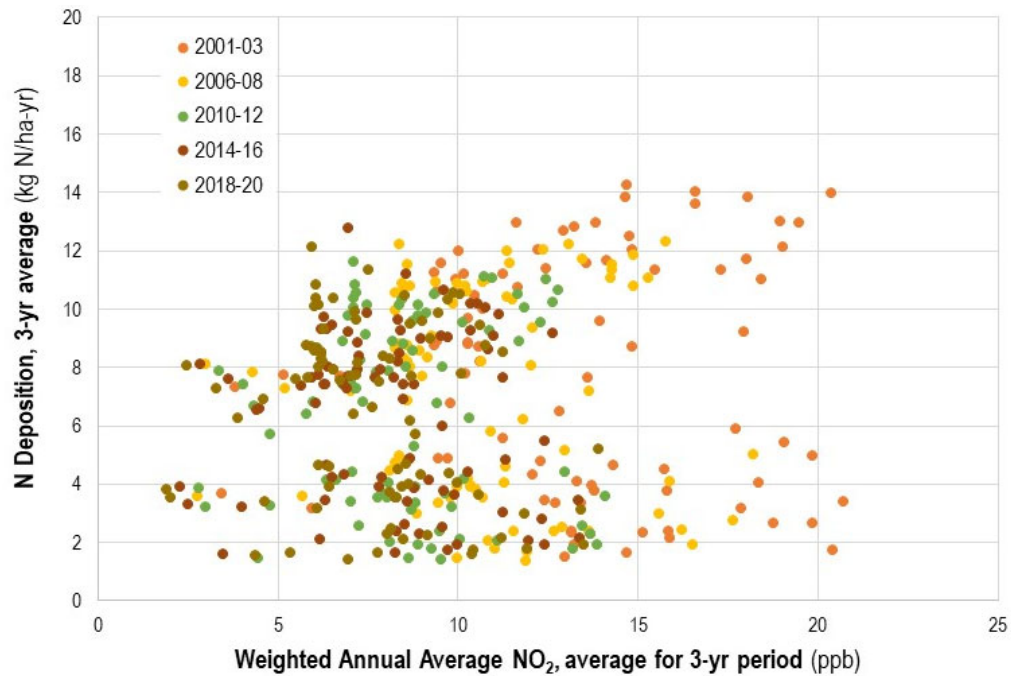
Should you have any questions regarding this memo, please contact me (919-541-3889; email [sasser.erika@epa.gov](mailto:sasser.erika@epa.gov)) or Karen Wesson, of my staff (919-541-3515; email [Wesson.karen@epa.gov](mailto:Wesson.karen@epa.gov)).

cc: Tom Brennan, SAB, OA  
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Steve Dutton, ORD/CPHEA  
Steve McDow, ORD/CPHEA  
Tara Greaver, ORD/CPHEA

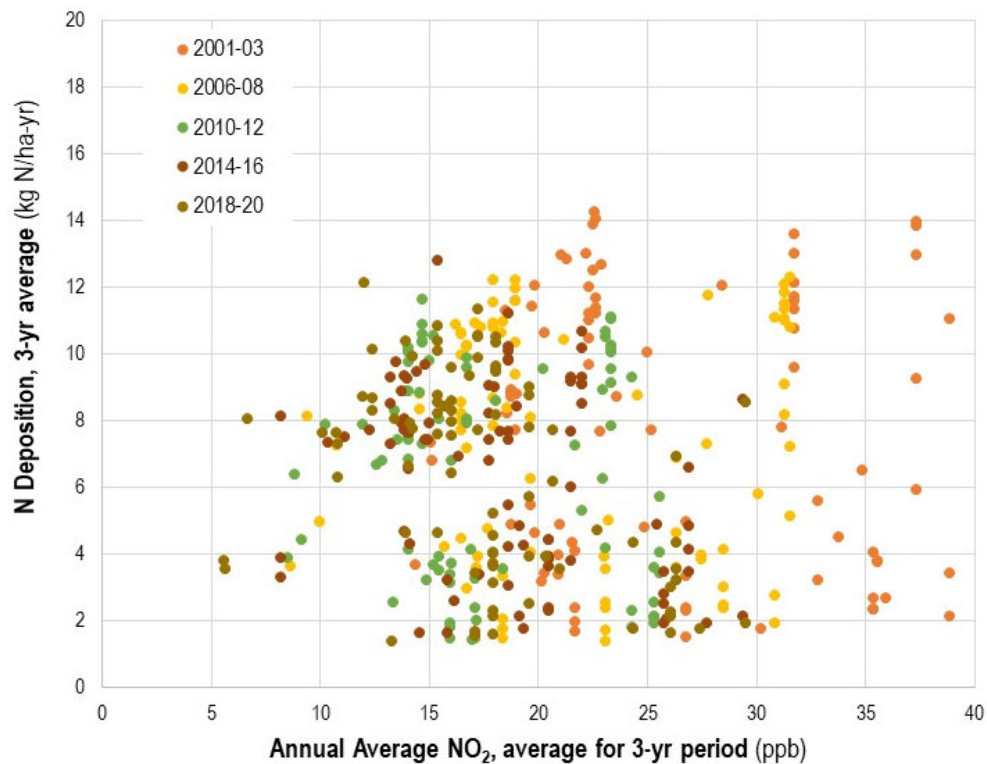
Attachments

## Attachment 1

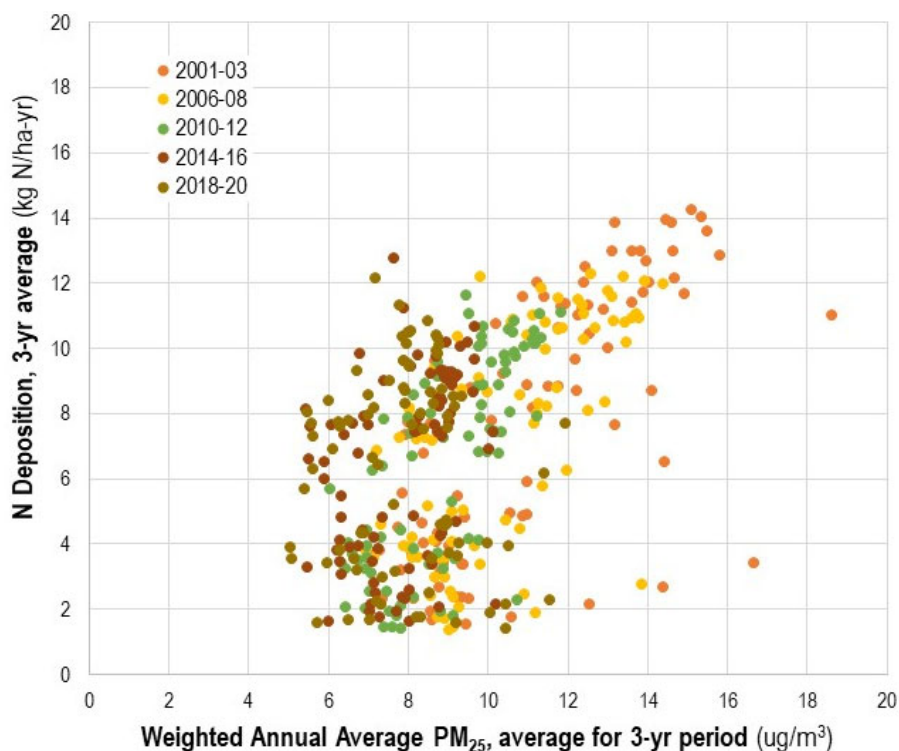
Corrected Figures 6-20, 6-21, 6-25, 6-26, 6-28, 6-29



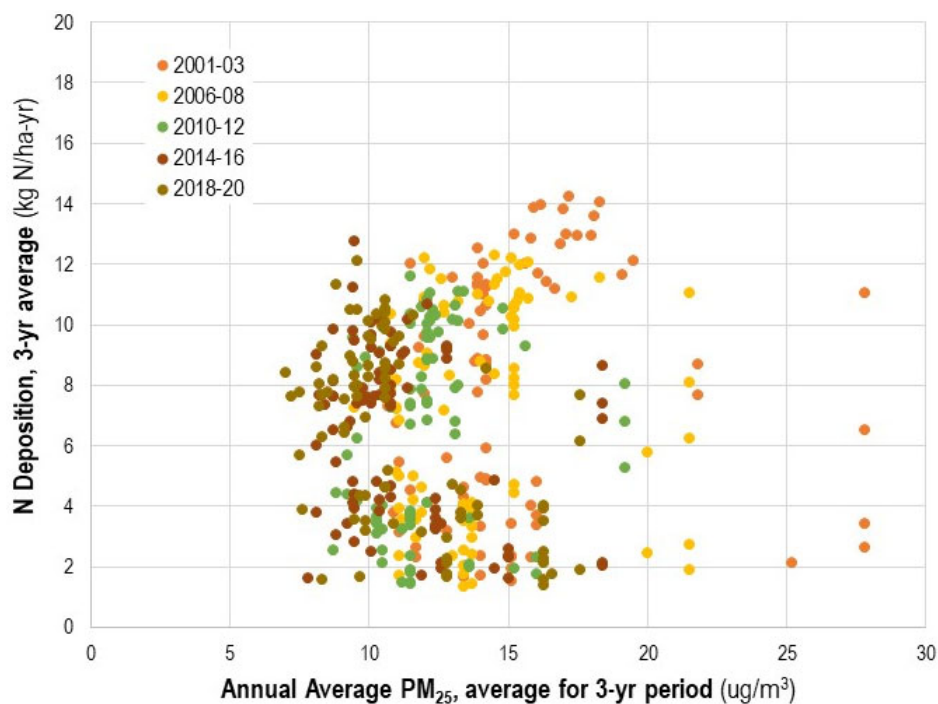
**Figure 6-20.** Scatterplot of estimated 3-year average N deposition (ecoregion median) and the weighted secondary NO<sub>2</sub> design values from contributing upwind areas for that ecoregion (EAQM) also averaged over 3 years.



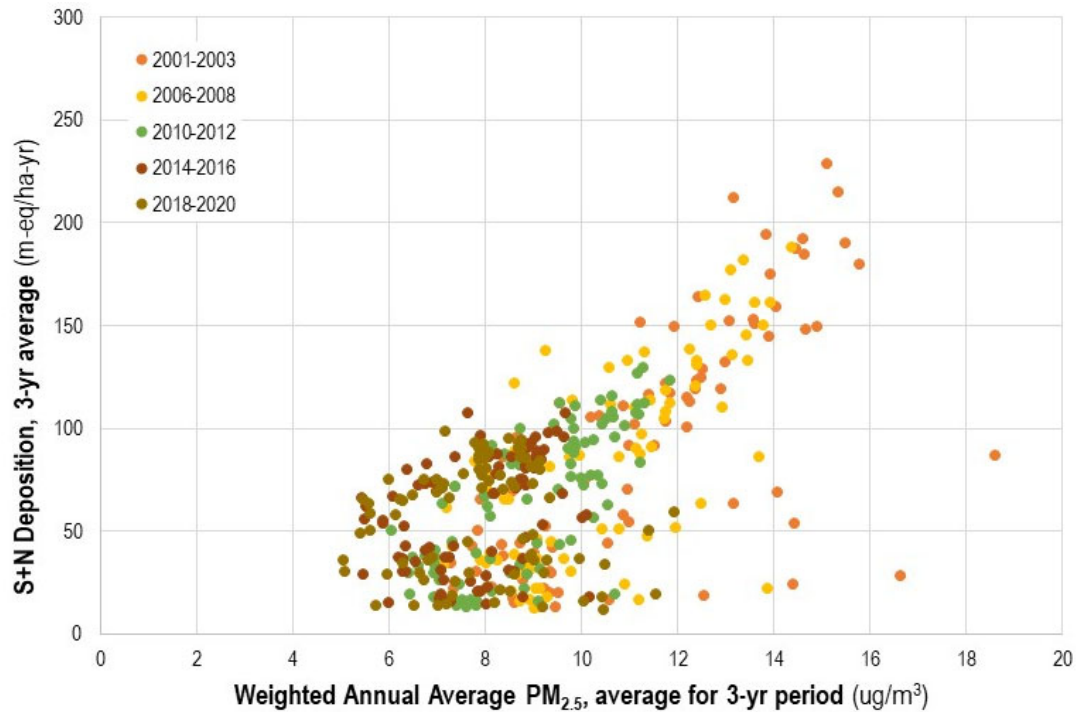
**Figure 6-21.** Scatterplot of estimated 3-year average N deposition (ecoregion median) and the secondary NO<sub>2</sub> design value over that 3-year period from the contributing monitor with the maximum value for each ecoregion.



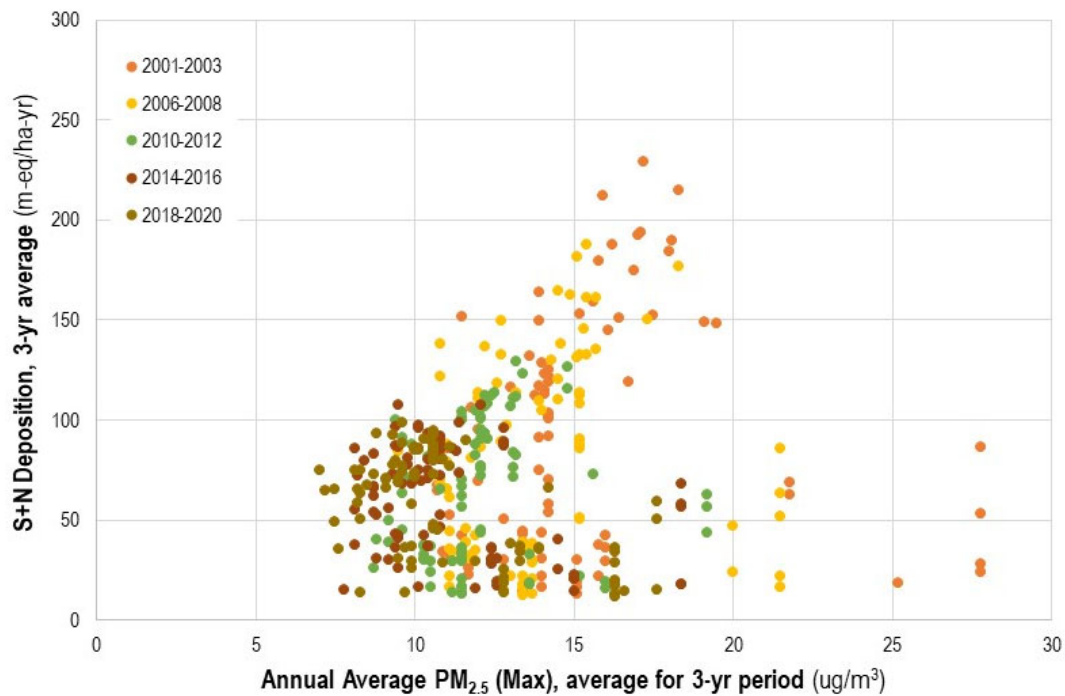
**Figure 6-25.** Estimated 3-year average N deposition (ecoregion median) and average of weighted annual average PM<sub>2.5</sub> concentrations in 3-year period (EAQM) for that ecoregion.



**Figure 6-26.** Estimated 3-year average N deposition (ecoregion median) and annual average PM<sub>2.5</sub> concentration in 3-year period from maximum contributing monitor for that ecoregion.



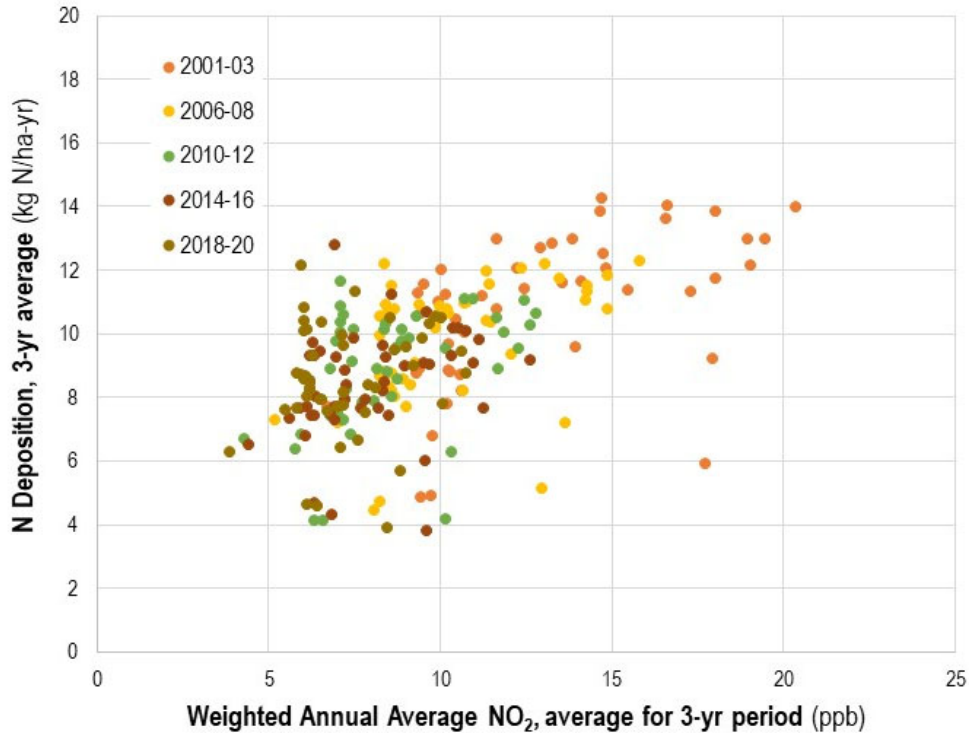
**Figure 6-28.** Estimated 3-year average S+N deposition (ecoregion median) and average of weighted annual average  $PM_{2.5}$  concentrations in 3-year period (EAQM) for that ecoregion.



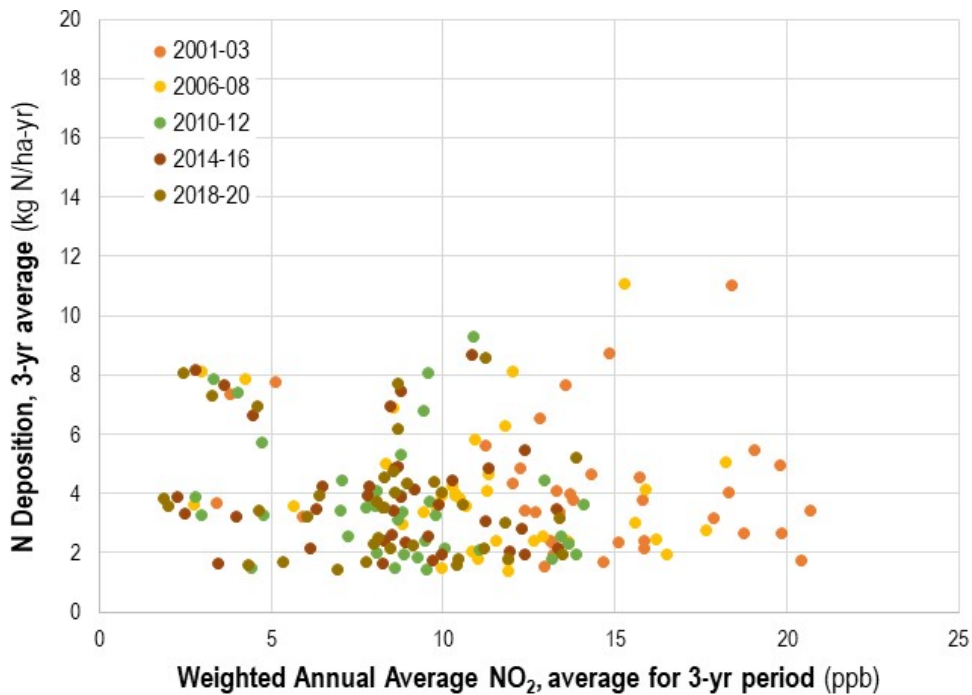
**Figure 6-29.** Estimated 3-year average S+N deposition (ecoregion median) and average annual average  $PM_{2.5}$  concentration in 3-year period from maximum contributing monitor for that ecoregion.

## Attachment 2

East Only and West Only Versions of  
Corrected Figures 6-20, 6-21, 6-25, 6-26, 6-28, 6-29

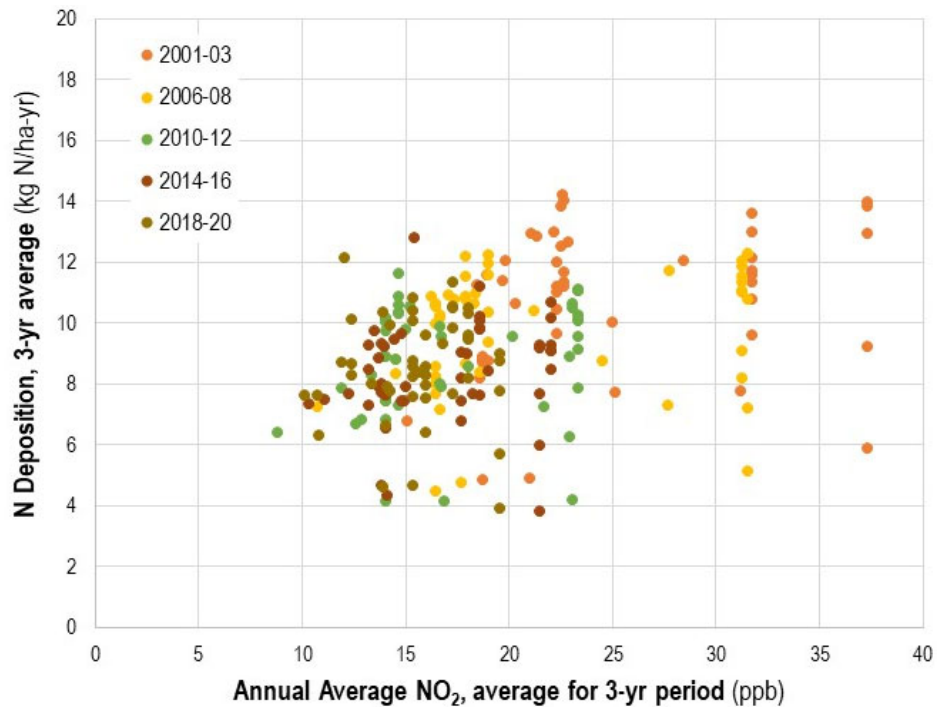


**Figure 6-20. East Only:** Scatterplot of estimated 3-year average N deposition (ecoregion median) and the weighted secondary NO<sub>2</sub> design values from contributing upwind areas for that ecoregion (EAQM) also averaged over 3 years.

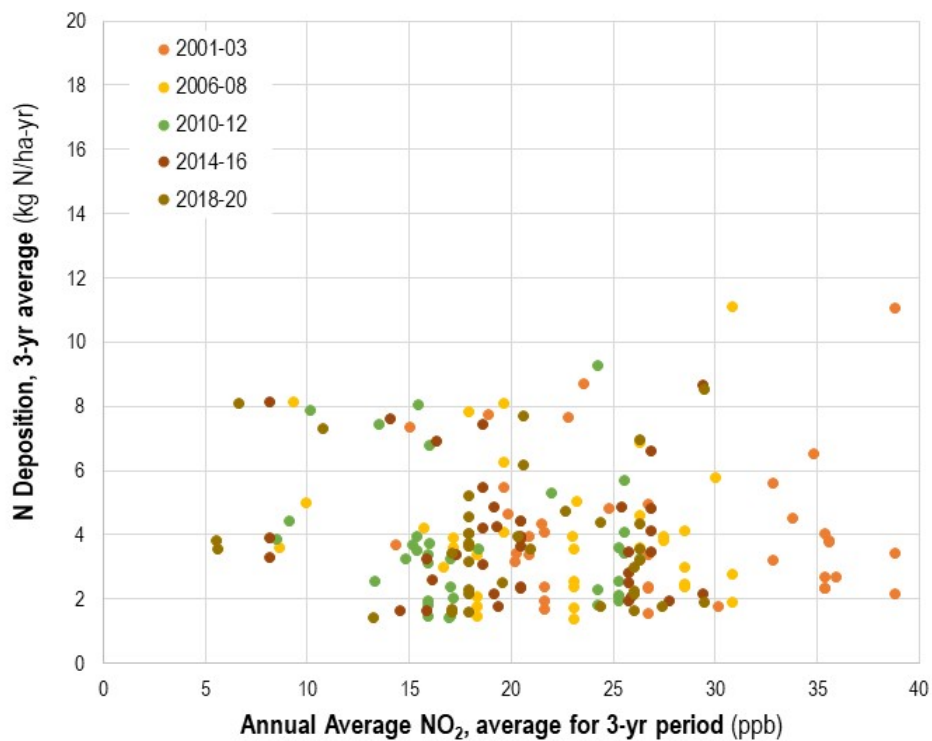


**Figure 6-20. West Only:** Scatterplot of estimated 3-year average N deposition (ecoregion median) and the weighted secondary NO<sub>2</sub> design values from contributing upwind areas for that ecoregion (EAQM) also averaged over 3 years.





**Figure 6-21. East Only:** Scatterplot of estimated 3-year average N deposition (ecoregion median) and the secondary NO<sub>2</sub> design value over that 3-year period from the contributing monitor with the maximum value for each ecoregion.



**Figure 6-21. West Only:** Scatterplot of estimated 3-year average N deposition (ecoregion median) and the secondary NO<sub>2</sub> design value over that 3-year period from the contributing monitor with the maximum value for each ecoregion.

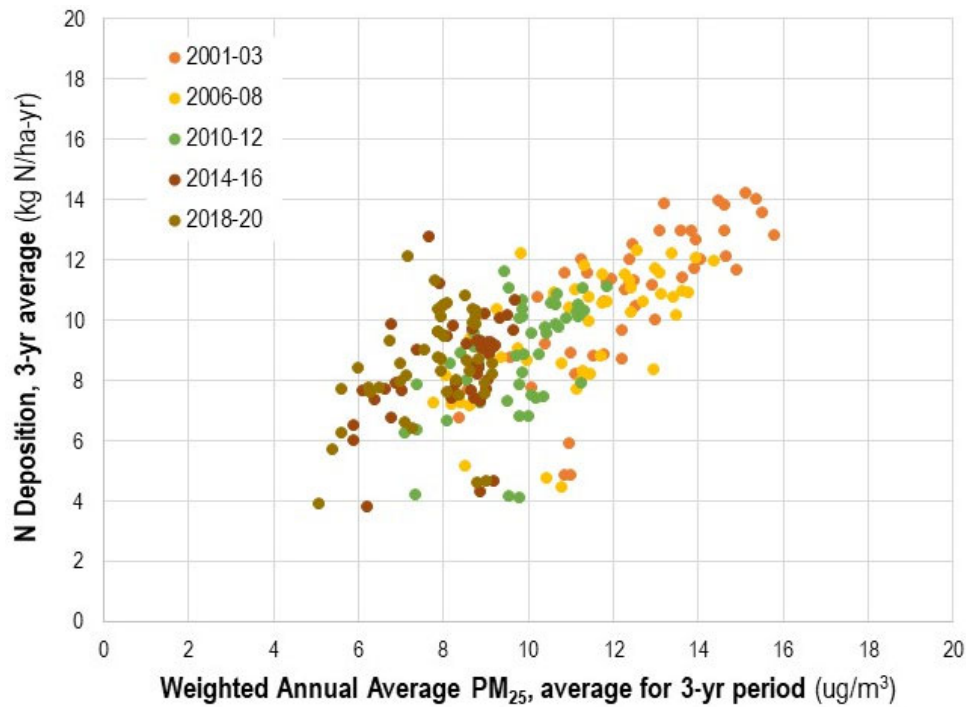


Figure 6-25. **East Only:** Estimated 3-year average N deposition (ecoregion median) and average of weighted annual average PM<sub>2.5</sub> concentrations in 3-year period (EAQM) for that ecoregion.

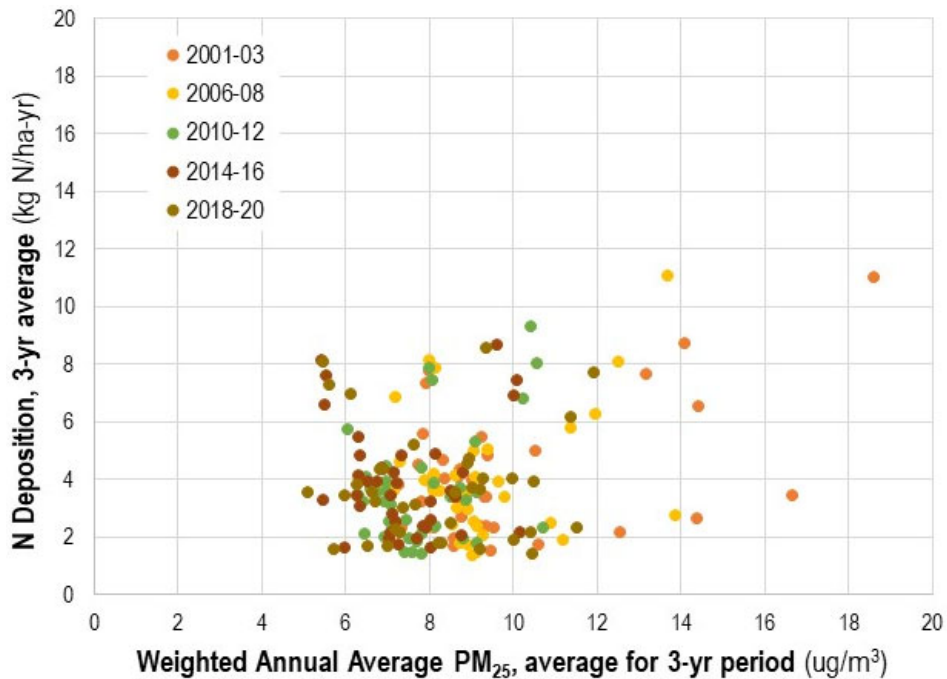


Figure 6-25. **West Only:** Estimated 3-year average N deposition (ecoregion median) and average of weighted annual average PM<sub>2.5</sub> concentrations in 3-year period (EAQM) for that ecoregion.

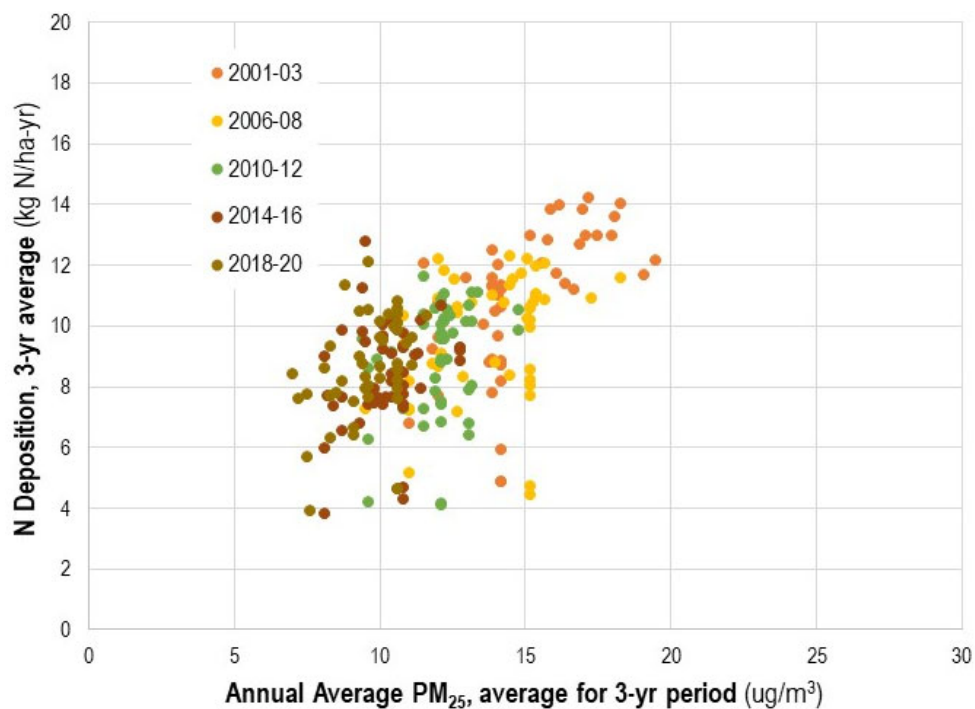


Figure 6-26. **East Only:** Estimated 3-year average N deposition (ecoregion median) and annual average PM<sub>2.5</sub> concentration in 3-year period from maximum contributing monitor for that ecoregion.

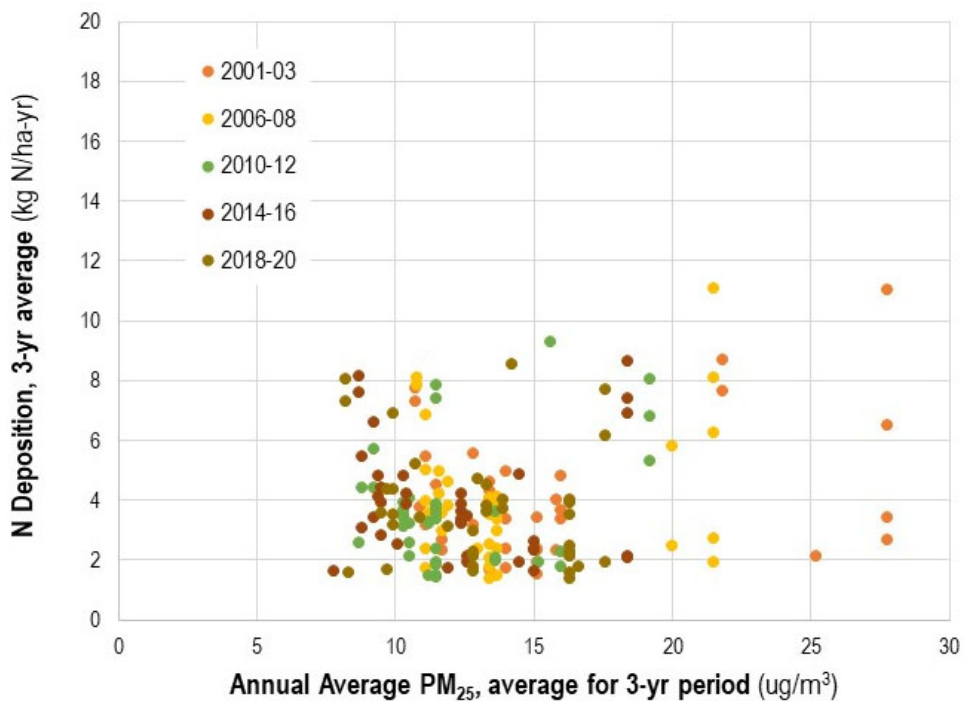


Figure 6-26. **West Only:** Estimated 3-year average N deposition (ecoregion median) and annual average PM<sub>2.5</sub> concentration in 3-year period from maximum contributing monitor for that ecoregion.

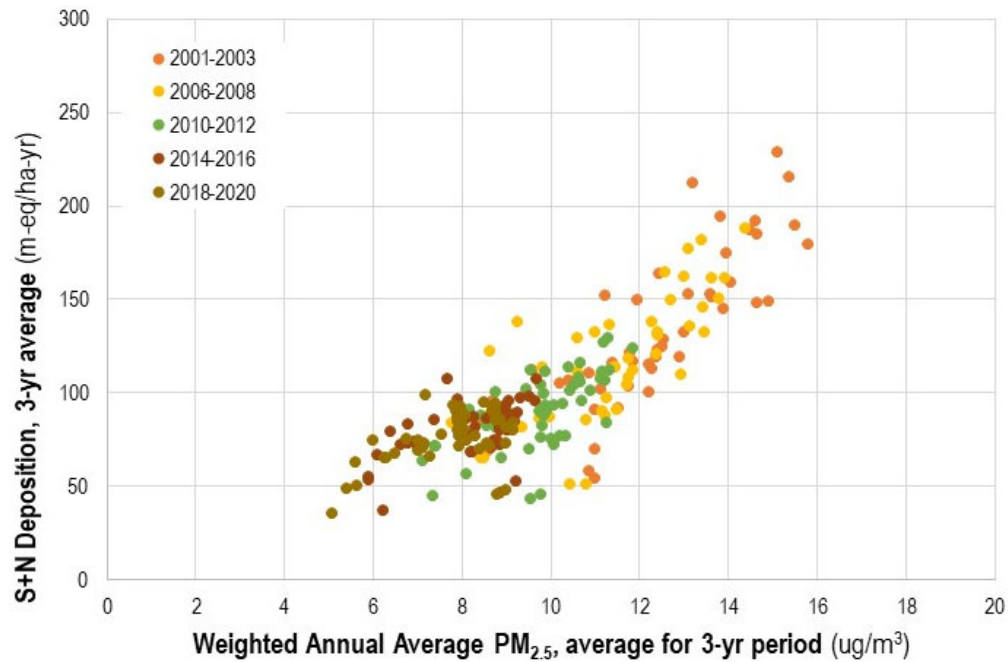


Figure 6-28. **East Only:** Estimated 3-year average S+N deposition (ecoregion median) and average of weighted annual average PM<sub>2.5</sub> concentrations in 3-year period (EAQM) for that ecoregion.

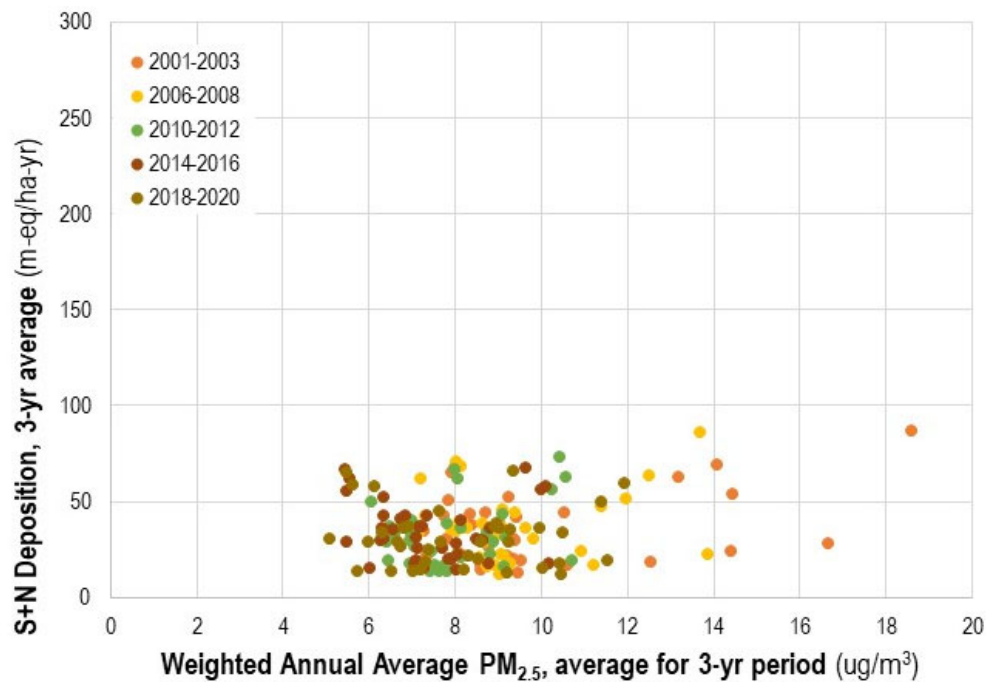
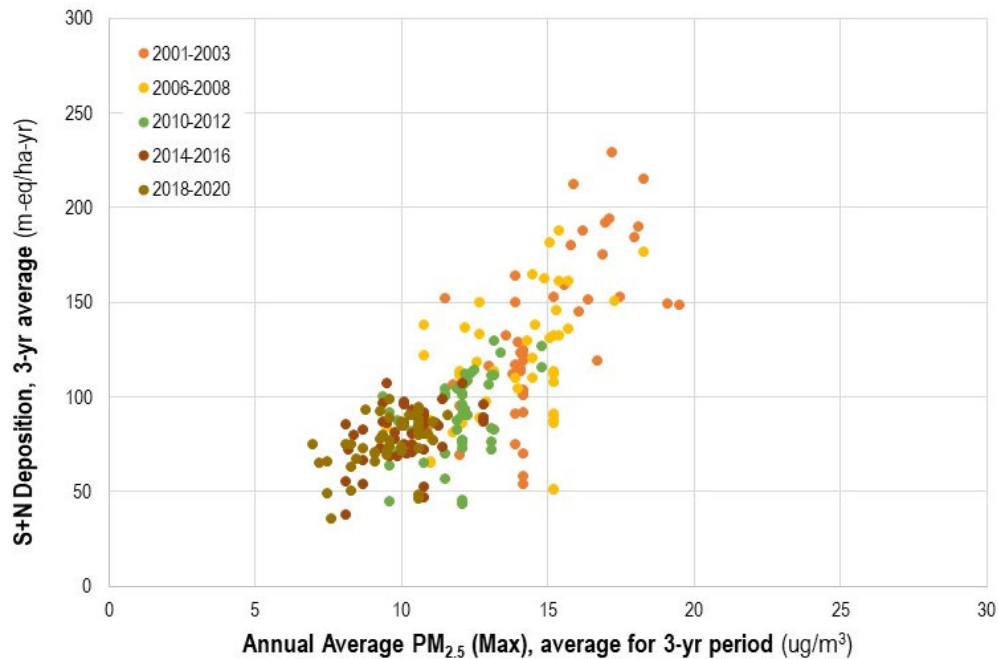
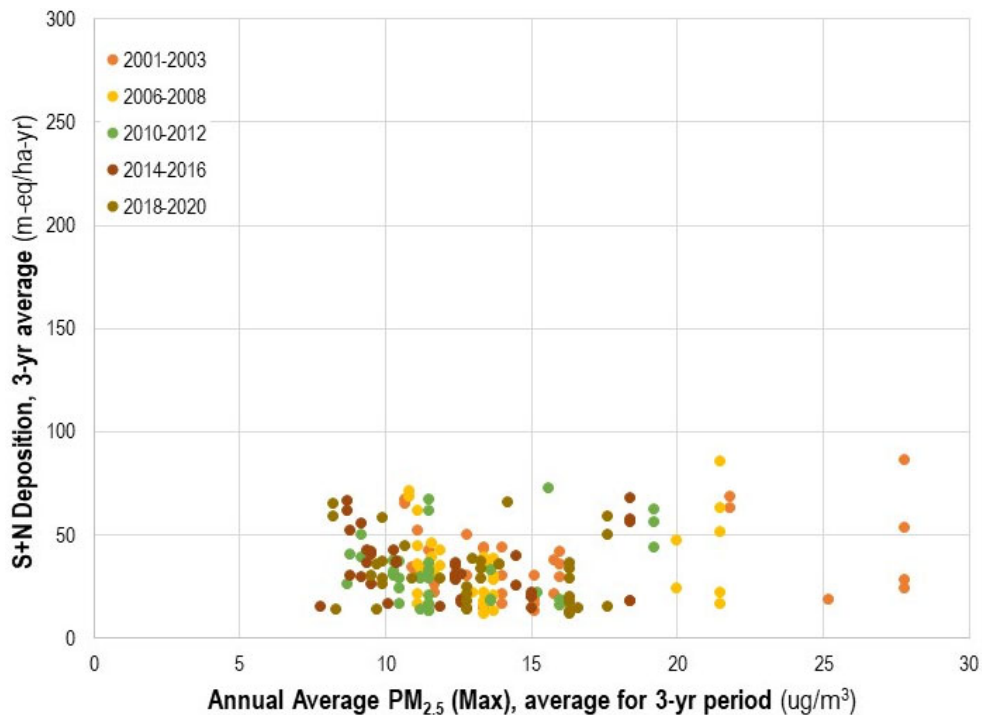


Figure 6-28. **West Only:** Estimated 3-year average S+N deposition (ecoregion median) and average of weighted annual average PM<sub>2.5</sub> concentrations in 3-year period (EAQM) for that ecoregion.



**Figure 6-29. East Only: Estimated 3-year average S+N deposition (ecoregion median) and average annual average PM<sub>2.5</sub> concentration in 3-year period from maximum contributing monitor for that ecoregion.**



**Figure 6-29. West Only: Estimated 3-year average S+N deposition (ecoregion median) and average annual average PM<sub>2.5</sub> concentration in 3-year period from maximum contributing monitor for that ecoregion.**