

CSN 2022 Site Report: Lancaster Downwind (PA)

AQS ID: 42-071-0012, POC 5 (40.0438, -76.1124) 1-in-6 Day Schedule

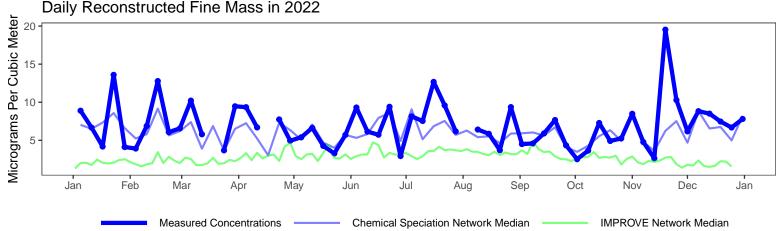
The Chemical Speciation Network (CSN) is a routine air monitoring network designed to complement the PM_{2.5} monitoring network; support the implementation of PM_{2.5} National Ambient Air Quality Standards (NAAQS); assist in developing and tracking emission control strategies; and provide data to aid in health studies. CSN sites are primarily located in urban areas and complement the largely rural Interagency Monitoring of PROtected Visual Environments (IMPROVE) network. The CSN target analytes are trace elements, ions, and carbon.

Percent of Samples Successfully Collected and Analyzed Per Year

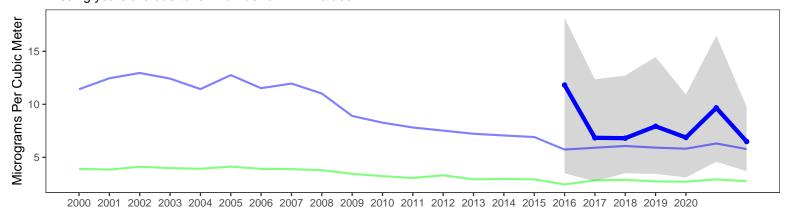
2016	2017	2018	2019	2020	2021	2022
91	93	95	98	98	89	97

Samples Successfully Collected and Analyzed in 2022 by Filter Type. PTFE: 59 (96.7%), Nylon: 60 (98.4%), Quartz: 59 (96.7%)

The plots below show temporal trends for site 42-071-0012 alongside network-wide CSN and IMPROVE average concentrations. The top plot shows the variability of the reconstructed fine mass (RFM) concentrations during 2022; RFM can only be calculated if all three filters collected on a sampling day are valid. The bottom plot illustrates the long-term trends of ambient concentrations; the gray shaded region represents the range of values measured each year at this site, illustrated using the 10th and 90th percentile values.



Long-Term Trends in Reconstructed Fine Mass Missing years are due to low number of RFM values.



More Information

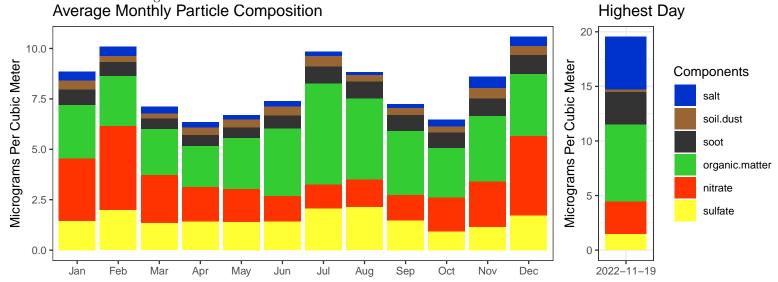
To view and download CSN data: https://www.epa.gov/outdoor-air-quality-data

EPA website with guidance documents and background information: https://www.epa.gov/amtic/chemical-speciation-network-csn EPA real-time air monitoring data: https://www.airnow.gov/

Univ. of California, Davis website with information about current research and publications: https://aqrc.ucdavis.edu/csn
The Colorado State Univ. website with data resources, literature, and visibility overviews: http://vista.cira.colostate.edu/improve/



The following plots summarize the chemical composition of particles collected at this site. The monthly averaged compositions calculated from 2018-2022 data are shown on the left while compositions for the day with the highest measured concentrations during 2022 are shown on the right.



Components	Calculation	Natural Sources	Anthropogenic Sources
Salt Soil Dust	$1.8 \cdot Chloride$ $2.2 \cdot Al + 2.49 \cdot Si + 1.63 \cdot Ca$ $+2.42 \cdot Fe + 1.94 \cdot Ti$	Ocean spray, dry lakebeds Soil resuspension, dust storms long-range transport	Chemical manufacturing, lake consumption Construction, agriculture, deforestation, unpaved roads
Soot	Elemental Carbon	Wildfires	Motor vehicles, wood burning, smoking
Organic Matter Nitrate Sulfate	$1.4 \cdot Organic\ Carbon$ $1.29 \cdot Nitrate$ $4.125 \cdot Sulfur$	Plants, animals, wildfires Plants, animals Volcanism	Motor vehicles, cooking oils, household cleaners Fertilizer, stock yards, chemical manufacturing Coal-fired power plants, chemical manufacturing

The following map shows the average RFM concentrations for nearby sites in both CSN and the rural IMPROVE Network. The point shapes indicate which network the sites are associated with. The color bar indicates the average annual RFM concentration (micrograms per cubic meter) measured at each site in 2022.

