



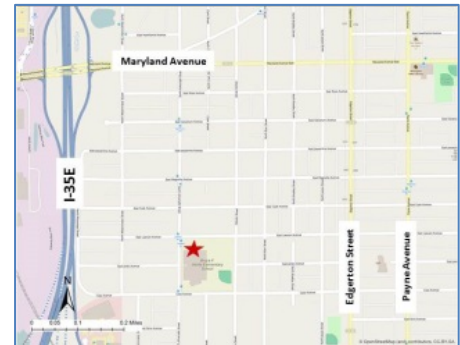
Community Air Monitoring Project

Summary Report – St. Paul Payne-Phalen

Project overview

In 2013, the Minnesota Legislature funded a two-year air monitoring study to measure air quality in Minnesota communities where low income or communities of color might be disproportionately impacted by pollution from highway traffic, air traffic, and industrial sources. This legislation funds one monitor to be moved to seven locations in a two-year period.

The project began on October 1, 2013 with monitoring in the Minneapolis East Phillips Neighborhood of Minneapolis. The community monitor was moved to several communities and then moved into the St. Paul Payne-Phalen community. This area is a mix of residential and business. Monitoring ran from April 1 to June 30, 2015.



Payne-Phalen Community Air Monitoring Site

What we monitored

Air was monitored for specific chemicals that are associated with adverse public health effects (**Attachment A**). These chemicals are classified as fine particles (PM_{2.5}) or air toxic pollutants (carbonyls, metals or volatile organic compounds). Although only a three-month study, for comparison purposes, we compared the average daily PM_{2.5} monitored data to the daily fine particle standard and the air toxic pollutants to the available long-term health benchmarks. These comparisons are used for informational purposes only and should not be used to determine compliance with standards or health risks. The data were also compared with other data collected in the same time period at other monitors in Minnesota.

Findings at a glance:

- All average daily PM_{2.5} values were below the daily PM_{2.5} standard of 35 micrograms per cubic meter (µg/m³).
- Average daily PM_{2.5} values measured at the Payen-Phalen monitor were generally higher than the values seen at most other sites for a majority of the monitoring days but followed a similar daily trend as other metro sites.
- Of the 70 air toxic chemicals measured for this project, the levels of 44 chemicals were so low that they were not detected by the monitor.
- Average air toxic values measured at the Payne-Phalen site were all below any associated health benchmark values.

Summary of results

Fine particles (PM_{2.5})

Fine particles are a complex mixture of extremely small particles and liquid droplets that are created during combustion when coal, gasoline, diesel, wood and other fuels are burned, and are also created in the air by chemical reactions among other pollutants. Because of their small size, fine particles can be inhaled deeply into the lungs and can enter the blood stream. Exposure to fine particle pollution can contribute to respiratory and cardiovascular health effects.

Fine particles are regulated on an annual and daily basis to guard against long-term and short-term health effects linked to fine particle exposure. To test compliance with these standards, a minimum of three-years of monitoring data is required. The monitoring period for this project is too short to determine whether the project sites meet the fine particle standards. However, as an informal comparison, we have compared daily fine particle results to the short term fine particle standards of 35 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).



U.S. Environmental Protection Agency (EPA) regulations state that a monitored site meets daily PM_{2.5} regulatory requirements if the 98th percentile of the 24-hour PM_{2.5} concentrations in a year, **averaged over three years**, is less than or equal to 35 $\mu\text{g}/\text{m}^3$. For more information: http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_index.html

The average daily trends (Figure 1) over the three month period were similar between the Payne-Phalen monitor and other Metro monitoring sites (locations shown in Figure 2). All average daily PM_{2.5} values were below the daily PM_{2.5} standard of 35 $\mu\text{g}/\text{m}^3$. Average daily values measured at the Payne-Phalen community monitor were generally higher than those seen at most other sites for a majority of the monitoring days (Table 1) but followed a similar daily trend as other sites.

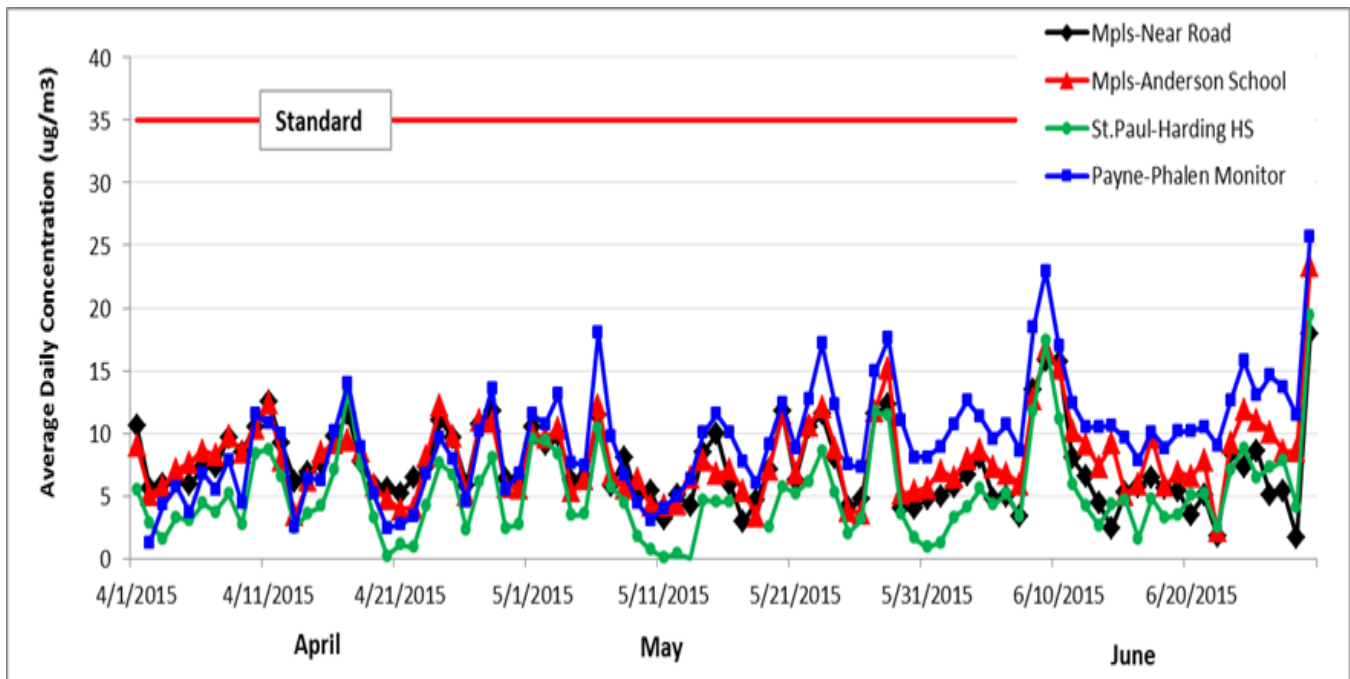


Figure 1. Average daily PM_{2.5} values at St. Paul-Minneapolis sites from April 1 to June 30, 2015.

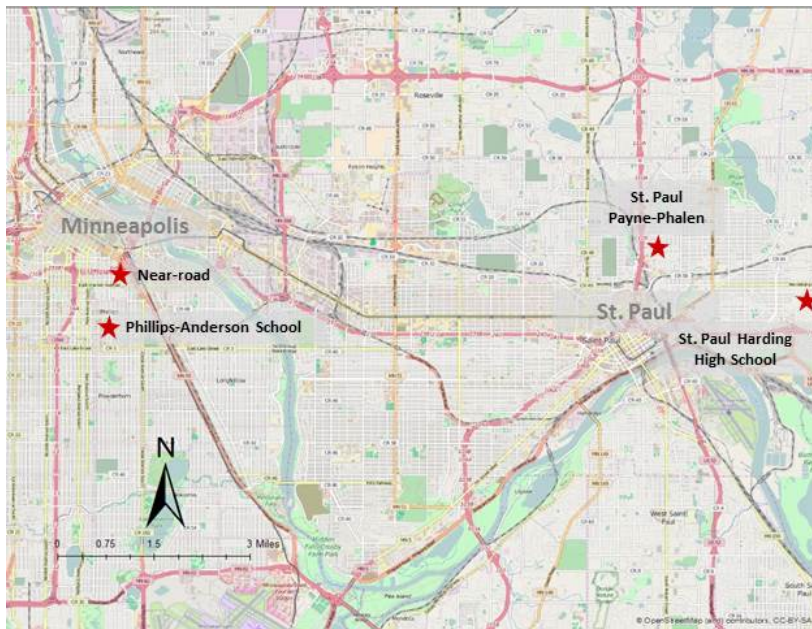


Figure 2. Location of the Payne-Phalen community air monitor in relation to other PM_{2.5} air monitors in the St. Paul-Minneapolis metro area. For more information about the individual sites, please visit the MPCA Air Monitoring Network Plan website (<https://www.pca.state.mn.us/air/air-monitoring-network-plan>).

Table 1. Summary information describing average daily PM_{2.5} values found at MPCA monitors during the monitoring period of April 1-June 30, 2015.

Site	Min mg/m ³	Max mg/m ³	Mean ¹ mg/m ³	Median ² mg/m ³	Standard Deviation* mg/m ³	Number of days that concentration values at Payne-Phalen were		Total Number of Monitoring Days ⁺
						higher	lower	
Payne-Phalen Monitor	1.3	25.7	9.8	9.7	4.6			
Mpls Phillips Anderson School	2.2	23.4	8.2	7.8	3.5	65	25	90
Mpls Near-road	1.7	18.2	7.5	6.4	3.3	64	26	90
St. Paul Harding High School	0.0	19.4	5.3	4.5	3.7	87	1	88
Anoka Airport	0.0	15.5	4.1	3.3	3.5	80	4	84
Apple Valley	0.3	18.5	4.8	4.1	3.4	80	6	86
Virginia	2.9	29.9	6.8	5.7	4.2	73	16	89
Rochester	1.5	15.6	6.3	5.8	3.0	80	10	90
Talahi School	0.4	23.5	4.8	3.9	3.8	83	3	86
St. Michael	0.2	20.2	4.9	4.4	3.5	82	2	84
Detroit Lakes	0.0	23.0	4.7	4.0	3.8	74	8	82
Marshall	0.4	26.0	5.3	4.0	4.4	80	10	90
Duluth-Laura McA School	0.0	25.9	5.5	4.3	4.0	82	8	90
Ely	2.5	39.0	5.7	4.8	4.2	78	10	88
Brainerd Airport	0.9	21.8	5.9	4.5	3.9	67	13	80
Near Road Lakeville	0.6	21.4	7.1	6.6	3.6	78	12	90
Cloquet - Red Lake Band	0.3	23.0	4.3	3.1	3.7	82	6	88

¹Mean value is the arithmetic average value of all of the average daily PM_{2.5} measurements

²Median value is the middle value of the set of average daily PM_{2.5} measurements

*Standard Deviation of the mean values reported in this table

⁺Not all days had complete data available for analysis

Summary of results (cont'd)

Air toxics

Air toxic pollutants are those chemicals known or suspected to cause serious human health effects or adverse environmental effects. Example pollutants include *methylene chloride*, used as a solvent and paint stripper, *perchloroethylene*, emitted by some dry cleaning facilities and *benzene*, which is found in gasoline. Some air toxic pollutants are metals such as *cadmium*, *chromium*, or *lead* compounds.

Air toxics health benchmarks

Existing air quality standards and health benchmarks come from a variety of sources. However, these are not available for all chemicals. For air toxics, the MPCA uses available published health benchmarks. Specific information about standards and health benchmarks can be found at: <https://www.pca.state.mn.us/air/air-toxics-minnesota>.

Of the 70 air toxic pollutants measured (**Attachment A**), there were 26 pollutants detected at the Payne-Phalen community monitor. When compared to values at other fixed monitoring sites (sites shown in **Figure 3**), the majority of these chemicals did not significantly* differ in measured values (**Figure 4**).

*Kaplan-Meier non-parametric non-detects data analysis



Minnesota Public Health Data can be found at <https://apps.health.state.mn.us/mndata/home>

This data can be searched by county to help you find public health information relevant to your local area.

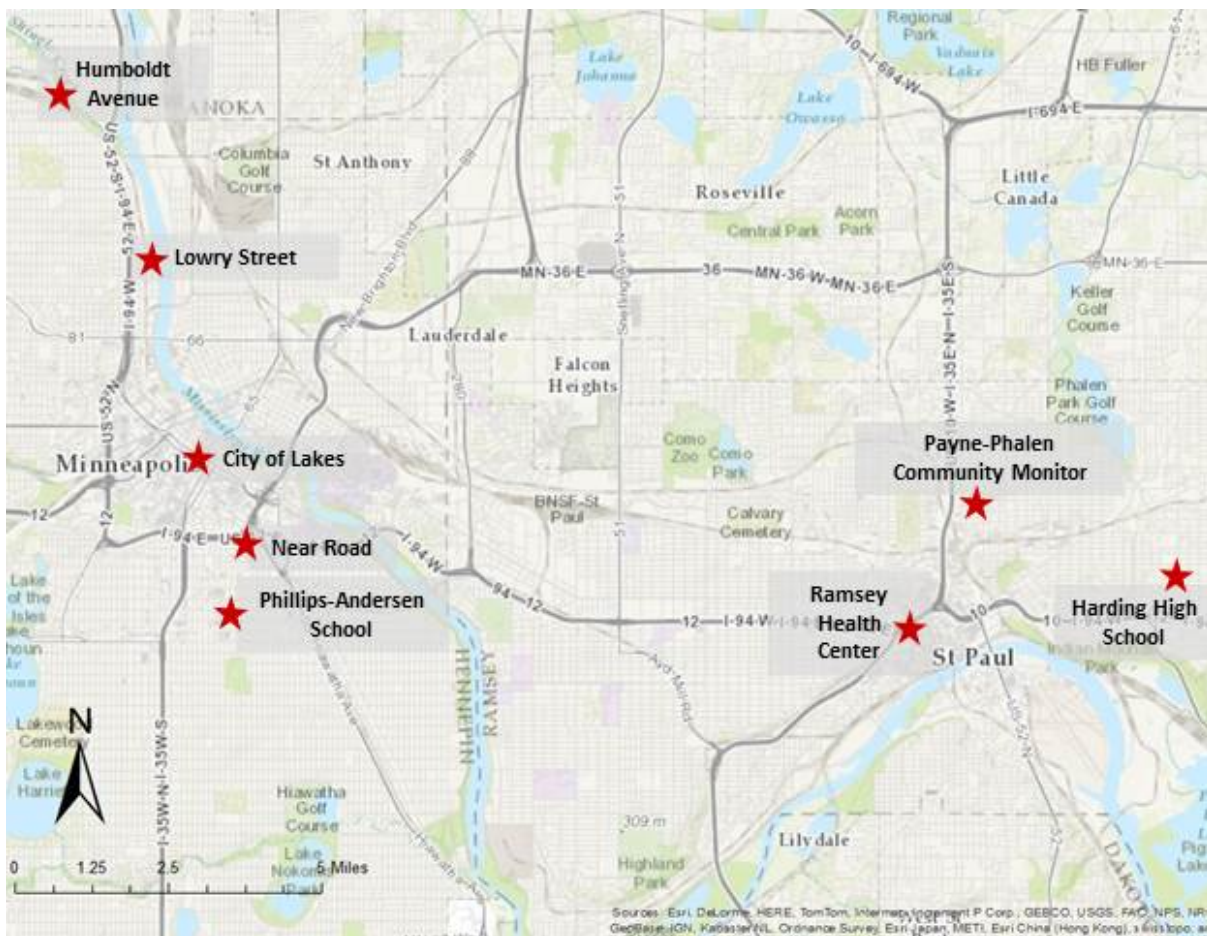


Figure 3. Location of the community air monitor in relation to other fixed site air toxics monitors in the St. Paul-Minneapolis metropolitan area.

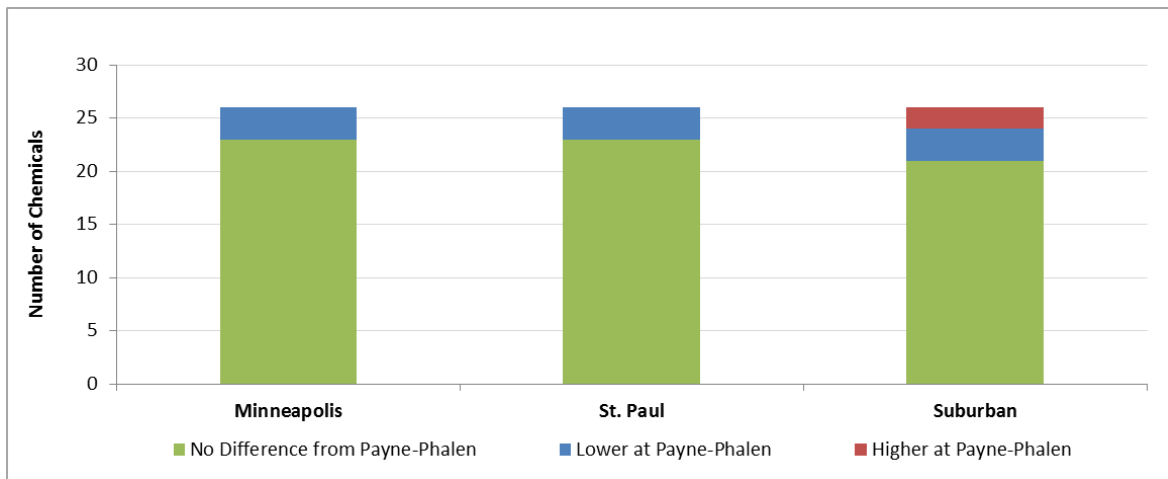


Figure 4. The number of air toxic pollutants that differed between those measured at the Payne-Phalen site and other monitors around the Twin Cities.

Compared to measurements in Minneapolis, St. Paul and Suburban sites, most of the pollutants were of similar or lower values at the Payne-Phalen community monitoring site (**Attachment A**). Of the detected metals, the average values of two metals (iron and zinc) at the Payne-Phalen site were higher* than seen at Suburban sites. No values were found to be above any associated standard or health benchmark.

*Kaplan-Meier non-parametric non-detects data analysis

What you can do to reduce your exposure to air pollutants

To reduce your risk of developing bad health from exposures to air pollution:

- Avoid exposure to tobacco smoke, wood smoke, vehicle exhaust, and other sources of airborne particles.
- Avoid prolonged outdoor exertion near high-traffic areas.
- Stay informed about air pollution alerts and advisories in your area by visiting the MPCA Air Quality Index website (<https://www.pca.state.mn.us/air/current-air-quality-index>), calling the AQI Information Line (651-297-1630) or subscribing to the MPCA Air Quality Forecast Alert system (<http://mn.enviroflash.info/>).
- If you experience respiratory or cardiovascular symptoms (e.g., persistent cough, burning eyes, wheezing, shortness of breath, tightness of chest, or chest pain) on air quality alert days, consult with a health care professional, as needed. Pay particular attention if you are an athlete, or if you or your children have a respiratory or cardiovascular condition.
- Work together with others in your community to improve air quality (see website links below for more information).

Links to other information

For more information about commonly found air pollutants and their sources, please visit <https://www.epa.gov/learn-issues/learn-about-air>.

Be Air Aware is a website resource available for individuals, communities, and employers concerned about how air pollution affects health. The site offers information about air pollution in Minnesota, both outdoor and indoor, and steps that people can take to protect their health. <https://www.beairawaremn.org/>

For more information on the air monitoring results from air quality monitoring studies, please call 651-296-6300 or 1-800-657-3864 and ask for air data analysis staff. For more information and to view updates about the Community Air Monitoring Project, please visit <https://www.pca.state.mn.us/air/community-air-monitoring-project>.

More information about the MPCA's air monitoring program is available on the web at <https://www.pca.state.mn.us/air/air-pollution-monitoring>.

Attachment A. Community Air Monitoring Project - Monitored Air Quality Pollutants

Carbonyls

Acetaldehyde
Benzaldehyde
Butyraldehyde
Formaldehyde^T
Propionaldehyde
Trans-Crotonaldehyde¹

Metals

Antimony^S
Arsenic¹
Barium²
Beryllium¹
Cadmium¹
Chromium²
Cobalt¹
Iron^C
Lead
Manganese
Nickel²
Selenium²
Zinc^{C,S}

PM2.5 Continuous

PM2.5 Concentration

Volatile Organic Compounds

1,1,2,2-Tetrachloroethane¹
1,1,2-Trichloroethane¹
1,1-Dichloroethane¹
1,1-Dichloroethylene¹
1,2,4-Trichlorobenzene¹
1,2,4-Trimethylbenzene^U
1,2-Dichlorobenzene¹
1,2-Dichloropropane¹
1,3,5-Trimethylbenzene²
1,3-Butadiene²
1,3-Dichlorobenzene¹
1,4-Dichlorobenzene¹
Benzene
Benzene, 1-Ethenyl-4-Methyl²
Benzyl Chloride¹
Bromodichloromethane²
Bromoform¹
Bromomethane¹
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene¹
Chloroethane¹
Chloroform^T
Chloromethane²
Cis-1,2-Dichloroethene¹
Cis-1,3-Dichloropropene¹

Cyclohexane^T
Dibromochloromethane¹
Dichlorodifluoromethane
Dichloromethane²
Ethylbenzene
Ethylene Dibromide¹
Ethylene Dichloride
Freon 113
Freon 114²
Hexachlorobutadiene
M/P Xylene^U
Methyl Butyl Ketone^S
Methyl Chloroform¹
Methyl Tert-Butyl Ether¹
N-Heptane²
N-Hexane²
O-Xylene
Styrene²
Tetrachloroethylene²
Toluene^U
Trans-1,2-Dichloroethylene²
Trans-1,3-Dichloropropene¹
Trichloroethylene²
Trichlorofluoromethane
Vinyl Chloride¹

¹Indicates chemicals that were below detection limits at all monitors in Minnesota, including the Payne-Phalen monitor, for this three month monitoring time.

²Indicates chemicals that were below the detection limit at the Payne-Phalen monitor, but were detected at one or more monitoring sites in Minnesota.

^CIndicates chemicals that were higher* at the Payne-Phalen monitor than at Suburban Twin Cities fixed monitors. (2 chemicals higher: 2 metals)

^SIndicates chemicals that were lower* at the Payne-Phalen monitor than at Minneapolis fixed monitors. (3 chemicals lower: 2 metals, 1 VOC)

^TIndicates chemicals that were lower* at the Payne-Phalen monitor than at St. Paul fixed monitors. (3 chemicals lower: 1 carbonyl, 2 VOCs)

^UIndicates chemicals that were lower* at the Payne-Phalen monitor than at suburban Twin Cities fixed monitors. (3 chemicals lower: 3 VOCs)

*Kaplan-Meier non-parametric NADA averaged values