2013 Air Toxics Summary

New Jersey Department of Environmental Protection

INTRODUCTION

Air pollutants can be divided into two categories: the criteria pollutants (ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, and lead); and air toxics. The criteria pollutants have been addressed at the national level since the 1970s. The United States Environmental Protection Agency (USEPA) has set National Ambient Air Quality Standards (NAAQS) for them, and they are subject to a standard planning process that includes monitoring, reporting, and control requirements. Each of these pollutants is discussed in its own section of this New Jersey Department of Environmental Protection (NJDEP) 2013 Air Quality Report.

Air toxics are basically all the other chemicals released into the air that have the potential to cause adverse health effects in humans. These effects cover a wide range of conditions, from lung irritation to birth defects to cancer. There are no NAAQS for these pollutants, but in 1990 the U.S. Congress directed the USEPA to begin addressing a list of almost 200 air toxics by developing control technology standards for specific categories of sources that emit them. These air toxics are known as the Clean Air Act Hazardous Air Pollutants (HAPs). You can get more information about HAPs at the USEPA Air Toxics web site at www.epa.gov/ttn/atw . NJDEP also has several web pages dedicated to air toxics. They can be accessed at www.state.nj.us/dep/airtoxics .

HEALTH EFFECTS

People exposed to significant amounts of air toxics may have an increased chance of getting cancer or experiencing other serious health effects. The noncancer health effects can range from respiratory, neurological, reproductive, developmental, or immune system damage, to irritation and effects on specific organs. In addition to inhalation exposure, there can be risks from the deposition of toxic pollutants onto soil or surface water. There, they can be taken up by plants and animals which are later consumed by humans.

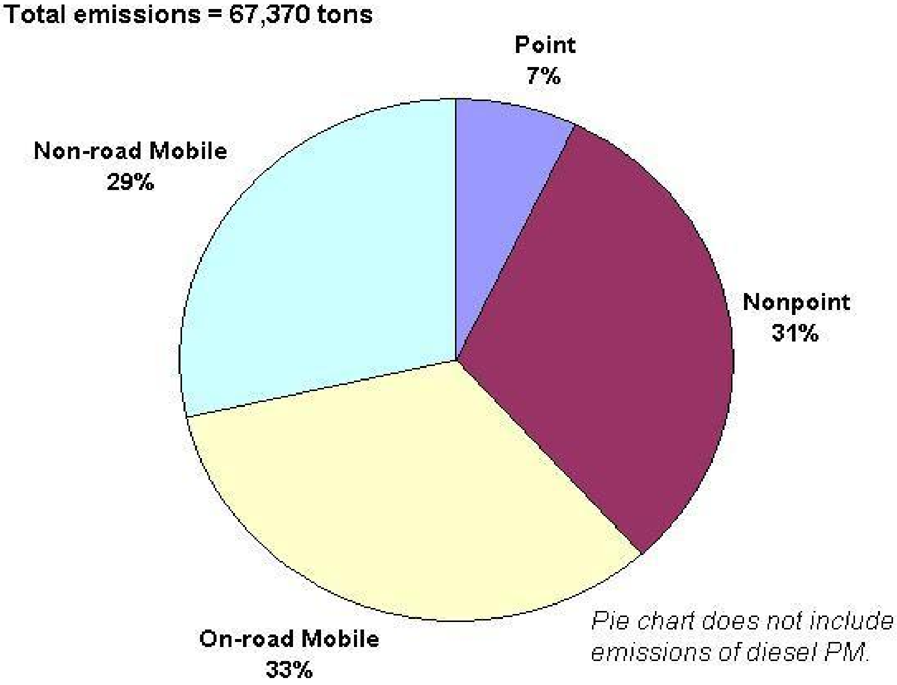
The effects on human health resulting from exposure to specific air toxics can be estimated by using chemical-specific health benchmarks. These are based on toxicity values developed by the USEPA and other agencies, using chemical-specific health studies. For carcinogens (chemicals suspected of causing cancer) the health benchmark is the concentration of the pollutant that corresponds to a one-in-a-million increase in the risk of getting cancer if a person was to breathe that concentration over his or her entire lifetime. The health benchmark for a noncarcinogen is the air concentration at which no adverse health effect is expected to occur, even if a person is exposed to that concentration on a daily basis for a lifetime (this is also known as a reference concentration). Not all air toxics have health benchmarks, because of a lack of toxicity studies. Available health benchmarks for the air toxics monitored in New Jersey are listed in Tables 6 through 9. If ambient air concentrations exceed the health benchmarks then some action, such as a reduction in emissions, should be considered.

SOURCES OF AIR TOXICS

A number of years ago, USEPA began the National-Scale Air Toxics Assessment (NATA). Starting with the year 1996, they set out on a three-year cycle to determine people's exposure to air toxics around the country. To do this, USEPA first prepares a comprehensive inventory of air toxics emissions from all man-made sources. The emissions inventory is reviewed and updated by each state. Although there are likely to be some errors in the details of such a massive undertaking, the emissions inventory still gives us a reasonable indication of the most important sources of air toxic emissions in our state. The pie chart in Figure 1, based on the most recent NATA (for 2005) emissions estimates, shows that mobile sources are the largest contributors of air toxics emissions in New Jersey.

On-road mobile sources (cars and trucks) account for 33% of the air toxics emissions, and non-road mobile sources (airplanes, trains, construction equipment, lawnmowers, boats, dirt bikes, etc.) contribute an additional 20%. Nonpoint sources (residential, commercial, and small industrial sources) represent 31% of the inventory, and point sources (such as factories and power plants) account for the remaining 7%.

Figure 1
2005 Air Toxics Emissions Source
Estimates for New Jersey



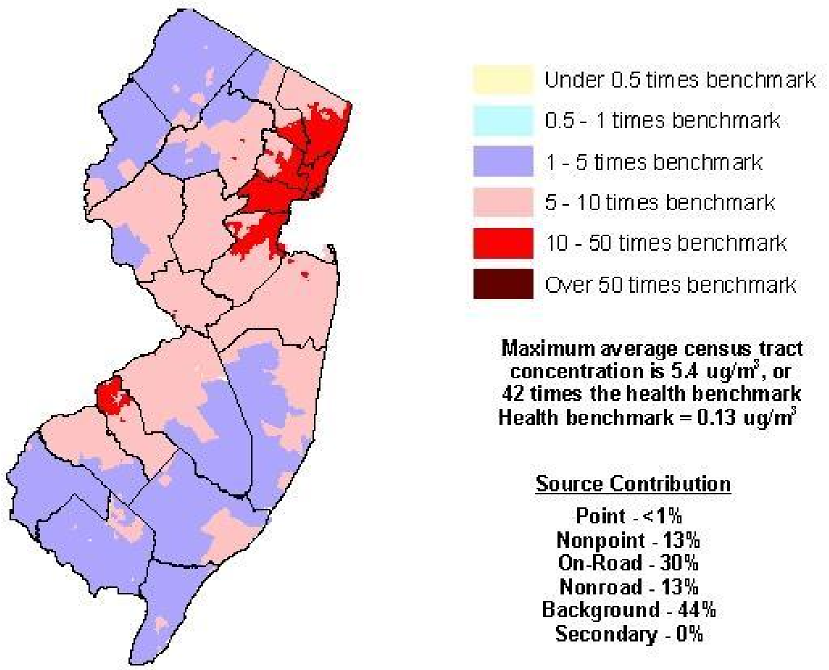
Pie chart does not include emissions of diesel PM.

ESTIMATING AIR TOXICS EXPOSURE

There are a limited number of air toxics monitors located throughout the country, because of costs and logistics. In order to estimate air toxics concentrations in areas across the U.S., especially those areas with no monitors, USEPA's NATA project uses its emissions inventory in an air dispersion model that predicts ambient annual average concentrations. (A comparison of NATA estimates with monitoring data is presented in Figure 19).

The map in Figure 2 shows the NATA-predicted concentrations of benzene throughout New Jersey. The high concentration areas tend to overlap the more densely populated areas of the state, following the pattern of emissions. Not all air toxics follow this pattern, as some are more closely associated with individual point sources or air transport, but in general, higher population densities result in greater emissions of, and exposure to, air toxics. Maps for other air toxics can be found at www.nj.gov/dep/airtoxics/nataest05.htm.

Figure 2
BENZENE - 2005 NATA Predicted
Concentrations for New Jersey



Analysis of the NATA state and county average air toxics concentrations indicates that twenty-three chemicals were predicted to exceed their health benchmarks, or level of concern, in one or more counties in 2005. Twenty-two of these chemicals were evaluated based on their cancer potency, and one (acrolein) was based on non-cancer effects. Estimated air concentrations of these 23 pollutants vary around the state, depending on the types of sources that emit them. This is summarized in Table 1.

Table 1
Air Toxics of Greatest Concern in New Jersey
Based on 2005 National-Scale Air Toxics Assessment

Pollutant of Concern	Number of Counties Above Health Benchmark	Primary Source of Emissions
Acetaldehyde	Statewide	Background, secondary
Acrolein	Statewide	Background, nonpoint
Acrylonitrile	2 (Bergen & Essex)	Point, nonpoint
Arsenic Compounds	19	Background, secondary
Benzene	Statewide	Background, mobile
1,3-Butadiene	Statewide	Background, mobile
Cadmium Compounds	1 (Warren)	Nonpoint, background
Carbon Tetrachloride	Statewide	Background
Chloroform	Statewide	Nonpoint, background
Chromium (hexavalent)	20	Background, point
Cobalt Compounds	7	Point
1,4-Dichlorobenzene	8	Nonpoint, background
1,3-Dichloropropene	1 (Hudson)	Nonpoint
Diesel Particulate Matter	Statewide	Mobile
Ethylbenzene	6	Mobile, nonpoint
Ethylene Oxide	6	Background, nonpoint
Formaldehyde	Statewide	Background, secondary
Methyl Chloride	Statewide	Background
Naphthalene	20	Nonpoint, mobile
Nickel compounds	1 (Hudson)	Nonpoint, point
PAH/POM	18	Nonpoint
Tetrachloroethylene	8	Nonpoint, background
1,1,2-Trichloroethane	1 (Salem)	Nonpoint

NEW JERSEY AIR TOXICS MONITORING PROGRAM RESULTS FOR 2013

NJDEP has four air toxics monitoring sites for volatile organic compounds (VOCs) around the state (located in Camden, Chester, Elizabeth, and New Brunswick), and five for toxic metals (Camden, Chester, Elizabeth, New Brunswick, and Newark).

The Chester monitoring site is in rural Morris County, away from known sources, and serves as kind of a “background” monitor. The New Brunswick monitoring station is in a suburban setting, and the Elizabeth monitor is located next to the Exit 13 tollbooths on the New Jersey Turnpike. The Camden monitor is located in an industrial urban setting, while the Newark monitoring site is in an urban residential area. More information about the air monitoring sites can be found in the annual Air Quality Report at www.njaqinow.net/Default.ltr.aspx.

A previous monitoring site in Camden (officially called the Camden Lab site) was shut down on September 29, 2008, because NJDEP lost access to the location. The Camden Lab site had been measuring several toxics since 1989. The new monitoring site in Camden (formally called the Camden Spruce Street site) became operational in 2013. The Elizabeth air toxics site (formally called the Elizabeth Lab site) began measuring VOCs in 2000, and the New Brunswick and Chester sites started in July 2001. Analysis of toxic metals at these sites also began in 2001, with the Newark Firehouse site added in 2010. Data for some of the toxic metals will be discussed below.

New Jersey's VOC monitors are part of the Urban Air Toxics Monitoring Program (UATMP), sponsored by the U.S. Environmental Protection Agency. A 24-hour integrated air sample is collected in a canister every six days, and then sent to the EPA contract laboratory (ERG, located in North Carolina) to be analyzed for VOCs and carbonyls (a subset of VOCs that includes formaldehyde and acetaldehyde).

2013 air toxic monitoring results for VOCs are shown in Table 2. This table contains the annual average concentration for each air toxic measured at the four New Jersey monitoring sites. All values are in micrograms per cubic meter ($\mu g/m^3$). More detail can be found in Tables 6 through 9, including additional statistics, detection limit information, health benchmarks used by NJDEP, risk ratios, and concentrations in parts per billion by volume (ppbv). The ppbv units are more common for monitoring results, while $\mu g/m^3$ units are generally used in modeling and health studies. Many of the compounds that were analyzed were below the detection limit of the method used. These are listed separately in Table 10.

Chemicals with reported averages based on data with less than 50% of the samples above the detection limit should be viewed with caution. Median values (the value of the middle sample value when the results are ranked) are reported in Tables 6 through 9 along with the mean (average) concentrations because for some compounds only a single or very few high values were recorded. These high values will tend to increase the average concentration significantly, but would have less effect on the median value. In such cases, the median value may be a better indicator of long-term exposures (the basis for the air toxics health benchmarks).

The Chester site had the lowest concentrations for the bulk of the prevalent air toxics. The highest concentrations for many compounds were found in Camden.

USEPA has recently determined that the methods used to collect and analyze **acrolein** in ambient air are not producing reliable results. More information is available at www.epa.gov/schoolair/acrolein.html . Although we are including the 2013 New Jersey acrolein data in this report, the concentrations are highly uncertain and should be viewed with caution.

This report includes results for toxic metals from the particulate speciation monitors in Camden, Chester, Elizabeth, New Brunswick, and Newark. The data is collected every three days. Monitoring data for other speciated particulate can be found in Appendix B (Fine Particulate Speciation Summary) of the annual Air Quality Report (www.njaqinow.net/Default.ltr.aspx). Table 3 presents the annual average concentrations for pollutants which have a health benchmark, along with estimated risk ratios. (For more information see the section on "Estimating Health Risk" below.) Chromium and nickel have health benchmarks that are based on carcinogenicity of specific compounds. Since the monitoring method only measures total chromium or nickel and cannot distinguish between different types of compounds, cancer risk ratios are not calculated with those benchmarks. However, risk ratios are calculated for nickel based on noncancer effects.

Table 2

2013 Summary of Toxic Volatile Organic Compounds Monitored in New Jersey

Annual Average Concentration
micrograms per cubic meter (μg/m^3)

Pollutant	Synonym	HAP	CAS No.	Camden	Chester	Elizabeth	New Brunswick
Acetaldehyde		*	75-07-0	2.776	1.305	2.598	1.651
Acetone			67-64-1	3.278	2.005	2.631	2.337
Acetonitrile		*	75-05-8	0.824	0.674	0.558	16.026
Acetylene			74-86-2	0.781	0.381	0.889	0.587
Acrolein[a]		*	107-02-8	1.122	1.027	1.039	1.124
Acrylonitrile		*	107-13-1	0.060	*0.101*	0.756	1.161
tert-Amyl Methyl Ether			994-05-8	0.002	*0.003*	*0.002*	*0.005*
Benzaldehyde			100-52-7	1.142	0.064	0.124	0.086
Benzene		*	71-43-2	0.852	0.490	0.803	0.650
Bromochloromethane			74-97-5	ND	ND	ND	ND
Bromodichloromethane			75-27-4	0.003	*0.007*	*0.002*	*0.008*
Bromoform		*	75-25-2	0.013	*0.011*	*0.011*	*0.014*
Bromomethane	Methyl bromide	*	74-83-9	0.518	0.053	0.047	0.056
1,3-Butadiene		*	106-99-0	0.097	0.038	0.113	0.070
Butyraldehyde			123-72-8	0.541	0.157	0.379	0.244
Carbon Disulfide		*	75-15-0	2.729	2.515	9.010	17.782
Carbon Tetrachloride		*	56-23-5	0.605	0.612	0.624	0.614
Chlorobenzene		*	108-90-7	0.001	*0.003*	ND	*0.002*
Chloroethane	Ethyl chloride	*	75-00-3	0.037	*0.026*	*0.008*	*0.022*
Chloroform		*	67-66-3	0.132	0.104	0.133	0.131
Chloromethane	Methyl chloride	*	74-87-3	1.362	1.223	1.137	1.154
Chloroprene	2-Chloro-1,3-butadiene	*	126-99-8	ND	ND	ND	ND
Crotonaldehyde			123-73-9	0.412	0.362	0.372	0.331
Dibromochloromethane			124-48-1	0.033	0.032	*0.024*	0.037
1,2-Dibromoethane	Ethylene dibromide	*	106-93-4	0.001	ND	ND	*0.002*
m-Dichlorobenzene	1,3-Dichlorobenzene		541-73-1	0.098	0.066	*0.002*	*0.003*
o-Dichlorobenzene	1,2-Dichlorobenzene		95-50-1	0.005	*0.004*	*0.003*	*0.006*
p-Dichlorobenzene	1,4-Dichlorobenzene	*	106-46-7	0.040	*0.015*	*0.028*	*0.024*
Dichlorodifluoromethane			75-71-8	2.570	2.433	2.518	2.536
1,1-Dichloroethane	Ethylidene dichloride	*	75-34-3	ND	*0.001*	ND	ND
1,2-Dichloroethane	Ethylene dichloride	*	107-06-2	0.089	0.073	0.074	0.086
1,1-Dichloroethylene	Vinylidene chloride	*	75-35-4	0.001	*0.003*	ND	*0.003*
cis-1,2-Dichloroethylene	cis-1,2-Dichloroethene		156-59-2	ND	ND	ND	ND
trans-1,2-Dichloroethylene	trans-1,2-Dichloroethene		156-60-5	0.002	ND	ND	ND
Dichloromethane	Methylene chloride	*	75-09-2	1.167	0.956	0.819	0.691

- *Values in* ***italics*** *indicate averages based on less than 50% of samples above the detection limit.*
- **ND** indicates that all samples were below the detection limit.
- HAP = Hazardous air pollutant as listed in the Clean Air Act.

[a] Acrolein concentrations are highly uncertain because of problems with collection and analysis methods.

Table 2 (continued)
2013 Summary of Toxic Volatile Organic Compounds Monitored in New Jersey

Annual Average Concentration
micrograms per cubic meter (μg/m^3)

Pollutant	Synonym	HAP	CAS No.	Camden	Chester	Elizabeth	New Bruns-wick
1,2-Dichloropropane	Propylene dichloride	*	78-87-5	ND	ND	ND	ND
cis-1,3-Dichloropropene	cis-1,3-Dichloropropylene	*	542-75-6	ND	ND	ND	ND
trans-1,3-Dichloropropene	trans-1,3-Dichloropropylene	*	542-75-6	ND	ND	ND	ND
Dichlorotetrafluoroethane	Freon 114		76-14-2	0.124	0.121	0.121	0.129
2,5-Dimethylbenzaldehyde			5799-94-2	ND	ND	ND	ND
Ethyl Acrylate		*	140-88-5	ND	ND	ND	ND
Ethyl tert-Butyl Ether	tert-Butyl ethyl ether		637-92-3	0.205	0.198	0.277	*0.086*
Ethylbenzene		*	100-41-4	0.304	0.123	0.431	0.250
Formaldehyde		*	50-00-0	4.957	2.130	4.886	2.236
Hexachloro-1,3-butadiene	Hexachlorobutadiene	*	87-68-3	0.021	*0.020*	*0.016*	*0.024*
Hexaldehyde	Hexanaldehyde		66-25-1	0.537	0.065	0.177	0.100
Isovaleraldehyde			590-86-3	ND	ND	ND	ND
Methyl Ethyl Ketone	MEK		78-93-3	0.554	0.317	0.489	0.368
Methyl Isobutyl Ketone	MIBK	*	108-10-1	0.194	0.119	0.189	0.163
Methyl Methacrylate		*	80-62-6	0.036	*0.002*	*0.049*	*0.007*
Methyl tert-Butyl Ether	MTBE	*	1634-04-4	0.743	3.148	0.155	*0.084*
n-Octane			111-65-9	0.272	0.217	0.328	0.160
Propionaldehyde		*	123-38-6	0.598	0.223	0.490	0.293
Propylene			115-07-1	1.054	0.430	2.489	0.599
Styrene		*	100-42-5	1.296	0.062	0.121	0.129
1,1,2,2-Tetrachloroethane		*	79-34-5	0.009	*0.011*	*0.106*	*0.150*
Tetrachloroethylene	Perchloroethylene	*	127-18-4	0.132	0.060	0.127	0.086
Tolualdehydes				0.363	0.066	0.131	0.051
Toluene		*	108-88-3	4.126	1.534	2.478	1.782
1,2,4-Trichlorobenzene		*	102-82-1	0.002	ND	ND	*0.004*
1,1,1-Trichloroethane	Methyl chloroform	*	71-55-6	0.047	0.035	0.046	0.045
1,1,2-Trichloroethane		*	79-00-5	ND	ND	ND	ND
Trichloroethylene		*	79-01-6	0.048	*0.005*	*0.024*	*0.015*
Trichlorofluoromethane			75-69-4	2.002	1.377	1.450	1.458
Trichlorotrifluoroethane	1,1,2-Trichloro-1,2,2-trifluoroethane		76-13-1	0.642	0.644	0.637	0.646
1,2,4-Trimethylbenzene			95-63-6	0.461	0.125	0.400	0.170
1,3,5-Trimethylbenzene			108-67-8	0.174	0.098	0.141	0.076
Valeraldehyde			110-62-3	0.329	0.050	0.158	0.086
Vinyl chloride		*	75-01-4	0.010	*0.001*	ND	*0.001*
m,p-Xylene		*	1330-20-7	0.739	0.256	1.065	0.558
o-Xylene		*	95-47-6	0.338	0.115	0.457	0.269

- *Values in **italics** indicate averages based on less than 50% of samples above the detection limit.*
- **ND** indicates that all samples were below the detection limit.
- HAP = Hazardous air pollutant as listed in the Clean Air Act.

Table 3
2013 New Jersey Toxic Metals Summary & Risk Ratios

Pollutant	HAP[a]	Annual average concentration (µg/m³)[b]					Health Bench-mark (µg/m³)[c]	Risk Ratio[d]				
		Camden	Chester	Elizabeth	New Bruns-wick	Newark		Camden	Chester	Elizabeth	New Bruns-wick	Newark
Antimony	*	0.0179	0.0219	0.0199	0.0186	0.0190	0.2	0.1	0.1	0.1	0.1	0.1
Arsenic	*	*0.0009*	*0.0005*	*0.0005*	*0.0005*	*0.0004*	*2.30E-04*	4	2	2	2	2
Cadmium	*	*0.0019*	*0.0022*	*0.0015*	*0.0016*	*0.0018*	*2.40E-04*	8	9	6	7	7
Chlorine	*	0.1836	0.0070	0.0236	0.0148	0.0171	0.2	0.9	0.04	0.1	0.1	0.1
Chromium[e]	*	0.0040	0.0070	0.0077	0.0124	0.0062	*8.30E-05*	See "e" below				
Cobalt	*	0.0010	0.0007	0.0008	0.0007	0.0008	*1.10E-04*	9	6	7	7	7
Lead	*	0.0088	*0.0010*	*0.0010*	*0.0012*	0.0013	0.15	0.06	0.01	0.01	0.01	0.01
Manganese	*	0.0036	*0.0007*	0.0016	0.0016	0.0011	0.05	0.07	0.01	0.03	0.03	0.02
Nickel	*	0.0028	0.0009	0.0024	0.0026	0.0018	0.05	0.06	0.02	0.05	0.05	0.04
Nickel[f]	*	0.0028	0.0009	0.0024	0.0026	0.0018	*2.10E-03*	See "f" below				
Phosphorus	*	0.0055	0.0055	0.0057	0.0056	0.0059	0.07	0.1	0.1	0.1	0.1	0.1
Selenium	*	0.0011	0.0011	0.0011	0.0011	0.0010	20	0.0001	0.0001	0.0001	0.0001	0.0001
Silicon		0.0631	0.0370	0.0667	0.0399	0.0603	3	0.02	0.01	0.02	0.01	0.02
Vanadium		0.0023	0.0016	0.0020	0.0016	0.0020	0.1	0.02	0.02	0.02	0.02	0.02

[a] HAP = Hazardous air pollutant listed in the Clean Air Act.

[b] Annual average concentrations in italics are based on less than 50% of the samples above the detection limit.

[c] The health benchmark is defined as the chemical-specific air concentration above which there may be human health concerns. Toxicity values are not available for all chemicals. For more information, go to www.nj.gov/dep/aqpp/risk.html.
Health benchmarks in italics have a cancer endpoint.
For a carcinogen (cancer-causing chemical), the health benchmark is set at the air concentration that would cause no more than a one-in-a-million increase in the likelihood of getting cancer, even after a lifetime of exposure.
For a non-carcinogen, the health benchmark is the maximum air concentration to which exposure is likely to cause no harm, even if that exposure occurs on a daily basis for a lifetime.

[d] The risk ratio for a chemical is a comparison of the annual mean air concentration to the health benchmark. A risk ratio greater than one may be of concern. If the annual mean is 0, then the risk ratio cannot be calculated.

[e] Chromium - The health benchmark is based on carcinogenicity of hexavalent chromium (Cr^{+6}). It is not known how much of the chromium measured by the monitor is hexavalent.

[f] Nickel - The cancer-based health benchmark for nickel is based on specific nickel compounds. It is not known how much of the nickel measured by the monitor is in that form.

More information on speciated fine particulate matter measured in New Jersey can be found in the NJDEP's 2013 Air Quality Report, Appendix B - Fine Particulate Speciation Summary, at www.njaqinow.net/Default.ltr.aspx.

ESTIMATING HEALTH RISK

A simplified way to determine whether the ambient concentration of an air toxic could pose a potential human health risk is to compare the air concentration to a health benchmark. The number that we get when we divide the concentration by the benchmark is called a **risk ratio**. If the risk ratio is less than one, the air concentration should not pose a health risk. If it is greater than one, it may be of concern. The risk ratio also indicates how much higher or lower the estimated air concentration is compared to the health benchmark.

The pollutants with risk ratios greater than one for at least one monitoring site are summarized in Table 4. In addition to the toxic VOCs and carbonyls, speciated metals were also evaluated for risk. Elizabeth had fourteen pollutants with annual average concentrations that exceeded their health benchmarks, New Brunswick had thirteen, and Camden and Chester had twelve. The toxic VOCs with risk ratios greater than one at all sites are acetaldehyde, acrylonitrile, benzene, 1,3-butadiene, carbon tetrachloride, chloroform, chloromethane (methyl chloride), 1,2-dichloroethane, and formaldehyde. Toxic metals that had risk ratios greater than one at the five monitoring sites were arsenic, cadmium, and cobalt.

Although the mean concentrations of acrolein exceeded the health benchmark at all sites (see Tables 6 through 9), they are not included here because of problems with the sampling method. Formaldehyde contributed the highest risks, but note that the risks varied substantially from site to site. Ethylbenzene was over the level of concern only at Elizabeth, but just barely. Risk ratios for 1,1,2,2-tetrachloroethane were of concern only at Elizabeth and New Brunswick, but these are based on detection levels of less than 50%. Details for each site, including health benchmarks used to calculate risk ratios, can be found in Tables 6 through 9.

Table 4 can be compared with the risk results predicted by NATA in Table 5. Chromium and nickel cancer risk cannot be estimated from monitoring data because the sampling method measures total chromium and total nickel concentrations; the amounts that are in the carcinogenic form cannot be determined. 1,3-Dichlopropene and 1,1,2-trichloroethane samples were mostly below the detection limits, so no annual average concentration could be calculated. Ethylene oxide and naphthalene are not sampled at the New Jersey sites. PAH/POM are polycyclic aromatic hydrocarbons/polycyclic organic matter, a broad class of compounds that are not measured in New Jersey because of a lack of a practical sampling method. On the other hand, acrylonitrile is measured in New Jersey at levels higher than estimated by NATA.

NATA estimates show concentrations of diesel particulate matter (DPM) in New Jersey that are at levels that potentially pose a higher cancer risk than the other air toxics combined. However, actually measuring diesel in the ambient air is problematic. It is difficult to distinguish particulate matter emitted by diesel engines from other types of particulate matter. Diesel emissions consist of agglomerated and condensed fine particles and gases, onto which are adsorbed potentially hundreds of compounds formed by incomplete combustion, such as polycyclic aromatic hydrocarbons (PAHs) and nitrated PAHs. Some of these very specific compounds have been suggested as indicators for DPM, but sampling technologies and costs continue to be obstacles. Elemental carbon is sometimes assumed to be an indicator for diesel emissions. See Figure 3 for a comparison of DPM concentrations from NATA with monitored concentrations of elemental carbon. For more information about diesel, see www.nj.gov/dep/airtoxics/diesemis.htm.

Table 4
Monitored Toxic Air Pollutants with Risk Ratios Greater Than One in NJ for 2013

		Risk Ratio				
	POLLUTANT	**Camden**	**Chester**	**Elizabeth**	**New Brunswick**	**Newark**
1	Acetaldehyde	6	3	6	4	
2	Acrylonitrile	*4*	*7*	50	77	
3	Arsenic	4	2	2	2	2
4	Benzene	7	4	6	5	
5	1,3-Butadiene	3	1.2	3	2	
6	Cadmium	8	9	6	7	7
7	Carbon Tetrachloride	9	9	9	9	
8	Chloroform	3	2	3	3	
9	Chloromethane	2	2	2	2	
10	Cobalt	9	6	7	7	7
11	1,2-Dichloroethane	2	2	2	2	
12	Ethylbenzene	0.8	0.3	1.1	0.6	
13	Formaldehyde	64	28	63	29	
14	1,1,2,2-Tetrachloroethane	*0.5*	*0.6*	*6*	*9*	

Values in italics are based on less than 50% of samples above the detection limit.

Figure 3. Comparison of Elemental Carbon Monitoring Data
with NATA 2005 Predicted Concentrations for Diesel PM

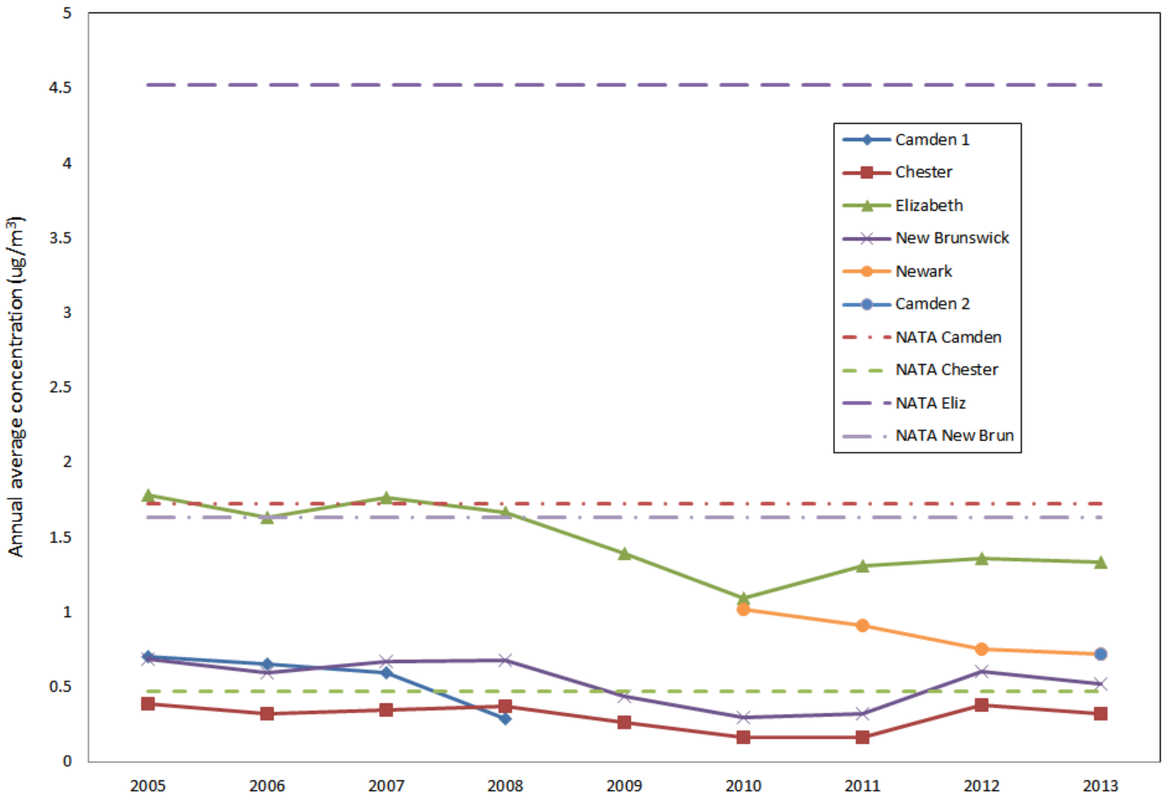


Table 5
2005 NATA Modeled Air Concentrations Compared to Health Benchmarks
New Jersey Statewide Averages

Pollutant	**Modeled Air Concentration ($\mu g/m^3$)**	**Health Benchmark ($\mu g/m^3$)**	**Risk Ratio**	**% Contribution from**				
				Major Sources	Area Sources	On-Road Mobile Sources	Nonroad Mobile Sources	Background & Secondary Formation
Acetaldehyde	1.9	0.45	**4.3**	<1%	4%	6%	3%	87%*
Acrolein	0.062	*0.020*	**3.1**	<1%	22%	14%	9%	55%*
Arsenic compounds	0.00053	0.00023	**2.3**	3%	13%	5%	5%	74%
Benzene	1.3	0.13	**10**	<1%	13%	30%	13%	44%
1,3-Butadiene	0.095	0.033	**2.9**	<1%	<1%	40%	17%	43%
Cadmium compounds	0.00011	0.00024	0.5	12%	44%	0%	1%	43%
Carbon tetrachloride	0.61	0.17	**3.6**	0%	<1%	0%	0%	100%
Chloroform	0.13	0.043	**3.1**	<1%	54%	0%	0%	46%
Chromium (hexavalent form)	0.00024	0.000083	**2.9**	29%	10%	4%	1%	56%
Cobalt Compounds	0.000093	0.00011	0.8	93%	7%	0%	0%	0%
1,4-Dichlorobenzene	0.12	0.091	**1.3**	<1%	58%	0%	0%	42%
1,3-Dichloropropene	0.14	0.25	0.5	0%	100%	0%	0%	0%
Diesel particulate matter	1.1	0.0033	**327**	0%	0%	47%	53%	0%
Ethylbenzene	0.34	0.40	0.9	1%	30%	45%	24%	0%
Ethylene oxide	0.011	0.011	**1.0**	12%	18%	0%	0%	70%
Formaldehyde	2.2	0.077	**28**	<1%	3%	9%	6%	82%*
Methyl chloride	1.2	0.56	**2.2**	<1%	1%	0%	0%	99%
Naphthalene	0.13	0.029	**4.6**	1%	48%	26%	4%	21%
Nickel Compounds	0.0012	0.0021	0.6	36%	37%	2%	10%	15%
PAH/POM**	0.012	0.0072*	**1.6**	1%	79%	8%	12%	0%
Tetrachloroethylene	0.25	0.17	**1.4**	<1%	61%	0%	0%	39%
1,1,2-Trichloroethane	0.0066	0.063	0.1	<1%	100%	0%	0%	0%

- For information on risk ratios see section on “Estimating Health Risk” above.
- Chemicals with risk ratios greater than or equal to 1 are in bold.
- Risk ratios based on noncarcinogenic effects are in *italics*.
- For diesel particulate matter, onroad and nonroad concentrations include a model-estimated background concentration.
- *Acetaldehyde, acrolein and formaldehyde concentration estimates include secondary formation, which is the process by which chemicals in the air are transformed into other chemicals.
- **PAH/POM is "polycyclic aromatic hydrocarbons/polycyclic organic matter." These define a broad class of compounds. The chemicals making up this class were broken up into 8 groups based on toxicity, and each group was assigned a cancer-weighted toxicity estimate. 0.0072 $\mu g/m^3$ is the health benchmark average across the 8 groups.

TRENDS AND COMPARISONS

Monitoring of air toxics in New Jersey has been going on for over a decade, although it continues to evolve, with improvements in the ability to detect given chemicals at lower concentrations. Figures 4 through 13 show data for some of the VOCs that have been sampled over the past decade. As mentioned previously, the first toxics monitoring site in Camden (Camden Lab) was shut down in 2008. It is identified in Figures 4 through 13 as “Camden 1.” The new Camden site, located about two miles from the old site, is designated “Camden 2.”

According to USEPA’s National Air Toxics Assessment (NATA), **acetaldehyde** concentrations in New Jersey (Figure 4) are primarily influenced by secondary formation, a process in which chemicals in the air are transformed into other chemicals by chemical reactions. Mobile sources also contribute to ambient levels. In 2003, no data was collected in Camden after September, which could have had an influence on the low annual average for that year. In 2004 in both Camden and New Brunswick, high levels of acetaldehyde were measured over a number of weeks. Note the similarity with the formaldehyde graph (Figure 12).

Acrylonitrile concentrations (Figure 5) are impacted by nonpoint sources and background. In 2013, Elizabeth and New Brunswick samples were consistently higher than Camden and Chester (which were mostly below the detection limit). The high concentration in 2008 in Elizabeth is the result of a number of high sample values that year. Data for New Brunswick for 2012 were invalidated because of problems with the sampler.

Figure 6 shows a decrease in **benzene** concentrations over the past decade. Most benzene now comes from mobile and area sources, and is also transported from other regions (background). Sources of **1,3-butadiene** (Figure 7) are similar to those of benzene.

Some of the increase in **chloroform** concentrations shown in Figure 8 is believed to be from improvements in the detection limit. Nonpoint sources and background are the major contributors to ambient chloroform levels.

Chloromethane (also known as methyl chloride) levels are influenced primarily by background. Figure 9 shows that concentrations have remained relatively stable from year to year, and that all sites show similar levels.

1,4-Dichlorobenzene (Figure 10) is emitted primarily from nonpoint sources. It is used in products such as pesticides, disinfectant, mothballs and toilet deodorizer blocks. There is also a significant background level. The high annual average for New Brunswick in 2005 is attributable to an exceptionally high reading on July 27th that may be a lab error.

Ethylbenzene is associated with mobile sources, which is probably why it is higher at the Elizabeth monitoring site and lower at Chester (Figure 11). 2001 data for Chester and New Brunswick have been omitted from the graph because of problems encountered when sampling was begun that May.

Formaldehyde (Figure 12) is a ubiquitous pollutant that is often found at higher concentrations indoors rather than outdoors because of its use in many consumer goods. It is used in the production of fertilizer, paper, plywood, urea-formaldehyde resins, and many other products. In New Jersey the primary emitters of formaldehyde are on-road mobile sources, although secondary formation and transport contribute significantly to high outdoor concentrations. As with acetaldehyde, a number of very high samples were measured at Camden and New Brunswick, in 2004.

Tetrachloroethylene (also known as perchloroethylene) (Figure 13) is used as an industrial solvent and in dry cleaning. It is a common contaminant of hazardous waste sites because of a tendency in the 20th century to dispose of it improperly. Production and demand for it by industry has been declining.

Figure 4
ACETALDEHYDE – New Jersey Monitored Concentrations

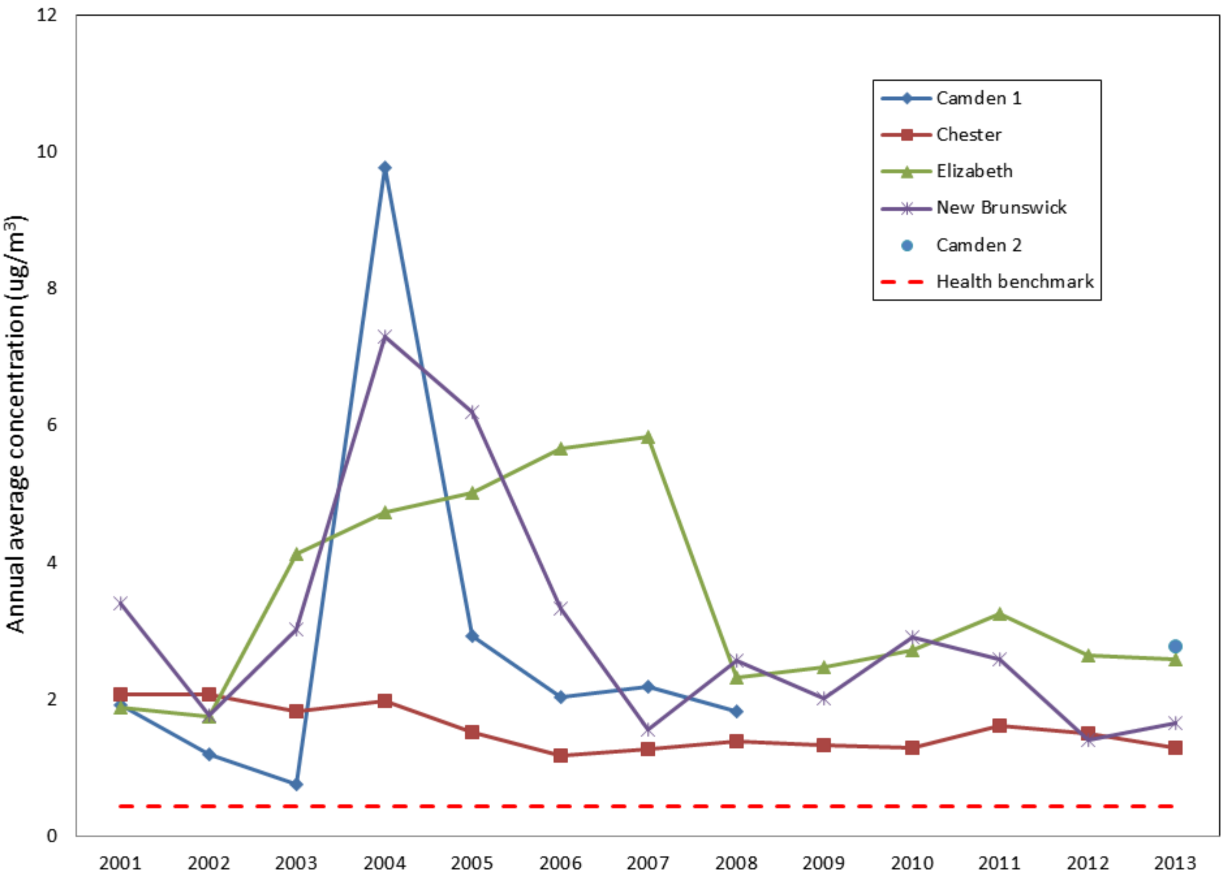


Figure 5
ACRYLONITRILE – New Jersey Monitored Concentrations

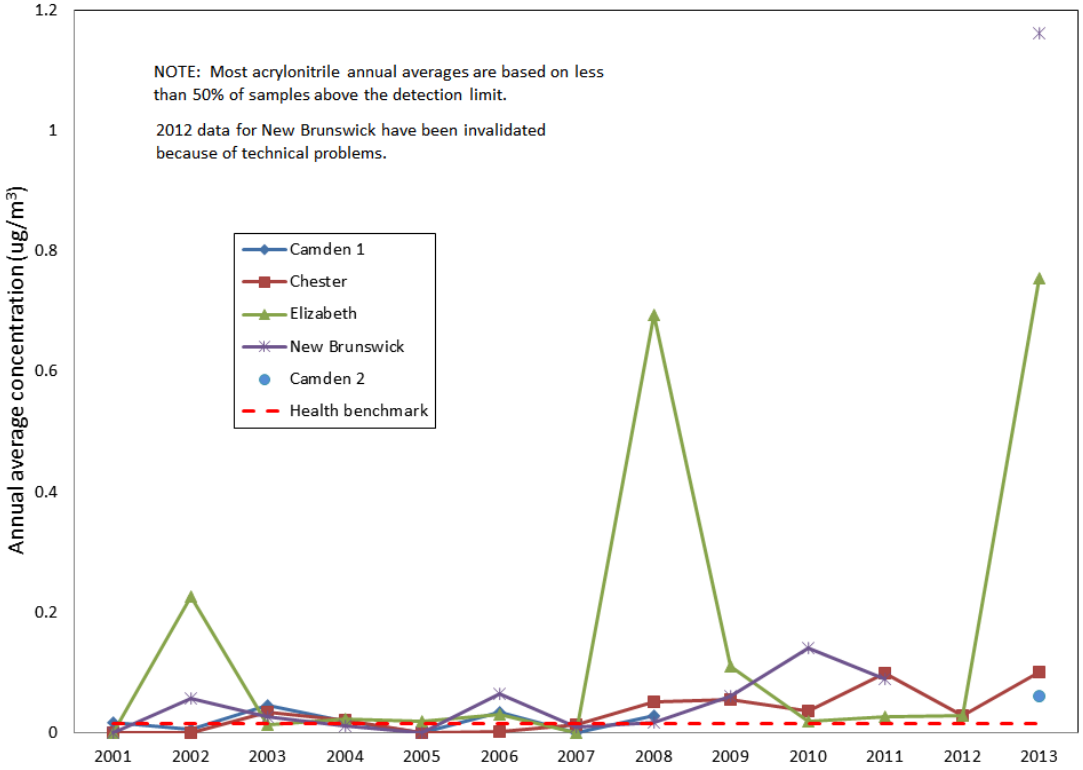


Figure 6
BENZENE – New Jersey Monitored Concentrations

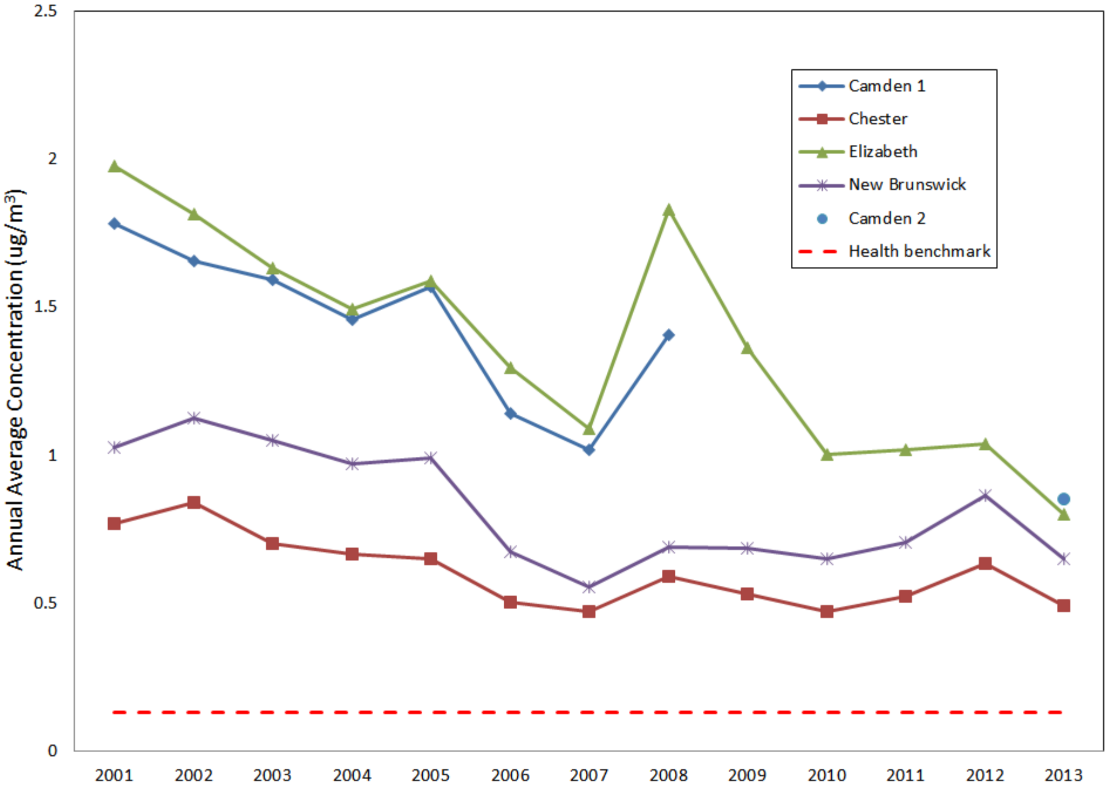


Figure 7
1,3-BUTADIENE – New Jersey Monitored Concentrations

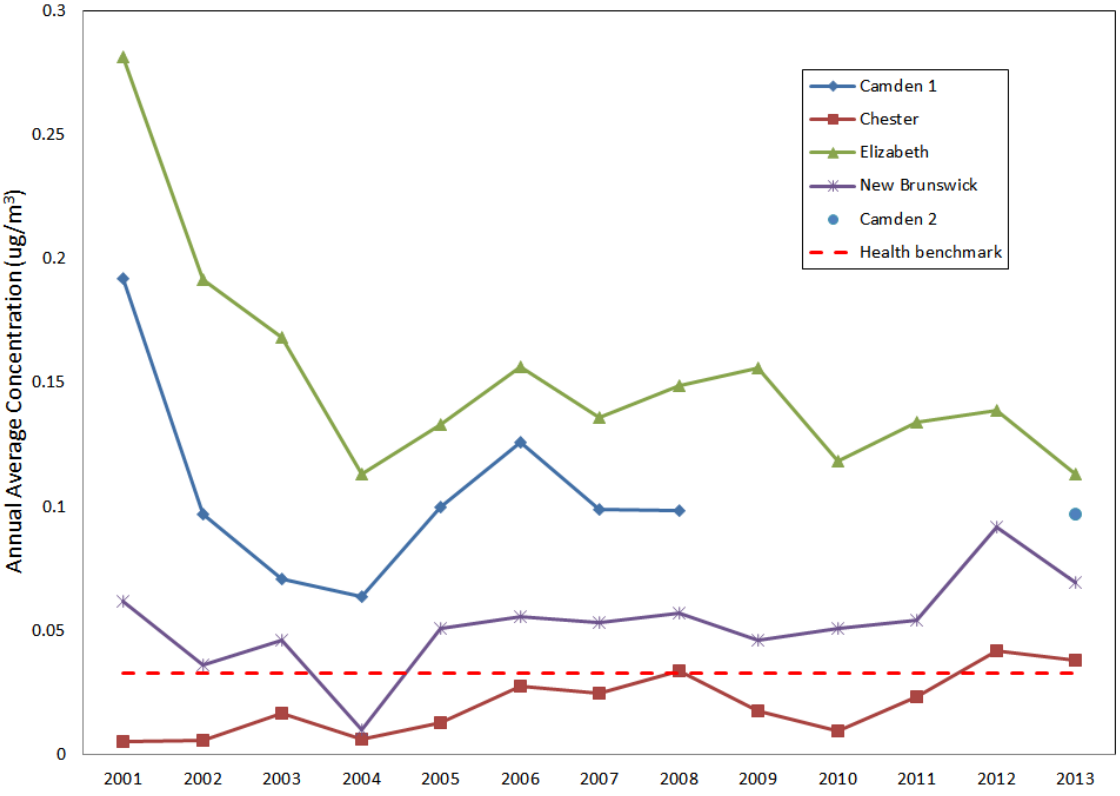
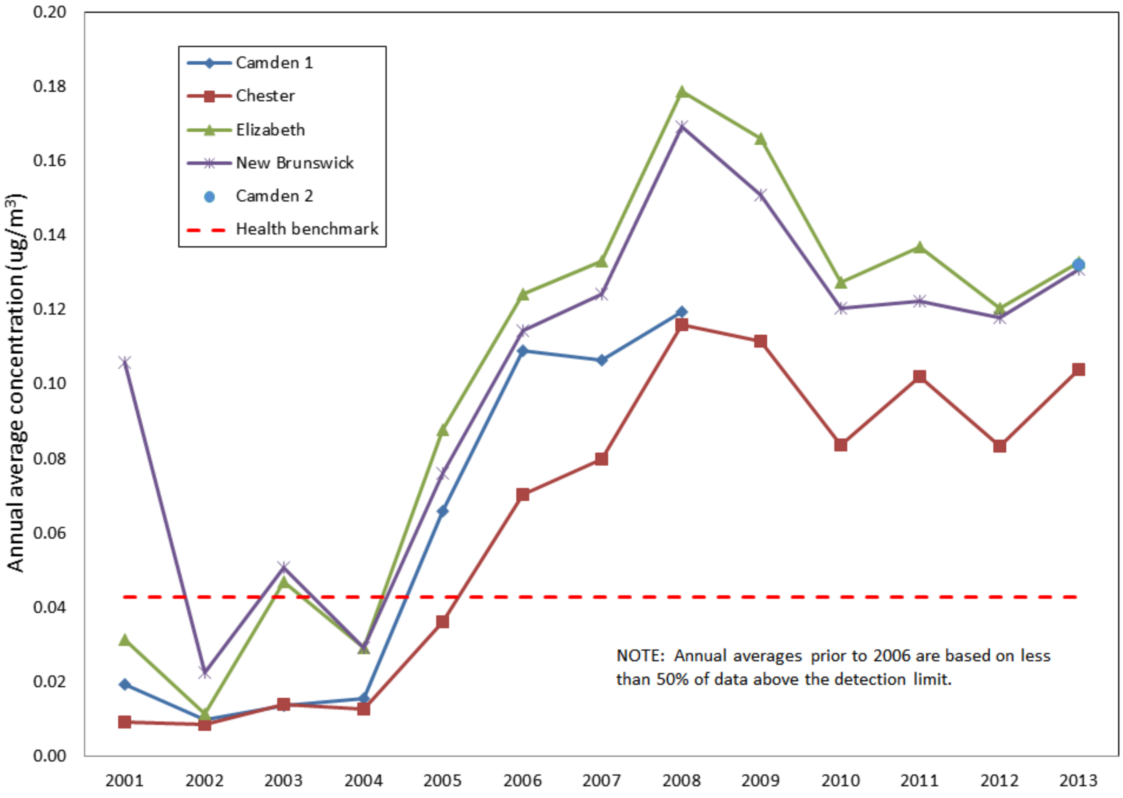


Figure 8
CHLOROFORM – New Jersey Monitored Concentrations



NOTE: Annual averages prior to 2006 are based on less than 50% of data above the detection limit.

Figure 9
CHLOROMETHANE (Methyl chloride) – New Jersey Monitored Concentrations

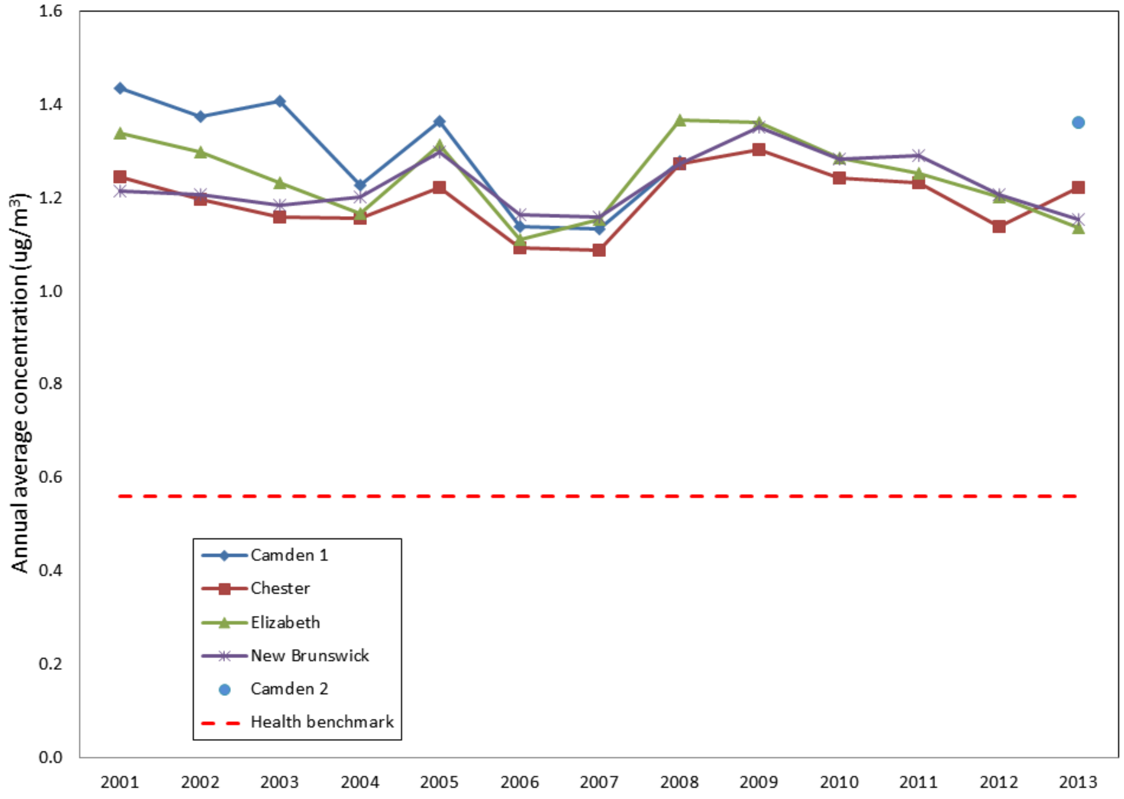


Figure 10
1,4-DICHLOROBENZENE – New Jersey Monitored Concentrations

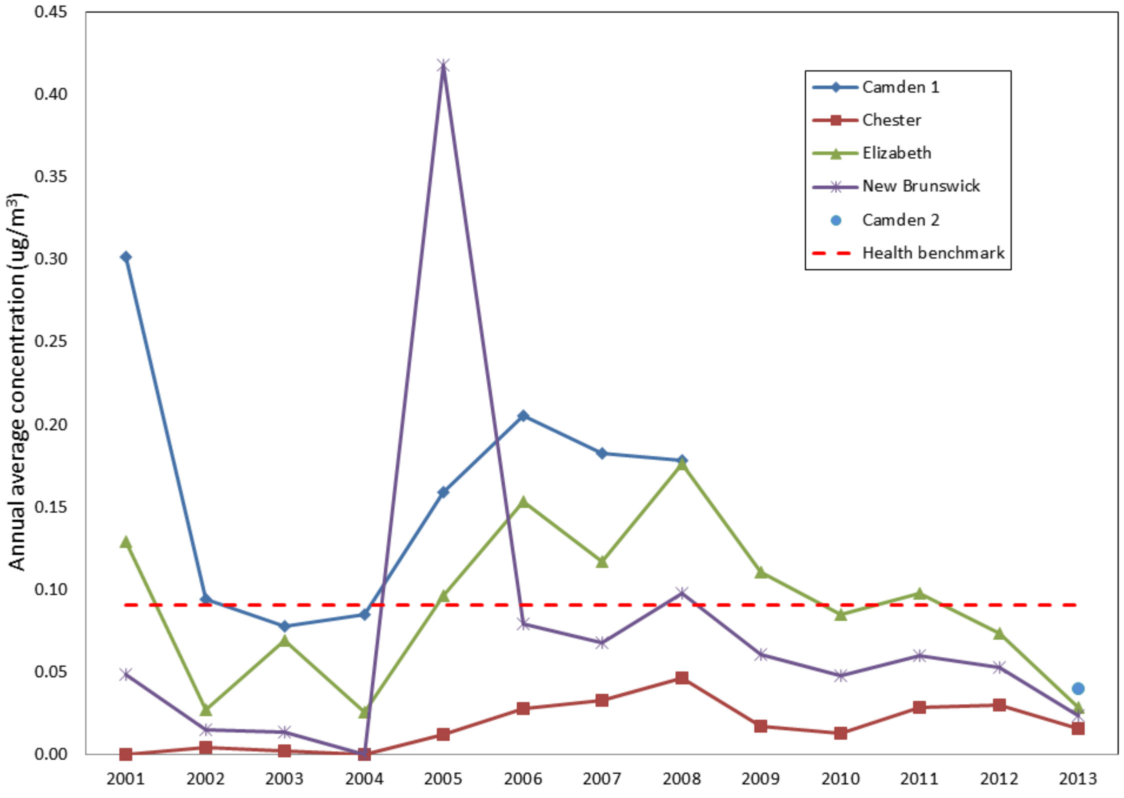


Figure 11

ETHYLBENZENE – New Jersey Monitored Concentrations

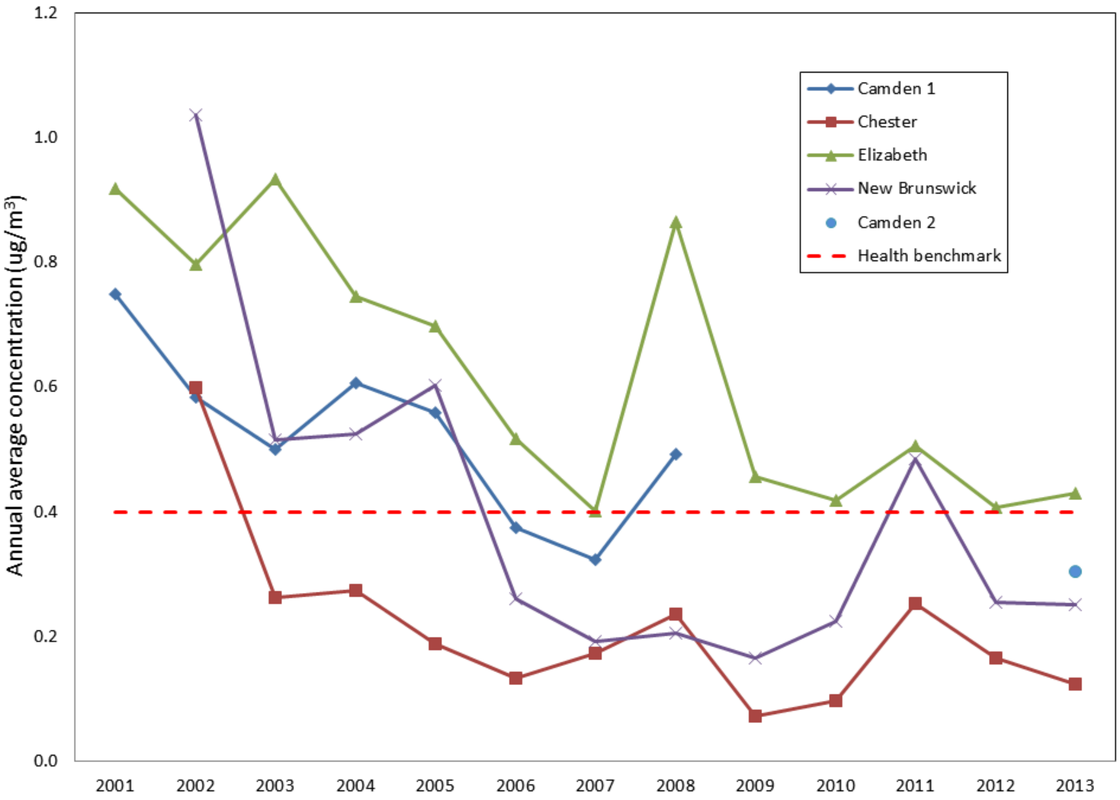


Figure 12

FORMALDEHYDE – New Jersey Monitored Concentrations

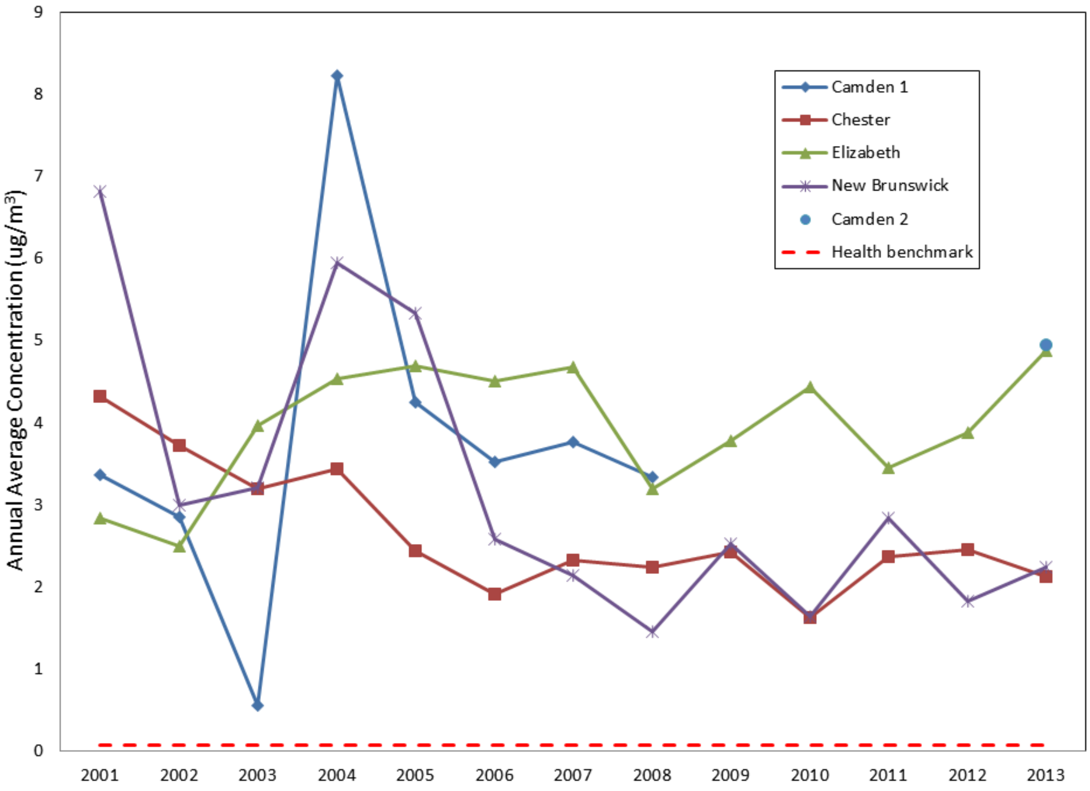
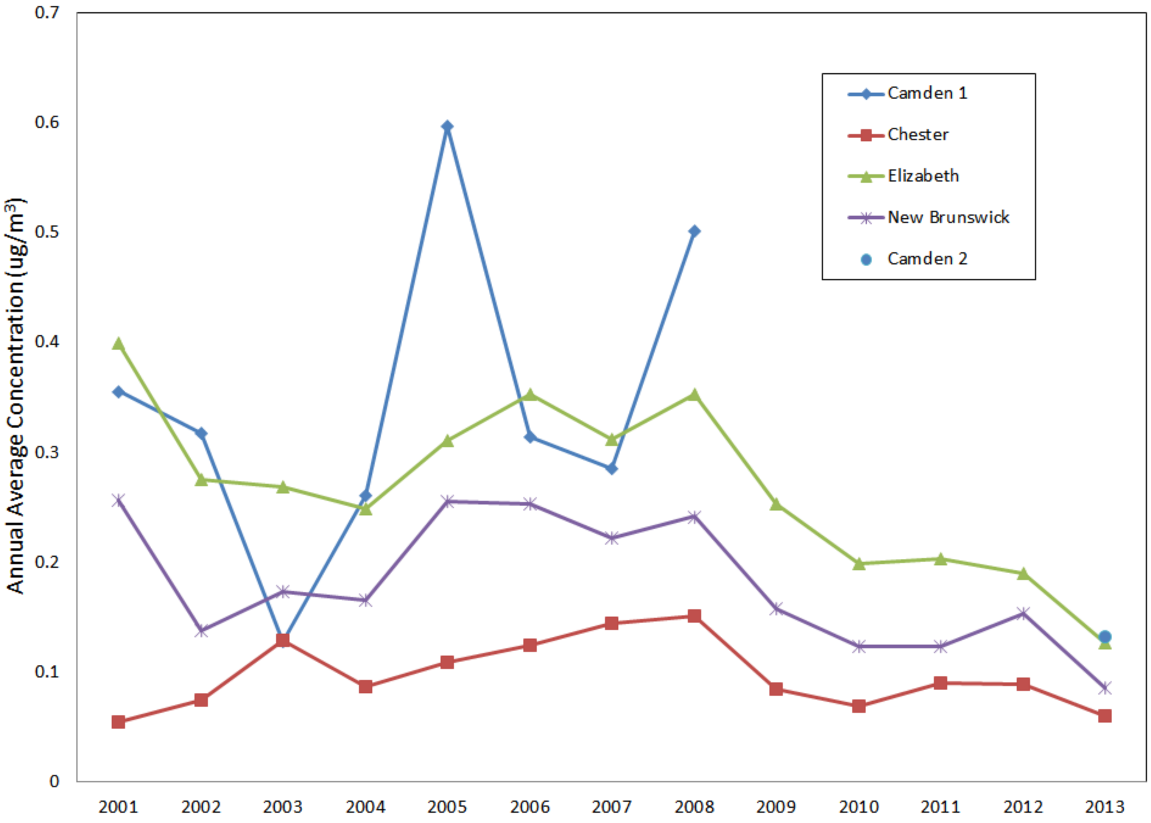


Figure 13

TETRACHLOROETHYLENE – New Jersey Monitored Concentrations



Toxic metals data are presented in Figures 14 through 18, taken from the $PM_{2.5}$ speciation monitors around the state. The Newark site became operational in 2010, and a new Camden site was established in 2013.

Chromium and nickel are shown here because NATA 2005 indicated that there are levels of their carcinogenic forms in the air above the one-in-a-million cancer risk level. The data in Figures 16 and 18 are for total chromium and nickel. The specific carcinogenic compounds cannot be measured with available monitoring methods.

Arsenic, cadmium, and cobalt concentrations are all influenced by combustion, industrial processes, and transport.

Note that in a few of the graphs some of the years are marked with an asterisk, indicating that less than 50% of the samples used to calculate the annual average were above the detection limit. Values below the detection limit are considered to be zero.

Figure 14
ARSENIC – New Jersey Monitored Concentrations

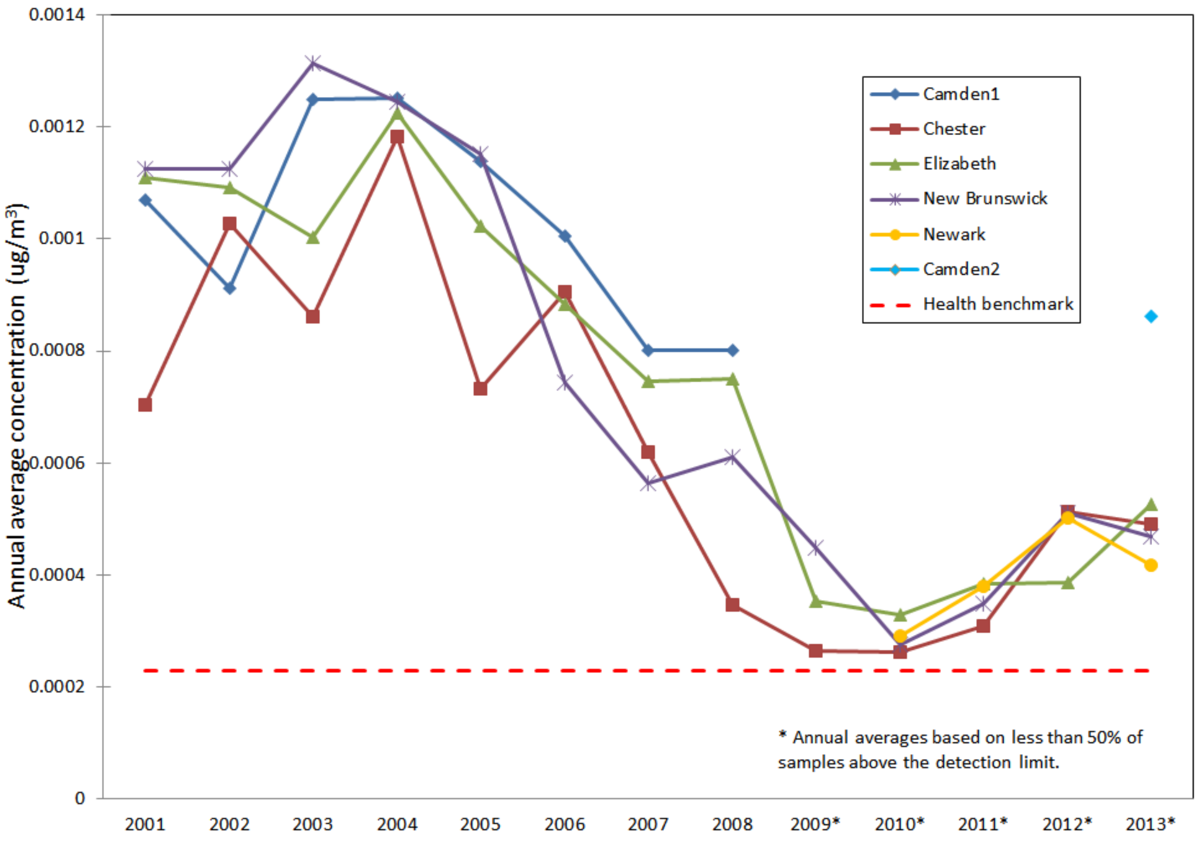
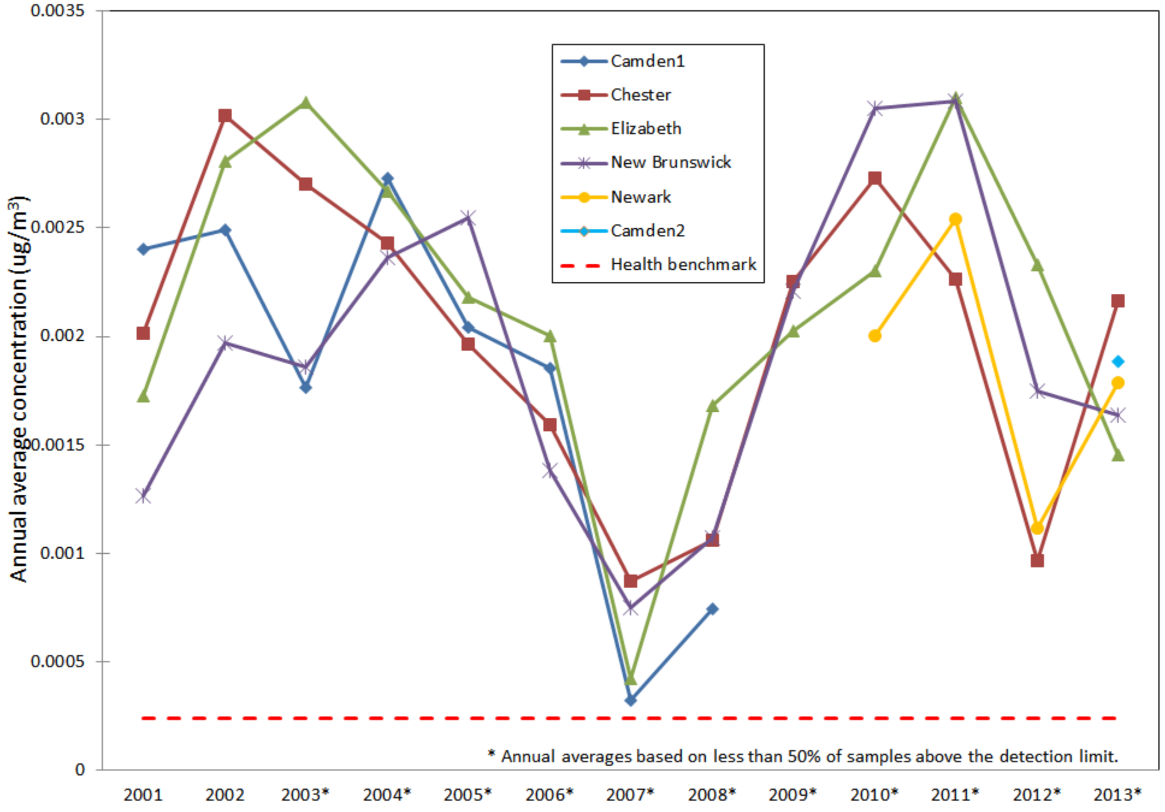


Figure 15

CADMIUM – New Jersey Monitored Concentrations



* Annual averages based on less than 50% of samples above the detection limit.

Figure 16

CHROMIUM – New Jersey Monitored Concentrations

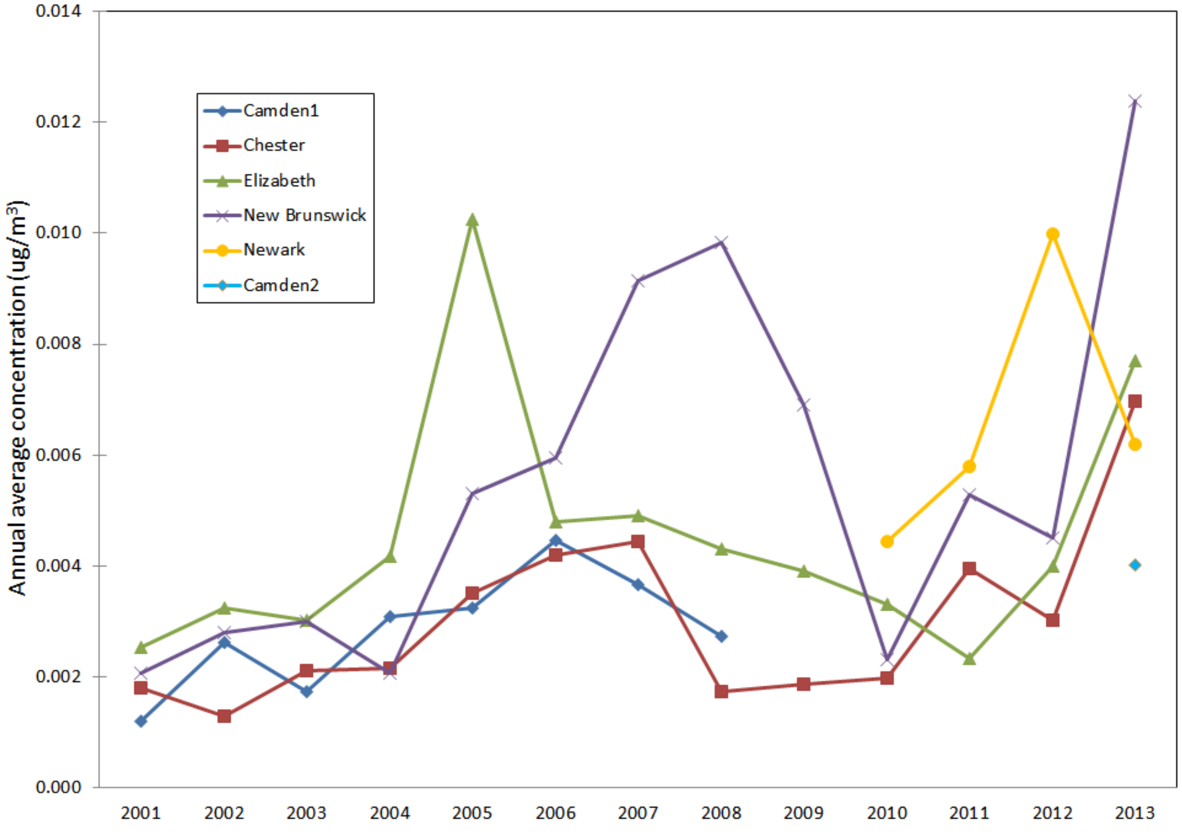


Figure 17
COBALT – New Jersey Monitored Concentrations

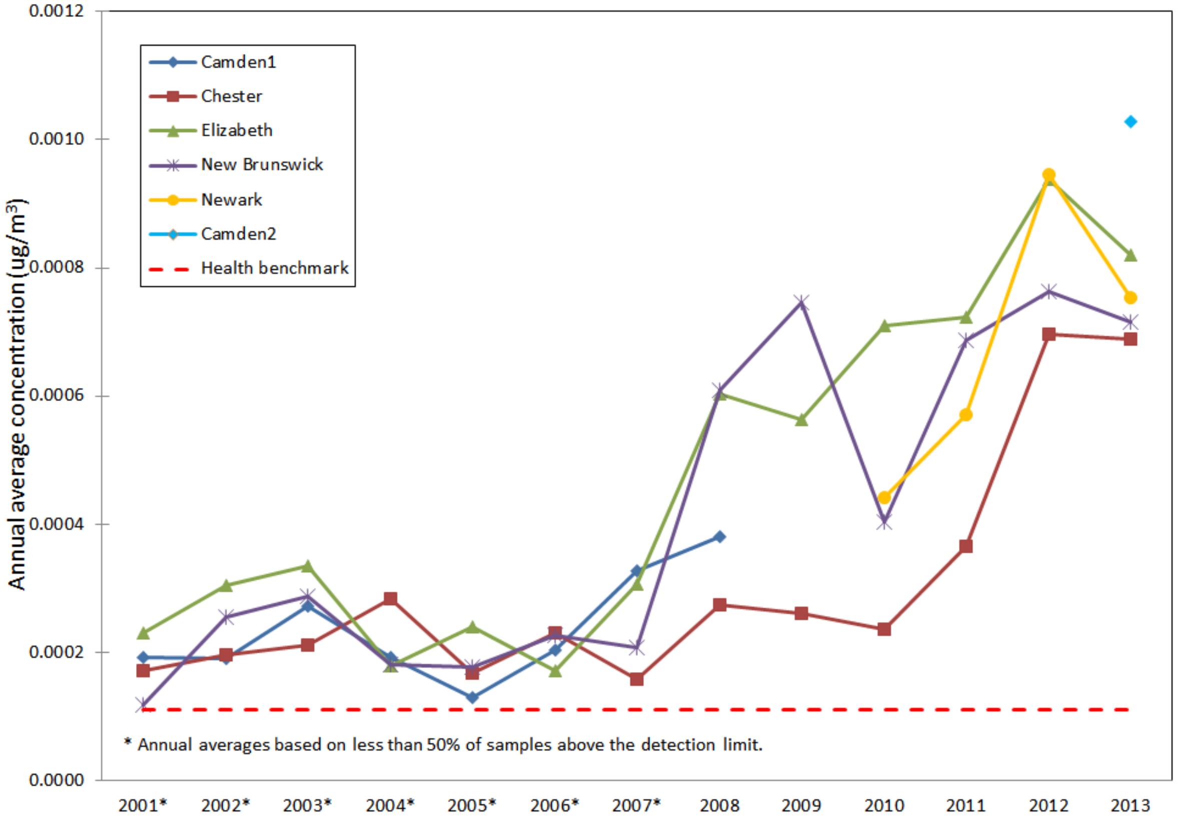


Figure 18
NICKEL – New Jersey Monitored Concentrations

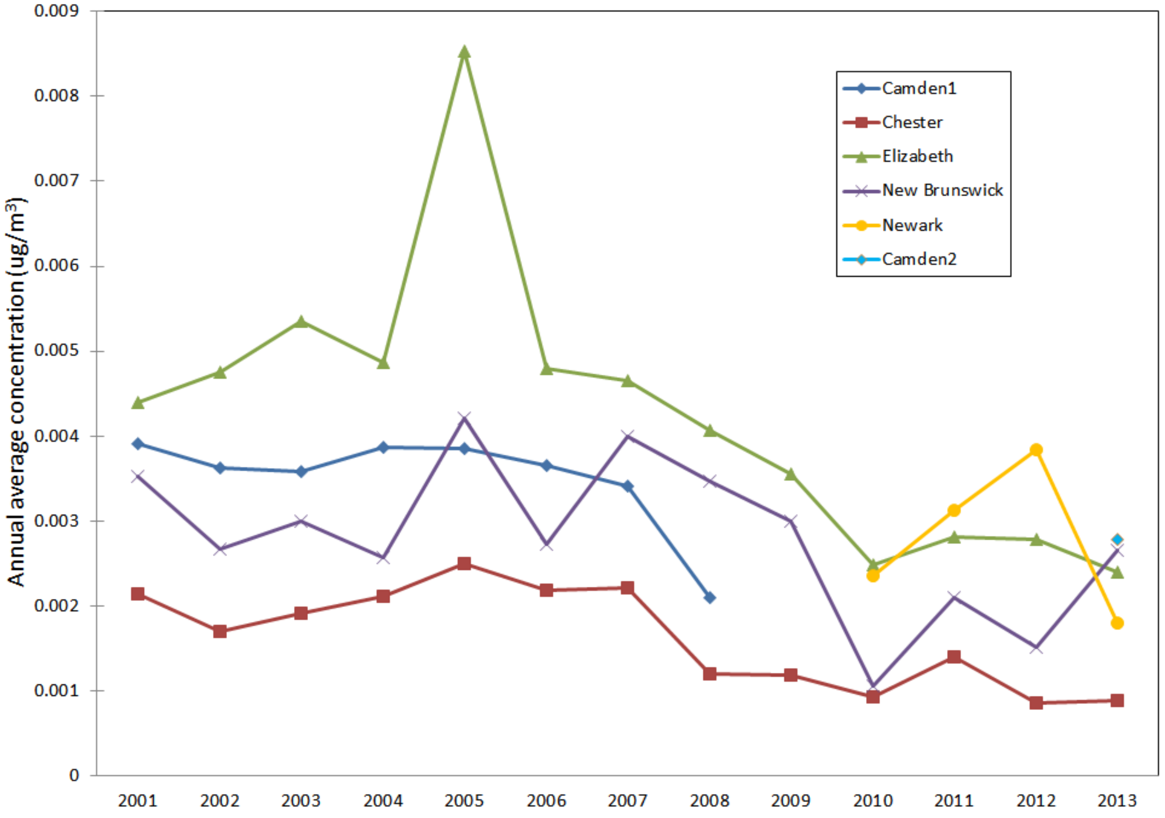
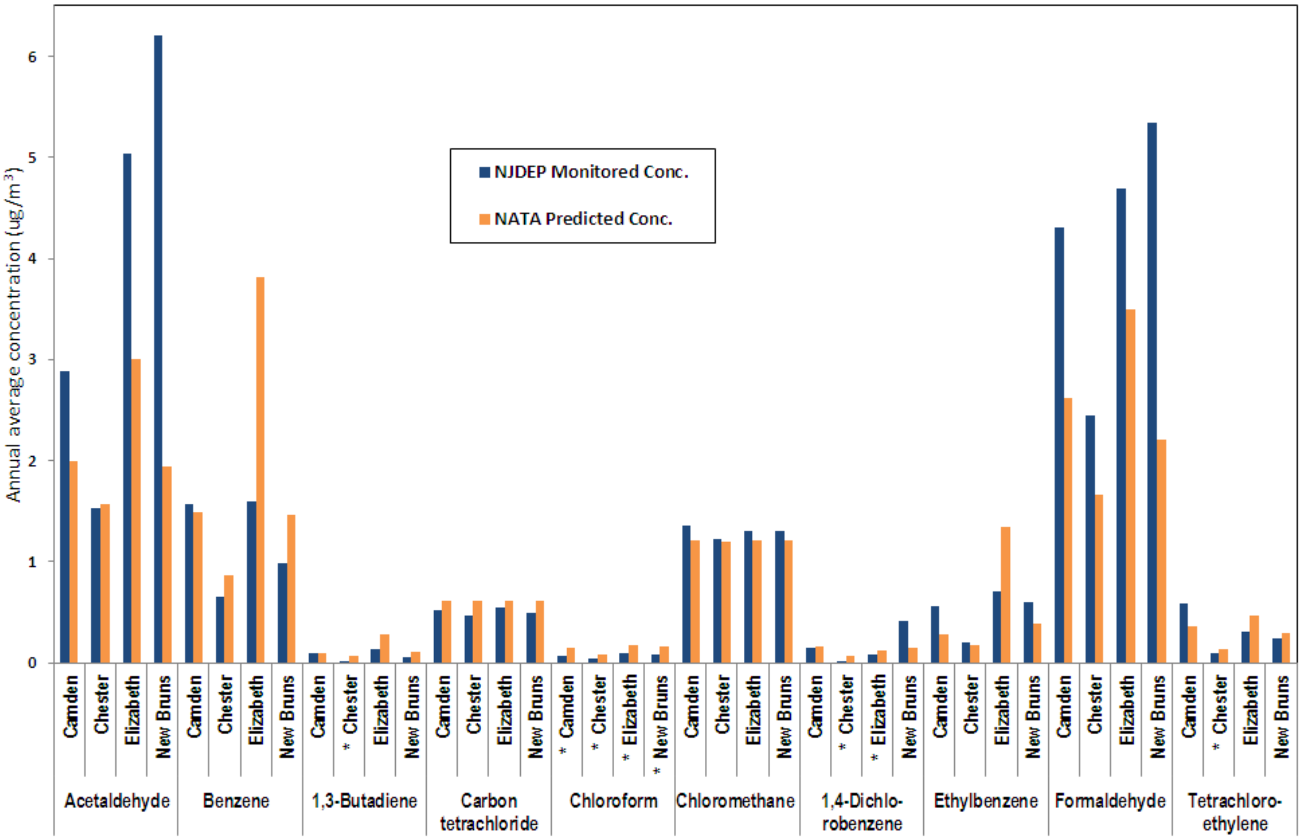


Figure 19 below shows a comparison of annual average concentrations measured at New Jersey's four air toxics monitoring sites in 2005 with annual average concentrations predicted by USEPA's 2005 NATA (at the monitoring site census tract). Most of the pollutants show agreement within a factor of 2 or less, although acetaldehyde and formaldehyde appear to be underestimated by NATA.

Figure 19
2005 New Jersey Monitored Concentrations Compared
to 2005 NATA Predicted Concentrations



* Monitoring data average is based on less than 50% of samples above the detection limit.

Table 6

CAMDEN NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
Acetaldehyde	75-07-0	1.541	1.420	3.560	2.776	2.558	6.414	0.45	**6**	0.007	100
Acetone	67-64-1	1.380	1.100	3.940	3.278	2.613	9.359	31000	0.0001	0.014	100
Acetonitrile	75-05-8	0.491	0.290	8.270	0.824	0.487	13.88	60	0.01	0.012	100
Acetylene	74-86-2	0.734	0.639	1.860	0.781	0.680	1.979			0.078	100
Acrolein[g]	107-02-8	0.489	0.448	0.973	1.122	1.027	2.231	0.02	56[g]	0.165	100
Acrylonitrile	107-13-1	*0.028*	0	0.313	*0.060*	0	0.679	0.015	**4**	0.130	21
tert-Amyl Methyl Ether	994-05-8	*0.0004*	0	0.008	*0.002*	0	0.033			0.067	5
Benzaldehyde	100-52-7	0.263	0.057	1.820	1.142	0.247	7.900			0.087	100
Benzene	71-43-2	0.267	0.244	0.636	0.852	0.780	2.032	0.13	**7**	0.010	100
Bromochloromethane	74-97-5	0	0	0	0	0	0			0.323	0
Bromodichloromethane	75-27-4	*0.0005*	0	0.011	*0.003*	0	0.074			0.094	5
Bromoform	75-25-2	*0.001*	0	0.012	*0.013*	0	0.124	0.91	0.01	0.217	14
Bromomethane	74-83-9	0.133	0.018	3.370	0.518	0.070	13.09	5	0.1	0.078	93
1,3-Butadiene	106-99-0	0.044	0.039	0.093	0.097	0.086	0.206	0.033	**3**	0.024	98
Butyraldehyde	123-72-8	0.184	0.167	0.422	0.541	0.493	1.245			0.035	100
Carbon Disulfide	75-15-0	0.876	0.927	1.580	2.729	2.887	4.920	700	0.004	0.009	100
Carbon Tetrachloride	56-23-5	0.096	0.098	0.140	0.605	0.617	0.881	0.17	**9**	0.088	100
Chlorobenzene	108-90-7	*0.0002*	0	0.012	*0.001*	0	0.055	1000	0.000001	0.110	2
Chloroethane	75-00-3	*0.014*	0	0.096	*0.037*	0	0.253	10000	0.000004	0.066	42
Chloroform	67-66-3	0.027	0.028	0.057	0.132	0.137	0.278	0.043	**3**	0.083	96
Chloromethane	74-87-3	0.660	0.597	3.390	1.362	1.233	7.000	0.56	**2**	0.029	100
Chloroprene	126-99-8	0	0	0	0	0	0	7		0.119	0
Crotonaldehyde	123-73-9	0.144	0.048	0.707	0.412	0.138	2.027			0.043	100
Dibromochloromethane	124-48-1	0.003	0.003	0.012	0.033	0.030	0.119			0.030	54
1,2-Dibromoethane	106-93-4	*0.0001*	0	0.008	*0.001*	0	0.061	0.0017	0.6	0.131	2
m-Dichlorobenzene	541-73-1	0.016	0.016	0.042	0.098	0.096	0.253			0.222	86
o-Dichlorobenzene	95-50-1	*0.001*	0	0.011	*0.005*	0	0.066	200	0.00003	0.126	11
p-Dichlorobenzene	106-46-7	0.007	0.006	0.029	0.040	0.036	0.174	0.091	0.4	0.114	53
Dichlorodifluoromethane	75-71-8	0.520	0.519	0.730	2.570	2.567	3.610	200	0.01	0.089	100
1,1-Dichloroethane	75-34-3	0	0	0	0	0	0	0.63	0	0.061	0
1,2-Dichloroethane	107-06-2	0.022	0.022	0.049	0.089	0.089	0.198	0.038	**2**	0.065	93
1,1-Dichloroethylene	75-35-4	*0.0002*	0	0.007	*0.001*	0	0.028	200	0.000004	0.056	4
cis-1,2-Dichloroethylene	156-59-2	0	0	0	0	0	0			0.048	0
trans-1,2-Dichloroethylene	156-60-5	*0.0005*	0	0.017	*0.002*	0	0.067			0.048	4
Dichloromethane	75-09-2	*0.336*	0	3.710	*1.167*	0	12.89	2.1	0.6	0.080	48

[a] See page 32 for footnotes.

Table 6 (continued)

CAMDEN NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
1,2-Dichloropropane	78-87-5	0	0	0	0	0	0	0.1		0.088	0
cis-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.082	0
trans-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.073	0
Dichlorotetrafluoroethane	76-14-2	0.018	0.017	0.025	0.124	0.119	0.175			0.161	100
2,5-Dimethylbenzaldehyde	5799-94-2	0	0	0	0	0	0			0.016	0
Ethyl Acrylate	140-88-5	0	0	0	0	0	0	2		0.049	0
Ethyl tert-Butyl Ether	637-92-3	0.049	0.016	0.894	0.205	0.067	3.736			0.059	60
Ethylbenzene	100-41-4	0.070	0.063	0.166	0.304	0.274	0.721	0.40	0.8	0.048	100
Formaldehyde	50-00-0	4.036	3.750	9.460	4.957	4.605	11.62	0.077	**64**	0.028	100
Hexachloro-1,3-butadiene	87-68-3	*0.002*	0	0.013	*0.021*	0	0.139	0.045	0.5	0.085	25
Hexaldehyde	66-25-1	0.131	0.084	0.612	0.537	0.344	2.507			0.090	100
Isovaleraldehyde	590-86-3	0	0	0	0	0	0			0.007	0
Methyl Ethyl Ketone	78-93-3	0.188	0.170	0.501	0.554	0.501	1.475	5000	0.0001	0.071	100
Methyl Isobutyl Ketone	108-10-1	0.047	0.045	0.118	0.194	0.184	0.483	3000	0.0001	0.061	100
Methyl Methacrylate	80-62-6	*0.010*	0	0.171	*0.036*	0	0.602	700	0.0001	0.088	30
Methyl tert-Butyl Ether	1634-04-4	0.206	0.099	1.380	0.743	0.357	4.975	3.8	0.2	0.040	96
n-Octane	111-65-9	0.058	0.059	0.125	0.272	0.276	0.584			0.093	98
Propionaldehyde	123-38-6	0.252	0.234	0.614	0.598	0.556	1.459	8	0.1	0.007	100
Propylene	115-07-1	0.612	0.539	1.510	1.054	0.928	2.599	3000	0.0004	0.057	100
Styrene	100-42-5	0.304	0.191	3.660	1.296	0.814	15.59	1.8	0.7	0.102	100
1,1,2,2-Tetrachloroethane	79-34-5	*0.001*	0	0.009	*0.009*	0	0.062	0.017	0.5	0.124	18
Tetrachloroethylene	127-18-4	0.019	0.019	0.050	0.132	0.129	0.339	0.17	0.8	0.136	91
Tolualdehydes		0.074	0.040	0.460	0.363	0.197	2.260			0.025	100
Toluene	108-88-3	1.095	1.000	3.680	4.126	3.768	13.87	5000	0.001	0.170	100
1,2,4-Trichlorobenzene	102-82-1	*0.0003*	0	0.018	*0.002*	0	0.134	4	0.001	0.163	2
1,1,1-Trichloroethane	71-55-6	0.009	0.009	0.017	0.047	0.049	0.093	1000	0.00005	0.109	88
1,1,2-Trichloroethane	79-00-5	0	0	0	0	0	0	0.063		0.115	0
Trichloroethylene	79-01-6	*0.009*	0	0.061	*0.048*	0	0.328	0.5	0.1	0.118	40
Trichlorofluoromethane	75-69-4	0.356	0.304	1.690	2.002	1.708	9.496	700	0.003	0.084	100
Trichlorotrifluoroethane	76-13-1	0.084	0.084	0.101	0.642	0.644	0.774	30000	0.00002	0.130	100
1,2,4-Trimethylbenzene	95-63-6	0.094	0.084	0.316	0.461	0.413	1.553			0.123	98
1,3,5-Trimethylbenzene	108-67-8	0.035	0.032	0.102	0.174	0.157	0.501			0.108	98
Valeraldehyde	110-62-3	0.093	0.076	0.293	0.329	0.268	1.032			0.011	100
Vinyl chloride	75-01-4	*0.004*	0	0.078	*0.010*	0	0.199	0.11	0.1	0.028	21
m,p-Xylene	1330-20-7	0.170	0.154	0.530	0.739	0.669	2.301	100	0.01	0.009	100
o-Xylene	95-47-6	0.078	0.066	0.189	0.338	0.287	0.821	100	0.003	0.087	100

[a] See page 32 for footnotes.

Table 7

CHESTER NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
Acetaldehyde	75-07-0	0.724	0.654	2.230	1.305	1.178	4.018	0.45	**3**	0.007	100
Acetone	67-64-1	0.844	0.772	2.050	2.005	1.834	4.870	31000	0.00006	0.014	100
Acetonitrile	75-05-8	0.401	0.271	7.990	0.674	0.455	13.41	60	0.01	0.012	100
Acetylene	74-86-2	0.358	0.284	0.949	0.381	0.302	1.010			0.078	100
Acrolein[g]	107-02-8	0.448	0.447	0.965	1.027	1.025	2.213	0.02	51[g]	0.165	100
Acrylonitrile	107-13-1	*0.047*	0	0.262	*0.101*	0	0.569	0.015	**7**	0.130	44
tert-Amyl Methyl Ether	994-05-8	*0.001*	0	0.011	*0.003*	0	0.046			0.067	8
Benzaldehyde	100-52-7	0.015	0.012	0.053	0.064	0.052	0.230			0.087	100
Benzene	71-43-2	0.154	0.134	0.901	0.490	0.428	2.878	0.13	**4**	0.010	100
Bromochloromethane	74-97-5	0	0	0	0	0	0			0.323	0
Bromodichloromethane	75-27-4	*0.001*	0	0.013	*0.007*	0	0.087			0.094	11
Bromoform	75-25-2	*0.001*	0	0.011	*0.011*	0	0.114	0.91	0.01	0.217	13
Bromomethane	74-83-9	0.014	0.015	0.037	0.053	0.058	0.144	5	0.01	0.078	85
1,3-Butadiene	106-99-0	0.017	0.018	0.052	0.038	0.040	0.115	0.033	**1.2**	0.024	72
Butyraldehyde	123-72-8	0.053	0.049	0.153	0.157	0.145	0.451			0.035	100
Carbon Disulfide	75-15-0	0.808	1.060	1.760	2.515	3.301	5.481	700	0.004	0.009	100
Carbon Tetrachloride	56-23-5	0.097	0.097	0.134	0.612	0.610	0.843	0.17	**9**	0.088	100
Chlorobenzene	108-90-7	*0.001*	0	0.015	*0.003*	0	0.069	1000	0.000003	0.110	5
Chloroethane	75-00-3	*0.010*	0	0.057	*0.026*	0	0.150	10000	0.000003	0.066	33
Chloroform	67-66-3	0.021	0.021	0.083	0.104	0.103	0.405	0.043	**2**	0.083	90
Chloromethane	74-87-3	0.592	0.578	1.230	1.223	1.194	2.540	0.56	**2**	0.029	100
Chloroprene	126-99-8	0	0	0	0	0	0	7		0.119	0
Crotonaldehyde	123-73-9	0.126	0.032	1.200	0.362	0.092	3.440			0.043	100
Dibromochloromethane	124-48-1	0.003	0.003	0.012	0.032	0.030	0.119			0.030	52
1,2-Dibromoethane	106-93-4	0	0	0	0	0	0	0.0017		0.131	0
m-Dichlorobenzene	541-73-1	0.011	0.013	0.038	0.066	0.078	0.228			0.222	69
o-Dichlorobenzene	95-50-1	*0.001*	0	0.010	*0.004*	0	0.060	200	0.00002	0.126	8
p-Dichlorobenzene	106-46-7	*0.003*	0	0.013	*0.015*	0	0.078	0.091	0.2	0.114	30
Dichlorodifluoromethane	75-71-8	0.492	0.508	0.634	2.433	2.512	3.136	200	0.01	0.089	100
1,1-Dichloroethane	75-34-3	*0.0002*	0	0.011	*0.001*	0	0.045	0.63	0.001	0.061	2
1,2-Dichloroethane	107-06-2	0.018	0.019	0.039	0.073	0.077	0.158	0.038	**2**	0.065	85
1,1-Dichloroethylene	75-35-4	*0.001*	0	0.009	*0.003*	0	0.036	200	0.00002	0.056	11
cis-1,2-Dichloroethylene	156-59-2	0	0	0	0	0	0			0.048	0
trans-1,2-Dichloroethylene	156-60-5	0	0	0	0	0	0			0.048	0
Dichloromethane	75-09-2	0.275	0.127	3.240	0.956	0.441	11.26	2.1	0.5	0.080	88

[a] See page 32 for footnotes.

Table 7 (continued)

CHESTER NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
1,2-Dichloropropane	78-87-5	0	0	0	0	0	0	0.1		0.088	0
cis-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.082	0
trans-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.073	0
Dichlorotetrafluoroethane	76-14-2	0.017	0.017	0.025	0.121	0.119	0.175			0.161	100
2,5-Dimethylbenzaldehyde	5799-94-2	0	0	0	0	0	0			0.016	0
Ethyl Acrylate	140-88-5	0	0	0	0	0	0	2		0.049	0
Ethyl tert-Butyl Ether	637-92-3	0.047	0.035	0.164	0.198	0.146	0.685			0.059	79
Ethylbenzene	100-41-4	0.028	0.021	0.180	0.123	0.091	0.782	0.40	0.3	0.048	100
Formaldehyde	50-00-0	1.735	1.48	4.340	2.130	1.818	5.330	0.077	**28**	0.028	100
Hexachloro-1,3-butadiene	87-68-3	*0.002*	0	0.015	*0.020*	0	0.160	0.045	0.5	0.085	23
Hexaldehyde	66-25-1	0.016	0.013	0.098	0.065	0.053	0.401			0.090	90
Isovaleraldehyde	590-86-3	0	0	0	0	0	0			0.007	0
Methyl Ethyl Ketone	78-93-3	0.108	0.097	0.328	0.317	0.286	0.966	5000	0.00006	0.071	100
Methyl Isobutyl Ketone	108-10-1	0.029	0.027	0.094	0.119	0.111	0.385	3000	0.00004	0.061	100
Methyl Methacrylate	80-62-6	*0.001*	0	0.010	*0.002*	0	0.035	700	0.000003	0.088	7
Methyl tert-Butyl Ether	1634-04-4	0.873	0.142	7.190	3.148	0.512	25.92	3.8	0.8	0.040	97
n-Octane	111-65-9	0.046	0.039	0.264	0.217	0.182	1.233			0.093	98
Propionaldehyde	123-38-6	0.094	0.087	0.260	0.223	0.207	0.618	8	0.03	0.007	100
Propylene	115-07-1	0.250	0.236	0.478	0.430	0.406	0.823	3000	0.0001	0.057	100
Styrene	100-42-5	0.014	0.010	0.140	0.062	0.043	0.596	1.8	0.03	0.102	56
1,1,2,2-Tetrachloroethane	79-34-5	*0.002*	0	0.013	*0.011*	0	0.089	0.017	0.6	0.124	18
Tetrachloroethylene	127-18-4	0.009	0.010	0.035	0.060	0.068	0.237	0.17	0.4	0.136	67
Tolualdehydes		0.013	0.011	0.078	0.066	0.054	0.383			0.025	71
Toluene	108-88-3	0.407	0.363	3.140	1.534	1.368	11.83	5000	0.0003	0.170	100
1,2,4-Trichlorobenzene	102-82-1	0	0	0	0	0	0	4	0	0.163	0
1,1,1-Trichloroethane	71-55-6	0.006	0.008	0.015	0.035	0.044	0.082	1000	0.00004	0.109	70
1,1,2-Trichloroethane	79-00-5	0	0	0	0	0	0	0.063	0	0.115	0
Trichloroethylene	79-01-6	*0.001*	0	0.014	*0.005*	0	0.075	0.5	0.01	0.118	10
Trichlorofluoromethane	75-69-4	0.245	0.246	0.312	1.377	1.382	1.753	700	0.002	0.084	100
Trichlorotrifluoroethane	76-13-1	0.084	0.084	0.111	0.644	0.644	0.851	30000	0.00002	0.130	100
1,2,4-Trimethylbenzene	95-63-6	0.025	0.020	0.188	0.125	0.098	0.924			0.123	95
1,3,5-Trimethylbenzene	108-67-8	0.020	0.016	0.088	0.098	0.079	0.433			0.108	82
Valeraldehyde	110-62-3	0.014	0.013	0.054	0.050	0.046	0.190			0.011	96
Vinyl chloride	75-01-4	*0.0003*	0	0.011	*0.001*	0	0.028	0.11	0.008	0.028	3
m,p-Xylene	1330-20-7	0.059	0.041	0.484	0.256	0.178	2.101	100	0.003	0.009	100
o-Xylene	95-47-6	0.027	0.019	0.210	0.115	0.082	0.912	100	0.001	0.087	98

[a] See page 32 for footnotes.

Table 8

ELIZABETH NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
Acetaldehyde	75-07-0	1.442	1.360	2.870	2.598	2.450	5.171	0.45	**6**	0.007	100
Acetone	67-64-1	1.108	1.010	3.180	2.631	2.399	7.554	31000	0.0001	0.014	100
Acetonitrile	75-05-8	0.333	0.202	1.600	0.558	0.339	2.686	60	0.01	0.012	100
Acetylene	74-86-2	0.835	0.700	2.830	0.889	0.745	3.012			0.078	100
Acrolein[g]	107-02-8	0.453	0.412	0.975	1.039	0.945	2.236	0.02	52[g]	0.165	100
Acrylonitrile	107-13-1	0.348	0.355	1.450	0.756	0.770	3.147	0.015	**50**	0.130	66
tert-Amyl Methyl Ether	994-05-8	*0.0004*	0	0.009	*0.002*	0	0.038			0.067	5
Benzaldehyde	100-52-7	0.029	0.026	0.119	0.124	0.113	0.517			0.087	100
Benzene	71-43-2	0.251	0.234	0.503	0.803	0.748	1.607	0.13	**6**	0.010	100
Bromochloromethane	74-97-5	0	0	0	0	0	0			0.323	0
Bromodichloromethane	75-27-4	*0.0002*	0	0.008	*0.002*	0	0.054			0.094	3
Bromoform	75-25-2	*0.001*	0	0.01	*0.011*	0	0.103	0.91	0.01	0.217	13
Bromomethane	74-83-9	0.012	0.014	0.050	0.047	0.054	0.194	5	0.01	0.078	77
1,3-Butadiene	106-99-0	0.051	0.046	0.113	0.113	0.102	0.250	0.033	**3**	0.024	100
Butyraldehyde	123-72-8	0.129	0.123	0.344	0.379	0.363	1.015			0.035	100
Carbon Disulfide	75-15-0	2.893	3.840	6.440	9.010	11.96	20.05	700	0.01	0.009	100
Carbon Tetrachloride	56-23-5	0.099	0.097	0.135	0.624	0.610	0.849	0.17	**9**	0.088	100
Chlorobenzene	108-90-7	0	0	0	0	0	0	1000	0	0.110	0
Chloroethane	75-00-3	*0.003*	0	0.050	*0.008*	0	0.132	10000	0.000001	0.066	10
Chloroform	67-66-3	0.027	0.029	0.056	0.133	0.142	0.273	0.043	**3**	0.083	87
Chloromethane	74-87-3	0.551	0.546	0.681	1.137	1.128	1.406	0.56	**2**	0.029	100
Chloroprene	126-99-8	0	0	0	0	0	0	7		0.119	0
Crotonaldehyde	123-73-9	0.130	0.051	1	0.372	0.146	2.867			0.043	100
Dibromochloromethane	124-48-1	*0.002*	0	0.010	*0.024*	0	0.099			0.030	41
1,2-Dibromoethane	106-93-4	0	0	0	0	0	0	0.0017		0.131	0
m-Dichlorobenzene	541-73-1	*0.0003*	0	0.007	*0.002*	0	0.042			0.222	5
o-Dichlorobenzene	95-50-1	*0.001*	0	0.008	*0.003*	0	0.048	200	0.00002	0.126	10
p-Dichlorobenzene	106-46-7	*0.005*	0	0.017	*0.028*	0	0.102	0.091	0.3	0.114	46
Dichlorodifluoromethane	75-71-8	0.509	0.511	0.722	2.518	2.527	3.571	200	0.01	0.089	100
1,1-Dichloroethane	75-34-3	0	0	0	0	0	0	0.63		0.061	0
1,2-Dichloroethane	107-06-2	0.018	0.021	0.037	0.074	0.085	0.150	0.038	**2**	0.065	77
1,1-Dichloroethylene	75-35-4	0	0	0	0	0	0	200		0.056	0
cis-1,2-Dichloroethylene	156-59-2	0	0	0	0	0	0			0.048	0
trans-1,2-Dichloroethylene	156-60-5	0	0	0	0	0	0			0.048	0
Dichloromethane	75-09-2	0.236	0.156	2.250	0.819	0.542	7.817	2.1	0.4	0.080	100

[a] See page 32 for footnotes.

Table 8 (continued)

ELIZABETH NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
1,2-Dichloropropane	78-87-5	0	0	0	0	0	0	0.1		0.088	0
cis-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.082	0
trans-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.073	0
Dichlorotetrafluoroethane	76-14-2	0.017	0.017	0.023	0.121	0.119	0.161			0.161	100
2,5-Dimethylbenzaldehyde	5799-94-2	0	0	0	0	0	0			0.016	0
Ethyl Acrylate	140-88-5	0	0	0	0	0	0	2		0.049	0
Ethyl tert-Butyl Ether	637-92-3	0.066	0.064	0.148	0.277	0.267	0.618			0.059	100
Ethylbenzene	100-41-4	0.099	0.092	0.230	0.431	0.399	0.999	0.40	**1.1**	0.048	100
Formaldehyde	50-00-0	3.978	3.380	12.90	4.886	4.151	15.84	0.077	**63**	0.028	100
Hexachloro-1,3-butadiene	87-68-3	*0.002*	0	0.012	*0.016*	0	0.128	0.045	0.4	0.085	21
Hexaldehyde	66-25-1	0.043	0.03	0.324	0.177	0.123	1.327			0.090	100
Isovaleraldehyde	590-86-3	0	0	0	0	0	0			0.007	0
Methyl Ethyl Ketone	78-93-3	0.166	0.145	0.389	0.489	0.426	1.146	5000	0.0001	0.071	100
Methyl Isobutyl Ketone	108-10-1	0.046	0.047	0.108	0.189	0.193	0.442	3000	0.0001	0.061	97
Methyl Methacrylate	80-62-6	*0.014*	0	0.141	*0.049*	0	0.496	700	0.0001	0.088	31
Methyl tert-Butyl Ether	1634-04-4	0.043	0.034	0.215	0.155	0.123	0.775	3.8	0.04	0.040	87
n-Octane	111-65-9	0.070	0.063	0.207	0.328	0.294	0.967			0.093	100
Propionaldehyde	123-38-6	0.206	0.176	0.457	0.490	0.418	1.086	8	0.06	0.007	100
Propylene	115-07-1	1.446	0.998	5.430	2.489	1.718	9.345	3000	0.001	0.057	100
Styrene	100-42-5	0.028	0.025	0.123	0.121	0.106	0.524	1.8	0.07	0.102	92
1,1,2,2-Tetrachloroethane	79-34-5	*0.015*	0	0.105	*0.106*	0	0.721	0.017	**6**	0.124	33
Tetrachloroethylene	127-18-4	0.019	0.018	0.050	0.127	0.122	0.339	0.17	0.7	0.136	89
Tolualdehydes		0.027	0.026	0.076	0.131	0.125	0.373			0.025	94
Toluene	108-88-3	0.658	0.603	1.720	2.478	2.272	6.481	5000	0.0005	0.170	100
1,2,4-Trichlorobenzene	102-82-1	0	0	0	0	0	0	4		0.163	0
1,1,1-Trichloroethane	71-55-6	0.008	0.009	0.036	0.046	0.049	0.196	1000	0.00005	0.109	79
1,1,2-Trichloroethane	79-00-5	0	0	0	0	0	0	0.063		0.115	0
Trichloroethylene	79-01-6	*0.004*	0	0.039	*0.024*	0	0.210	0.5	0.05	0.118	30
Trichlorofluoromethane	75-69-4	0.258	0.253	0.363	1.450	1.422	2.040	700	0.002	0.084	100
Trichlorotrifluoroethane	76-13-1	0.083	0.082	0.099	0.637	0.628	0.759	30000	0.00002	0.130	100
1,2,4-Trimethylbenzene	95-63-6	0.081	0.072	0.243	0.400	0.354	1.195			0.123	100
1,3,5-Trimethylbenzene	108-67-8	0.029	0.025	0.082	0.141	0.123	0.403			0.108	100
Valeraldehyde	110-62-3	0.045	0.038	0.221	0.158	0.132	0.779			0.011	100
Vinyl chloride	75-01-4	0	0	0	0	0	0	0.11		0.028	0
m,p-Xylene	1330-20-7	0.245	0.231	0.566	1.065	1.003	2.458	100	0.01	0.009	100
o-Xylene	95-47-6	0.105	0.102	0.224	0.457	0.443	0.973	100	0.005	0.087	100

[a] See page 32 for footnotes.

Table 9

NEW BRUNSWICK NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m^3)[c,d]	Annual Median (µg/m^3)[d]	24-Hour Max. (µg/m^3)	Health Bench-mark (µg/m^3)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m^3)	% Above Minimum Detection Limit
Acetaldehyde	75-07-0	0.916	0.882	1.640	1.651	1.588	2.955	0.45	**4**	0.007	100
Acetone	67-64-1	0.984	0.935	1.950	2.337	2.220	4.632	31000	0.0001	0.014	100
Acetonitrile	75-05-8	9.545	0.241	565.0	16.03	0.405	948.6	60	0.3	0.012	100
Acetylene	74-86-2	0.551	0.480	1.600	0.587	0.511	1.703			0.078	100
Acrolein[g]	107-02-8	0.490	0.423	1.010	1.124	0.969	2.316	0.02	56[g]	0.165	100
Acrylonitrile	107-13-1	0.535	0.509	1.380	1.161	1.105	2.995		**77**	0.130	98
tert-Amyl Methyl Ether	994-05-8	*0.001*	0	0.011	*0.005*	0	0.046			0.067	13
Benzaldehyde	100-52-7	0.020	0.016	0.048	0.086	0.069	0.208			0.087	100
Benzene	71-43-2	0.203	0.196	0.390	0.650	0.626	1.246	0.13	**5**	0.010	100
Bromochloromethane	74-97-5	0	0	0	0	0	0			0.323	0
Bromodichloromethane	75-27-4	*0.001*	0	0.013	*0.008*	0	0.087			0.094	13
Bromoform	75-25-2	*0.001*	0	0.014	*0.014*	0	0.145	0.91	0.02	0.217	15
Bromomethane	74-83-9	0.014	0.013	0.114	0.056	0.050	0.443	5	0.01	0.078	84
1,3-Butadiene	106-99-0	0.031	0.031	0.073	0.070	0.069	0.161	0.033	**2**	0.024	95
Butyraldehyde	123-72-8	0.083	0.081	0.153	0.244	0.239	0.451			0.035	100
Carbon Disulfide	75-15-0	5.710	5.820	22.70	17.78	18.12	70.69		0.03	0.009	100
Carbon Tetrachloride	56-23-5	0.098	0.098	0.134	0.614	0.617	0.843	0.17	**9**	0.088	100
Chlorobenzene	108-90-7	*0.0003*	0	0.012	*0.002*	0	0.055	1000	0.000002	0.110	3
Chloroethane	75-00-3	*0.008*	0	0.102	*0.022*	0	0.269	10000	0.000002	0.066	18
Chloroform	67-66-3	0.027	0.026	0.045	0.131	0.127	0.220	0.043	**3**	0.083	95
Chloromethane	74-87-3	0.559	0.545	0.800	1.154	1.125	1.652	0.56	**2**	0.029	100
Chloroprene	126-99-8	0	0	0	0	0	0	7		0.119	0
Crotonaldehyde	123-73-9	0.115	0.037	0.725	0.331	0.106	2.078			0.043	100
Dibromochloromethane	124-48-1	0.004	0.004	0.011	0.037	0.040	0.109			0.030	62
1,2-Dibromoethane	106-93-4	*0.0002*	0	0.012	*0.002*	0	0.092	0.0017	0.9	0.131	2
m-Dichlorobenzene	541-73-1	*0.001*	0	0.008	*0.003*	0	0.048			0.222	8
o-Dichlorobenzene	95-50-1	*0.001*	0	0.011	*0.006*	0	0.066	200	0.00003	0.126	13
p-Dichlorobenzene	106-46-7	*0.004*	0	0.025	*0.024*	0	0.150	0.091	0.3	0.114	43
Dichlorodifluoromethane	75-71-8	0.513	0.528	0.636	2.536	2.611	3.145	200	0.01	0.089	100
1,1-Dichloroethane	75-34-3	0	0	0	0	0	0	0.63		0.061	0
1,2-Dichloroethane	107-06-2	0.021	0.021	0.035	0.086	0.085	0.142	0.038	**2**	0.065	97
1,1-Dichloroethylene	75-35-4	*0.001*	0	0.010	*0.003*	0	0.040	200	0.00001	0.056	10
cis-1,2-Dichloroethylene	156-59-2	0	0	0	0	0	0			0.048	0
trans-1,2-Dichloroethylene	156-60-5	0	0	0	0	0	0			0.048	0
Dichloromethane	75-09-2	0.199	0.150	1.140	0.691	0.521	3.960	2.1	0.3	0.080	100

[a] See page 32 for footnotes.

Table 9 (continued)

NEW BRUNSWICK NJ 2013 Toxic VOCs Monitoring Data[a]

Analyte[b]	CAS No.	Annual Mean (ppbv)[c,d]	Annual Median (ppbv)[d]	24-Hour Max. (ppbv)	Annual Mean (µg/m³)[c,d]	Annual Median (µg/m³)[d]	24-Hour Max. (µg/m³)	Health Bench-mark (µg/m³)[e]	Annual Mean Risk Ratio[f]	Detection Limit (µg/m³)	% Above Minimum Detection Limit
1,2-Dichloropropane	78-87-5	0	0	0	0	0	0	0.1		0.088	0
cis-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.082	0
trans-1,3-Dichloropropene	542-75-6	0	0	0	0	0	0			0.073	0
Dichlorotetrafluoroethane	76-14-2	0.018	0.018	0.026	0.129	0.126	0.182			0.161	100
2,5-Dimethylbenzaldehyde	5799-94-2	0	0	0	0	0	0			0.016	0
Ethyl Acrylate	140-88-5	0	0	0	0	0	0	2		0.049	0
Ethyl tert-Butyl Ether	637-92-3	*0.021*	0	0.154	*0.086*	0	0.644			0.059	28
Ethylbenzene	100-41-4	0.058	0.056	0.123	0.250	0.243	0.534	0.40	0.6	0.048	100
Formaldehyde	50-00-0	1.820	1.630	4.730	2.236	2.002	5.809	0.077	**29**	0.028	100
Hexachloro-1,3-butadiene	87-68-3	*0.002*	0	0.015	*0.024*	0	0.160	0.045	0.5	0.085	26
Hexaldehyde	66-25-1	0.024	0.021	0.087	0.100	0.084	0.356			0.090	100
Isovaleraldehyde	590-86-3	0	0	0	0	0	0			0.007	0
Methyl Ethyl Ketone	78-93-3	0.125	0.119	0.287	0.368	0.349	0.845	5000	0.0001	0.071	100
Methyl Isobutyl Ketone	108-10-1	0.040	0.037	0.093	0.163	0.152	0.381	3000	0.0001	0.061	97
Methyl Methacrylate	80-62-6	*0.002*	0	0.057	*0.007*	0	0.201	700	0.00001	0.088	10
Methyl tert-Butyl Ether	1634-04-4	*0.023*	0	0.263	*0.084*	0	0.948	3.8	0.02	0.040	49
n-Octane	111-65-9	0.034	0.032	0.185	0.160	0.149	0.864			0.093	100
Propionaldehyde	123-38-6	0.123	0.109	0.260	0.293	0.258	0.618	8	0.04	0.007	100
Propylene	115-07-1	0.348	0.306	0.859	0.599	0.527	1.478	3000	0.0002	0.057	100
Styrene	100-42-5	0.030	0.027	0.171	0.129	0.115	0.728	1.8	0.1	0.102	95
1,1,2,2-Tetrachloroethane	79-34-5	*0.022*	0	0.171	*0.150*	0	1.174	0.017	**9**	0.124	36
Tetrachloroethylene	127-18-4	0.013	0.014	0.040	0.086	0.095	0.271	0.17	0.5	0.136	79
Tolualdehydes		0.010	0.009	0.038	0.051	0.042	0.187			0.025	74
Toluene	108-88-3	0.473	0.420	1.510	1.782	1.583	5.690	5000	0.0004	0.170	100
1,2,4-Trichlorobenzene	102-82-1	*0.0005*	0	0.019	*0.004*	0	0.141	4	0.001	0.163	3
1,1,1-Trichloroethane	71-55-6	0.008	0.008	0.017	0.045	0.044	0.093	1000	0.00005	0.109	85
1,1,2-Trichloroethane	79-00-5	0	0	0	0	0	0	0.063		0.115	0
Trichloroethylene	79-01-6	*0.003*	0	0.039	*0.015*	0	0.210	0.5	0.03	0.118	20
Trichlorofluoromethane	75-69-4	0.259	0.254	0.368	1.458	1.427	2.068	700	0.002	0.084	100
Trichlorotrifluoroethane	76-13-1	0.084	0.083	0.105	0.646	0.636	0.805	30000	0.00002	0.130	100
1,2,4-Trimethylbenzene	95-63-6	0.034	0.030	0.080	0.170	0.147	0.393			0.123	100
1,3,5-Trimethylbenzene	108-67-8	0.015	0.014	0.037	0.076	0.069	0.182			0.108	85
Valeraldehyde	110-62-3	0.024	0.021	0.054	0.086	0.074	0.190			0.011	100
Vinyl chloride	75-01-4	*0.0003*	0	0.008	*0.001*	0	0.020	0.11	0.01	0.028	3
m,p-Xylene	1330-20-7	0.129	0.126	0.303	0.558	0.547	1.316	100	0.01	0.009	100
o-Xylene	95-47-6	0.062	0.062	0.152	0.269	0.269	0.660	100	0.003	0.087	100

[a] See page 32 for footnotes.

Footnotes for Tables 6 through 9

[b] Analytes in bold text had annual means above the long-term health benchmark.

[c] Numbers in italics are arithmetic means (or averages) based on less than 50% of the samples above the detection limit.

[d] For a valid 24-hour sampling event, when the analyzing laboratory reports the term “Not Detected” for a particular pollutant, the concentration of 0.0 ppbv is assigned to that pollutant. These zero concentrations were included in the calculation of annual averages and medians for each pollutant regardless of percent detection.

[e] The health benchmark is defined as the chemical-specific air concentration above which there may be human health concerns. For a carcinogen (cancer-causing chemical), the health benchmark is set at the air concentration that would cause no more than a one-in-a-million increase in the likelihood of getting cancer, even after a lifetime of exposure. For a non-carcinogen, the health benchmark is the maximum air concentration to which exposure is likely to cause no harm, even if that exposure occurs on a daily basis for a lifetime. These toxicity values are not available for all chemicals. For more information, go to www.nj.gov/dep/aqpp/risk.html.

[f] The risk ratio for a chemical is a comparison of the annual mean air concentration to the long-term health benchmark. If the annual mean is 0, then the annual mean risk ratio is not calculated.

[g] Acrolein concentrations are highly uncertain because of problems with collection and analysis methods.

Table 10

Analytes with 100% Non-Detects in 2013

	Analyte	CAS No.	Camden	Chester	Elizabeth	New Brunswick
1	Bromochloromethane	74-97-5	X	X	X	X
2	Chlorobenzene	108-90-7			X	
3	Chloroprene	126-99-8	X	X	X	X
4	1,2-Dibromoethane	106-93-4		X	X	
5	1,1-Dichloroethane	75-34-3	X		X	X
6	1,1-Dichloroethene	75-35-4			X	
7	cis-1,2-Dichloroethylene	156-59-2	X	X	X	X
8	trans-1,2-Dichloroethylene	156-60-5		X	X	X
9	1,2-Dichloropropane	78-87-5	X	X	X	X
10	cis-1,3-Dichloropropene	542-75-6	X	X	X	X
11	trans-1,3-Dichloropropene	542-75-6	X	X	X	X
12	2,5-Dimethylbenzaldehyde	5799-94-2	X	X	X	X
13	Ethyl Acrylate	140-88-5	X	X	X	X
14	Isovaleraldehyde	590-86-3	X	X	X	X
15	1,2,4-Trichlorobenzene	102-82-1		X	X	
16	1,1,2-Trichloroethane	79-00-5	X	X	X	X
17	Vinyl chloride	75-01-4			X	

In 2013, collected samples of these chemicals were never above the detection limits at the specific monitoring locations. However, they may be present in the air below the detection limit level. Chemical-specific detection limits can be found in Tables 6 through 9.

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