EMISSIONS INVENTORY

OVERVIEW

An emissions inventory is an estimation of the amount of air pollutants released into the ambient air. State environmental agencies such as NHDES are required by the EPA to develop an emissions inventory and report the estimated emissions on a regular basis. EPA then augments and compiles the state-submitted data to produce the National Emissions Inventory, or NEI. An updated version of the NEI is released every three years. The NEI is crucial to the air quality regulatory community for: examining trends in emissions over time, evaluating the effectiveness of emissions control programs, targeting particular emissions sources of interest, and responding to inquiries from the public. The NEI includes emissions estimates for pollutants that contribute to ozone and regional haze formation such as nitrogen oxides (NO_x), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), and volatile organic compounds (VOCs). More information on the NEI can be found on EPA's Air Emissions Inventories web page.

EMISSIONS SOURCE CATEGORIES

The following broad categories are important to understanding the various sources of emissions:

POINT SOURCES are discrete locations where emissions are released. Point sources generally include larger facilities such as power plants, factories, and large industrial, commercial, or institutional facilities. For purposes of the NEI, airports and large rail yards are also considered point sources. Many point sources, such as power plants, actually measure their emissions using continuous monitoring equipment installed in their exhaust stacks. Many point sources are required to report their emissions to their state air agency or the EPA on an annual basis as part of an air permitting program.

AREA SOURCES are facilities or activities that are too numerous or widespread to evaluate individually. This category includes yard equipment, residential heating, business emissions paint and solvent vapors, etc. Emissions estimates for area sources are made using broad-based data such as statewide fuel use, population, or number of employees. There is a wide array of area source categories,

but a handful of examples include residential fuel combustion, smaller commercial and institutional facilities, and consumer solvent use.

NONROAD SOURCES are vehicles and equipment not designed for traveling on roadways. Examples of nonroad sources include pleasure boats, ships, locomotives, recreational marine vessels, construction equipment, snowmobiles, and lawn and garden equipment.

ONROAD SOURCES are vehicles designed for traveling on roadways. Onroad sources include cars, trucks, buses, and motorcycles.

BIOGENIC SOURCES are natural sources of emissions. For example, VOCs, isoprene in particular, are released from forests, and small amounts of NO_x can be released during lighting strikes.

CURRENT EMISSIONS ESTIMATES FOR NEW HAMPSHIRE

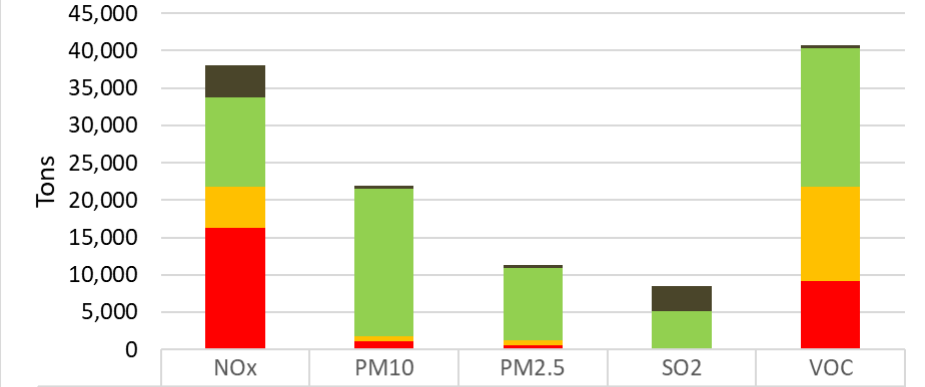
As mentioned above, the NEI is released on a three-year cycle. The most recent public release of the NEI includes emissions estimates for calendar year 2014 and will be updated to 2017 when the data becomes finalized. New Hampshire statewide total emissions, as compiled in the 2014 Final NEI Version 2, are shown below in Figure 1. The onroad and area source (e.g. residential fuel combustion) categories in New Hampshire are important contributors to NOx emissions. Particulate matter (PM_{10} and $PM_{2.5}$) emissions are dominated by area source categories such as agricultural tilling and construction dust. Fuel combustion in the point and area source categories are important contributors to SO_2 emissions, while onroad and nonroad vehicles emit relatively little SO_2. VOC emissions are dominated by area source categories such as consumer solvent use (e.g. use of paints, household cleaning products, etc.) and manufacturing processes at smaller industrial facilities. Onroad and nonroad vehicles also contribute significantly to VOCs.

Table 1: 2014 Emissions Estimates for New Hampshire by County (tons per year)

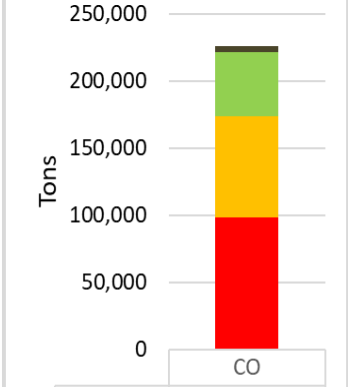
County	CO	NOx	PM_{10}	$PM_{2.5}$	SO_2	VOC
Belknap	15,511	1,994	1,308	715	290	3,142
Carroll	15,645	1,819	1,358	782	240	3,249
Cheshire	13,975	1,953	1,633	833	359	2,848
Coos	10,192	1,340	923	479	240	2,610
Grafton	19,262	3,139	2,346	1,211	703	3,878
Hillsborough	51,603	8,841	4,570	2,387	1,376	8,607
Merrimack	27,193	6,406	3,006	1,503	1,620	4,229
Rockingham	47,462	8,818	4,213	2,105	2,884	7,125
Strafford	15,588	2,442	1,618	832	503	2,693
Sullivan	9,684	1,342	1,010	510	339	2,386
Total	**226,115**	**38,094**	**21,985**	**11,357**	**8,554**	**40,767**

Emissions by county for 2014 are shown below in Table 1. New Hampshire's most populous counties are Hillsborough, Merrimack, and Rockingham, which are located in southeast and south-central New Hampshire. As would be expected, these counties have the highest estimated emissions in New Hampshire.

Figure 1: 2014 Statewide Emissions Estimates for New Hampshire



	NOx	PM10	PM2.5	SO2	VOC
Point	4,343	476	421	3,452	441
Area	11,894	19,732	9,709	4,951	18,560
Nonroad	5,565	672	632	16	12,598
Onroad	16,292	1,105	596	134	9,168



	CO
Point	4,808
Area	47,361
Nonroad	75,519
Onroad	98,426

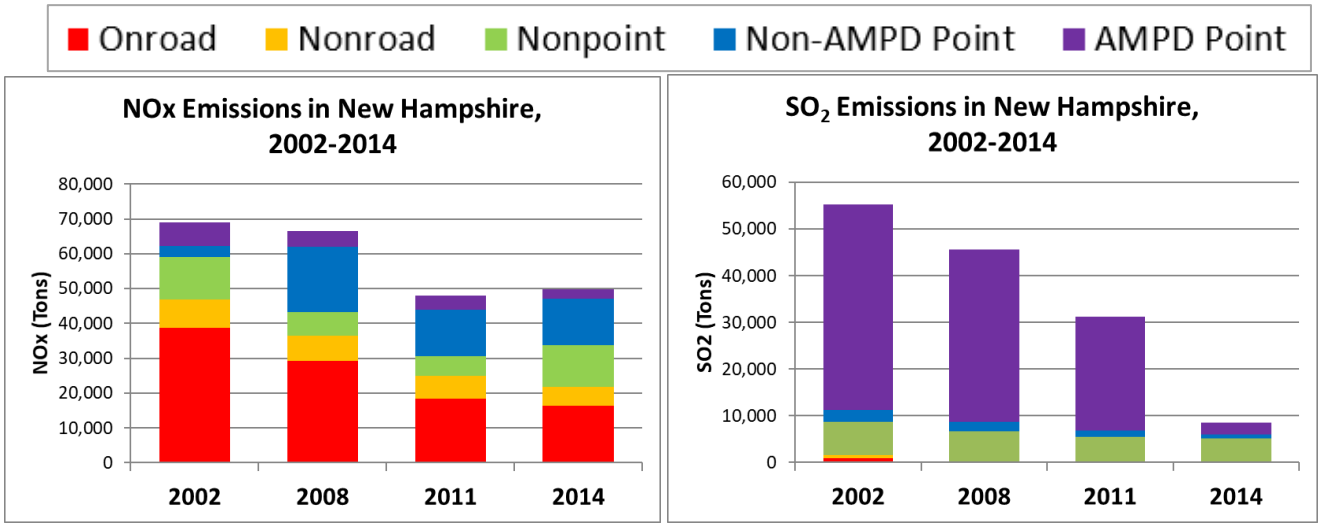
HISTORICAL TRENDS

The figures below show trends in emissions for NO_x, PM_{10}, $PM_{2.5}$, SO_2, and VOCs. All of the data comes from the NEI; however, because 2005 was a limited effort NEI, it is not included in the figures. For NO_x and SO_2, point source emissions are further broken down to reflect the emissions that are directly reported to EPA's Air Markets Program Database (AMPD). Large point sources that participate in an emissions control program such as the Cross-State Air Pollution Rule or the Acid Rain Program are required to report their emissions to AMPD.

In general, emissions have declined substantially in New Hampshire between 2002 and 2014. It should be noted, however, that trends in emissions can be artificially influenced by changes in emissions estimation methodologies. For example, an area source NO_x calculation method was changed for the 2014 NEI cycle. This caused an artificial increase in area source NO_x emissions for 2014; please see the green portion of the bars in Figure 2. Similarly, the decrease in point source PM_{10} and $PM_{2.5}$ emissions between 2002/2008 and 2011/2014 is somewhat overstated because of a change in calculation; please see the dark green portion of the bars in Figures 4 and 5.

The drastic decrease in SO_2 emissions, however, is real. Partway through the year 2011, a large power plant in New Hampshire installed a scrubber to control SO_2 emissions. Please see the light purple portion of the bars in Figure 3. Because of this control technology, SO_2 emissions in New Hampshire are expected to remain close to 2014 levels, or lower, now and into the future. This reduction in SO_2 emissions is instrumental in not only protecting health and welfare in New Hampshire, but improving visibility in scenic areas of New Hampshire and beyond.

Figures 2 and 3: NO_x and SO_2 Emissions in New Hampshire, 2002 – 2014



Figures 4, 5 and 6: PM_{10}, $PM_{2.5}$ and VOC Emissions in New Hampshire, 2002 - 2014