

**AIR**  
**INDICATOR 1**

*“Trends in ambient air quality for each of the 6 criteria air pollutants.”*

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## SCREENING RESULTS: Overview

Ambient air quality monitoring is among the most extensive environmental data collection efforts in the United States. Following the Clean Air Act in 1970, the EPA mandated and supported the establishment of networks of stations at which air pollutants are continuously or at regular intervals, sampled and recorded. At the outset, an emphasis was placed on collecting the data these monitors generated in a centralized and accessible database.

The monitors are most often maintained by a state environmental agency or health department, although recent additions to the monitoring networks (such as the PAMS and PM2.5 monitors) have significant EPA support. Data is compiled and summarized, and delivered to EPA via hard copy reports or, as is nearly always the case now, via electronic transfer to the Aerometric Information Retrieval System (AIRS). The data includes hourly, monthly and seasonal averages of ambient concentrations of criteria air pollutants (and now other constituents), other computations such as daily and monthly maximum concentrations, and information about the location of the monitor and meteorological conditions during the sampling periods.

Because many aspects of ambient air monitoring are federally mandated and EPA supported, and because the data is collected in a common database, there is significant consistency in the quality of sampling and in the reporting of data. EPA provides extensive guidance and protocols for maintaining the accuracy and precision of sampling devices, for assuring statistical reliability of reported data, and for formatting data to be reported to AIRS. The AIRS database is currently undergoing a major overhaul to make data input, output, and public accessibility easier. For the purposes of this indicator however, extracting the necessary data to develop trends in criteria pollutants should not pose a great difficulty. In addition, nearly every state has produced annual written reports summarizing trends in ambient air quality, and EPA – New England publishes an annual report on ambient air quality in the region, with state-by-state descriptions. The most current regional report summarizes 1996 data.

While data quality and availability are *reasonably consistent* for ambient air quality in the New England states, there are some differences among the states in their monitoring efforts which may have bearing on the regional representation of this indicator. In particular, data differs among states in *what* pollutants are monitored, and *where* ambient air is monitored. Within a given state, what pollutants are monitored and where may vary over time, affecting the comparability of data used to present this indicator as a trend over time.

The ambient air monitoring network was established to monitor criteria air pollutants: carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), lead (Pb), and particulate matter (TSP, PM<sub>10</sub>, PM<sub>2.5</sub>). Monitoring of these pollutants has been based on those which are of most concern. As some have become lesser threats to human health, limited monitoring resources have been shifted accordingly. Most notably, major reductions in ambient lead concentrations have resulted in reduced monitoring efforts in the region. New Hampshire and Rhode Island no longer monitor for lead in ambient air, but monitor all other criteria pollutants. Maine monitors criteria pollutants with the exception of lead and carbon monoxide, neither of which is considered a significant threat in the state. Vermont monitors all criteria

pollutants, but continues to monitor lead as part of a state program, and does not report it to AIRS. Connecticut and Massachusetts currently monitor all criteria pollutants, although lead monitoring in Massachusetts was temporarily discontinued from 1995 to 1997.

While all of the New England states monitor at least the same four of the six criteria pollutants (NO<sub>x</sub>, SO<sub>2</sub>, ozone, and PM<sub>10</sub><sup>1</sup>), what is represented by the data on these pollutants depends in large part on where the monitors are located. Each state runs multiple monitoring locations, each location containing sampling devices for a variety of pollutants. Thus, within each state, pollutants are monitored at multiple locations.

According to EPA, the original and primary intention of the ambient air monitoring network is to measure air quality with respect to compliance with the national standards, which are intended to protect public health with a reasonable margin of safety. Therefore, monitors are expected to be sited in areas of human health concern – those areas with the highest suspected concentrations of pollutants, and/or the most population being exposed. This emphasis explains the targeting of monitors in primarily urbanized areas (although long-distance ozone transport has raised concerns for many non-urban areas). At the state level, the emphasis on monitoring has varied among states and within states over time. Every state has focused some or all of its monitoring efforts on high exposure (population)/high (pollutant) concentration areas. Massachusetts has located some additional sites with the intention of tracking “background” levels of pollutants, as have New Hampshire, Rhode Island, and Vermont. Vermont has located various monitors to reflect regional, statewide, and neighborhood scale air quality.

In the region, the total number of air monitors has decreased over time. More importantly, is the fact that monitors have moved over time, usually from areas that have experienced improved air quality, to areas with suspected problems. This “targeting” means that in some states, while a given pollutant may be monitored at several sites, long term trends may be available at a limited consistent set of monitors. It also means that long term trends combining two or more sites may represent periodic improvements, followed by apparent declines in air quality as sites are moved to new “hot-spots”.

In Connecticut, monitors have been moved over time to identify and monitor what have been described as “worst case scenarios”. Monitor locations have similarly evolved over time in Massachusetts, New Hampshire, and Rhode Island, and to a lesser extent, in Maine and Vermont.

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<sup>1</sup> The standard for particulate matter is being changed to reflect an understanding of the significant health effects of particles smaller than 2.5 microns in diameter. A monitoring network for PM<sub>2.5</sub> is being established, but is at this point in its infancy, and PM<sub>10</sub> continues to be monitored and reported.

**SCREENING RESULTS: Summary Matrix**

(see results of individual interviews in next section for more detail)

State/Entity	Database	Coverage/Consistency			Quality	Availability
		Spatial/demographic	Pollutants	Temporal		
<b>EPA-NE</b>	ambient air monitoring data	regional, and varies by state	All	monitoring networks (locations and pollutants) evolve over time	extensive hardware calibrations and statistical requirements for data are required; accuracy of monitors is considered good; concerns related to the geographic representation of ambient data or its relation to public health do exist	AIRS database nationally; limited web availability; hard copy annual regional report/summary
<b>Connecticut</b>	ambient air monitoring data	high exposure/high concentration areas	All	monitoring network evolves	see EPA-NE	AIRS; annual report (recent 1996)
<b>Maine</b>	ambient air monitoring data	high exposure/high concentration areas	All except lead and CO	Pb and CO monitoring discontinued	see EPA-NE	AIRS
<b>Massachusetts</b>	ambient air monitoring data	high exposure/high concentration areas; some background	All	Pb discontinued 1995-1997; network evolves geographically	see EPA-NE	AIRS; annual report (recent 1997)
<b>New Hampshire</b>	ambient air monitoring data	high exposure/high concentration areas; some background	All except lead	network evolves; several new monitors with short trend histories	see EPA-NE	AIRS
<b>Rhode Island</b>	ambient air monitoring data	high exposure/high concentration; urban metro areas; some background	All except lead	network evolves; one site has been discontinued recently	see EPA-NE	AIRS; annual report (current 1996)
<b>Vermont</b>	ambient air monitoring data	variety of background, high poulation/high exposure, regionally and state representative sites	All (lead in separate state database)	some evolution of monitor locations; new PM2.5 monitors to be added in 1999 and 2000	see EPA-NE	AIRS

## SCREENING RESULTS: Interview results

### AIR: INDICATOR 1

EPA – NEW ENGLAND

**Database** Type of data: ambient air quality  
Database(s): state ambient monitoring data entered into AIRS

Nationally, EPA maintains a database of ambient air quality data. It includes continuous samples from state- and EPA-run monitors for the criteria air pollutants.

### Coverage

#### *Spatial/*

*Demographic* The primary purpose of monitoring ambient air is to track ambient air with respect to some level of “compliance.” That is, to ensure that levels of criteria pollutants are below standards for protecting public health and the environment with a reasonable margin of safety. Measuring background levels for baselines/reference and for other research needs, is a secondary reason for the extensive monitoring networks.

*Pollutants* All states monitor some or all of the criteria pollutants, each state and each pollutant representing varying levels of effort.

*Temporal* The total number of sites in the region has diminished some over time. More notably, the location of monitoring sites has evolved, and continues to evolve. Earlier sites are located in areas of high concern to identify/confirm problem areas. As problems are addressed and trends improve, monitors are often moved. A large proportion of monitors in a state’s network may not have long histories and trend data.

When ambient monitoring networks were first established under the Clean Air Act in the 1970’s, each of the six criteria pollutants were monitored. As a pollutant becomes less of a threat, expending resources to monitor for it becomes less of a priority. Improvements in ambient lead concentrations since the late 1970s put lead levels below detection at most sites. Many states phased out lead monitoring, although some in recent years have resumed monitoring at select sites. NO<sub>x</sub> is now in a similar position. In most areas the pollutant is well below standards and likely to be subject to decreasing monitoring efforts on the one hand, however, at higher concentrations NO<sub>x</sub> continues to be of interest as an ozone precursor.

New monitors include the PAMS network which operates during the ozone season (summer) and includes monitors at 4 types of locations (upwind,

downwind, etc.), which monitor ozone and a variety of precursors. More recent additions include a growing network of PM sites capable of monitoring for PM<sub>2.5</sub> to address the new standard.

### **Quality/**

**Methodology** Quality of ambient monitoring data is generally good to excellent. Aside from EPA-administered requirements and guidelines for sampling equipment and methodology, EPA also audits individual sites for precision and accuracy. States and EPA use a variety of co-located samplers and point sample checks for precision, and control gas measurements for accuracy.

In addition, statistical requirements for reported continuous monitoring data controls the quality of data used for subsequent analyses.

EPA regional auditing has declined due to perceived quality of measurements and a decline in resources, although some auditing effort has been compensated for by an increased EPA – HQ role.

**Availability** Ambient air quality data from state and EPA monitors is available in a central database, called the Aerometric Information and Retrieval System (AIRS). This is an extensive electronic database maintained nationally by EPA. It is currently undergoing a restructuring to make data input and output more convenient. Monthly data from monitoring stations is entered into AIRS. The data contains information for each monitor, such as its location and monitoring objective, as well as on each pollutant including hourly and monthly mean and maximum concentrations, by pollutant. The AIRS database contains data as far back as the 1970s.

EPA-New England produces an annual report on air quality in New England, which summarizes recent trends in concentrations of criteria pollutants, by state.

## AIR: INDICATOR 1

### CONNECTICUT

<b>Database</b>	<p>Type of data: ambient air quality</p> <p>Database(s): state ambient monitoring data entered into AIRS</p> <p>The state maintains a network of approximately 60 individual monitors at air quality stations around the state.</p>
<b>Coverage</b>	
<i>Spatial/</i>	
<i>Demographic</i>	[See EPA-NE]
	Monitors are usually established in suspected and historically problem areas (i.e. high concentrations and high population exposures).
<i>Pollutants</i>	[see EPA-NE]
	All criteria pollutants (NO <sub>x</sub> , CO, ozone, SO <sub>2</sub> , PM <sub>10</sub> , Pb)
	Three PM 2.5 monitors have been operating since December 1997. PM concentrations vary dramatically between urban and rural areas.
<i>Temporal</i>	[see EPA-NE]
	As pollution in problem areas is addressed, the monitoring network continues to evolve to identify and measure the “worst case scenarios” – high exposure and high concentrations. Therefore, “young” monitors typically measure the highest levels of pollution.
	Lead monitoring was discontinued for 1997, and resumed in 1998.
<b>Quality/</b>	
<b>Methodology</b>	[see EPA-NE]
	Monitors receive occasional audits by the state.
<b>Availability</b>	[see EPA-NE]
	Annual hard copy reports are produced with summary and trend information for criteria pollutants. The most recent report is available for 1996. The 1997 report is at press (as of 7/98) and should be available soon.

## AIR: INDICATOR 1

### MAINE

**Database**      Type of data: ambient air quality  
 Database(s): state ambient monitoring data entered into AIRS

The state maintains a network of approximately 60 individual monitors at air quality stations around the state.

#### **Coverage**

*Spatial/*

*Demographic* [See EPA-NE]

Monitors are sited primarily in high emission areas (i.e., near point sources), or in high exposure (population) areas.

Ozone is the only criteria pollutant in Maine that reaches significant levels. High levels are attributed to two primary “upwind” sources: Connecticut and the Boston metro area.

*Pollutants*      [see EPA-NE]

The network monitors criteria pollutants with the exception of lead and carbon monoxide.

*Temporal*      [see EPA-NE]

Lead monitoring was phased out when levels were regularly below detection. CO was monitored at several sites in the 1970s, until the state came into attainment for CO; then it was monitored in the historical high concentration/high population areas from 1985-1989 to ensure good levels were maintained; and when trends were apparently steady or declining, monitoring was discontinued for CO.

#### **Quality/**

**Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

Most sites have long histories and trend data available.

## AIR: INDICATOR 1

### MASSACHUSETTS

**Database**      Type of data: ambient air quality  
 Database(s): state ambient monitoring data entered into AIRS

MA DEP maintains a network of approximately 70 individual monitors among 24 ambient air quality stations around the state.

### Coverage

#### *Spatial/*

*Demographic* [See EPA-NE]

The locating of monitors in MA is primarily population-based (to measure average exposures and maximum exposures). The majority of monitors are located in areas of high exposure (population) and expected high concentrations of pollutants. Monitors are not often located near high emissions/point sources. Some monitors are located for reference or background conditions.

*Pollutants*      [see EPA-NE]

All criteria pollutants (NO<sub>x</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>, ozone, lead).

*Temporal*      [see EPA-NE]

The monitoring network has changed with respect to the location of monitors, and continues to evolve over time.

MA DEP operates approximately 24 monitoring stations around the state, geographically representing the entire state, but with a bias towards high population, urban, and coastal areas.

Ambient lead monitoring was discontinued from 1995-1997 because levels were regularly below detection levels. Monitoring was resumed in 1998 (with new equipment) at one site in Kenmore Square, Boston which historically had the some of the highest levels.

### Quality/

**Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

Monitoring data is regularly entered into AIRS

Most current sites have been collecting data for at least five years. Longer trends are available from a few sites for each pollutant (with the exception of the two year gap in lead data).

MA DEP produces an annual report summarizing air quality, in hard copy, available publicly. The most recent report is available summarizing 1997 data.

## AIR: INDICATOR 1

### NEW HAMPSHIRE

<b>Database</b>	Type of data: ambient air quality Database(s): state ambient monitoring data entered into AIRS  The state maintains a network of approximately 40 individual monitors at air quality stations around the state.
<b>Coverage</b> <i>Spatial/</i> <i>Demographic</i>	[See EPA-NE]  Monitoring in New Hampshire is primarily targeted to high exposure (population) and high concentration (of pollutant) areas. Some monitors, even in non-attainment areas do register relatively low levels (e.g., Hubbard Brook) and are useful for background readings or for other research purposes in those areas (e.g., ecological).
<i>Pollutants</i>	[see EPA-NE]  All criteria pollutants with the exception of lead.
<i>Temporal</i>	[see EPA-NE]  The monitoring network has, and continues to evolve over time.  Several monitors are recent additions, such as in Laconia.
<b>Quality/</b> <b>Methodology</b>	[see EPA-NE]
<b>Availability</b>	[see EPA-NE]  Annual hard copy reports are produced. Summarize and show trends in criteria pollutants. The most recent is available for 1996.

## AIR: INDICATOR 1

### RHODE ISLAND

- Database** Type of data: ambient air quality  
Database(s): state ambient monitoring data entered into AIRS
- RI DEM and RI DOH maintain a network of monitors at air quality stations around the state.
- Coverage**  
*Spatial/*  
*Demographic* [See EPA-NE]
- There are approximately 9 air quality monitoring stations around the state. Most are in Providence and surrounding urban areas.
- Pollutants* [see EPA-NE]
- All criteria pollutants with the exception of lead.
- Temporal* [see EPA-NE]
- The monitoring network has, and continues to evolve over time.
- Two ozone sites have been located in the central and western parts of the state, which measure the highest ozone levels. One of these sites (Alton Jones) has a long history and trends for ozone. The other site (Narragansett) is a new site, operated since the 1997 ozone season. In 1997, one site in the city of Providence was discontinued. Currently, third ozone site operates in East Providence.
- Quality/**  
**Methodology** [see EPA-NE]
- Availability** [see EPA-NE]
- Annual hard copy reports are produced. These are typically 1-2 years behind. The RI DEM is currently working on the 1996 report.

## AIR: INDICATOR 1

### VERMONT

<b>Database</b>	Type of data: ambient air quality Database(s): state ambient monitoring data entered into AIRS  The state maintains a network of approximately 19 individual monitors at 8 air quality stations around the state.
<b>Coverage</b>	
<i>Spatial/</i>	
<i>Demographic</i>	[See EPA-NE]  Monitors are located throughout the state. For each pollutant, geographic representation is as follows: Ozone: Statewide monitors are regionally representative PM10: Statewide monitors represent high concentration/high population areas; and some background areas. NOx: Statewide monitors represent high concentration/high population areas at neighborhood scale Lead: Statewide monitors are state representative; some high concentration/high population; and some background sites. SO2: Statewide monitors represent high concentration/high population areas. CO: High concentration/high population sites.
<i>Pollutants</i>	[see EPA-NE]  All criteria pollutants are monitored. Lead is monitored at five sites for a separate state toxics monitoring program.
<i>Temporal</i>	[see EPA-NE]  Four PM 2.5 monitoring sites are to be added to the network by 1999, and two more by 2000.
<b>Quality/ Methodology</b>	[see EPA-NE]
<b>Availability</b>	[see EPA-NE] Most sites have long histories and trend data available.

**AIR**  
**INDICATOR 2**

*“Number of non-attainment areas and their associated populations that reach attainment, including the number of ozone non-attainment areas that meet the 1-hour ozone standard.”*

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## SCREENING RESULTS: Overview

Under the Clean Air Act, areas are designated as having attainment, non-attainment, partial attainment, or unclassifiable status with respect to each of the criteria pollutants PM, CO, NO<sub>x</sub>, SO<sub>2</sub>, lead, and ozone. These designations are reviewed on an on-going basis by EPA. A designated area may be defined as a state, county, part of county (including town or other geographic description), metropolitan statistical areas (MSAs), air quality control region, or some other unit. Designations are made by EPA based on compliance with national ambient air quality standards (NAAQS) using available ambient monitoring data, and other factors, including severity of non-compliance, trends, and state efforts to improve air quality.

Attainment designations are made by EPA and published in the *federal register* and then in the *code of federal regulations* (CFR). Therefore, other than informal lists duplicating the CFR list, there are no state databases for attainment area designations. The CFR is readily available at most libraries, in various electronic and internet formats, and from EPA (excerpted portions) in hard copy. For each state, designations are made for all attainment, non-attainment and other areas, such that the aggregate of the designated areas represents the entire state.

Population estimates for non-attainment areas are not included in the CFR listing, although do appear in other publications such as the annual Air Quality and Emission Trends report and on the EPA website. These sources include the number of non-attainment areas are listed by pollutant, by state, and population figures are given. Population figures in these other sources might be drawn from 1990 census data, supplemented by any state-contributed interim updates.

Concerns regarding the consistency of attainment/non-attainment reporting arise from the different units that may be used to define designated areas (e.g., counties), and from the methods and process for designating areas. Of particular concern for the near future, are the implications of a newly adopted ambient standard for ozone.<sup>2</sup> As mentioned above, areas are designated by a variety of units, from towns or partial counties, to entire states. Areas also differ within states, by pollutant. For example, Connecticut is designated by air quality *regions* for SO<sub>2</sub>, but by *partial counties* for CO and ozone. In Massachusetts, two areas represent the entire state for ozone, while partial counties define CO areas. All of Rhode Island is considered one non-attainment area for ozone. Thus, while each state may report the “number of non-attainment areas”, the sizes of these areas will vary dramatically. In addition, the units used to define non-attainment areas may change over time. In Maine for example, it is anticipated that if ozone designations (for the new standard) are made for 2000, they may be made for partial counties, rather than whole counties as they are currently. This in fact could occur in any state.

The other concern regarding consistency in reporting non-attainment status, is the process by which areas are designated and redesignated by EPA. Designations are based on a number of factors, including, but not limited to, compliance with ambient air quality standards. EPA reviews air data, along with trends and other factors. Areas out of compliance for a given year might not be designated non-attainment if the year represents particularly extreme meteorological conditions, or if the area is not severely out of compliance, or has not been out of

<sup>2</sup> From a 1-hour based standard to an 8-hour standard.

compliance for long. In addition, states have the discretion to propose existing non-attainment areas for redesignation as attainment. Thus a non-attainment area may meet air standards, but remain non-attainment, if the state does not wish immediate redesignation. Further, the process for re/designation may take 1-3 years for proposal, review, and publication in the CFR, which has implications for how responsive designations are to actual air quality.

Finally, the adoption of a new ozone standard will undoubtedly have an effect on the status of some areas in New England. Designations may be made in response to compliance with the new standard, regardless of changes in actual air quality.

**SCREENING RESULTS: Summary Matrix**

(see results of individual interviews in next section for more detail)

State/Entity	Database	Parameters	Coverage		Quality	Availability
			Spatial	Temporal		
<b>EPA-NE</b>	EPA listing for each state, of non-attainment and attainment areas in CFR, by pollutant	areas are designated based on compliance with ambient standards for criteria pollutants; other factors; and state-EPA negotiations	each state is completely represented by listing of attainment and non-attainment areas; redesignations in 2000 may change boundaries (e.g., from counties to other units partial counties, towns, etc.)	the CFR lists areas based on 1978 designations and subsequent modifications	guidelines exist for ambient air monitoring and for EPA designation/approval of attainment status; flexibility exists in designations; temporary and modified designations appear officially in the federal register before CFR update; redesignations may reflect changes in standards rather than air quality	lists in CFR are widely available in hard copy and electronically
<b>Connecticut</b>	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE
<b>Maine</b>	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE; some areas may become non-attainment in 2000 for new ozone standard, based on 96-98 data	see EPA-NE; future ozone redesignations will likely reflect change in standard	see EPA-NE
<b>Massachusetts</b>	see EPA-NE	see EPA-NE	whole state represented by two ozone non-attainment areas, while carbon monoxide is designated by partial counties	see EPA-NE	see EPA-NE	see EPA-NE
<b>New Hampshire</b>	see EPA-NE	see EPA-NE	see EPA-NE; some partial counties and MSAs	see EPA-NE; no redesignations likely in near future	see EPA-NE	see EPA-NE
<b>Rhode Island</b>	see EPA-NE	see EPA-NE	whole state is designated as one ozone non-attainment area (for 1-hour standard)	see EPA-NE	see EPA-NE	see EPA-NE
<b>Vermont</b>	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE	see EPA-NE

## SCREENING RESULTS: Interview results

### AIR: INDICATOR 2

EPA – New England

**Database** Type of data: non-attainment areas and populations  
Database(s): EPA and state listings of attainment designations (officially in Federal Register and CFR)

Nationally, EPA determines and publishes designations of non-attainment and attainment status for areas within each state.

**Parameters** Non-attainment describes an area, designated by EPA, as not sufficiently meeting ambient air quality standards. Areas can be designated as non-attainment for any of the criteria air pollutants: ozone, NO<sub>2</sub>, SO<sub>2</sub>, PM-10, CO. Attainment status is listed by whole state, county, partial county, MSA, or other area, by name or description, by pollutant. As designations are updated by EPA, they are published in the federal register. Complete listings are published in each edition of Title 40 of the Code of Federal Regulations, part 81.

Designations for non-attainment are based on an evaluation of state performance with respect to ambient air quality standards and other factors. Exceedences of ambient air quality standards are considered along with the severity, frequency, and period of exceedence, as well as meteorological variations, and state-EPA air management agreements.

Proposals for redesignation of non-attainment areas as attainment areas are made to EPA at the discretion of each state. Thus a state may choose to not seek redesignation for an area that has met ambient standards.

*Basis for Populations* Populations associated with each attainment or non-attainment area are not listed in the 40 CFR 81. Populations are listed for non-attainment areas in other publications.

**Coverage**  
*Spatial* Entire states are represented by the aggregate of designated attainment and non-attainment areas.

*Temporal* Each listing in 40 CFR 81 includes designations updated from 1978. However, there is often a 1-2 year lag time from proposal and review, to official redesignation.

Because of the new 8-hour ambient standard for ozone, states will recommend designations in 1999 (using 1996-1998 data), and official designations will not be made for ozone by EPA until 2000 (using 1997-1999 data).

**Quality/**

**Methodology** Standards are in place for ambient air quality, and guidelines exist for (non)attainment designation, however there is flexibility in state-EPA negotiations for redesignation. The federal register and CFR are official listings of effective attainment and non-attainment designations.

**Availability** The CFR and federal register are available in hard copy with wide distribution, and electronically via several sources.

## AIR: INDICATOR 2

### CONNECTICUT

**Database** Type of data: non-attainment areas and populations  
 Database(s): EPA and state listing of attainment designations (officially in Federal Register and CFR)

[see EPA-NE]

Connecticut is non-attainment for ozone. Some areas are non-attainment for PM10 and carbon monoxide.

**Parameters** [see EPA-NE]

*Basis for Populations* [see EPA-NE]

**Coverage**  
*Spatial* [see EPA-NE]

*Temporal* [see EPA-NE]

**Quality/  
 Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

**AIR: INDICATOR 2**

## MAINE

**Database** Type of data: non-attainment areas and populations  
 Database(s): EPA and state listing of attainment designations (officially in Federal Register and CFR)

[see EPA-NE]

Maine has non-attainment areas for ozone, and is in attainment for all other pollutants. Designated areas are listed by EPA in the CFR. While informal lists of designated areas may exist, the state does not maintain an official database.

**Parameters** [see EPA-NE]

*Basis for Populations* [see EPA-NE]

**Coverage**  
*Spatial* [see EPA-NE]

If redesignations are made in Maine after July 1999 proposals are made, non-attainment areas may no longer fall on county boundaries, but may be designated by some smaller unit(s), e.g., towns, in order to more accurately delineate areas in and out of compliance.

*Temporal* [see EPA-NE]

Based on new ozone standard, Maine will likely propose new designations in July 1999. Based on '96, '97, and '98 data some areas in attainment will likely be redesignated as non-attainment in 2000 or later.

**Quality/**  
**Methodology** [see EPA-NE]

Any redesignations for ozone will likely reflect changes in the standard rather than in air quality. A redesignation in 2000, will reflect data from 1996 through 1998.

**Availability** [see EPA-NE]

## AIR: INDICATOR 2

### MASSACHUSETTS

**Database** Type of data: non-attainment areas and populations  
 Database(s): EPA and state listing of attainment designations (officially in Federal Register and CFR)

[see EPA-NE]

Massachusetts is in non-attainment for ozone, and in some areas, for carbon monoxide. Designated areas are listed by EPA in the CFR. While informal lists of designated areas may exist, the state does not maintain an official database.

**Parameters** [see EPA-NE]

*Basis for Populations* [see EPA-NE]

**Coverage**  
*Spatial* [see EPA-NE]

Entire state represented. Ozone non-attainment areas are designated by whole counties in eastern and western portions of the state. Carbon monoxide areas are designated by partial counties and other areas (towns, AQCRs, etc.)

*Temporal* [see EPA-NE]

**Quality/  
 Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

**AIR: INDICATOR 2**  
NEW HAMPSHIRE

**Database** Type of data: non-attainment areas and populations  
Database(s): EPA and state listing of attainment designations (officially in Federal Register and CFR)

[see EPA-NE]

**Parameters** [see EPA-NE]

*Basis for Populations* [see EPA-NE]

**Coverage**  
*Spatial* [see EPA-NE]

Designated areas are defined by partial counties, towns, MSAs, etc.

*Temporal* [see EPA-NE]

No redesignations are likely in the near future.

**Quality/  
Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

## AIR: INDICATOR 2

### RHODE ISLAND

**Database**      Type of data: non-attainment areas and populations  
 Database(s): EPA and state listing of attainment designations (officially in Federal Register and CFR)

[see EPA-NE]

Rhode Island is non-attainment for ozone, but in attainment for all other pollutants.

**Parameters** [see EPA-NE]

*Basis for Populations* [see EPA-NE]

**Coverage**  
*Spatial* [see EPA-NE]

All of Rhode Island is designated as one non-attainment area for ozone. The state is in attainment for all other pollutants.

*Temporal* [see EPA-NE]

Rhode Island will likely be in non-attainment of the new 8-hour standard.

**Quality/  
 Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

**AIR: INDICATOR 2**  
VERMONT

**Database** Type of data: non-attainment areas and populations  
Database(s): EPA and state listing of attainment designations (officially in Federal Register and CFR)

[see EPA-NE]

Vermont is in attainment for all pollutants.

**Parameters** [see EPA-NE]

*Basis for Populations* [see EPA-NE]

**Coverage**  
*Spatial* [see EPA-NE]

*Temporal* [see EPA-NE]

**Quality/  
Methodology** [see EPA-NE]

**Availability** [see EPA-NE]

## AIR INDICATOR 3

*“Emission reductions since 1990 for each criteria air pollutant, as discussed in each annual edition of EPA’s National Air Pollutant Emission Trends report.”*

### CONTACTS

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MA DEP	Ken Santlal
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## SCREENING RESULTS: Overview

EPA maintains a national emissions trend (NET) inventory. This data is used to publish an annual Air Pollutant Emission Trends report, which describes emissions estimates for criteria air pollutants (all but ozone, for which VOCs are substituted) by state, source, and in other ways. The most recent report presents data through 1996. The data is drawn from a number of sources, primarily a 1990 base year inventory conducted using national level activity data (e.g., gasoline consumption, vehicle miles traveled, manufacturing and production estimates). Data for subsequent years is extrapolated by applying growth factors and population estimates to the 1990 data. Some estimates incorporate state-level data into the national calculations. For example, point sources use some state point source emissions data submitted to the AIRS database (from CT, NH, and VT). Mobile source estimates are calculated using national, as well as county-level data such as VMTs (in some years). Other pollutant sources are estimated almost solely on national data, grown from the 1990 inventory, and then apportioned to produce estimated state contributions using population and other demographic data. Overall, the 1990 NET inventory represents primarily national-level data. Data for subsequent years has little basis in actual state-level emissions data.

The annual Air Pollutant Emission Trends reports include emissions data for each of the criteria pollutants, for all source categories (point, mobile, area, non-road, and others), by state. The 1996 report does not include data for each year from 1990-1996 for each state, but this data is readily available in the NET database. It is important to note that the standard emissions factors and models are constantly modified and improved. In each Emission Trends report, data for previous years is 'backcast' using the latest factors, to ensure that emissions from all years are determined using the same procedures. However, the constant updating of emission estimation methodology from one year to the next makes emission trends from sequential reports not comparable.

In contrast to this national inventory which uses some state-level emissions data, but relies primarily on national estimates projected annually from 1990, each New England state has its own emissions inventory. These inventories were completed to meet a variety of requirements, particularly those placed on states with non-attainment areas under the Clean Air Act, and those created by the ozone transport assessment group(OTAG)<sup>3</sup>.

The state inventories may provide a more accurate picture of emissions, and could help support the indicator above, however they vary in the pollutants and time periods covered, as well as in their methodology for estimating emissions. Each state has conducted an inventory of point (facility) and non-point sources of the ozone precursors NO<sub>x</sub>, CO, and VOCs. Connecticut, Maine, Rhode Island, and Vermont include SO<sub>2</sub> and PM<sub>10</sub> in their facility inventories. Massachusetts includes SO<sub>2</sub> as well.

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<sup>3</sup> OTAG is an effort of EPA, ECOS, and industry and environmental groups, in which part of their activities involved creating a 1990 base emissions inventory for ozone precursors, using state-submitted estimates).

Every state has compiled a 1990 base year inventory for both point and non-point sources. Some states have completed reports on non-point emissions for 1993 and/or 1996. Some states have maintained facility inventories for years after 1990. The most recently compiled emissions data is available in Connecticut and Vermont for estimated annual emissions from facilities for 1997. See individual forms in Section II for specific availability by state.

The sources included in state-level inventories vary. Every state includes major point sources as defined in the Clean Air as well as many smaller facilities. The threshold criteria for inclusion of these smaller facilities vary by state. See individual forms in Section II.

In general, states estimate emissions similarly. They all utilize the same available factors, guidance, and models available from EPA. Facility inventories in every state are based on self-reported questionnaires, which ask the facilities to estimate their emissions using any of a number of methods such as mass balance equations, continuous emissions monitoring, or other data. Mobile emissions are typically estimated by inputting state data on VMTs, meteorology, and vehicle registries into a standard EPA model. Other non-point sources of emissions are estimated by either state-level data, or national figures apportioned to the state based on population/demographics, or a combination of both. See individual forms in Section II for specific state methods.

The primary concern for utilizing emissions data over time, is consistency in estimation. Emissions data is heavily dependent upon factors and models. EPA and other entities are constantly adjusting emissions factors and models to better reflect actual emissions. Thus, discerning real changes in emissions from year to year or from report to report, from changes due to new estimation methods is difficult.

SCREENING RESULTS: Summary Matrix

(see results of individual interviews in next section for more detail)

State/Entity	Database	Coverage			Quality	Availability
		Sources	Pollutants	Temporal		
EPA-NE	NET inventory of emissions estimates; annually published National Air Pollutant Emission Trends report	numerous point categories, mobile, non-road, area, and others (including biogenics)	all criteria pollutants (VOCs in place of ozone)	Net includes 1985-1990; emission trends report 1900-1996 current	1990 NET based on mostly national estimates with some state-level input; subsequent years are extrapolated using growth factors and some supplementary state data; mobile sources are calculated annually using county-level VMT data; states have been asked to	NET is an electronic database maintained nationally by EPA; the Emission Trends report is published annually in hard copy and electronically (on the www)
Connecticut	criteria pollutant emissions estimates: facilities inventory and non-point inventory	facilities include: all Title V, emitters of >10 tons of Nox or VOC, or >25 tons combined criteria pollutants; non-point includes: mobile, non-road, area sources	all criteria pollutants (VOCs in place of ozone)	facilities inventory available annually from 1994-1997; non-point inventory is complete for 1990 and 1993	facilities self-report emissions using standard factors, methods, and models; non-point sources are calculated using standard EPA protocols, factors, and state data	estimates reported to EPA; facilities data available via electronic query at CT DEP for 1995-97. Facilities data 1994 and prior is available through AIRS
Maine	criteria pollutant emissions estimates: facilities inventory and non-point inventory	facilities include: all major sources (emissions > 100 tons for any criteria pollutant), and all sources emitting over 100 tons CO, 25 tons Nox, 15 tons PM10, 40 tons SO2, 25 tons VOCs; non-point sources include mobile, non-road, area and biogenic	facilities report CO, Nox, PM10, SO2, VOCs; mobile and other non-point sources are estimated for CO, Nox, and VOCs	facility emissions are estimated annually, but have been compiled for 1990 and 1992; 1993-95 years were skipped, and 1996 will be completed this year; non-point sources are estimated every three years; data for 1990, 93, and 96 are complete	facilities self-report emissions using standard factors, methods, and models; ME DEP performs QA by comparing facility data over time and identifying inconsistencies; mobile sources are recalculated for each inventory based on state data, EPA models and	electronic database; reported to EPA for use in the Pollutant Emission Trends Report
Massachusetts	criteria pollutant emissions estimates: facilities inventory and non-point inventory	facilities included: major (>100 tons) and minor (>1 ton) sources, and numerous smaller sources; mobile, area, non-road, and biogenic sources as well	emissions are estimated for CO, NOx, VOCs, and SO2 for facilities, mobile, area, and non-road sources; VOCs are estimated for biogenics	emissions data on major sources exists for 10+ yrs; full facility inventory is available for 1990, 1996 soon, reporting is intended to be 3yr cycle; non-point sources are estimated every 3yrs; SO2 is estimated on 2-3 yr cycle	facilities self-report emissions estimates, DEP performs analysis and investigates suspected errors/fraud; area, biogenic, and mobile sources are estimated from standard models and state level data, mobile estimates are done in ~12 transportation regions	electronic database; reported to EPA

<p><b>New Hampshire</b></p>	<p>criteria pollutant emissions estimates: facilities inventory and non-point inventory</p>	<p>all permitted facilities (for criteria pollutants); mobile, area, non-road, and biogenic sources; while only emissions in non-attainment areas are required to be reported, NH DES estimates represent a majority of these sources in the state</p>	<p>CO, NOx, VOCs</p>	<p>base inventory 1990; facilities report emissions annually, but DES has processed this completely for 1994-95, 96 due soon; non-point estimates are complete for 1990 and 1993, 1996 due soon</p>	<p>facilities use variety of standard methods in self-reporting emissions; mobile, area, and biogenic sources are estimated with standard factors and models, along with state-level data; non-road emissions are apportioned to the state from national data</p>	<p>electronic database; some data reported to EPA</p>
<p><b>Rhode Island</b></p>	<p>criteria pollutant emissions estimates: facilities inventory and non-point inventory</p>	<p>all major and minor facilities, over 800 in all; area, mobile, and non-road sources</p>	<p>CO, NOx, VOCs; SO2 and PM for facilities</p>	<p>facilities inventoried annually; area, non-road, and mobile emissions estimated every 3yrs, 1990 base year, 1993 partial, 1996 complete</p>	<p>facilities use variety of standard methods in self-reporting emissions to DEM; DEM does some investigations to ensure accuracy; other sources estimated using standard models, factors, and state data</p>	<p>1990 and 1996 inventory available; data reported to EPA</p>
<p><b>Vermont</b></p>	<p>criteria pollutant emissions estimates: facilities inventory and non-point inventory</p>	<p>facilities emitting &gt; 5 tons of all criteria pollutants combined (~240), but report to EPA only for those emitting &gt;25 tons for any one pollutant; some small area sources; mobile, area, non-road, and biogenics</p>	<p>CO, NOx, VOCs, SO2, PM</p>	<p>facilities submit emissions data annually, partial data exists for 1985-86, full inventory exists for 1987-1997, some facilities have been added to inventory over time; a complete non-point inventory was done in 1993, for 1990 data</p>	<p>facilities use standard methods to self-report emissions; smaller sources submit data and VT ANR does estimates; mobile and area emissions are based on models, factors, and state data; non-road and biogenics are estimated based on national data apportioned</p>	<p>1990 complete inventory, reported to EPA; facility registry in database</p>

## SCREENING RESULTS: Interview results

### AIR: INDICATOR 3

EPA – NEW ENGLAND

<b>Database</b>	Type of data: estimated emissions of criteria air pollutants Database(s): National Emissions Trends(NET) emissions inventory; National Air Pollutant Emission Trends report
	Nationally, EPA maintains the NET inventory of emissions, and publishes the National Air Pollutant Emission Trends report, which includes criteria pollutant quantities, by state.
<b>Coverage</b>	
<i>Sources</i>	Emissions are estimated for numerous sources within the general categories: point, mobile, non-road, and other (e.g., biogenic).
<i>Pollutants</i>	Emissions of NO <sub>x</sub> , SO <sub>2</sub> , PM <sub>10</sub> , VOCs, CO, and lead are estimated.
<i>Temporal</i>	Inventory data is available from 1900-1996. Data based on 1990 NET inventory is available in the NET annually from 90-96.
<b>Quality/ Methodology</b>	Emissions quantities reported in the annual editions of the National Air Pollutant Emission Trends reports, are based primarily on 1990 NET data. This data is extrapolated to subsequent years and apportioned to state-level estimates. The initial 1990 NET inventory estimated emissions using a variety of data sources, primarily national level activity data, such as gasoline consumption and VMTs. The 1990 NET also incorporated some state-level data, particularly from state inventories submitted under OTAG, and point source data reported to AIRS/AFS. For subsequent years, the national inventory/report estimates emissions generally, as follows:

Point sources are estimated from the 1990 NET inventory using growth factors, except in CT, NH, and VT, where those states requested that EPA use data updated in the AIRS/AFS database.

Mobile sources from 1990-95 are estimated annually using county-level VMT data from the Federal Highway Administration's Highway Performance Monitoring System, and county-level emission factors (based on national factors and state-level data such as temperature and vehicle registrations). The 1990 inventory used some state-supplied VMT data (including New England). In 1990,

1995, and 1996, some states, primarily in the OTAG domain, supplied additional data for the emissions model.

Non-road emissions were estimated in the 1990 NET based on a 27 non-attainment area sample. Emissions estimates were then apportioned to other areas in the country based on climatic and geographic similarities to the samples, as well as population factors.

Other emissions were estimated in the 1990 NET using primarily national data, supplemented by some state-level data. Emissions in subsequent years were estimated based on growth factors applied to the 1990 data.

EPA has asked states to review emissions estimates for 1996, and for subsequent emissions estimates/reports, to supply their own state-level data to supplement and improve upon the EPA estimates where possible.

**Availability** EPA maintains an electronic database of emissions estimates for years 1985-1996. A hard copy and electronic copy report on National Air Pollutant Emission Trends is produced annually. The most recent covers estimates from 1900 through 1996.

## AIR: INDICATOR 3

### CONNECTICUT

<b>Database</b>	<p>Type of data: estimated emissions of criteria air pollutants Database(s): facility inventory; estimated source reports</p> <p>CT DEP maintains a database of facilities, and the estimated emissions of pollutants. CT DEP also estimates emissions from mobile and area sources and reports these estimates.</p>
<b>Coverage</b>	
<i>Sources</i>	<p>The facility inventory is comprised of approximately 275 sources and businesses. These include all facilities under Title V of the Clean Air Act, and sources which emit greater than 10 tons of VOCs or Nox, or greater than 25 tons of all other criteria pollutants.</p> <p>The CT DEP estimates emissions from mobile, area, and non-road sources as well, separately.</p>
<i>Pollutants</i>	<p>The facility inventory tracks emission of criteria pollutants (VOCs in place of ozone).</p>
<i>Temporal</i>	<p>Data is available on facilities annually from 1994 through 1997. Some data is available prior to 1994.</p> <p>Data on mobile, area, and other sources covers three year intervals, but only as recent as 1993.</p>
<b>Quality/</b>	
<b>Methodology</b>	<p>Facility emissions are estimated by the facilities using a variety of methods and guidelines including stack test results, and are reported by the facilities on a standard DEP form.</p> <p>Mobile, area, and other estimates are based on standard protocols. Mobile sources are based on EPA's Mobile modeling software, VMT calculations, and EPA emission factors. EPA guidance/methods are used where appropriate.</p>
<b>Availability</b>	<p>Facilities inventory data is available through AIRS through 1994. 1995-1997 data is available by data query in CT DEP.</p> <p>Mobile, area, and other source estimates area available for 1990 and 1993.</p>

Both facility and mobile/area estimates are reported to EPA for use in the Annual Air Pollutant Emission Trends Reports.

## AIR: INDICATOR 3

### MAINE

<b>Database</b>	<p>Type of data: estimated emissions of criteria air pollutants</p> <p>Database(s): facility inventory; estimated source reports</p> <p>ME DEP maintains a database of facilities emitting criteria pollutants, and estimates emissions from non-point sources.</p> <p>Emissions are reported in tons, by source and by pollutant.</p>
<b>Coverage</b>	
<i>Sources</i>	<p>Facilities in the database include all federally defined major sources (emissions greater than 100 tons for any criteria pollutant), and all sources emitting greater than:</p> <ul style="list-style-type: none"> <li>100 tons of CO</li> <li>25 tons of NO<sub>x</sub></li> <li>15 tons of PM<sub>10</sub></li> <li>40 tons of SO<sub>2</sub></li> <li>25 tons of VOCs</li> </ul> <p>Non-point sources tracked in the complete emissions source inventory include mobile, non-road, area, and biogenics.</p>
<i>Pollutants</i>	<p>Facilities report emissions of CO, NO<sub>x</sub>, PM<sub>10</sub>, SO<sub>2</sub>, and VOCs.</p> <p>Mobile, area, and other non-point emissions are estimated for CO, NO<sub>x</sub>, and VOCs.</p>
<i>Temporal</i>	<p>Facilities report estimated emissions annually. These have been computed by ME DEP for 1990, and 1992. 1993-1995 estimates are skipped. The agency is currently working on 1996 data, to be completed this year. The group of facilities required to report has remained consistent since 1990.</p> <p>For non-point sources, a base year inventory was completed for 1990. This is updated every three years (1993 and 1996 are complete)</p>

**Quality/**

**Methodology** Facilities report emission estimates to ME DEP, using the standard variety of methods (stack tests, emission models, AP-42, mass balance). ME DEP does QA by comparing facilities from year to year. Inconsistencies are flagged and presented to the licensing division for explanation. Some may require site visit or investigation, but most are explained by changes in licensing/permits.

Non-point emissions are estimated using standard models, factors, and data. Mobile sources are estimated by ME DEP using VMTs, and other information. Other non-point sources are calculated from the 1990 base year data, using standard growth factors and demographics. Some calculations (e.g., for biogenics) are done by EPA.

**Availability** Emissions estimates are available in DEP databases. Estimates are furnished to EPA.

## AIR: INDICATOR 3

### MASSACHUSETTS

<b>Database</b>	<p>Type of data: estimated emissions of criteria air pollutants Database(s): facility inventory; estimated source reports</p> <p>MA DEP maintains a database of facilities, and their estimated pollutant emissions. MA DEP also estimates emissions from mobile and area sources and reports these estimates.</p>
<b>Coverage</b>	
<i>Sources</i>	<p>The facility inventory is comprised of all major (&gt; 100 tons for any pollutant) and minor (&gt;1 ton) facilities. Some smaller emitters are included as well. The inventory is described as having nearly complete coverage for these point sources.</p> <p>The MA DEP estimates emissions from mobile, area (dry cleaners, landfills, degreasers, etc.), non-road (small engine), and biogenic sources as well, separately.</p>
<i>Pollutants</i>	<p>The facility inventory tracks CO, NO<sub>x</sub>, VOCs, and other ozone precursors. SO<sub>2</sub> is also tracked, primarily for acid rain program purposes. PM<sub>2.5</sub> emissions are not reported, but could be in the future if MA becomes non-attainment for PM.</p> <p>VOCs, NO<sub>x</sub>, SO<sub>2</sub>, and CO are estimated for stationary area, mobile, and non-road emissions. VOCs are estimated for biogenics.</p>
<i>Temporal</i>	<p>Facility inventory is intended to be conducted every three years, from a 1990 base year. However, a 1993 inventory was not done, and 1996 is due to be completed soon.</p> <p>Data on major sources is available back more than 10 years.</p> <p>Stationary area, mobile, and non-road estimates are completed every three years. SO<sub>2</sub> is reported at 2-3 year intervals.</p>
<b>Quality/ Methodology</b>	<p>The facilities inventory receives emissions estimates on survey forms from facilities. MA DEP verifies data and investigates suspected error or fraud. DEP uses EPA guidance and models to calculate emissions for: facility segments, point, stack, and entire plant.</p> <p>Stationary area sources are estimated using EPA models and protocols. Mobile sources are calculated by each transportation planning area in the state using VMTs, registry of vehicles, EPA factors and other data. These (~12) are then</p>

combined for state total. Non-road estimates are based on national calculation, apportioned to the state, based on demographic data. Biogenics are estimated using EPA models and data on land use, tree cover, species composition, etc.

**Availability** Facilities and other source data are maintained in electronic databases by MA DEP. Data is also reported to EPA for use in the Annual Pollutant Emission Trends Report.

## AIR: INDICATOR 3

### NEW HAMPSHIRE

<b>Database</b>	<p>Type of data: estimated emissions of criteria air pollutants</p> <p>Database(s): facility inventory; estimated source reports</p> <p>NH DES maintains a database of criteria pollutant emissions from facilities and non-point sources.</p>
<b>Coverage</b>	
<i>Sources</i>	<p>The database includes inventories of all permitted facilities emitting criteria pollutants in NH (majority of emissions are from power plants).</p> <p>Non-point sources include mobile, non-road, area, and biogenic sources.</p> <p>Inventories are required only in non-attainment areas, although most emissions are estimated for the whole state.</p>
<i>Pollutants</i>	CO, NO <sub>x</sub> , VOCs
<i>Temporal</i>	<p>A base inventory was completed in 1990. Facilities report emissions data to DES annually. DES then processes and enters the data. Inventory data is available in the database completely for 1994-95, with 1996 almost complete.</p> <p>Non-point estimates have been completed for 1990 and 1993. 1996 is almost complete.</p>
<b>Quality/</b>	
<b>Methodology</b>	<p>Facilities estimate emissions based on a variety of methods: stack tests, continuous monitoring, or AP-42 model.</p> <p>Mobile, area, and biogenic emissions are estimated using EPA standard models and factors, along with state-level data.</p> <p>Non-road estimates are made using national data, apportioned using state population/demographics.</p>
<b>Availability</b>	Emissions estimates are available in the database. Some emissions data is reported to EPA.

**AIR: INDICATOR 3**

## RHODE ISLAND

<b>Database</b>	Type of data: estimated emissions of criteria air pollutants Database(s): facility inventory; estimated source reports
	RI DEM maintains an inventory of criteria pollutant emission sources.
	Emission sources are tracked by facility, and by source (area, non-road, mobile). Quantity of emissions are estimated by source.
<b>Coverage</b>	
<i>Sources</i>	Over 800 sources are tracked. All major and minor facilities, and area, non-road, and mobile sources are included.
<i>Pollutants</i>	CO, NO <sub>x</sub> , and ozone precursors
<i>Temporal</i>	Inventory is conducted every three years. Base year is 1990, for which a complete inventory is available. A partial inventory is available for 1993, and the 1996 has not yet been done.
<b>Quality/ Methodology</b>	Facility emissions are estimated by the facilities using a variety of methods and guidelines including stack test results, and are reported by the facilities on a standard DEM questionnaire. DEM conducts some follow-up inspections.
<b>Availability</b>	Both facility and mobile/area estimates are reported to EPA for use in the Annual Air Pollutant Emission Trends Reports.

## AIR: INDICATOR 3

### VERMONT

<b>Database</b>	<p>Type of data: estimated emissions of criteria air pollutants          Database(s): facility inventory; estimated source reports</p> <p>VT ANR maintains an annual registry of facilities emitting criteria pollutants. VT ANR has also conducted one non-point emission report.</p> <p>Emission quantities are estimated by source and pollutant. Facility emissions are broken out by points (stack, boiler, etc.)</p>
<b>Coverage</b>	
<i>Sources</i>	<p>The facilities database includes all facilities emitting greater than 5 tons of all criteria pollutants combined, approximately 240 facilities. In reporting to EPA for the Trends Report, only those emitting greater than 25 tons for any one pollutant are included. VT ANR also estimates emissions from smaller area sources.</p> <p>Vermont conducted one complete inventory including mobile, non-road, area, and biogenic sources.</p>
<i>Pollutants</i>	CO, NO <sub>x</sub> , SO <sub>2</sub> , VOCs, PM
<i>Temporal</i>	<p>Facilities are required to register annually, submitting emission estimates upon which fees are based. The formal registration program was established in 1987, and has been updated annually through 1997. Partial data is available for 1985-86. Since 1987, some new or missed facilities have been added to the registry. A major group of these includes ski resorts – large NO<sub>x</sub> emitters previously missed due to the program's summer season focus.</p> <p>In 1993, ANR conducted a complete inventory including mobile, non-road, biogenic, and area sources. The inventory calculates 1990 base-year emissions data. Based on Vermont's attainment status, there is little obligation to produce another inventory, although one might be completed for 1996 data, but has not yet been.</p>
<b>Quality/ Methodology</b>	Facilities estimate their emissions for annual registration and fees using a variety of approved methods, and submit to ANR. The state has agreements with smaller area sources, whereby these sources submit data, and ANR estimates emissions for them using factors and models (e.g., EPA's AP-42 model).

The 1990 base-year inventory sources were estimated using standard factors and models. EPA provided estimates for Vermont's non-road and biogenic sources using national and state level data.

**Availability** The facility registry is available in a consolidated electronic database. This data and the 1990 inventory are furnished to EPA.

**AIR**

**INDICATOR 4**

*“Trend in emissions of toxic air pollutants.”*

**CONTACTS**

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ME DEP	Ellen Doering
MA DEP	Ken Pelletier
	Bob Boisel
NH DES	Tom Nejadlik
RI DEM	Barbara Morin
VT ANR, DEC	Paul Wishinski

## SCREENING RESULTS: Overview

Nationally, EPA maintains the Toxics Release Inventory under the Emergency Planning and Community Response Act (EPCRA). This inventory is a widely available and distributed database of releases of toxic chemicals from facilities around the country. Facilities self-report their releases, emissions, and transfers to environmental media and storage or disposal facilities of chemicals listed by EPA. These reports are submitted annually to EPA, using standard estimation methods and a standard reporting form.

The TRI covers all facilities in all states meeting the following criteria and thresholds:

- Conduct manufacturing operations (are in SIC 20-39)
- Have 10 or more full time employees (or part time equivalent)
- Manufacture, process, or import a listed chemical or group of chemicals in quantity over 25,000 pounds, *or* otherwise use a listed chemical in quantity over 10,000 pounds.

Chemicals with reporting requirements (approximately 650) are listed by EPA under EPCRA. The TRI contains data on the quantity of releases, emissions, and transfers, in pounds, annually from 1988-1996. Facilities are currently submitting, and EPA is currently compiling 1997 data.

The quality of the TRI data is often challenged. The TRI data is based on self-reported estimates of chemical quantities. While EPA issues explicit and detailed guidelines (often criticized for their complexity), and facilities report the methods used for estimation, the fact that data is based on approximations has been of concern. In addition, the inclusion of only a subset of all facilities which emit toxic pollutants, the group of manufacturing facilities, is important in understanding that the TRI does not represent the entire universe of toxics sources or emissions. In addition, as listed chemicals, reporting criteria, included facilities, and estimation methods have evolved over time, so have concerns for the comparability of TRI data over the years.

Beyond the TRI, there are other sources of data on toxic emissions for the New England states. Each of the states in the region, with the exception of Connecticut, maintains a separate inventory of facility toxics emissions. Some are supported under state toxic use reduction laws, others are attached to existing facility reporting requirements.

Three states – Maine, Massachusetts, and Rhode Island – track emissions from all TRI reporting facilities, as well as numerous other facilities either within a selected SIC group beyond the TRI, or meeting a state-defined emissions threshold. New Hampshire tracks emissions from all CAA Title V sources (some but not all of which may also be TRI reporters). Vermont tracks only those facilities that are already reporting to the state for meeting the thresholds for criteria air pollutants.

Three states – Maine, Massachusetts, and Vermont – require facilities to report on a list of chemicals which includes those required by the TRI, as well as additional chemicals which vary by state. Maine tracks numerous compounds of state significance in addition to the TRI list. Massachusetts adds all chemicals listed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Vermont tracks all chemicals used by reporting

facilities, which are listed on materials safety data sheets (MSDSs), in addition to other solvents and compounds. Rhode Island tracks the 188 EPA listed Hazardous Air Pollutants (HAPs) and other chemicals. New Hampshire tracks a subset of the HAPs.

Every state with a toxics inventory has data available for 1996. Massachusetts, Vermont, and Rhode Island have data for a common period from 1993 to 1996. The comparability of each state's data over time varies and is discussed in the individual forms in Section II.

SCREENING RESULTS: Summary Matrix

(see results of individual interviews in next section for more detail)

State/Entity	Database	Coverage			Quality	Availability
		Sources	Pollutants	Temporal		
<b>EPA-NE</b>	TRI	all facilities listed in EPCRA section 313: SIC 20-39, have >10 employees, either manufacture, process, or import >25,000 lbs of any listed chemical, or otherwise use >10,000lbs of any listed chemical	approximately 650 reported chemicals are listed by EPA	1988-1996 annual reporting; changes in chemicals and facilities over time	facilities self report emissions to EPA; EPA does QA; many concerns have been expressed about the scope of facilities and chemicals reported, as well as with reporting/estimation methods	the TRI is widely available annually; CD-ROM, internet, electronic, published reports annually
<b>Connecticut</b>	none; see EPA - New England	N/A	N/A	N/A	N/A	N/A
<b>Maine</b>	state toxic emissions inventory	all TRI facilities; all facilities emitting >2000 lbs of a listed chemical or >200 lbs of a carcinogen; most point sources are included, but many small area sources are missed	all TRI chemicals, all EPA-listed HAPs, other compounds of state significance	inventories done for 1990 (incomplete), 93 and 96; inventories expected at two year intervals	emissions estimates are self-reported by facilities; DEP conducts QA and on- and off-site audits	electronic database; 1993 inventory in hard copy, 1996 to be published in hard copy
<b>Massachusetts</b>	state toxic emissions inventory	all TRI facilities; includes additional facilities in commercial sectors beyond the TRI SIC group	all TRI chemicals, all CERCLA chemicals; chemicals are reported for all process uses; facilities meeting 25 tons manufacture or 10 ton otherwise use threshold must report all listed chemicals over 10 tons, regardless of use	facilities report to DEP annually; data compiled for 1990-1996	facilities self report to DEP and describe methods used for estimation; inspectors conduct some site audits	electronic database
<b>New Hampshire</b>	state toxic emissions inventory	all Title V sources	VOCs, and a subset of EPA HAPs	1996 inventory for Title V sources only; 1997 inventory includes Title V and some other sources	facilities self-report emissions estimates	electronic database
<b>Rhode Island</b>	state toxic emissions inventory	all major, minor, and other permitted sources; many other small sources (dry cleaners inventoried seperately)	all EPA HAPs and other chemicals	1989-present; although numerous chages in facilities and chemicals included	facilities self -report emissions estimates; state calculates for smaller sources; all verified by RI DEM	electronic database
<b>Vermont</b>	state toxic emissions inventory	all facilities registering for criteria emissions (greater than 5 tons of all criteria emissions combined)	all TRI, all chemicals listed in facilities MSDS, and numerous other solvents and compounds	1993-1997, updated annually	facilities self-report emissions estimates for toxics surcharge; facilities report controls and explain reductions in emissions figures; ANR does off-site QA	within the electronic criteria emissions registry database

## SCREENING RESULTS: Interview results

### AIR: INDICATOR 4

EPA – NEW ENGLAND

**Database** Nationally, EPA maintains the toxics release inventory (TRI), an inventory of toxic emissions, releases, and transfers from facilities, by media, along with other information on manufacturing processes and pollution prevention measures.

#### Coverage

##### *Sources*

Sources are described in Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA). Reporting facilities are those which conduct manufacturing operations (SIC 20-39), have 10 or more full-time employees (10 FTE), and use a listed chemical(s) as follows:

Manufacture, process, or import any chemical or group in quantity over 25,000 lbs

or,

otherwise use any chemical or group in quantity over 10,000 lbs.

*Pollutants* Approximately 650 listed chemicals and compounds (EPCRA).

*Temporal* TRI data is available from 1988-1996. The TRI is published annually, with a 1-2 year lag time. Listed chemicals and reporting facilities have changed over that time.

#### Quality/

**Methodology** Facilities self-report estimates of releases, on standardized forms, using extensive EPA guidance and mandated protocols. EPA compiles and performs quality assurance of this data.

Numerous issues have been raised regarding the quality of TRI data. Constant changes in guidance, listed chemicals, and covered facilities have improved the representativeness of the data, but at the expense of consistency over time. The TRI has been criticized for its methods, including: the limited range of facilities required to report (only manufacturing), the methods used for estimating releases, and the accurate identification of facilities and locations.

**Availability** The TRI is widely available in electronic format, on CD-ROM, via the Internet, and in hard copy reports. The 1996 data is available electronically, and will soon be available in hard copy and on CD-ROM.

**AIR: INDICATOR 4**  
CONNECTICUT

**Database** TRI data is reported by facilities to EPA. For description of the TRI database, see EPA-NE form (p.55).

Connecticut does not conduct a state toxics inventory at this time.

**Coverage**

*Sources* N/A

*Pollutants* N/A

*Temporal* N/A

**Quality/  
Methodology** N/A

**Availability** N/A

## AIR: INDICATOR 4

### MAINE

- Database** TRI data is reported by facilities to EPA. For description of the TRI database, see EPA-NE form (p.55).
- ME DEP maintains a periodic inventory of toxic emissions from TRI-reporting and other facilities.
- Coverage**
- Sources* All TRI reporting facilities are included in the ME DEP database. Also, all facilities emitting more than 2000 lbs of any listed chemical, or more than 200 lbs of any carcinogen (as defined by EPA, weight of evidence criteria).
- Pollutants* Chemical compounds listed by DEP to be reported in the inventory include all TRI chemicals, 189 HAPs, and other compounds of specific state significance (e.g., sulfur compounds from pulp mills).
- Temporal* Inventories have been done for 1990 (incomplete), 1993, and 1996. Future inventories are expected on a two year cycle ('98, '00,...).
- Quality/**
- Methodology** Facilities self-report emissions data to DEP. DEP performs QA on data reported by facilities.
- DEP describes the 1990 inventory is as incomplete. 1993 and 1996 data are described as consistent. DEP conducts targeted audits both off- and on- site. In 1993, little auditing took place on-site at facilities.
- The inventory is said to include most “point sources,” and some area sources. It is assumed that many small area sources are missed.
- Availability** Emissions inventories are maintained in a database. The 1993 inventory has been produced in hard copy; a 1996 hard copy report is to be published soon. Emissions data is *not* reported to AIRS.

**AIR: INDICATOR 4**  
MASSACHUSETTS

- Database** TRI data is reported by facilities to EPA. For description of the TRI database, see EPA-NE form (p.55).
- MA DEP maintains a database of TRI forms and additional data from facilities, such as information required by the state's Toxics Use Reduction law.
- Coverage**
- Sources* All TRI reporting facilities report to MA DEP. Also, numerous other "service" facilities beyond the TRI SIC group report.
- The reporting threshold for MA DEP's TUR inventory is the same as that for the TRI. However, if a facility exceeds the 25 ton threshold for any processed or manufactured chemicals, or 10 tons for any chemical otherwise used, all chemicals used by that facility over 10 tons, regardless of use, are also reported.
- Pollutants* Facilities report use and release of all TRI chemicals, in addition to all CERCLA chemicals, approximately 1400 in all.
- Again, once a facility reports over 25 tons for one pollutant, all are subject to a 10 ton threshold, thus more chemicals per facility may be reported to the state TUR database, than to the TRI alone.
- State requires reporting of chemicals in all process uses.
- Temporal* Facilities report to DEP annually. Data is compiled for 1990-1996.
- Quality/**
- Methodology** Facilities use and describe standard methods for calculating. MA DEP has multi-media trained inspectors who provide assurance of accuracy during some site visits.
- Availability** Electronic database.

## AIR: INDICATOR 4

### NEW HAMPSHIRE

**Database** TRI data is reported by facilities to EPA. For description of the TRI database, see EPA-NE form (p.55).

NH DES has maintained a partial inventory of toxic air sources, and plans to implement a comprehensive inventory in the future.

The inventory includes emissions quantities by pollutant and source.

#### **Coverage**

*Sources* All CAA Title V sources.

*Pollutants* VOC's, and a subset of hazardous air pollutants ("HAPs" listed by EPA).

*Temporal* From 1996-97, toxics were inventoried for Title V sources and some other sources. In 1996, an inventory was completed speciating all toxics from Title V sources only. In 1999, this speciated inventory will include all permitted facilities in New Hampshire.

#### **Quality/**

**Methodology** Inventory data is acquired from written surveys completed by facilities.

**Availability** Inventory data is available from a DES database.

**AIR: INDICATOR 4**  
RHODE ISLAND

**Database** TRI data is reported by facilities to EPA. For description of the TRI database, see EPA-NE form (p.55).

RI DEM maintains an inventory of facilities releasing air toxics.

The inventory tracks emissions quantities by pollutant and by source.

**Coverage**

*Sources* All major, minor, and permitted sources. Includes many small sources (e.g., autobody shops). Dry cleaners are listed in a separate database.

*Pollutants* HAPs and others

*Temporal* The inventory has tracked facilities and emissions as far back as 1989. However, changes in the pollutants and facilities included, and periodic emphases on geographic areas or business sectors, are likely to affect trends over time.

**Quality/**

**Methodology** Inventory data is provided via questionnaires to facilities. The DEM estimates emissions for small sources. All estimates are verified by RIDEM.

**Availability** Inventory data is available in an electronic database.

**AIR: INDICATOR 4**

## VERMONT

**Database** TRI data is reported by facilities to EPA. For description of the TRI database, see EPA-NE form (p.55).

VT ANR maintains an air toxics inventory “piggy-backed” on its criteria pollutant registration program and database. Facilities report total quantity of toxics used and amount emitted to air. Facilities also report controls which avoided or reduced emissions, and methods for calculations.

**Coverage**

*Sources* All facilities required to register criteria pollutant emissions: those emitting greater than 5 tons of all criteria pollutants combined.

*Pollutants* All chemicals released to air, including TRI chemicals, all chemicals listed on a facility’s materials safety data sheets (MSDS), and numerous solvents. Approximately 150-200 compounds are reported in all.

*Temporal* Toxics data is available in the database with consistent format and survey methodology from 1993 through 1997 and is updated annually.

**Quality/**

**Methodology** Toxics use and emission estimates are calculated by facilities and self-reported in their annual registration to compute toxics surcharges in addition to criteria pollutant emission fees. ANR uses mass balance and other calculations for QA and to summarize the data.

Facilities report the use of any controls to explain reductions in emissions, and report methods for calculating use and emissions.

**Availability** Toxics data is available via the criteria pollutant registration database.