

The Massachusetts Department of Environmental Protection (MassDEP) is the State agency responsible for protecting human health and the environment by ensuring clean air and water, the safe management and disposal of solid and hazardous wastes, the timely cleanup of hazardous waste sites and spills, and the preservation of wetlands and coastal resources. While MassDEP maintains its own database of environmental information, it must also share information with other agencies, such as the US Environmental Protection Agency (EPA), to comply with state and federal laws.

To share environmental information with the EPA and other states efficiently, MassDEP implemented a node on the National Environmental Information Exchange Network (NEIEN). This web-based network enables data to be ported from local databases, validated against a common XML schema, and routed into federal repositories.

MassDEP, with the support of the EPA, initiated the Exchange MassAir Project to implement an air quality flow to the EPA and develop a website to share real-time air quality data with the public.

### Project Background

For over 30 years, MassDEP has monitored outdoor air quality and required emissions controls for pollutants that adversely affect public health, welfare, and the environment. Currently, the state collects ambient air quality data from 21 monitoring locations across Massachusetts, a network of four privately funded industrial monitoring stations in the Boston area, and the Wampanoag tribe's monitor on Martha's Vineyard.

The Air Assessment Branch (AAB) is the air quality monitoring laboratory that analyzes data gathered from the network of monitors. The data, once gathered, goes through a rigorous, yet largely manual QA process. The data is submitted to the EPA either in raw form on an hourly basis or quarterly after going through the QA process. The data is occasionally submitted to interested parties, such as educational institutions.

### Highlights of the MassAir Project

#### I. Air Quality QA Tools

Air quality data collected by the MassDEP undergoes a rigorous QA process. Until the MassAir project, the process was highly labor intensive, repetitive, and manual. The MassAir project developed an automated process to improve QA efficiency, free up valuable state resources, and focus the manual QA efforts on suspicious data points that warrant further human investigation.

The automated process is part of the MassDEP Air QA Tools application - an internal MassDEP web application that allows the AAB staff to review all the state's air quality data via a single interface. The QA Tools application also contains a component that allows MassDEP to better manage the reporting of incidents and maintenance events that occur at each physical air monitoring field location as recorded by state field staff

#### II. MassAir Public Website

The MassDEP Air QA Tools application makes real-time air quality data available to the public on the web. Every hour, air sensors across the state report air quality

#### Project Objectives

- Deploy the Air Quality System (AQS) Data Flow on the MassDEP Node as part of the NEIEN
- Automate data gathering and data transfer for the flow using the MassDEP data sources and database(s) (existing and new)
- Develop an air monitoring public website to enable the sharing of real-time air quality data and other air quality related information with the public.
- Develop a set of Quality Assurance tools to streamline the process of air quality data review performed by state staff.

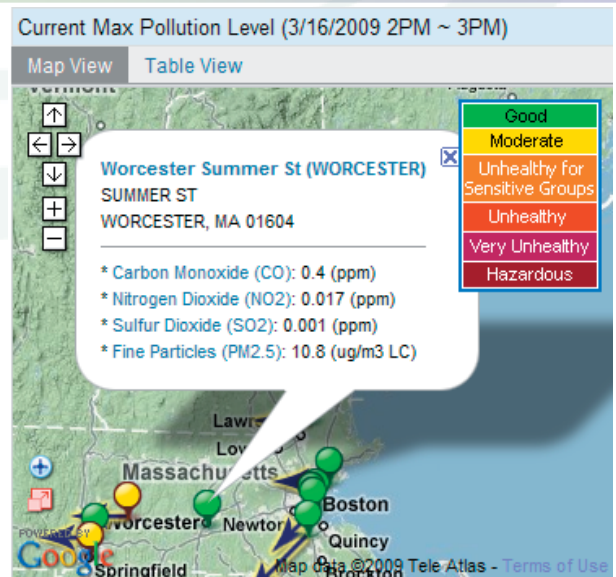


Figure 1: MassAir Real-Time Air Quality Maps

levels to the MassDEP. The data is filtered for possible erroneous values and fed to the MassAir public website, which offers the following benefits to the state, the public, and the EPA Exchange Network community:



## MassAir Project Highlights (cont.)

### ➤ Real Time Maps with Alerts

MassAir includes an interactive Google Maps interface that provides users the opportunity to browse air quality conditions across Massachusetts. The maps offer real-time and forecasted air quality levels, and include automatic alerts for when standard air quality thresholds are exceeded or are forecast to be exceeded. All visual map features are supported by accessible text equivalents.

### ➤ Trending and Analysis

MassAir includes graphing tools to give users the ability to view historical and daily trends for all AQS criteria pollutants across the state. The graphing interface allows graphs to be redrawn based on time, region, and pollutant, and includes the last 48 hours of hourly data and up to three years of historical daily averages. Users can view graphs containing actual measured values or browse each data point's calculated Air Quality Index. For additional evaluation, users can export data into Comma Separated Value (CSV) or XML formatted files, or print an HTML report. All visual graph features are supported by accessible text equivalents.

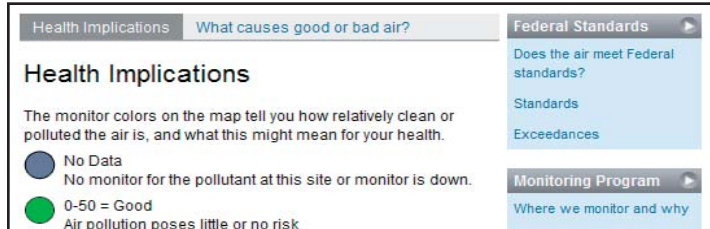


Figure 3: Example MassAir Educational Content

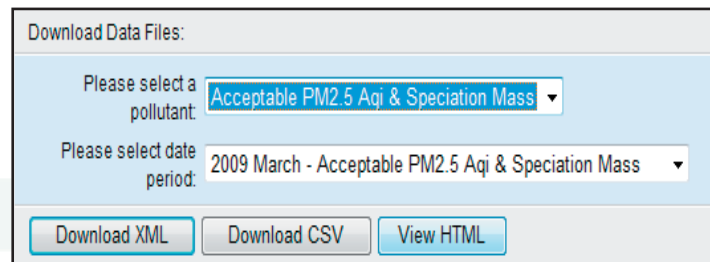


Figure 4: MassAir Data Download Interface

### ➤ MassAir is Built on Exchange Network Standards

One of the challenges of the MassAir project included building the MassAir public website in a way that leveraged its tools and features for other Exchange Network partners. To achieve this, the project team designed MassAir to run on data stored in the AQS Version 2.0 Standard XML format. This format is the same format used by Exchange Network partners across the nation to submit air quality data to the EPA (see AQS Data Flow below). The end result is that any of the Exchange Network partners that are capable of generating air quality data in the AQS 2.0 XML format can reuse the MassAir infrastructure to kick-start their own interactive public web interface.

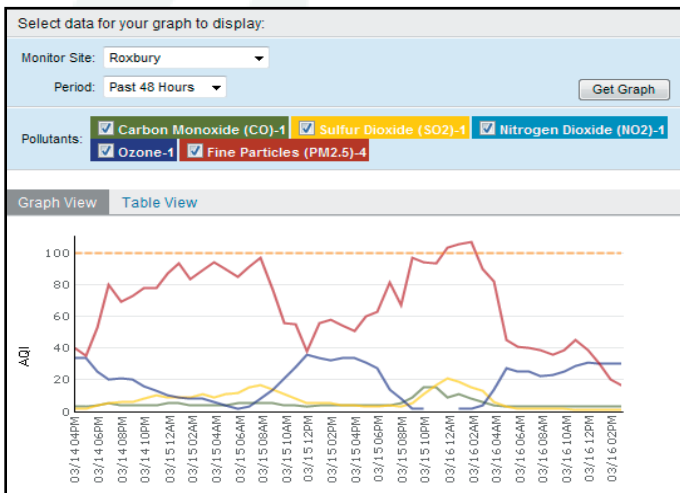


Figure 2: MassAir Graphing Interface

### ➤ Historical Data Access and Educational Content

MassAir is designed to support the needs of multiple types of public users through a variety of features. For example, MassAir includes a "My Community" feature to allow public users examine what the air quality data means for general public health in their own community. For users who are new to the study of air quality, MassAir provides educational information, background explanations, and links to further reading, all of which MassDEP air quality experts publish and maintain. For air quality researchers, MassAir includes the ability to download validated historical data sets for all MassDEP monitored parameters and sites.

## III. AQS Data Flow

One objective of the MassAir project is reporting air quality data to the EPA's AQS via MassDEP's Exchange Network Node. AQS is EPA's repository of ambient air quality data. AQS stores data from over 10,000 state, local and tribal monitors, 5000 of which are currently active.

Under the MassAir project, MassDEP set up an internal centralized AQS data repository; the repository allows the MassDEP to collect and manage air quality data from real-time air sensors and third-party data sources in a single streamlined process. The central repository supports both the MassDEP Air QA Tools application and the MassAir public website. An interface within the MassDEP QA Tools application allows MassDEP to submit air quality data from its central repository to the EPA AQS via the state's Exchange Network Node.

### Participating Member States and EPA Offices:

- Massachusetts Department of Environmental Protection
- USEPA Region I