



# Database and Analytical Tool Development for the Management of Data Derived from US DOE (NETL) Funded Fine Particulate (PM<sub>2.5</sub>) Research



Prepared for:

09.25.2002

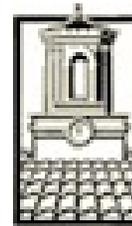
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## In Conjunction With



**TEXAS A&M**  
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## Project Objectives

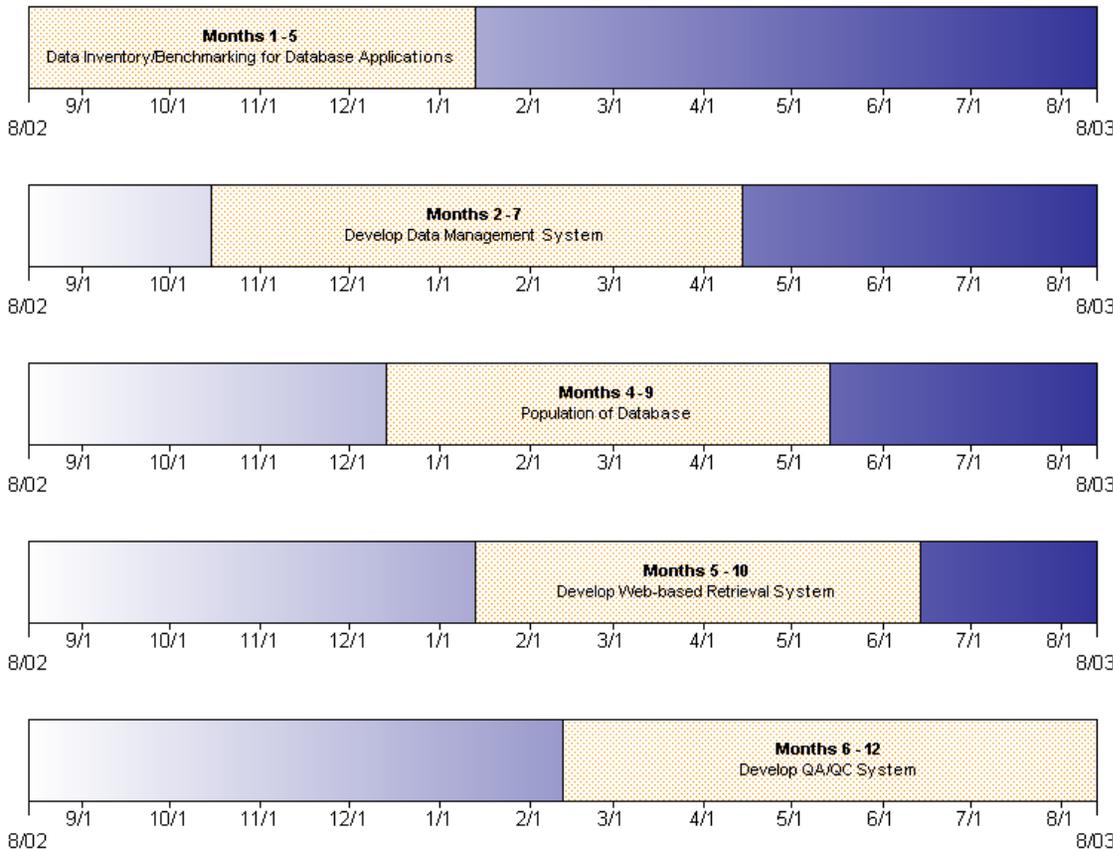
Primary objective is to develop a comprehensive, computer-based system for:

- Integrating the ambient air quality data being collected under multiple on-going DOE-sponsored monitoring programs in the Upper Ohio River Valley region (UORV)
- Creating a publicly-available tool for accessing, displaying, analyzing and interpreting these air quality data

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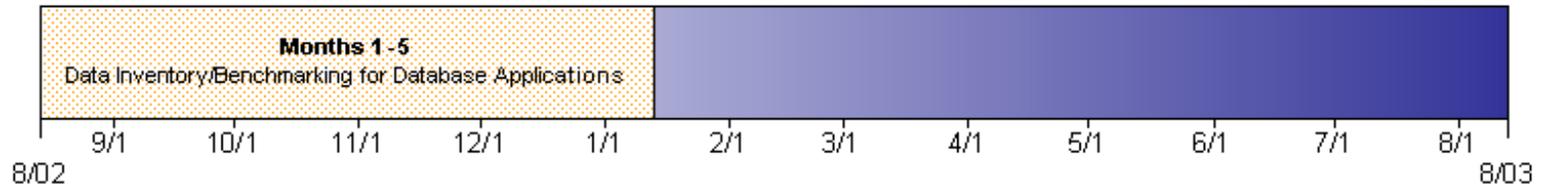
## Year One At a Glance



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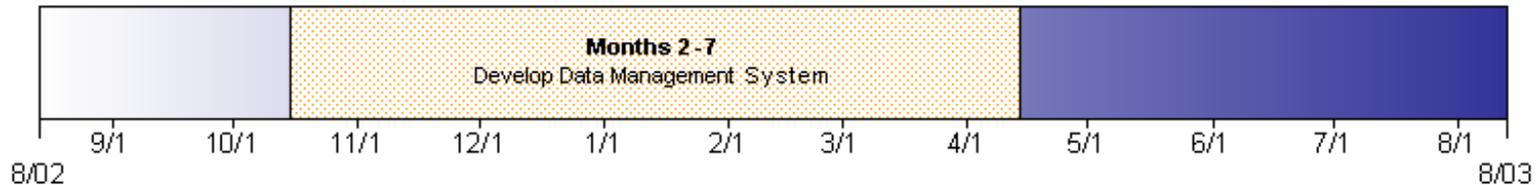


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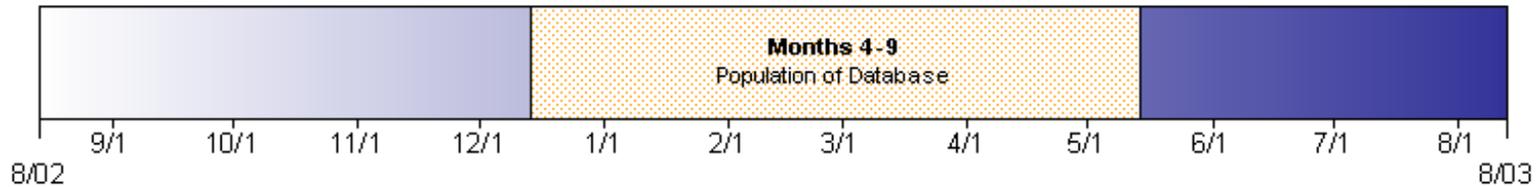
## Data Inventory/Benchmarking

- Gain useful information regarding existing efforts already underway
- Determine what data has been collected
- Determine data set formats
- Examine data collection/generation procedures



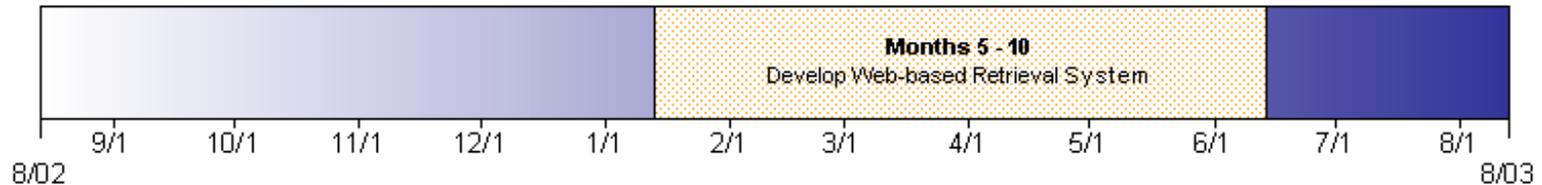
## Develop Data Management System (DMS)

- Allow for remote management of DMS
- Decrease expected operational costs associated with on-site management
- Web-based interface to manage archiving and retrieving data sets
- Primary site at Ohio University, mirrored at *ATS*



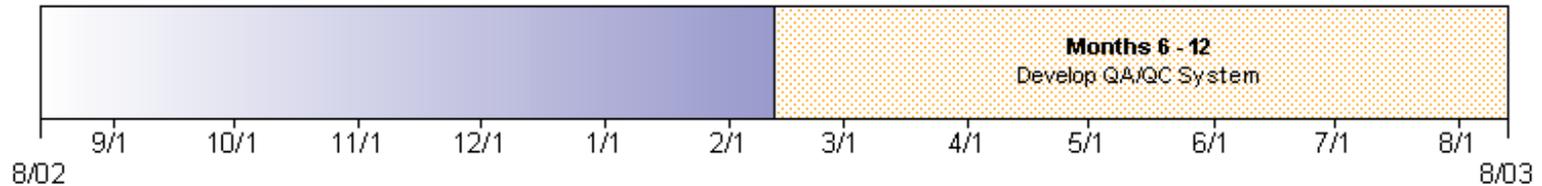
## Population of Database

- Allow for remote data uploading to primary server
- Location-based authentication model
- Standardize data format requirements
- Allow for automated data uploads from collection sites



## Web-Based Retrieval System

- Provide mechanisms for data sets to be retrieved from database
- Standardize output formats
- User-based authentication model



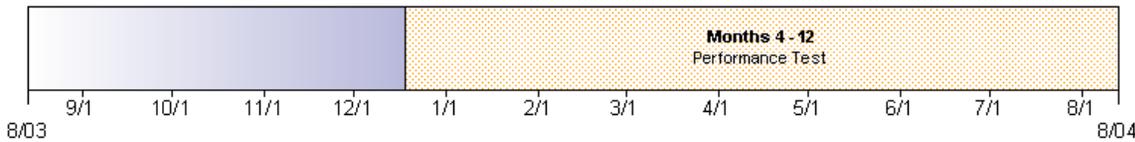
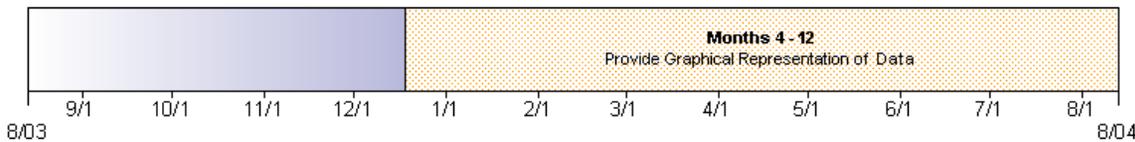
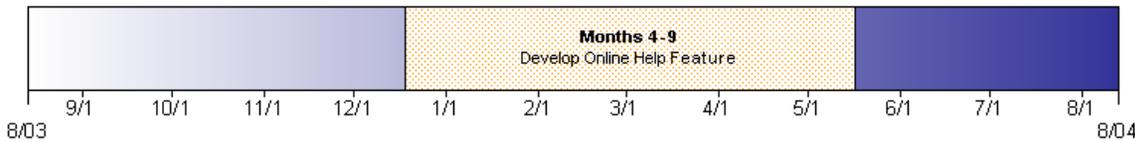
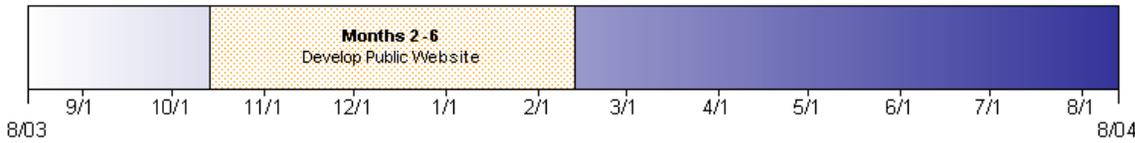
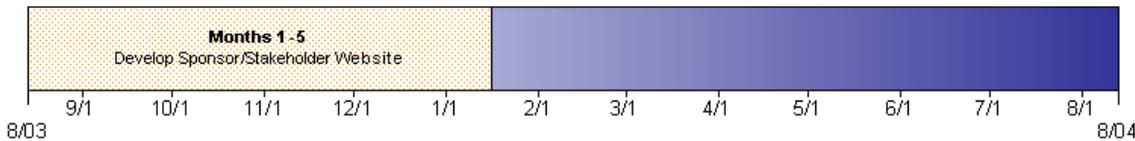
## Develop QA/QC System

- All procedures thoroughly documented
- Screening system algorithms for data quality
- Concurrent Versioning System (CVS) repository for source code control/review

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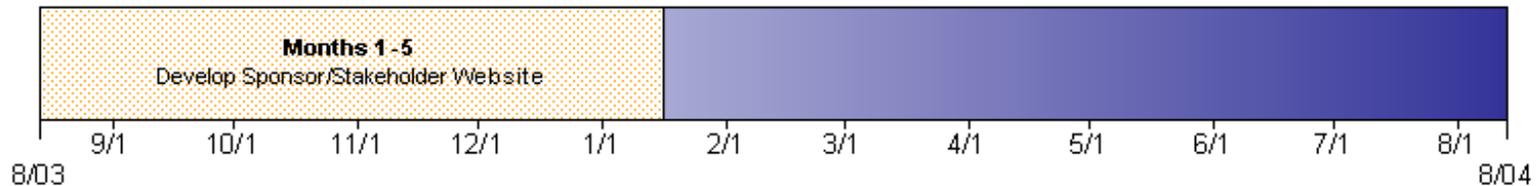
## Year Two At a Glance



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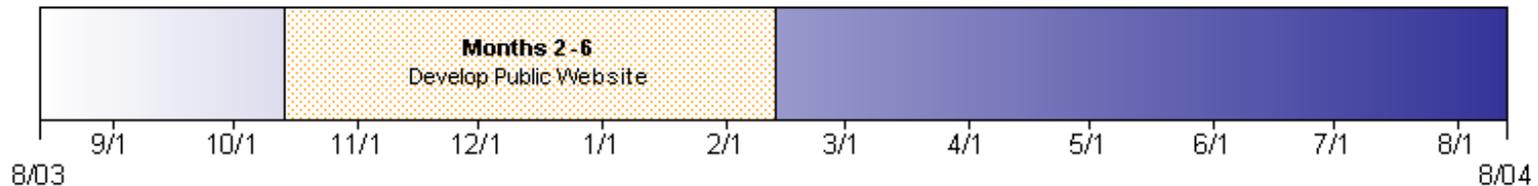


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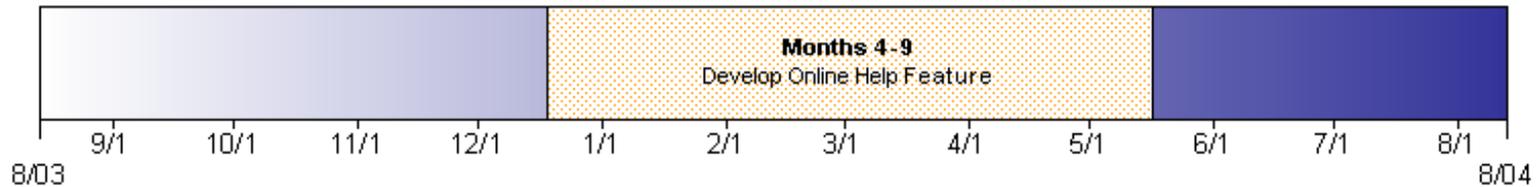
## Develop Sponsor/Stakeholder Website

- Dynamic charting capabilities
- Trend analysis
- Back trajectory analysis
- Online point source modeling capabilities
- Statistical analysis of pollutant profiles and distributions
- Meteorological evaluations



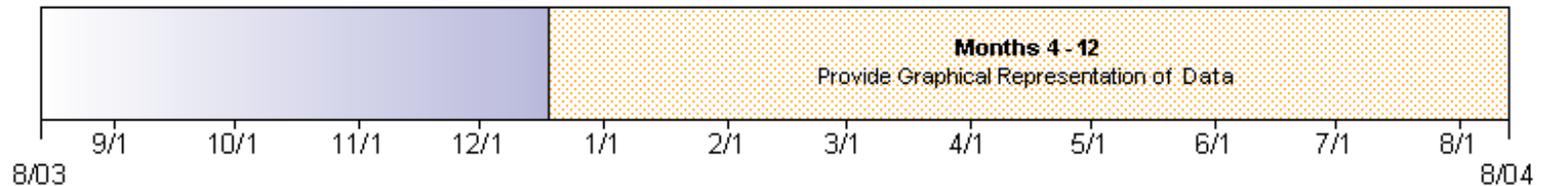
## Develop Public Website

- Backbone of the public outreach system
- Designed as an information/decision support center
- Provide clear and concise data summaries from the monitoring programs
- Easy-to-understand graphical representations of data sets
- Reviewed continuously by environmental and community representatives prior to official launch



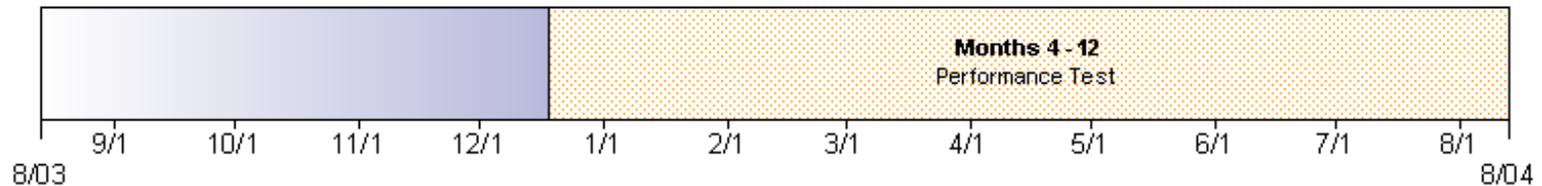
## Develop Online Help Feature

- Support both Sponsor/Stakeholder and Public Websites
- Interactive system to provide depth, understanding and context to environmental data sets
- Assist user at any level of scientific background in interpretation of data



## Provide Graphical Representation of Data

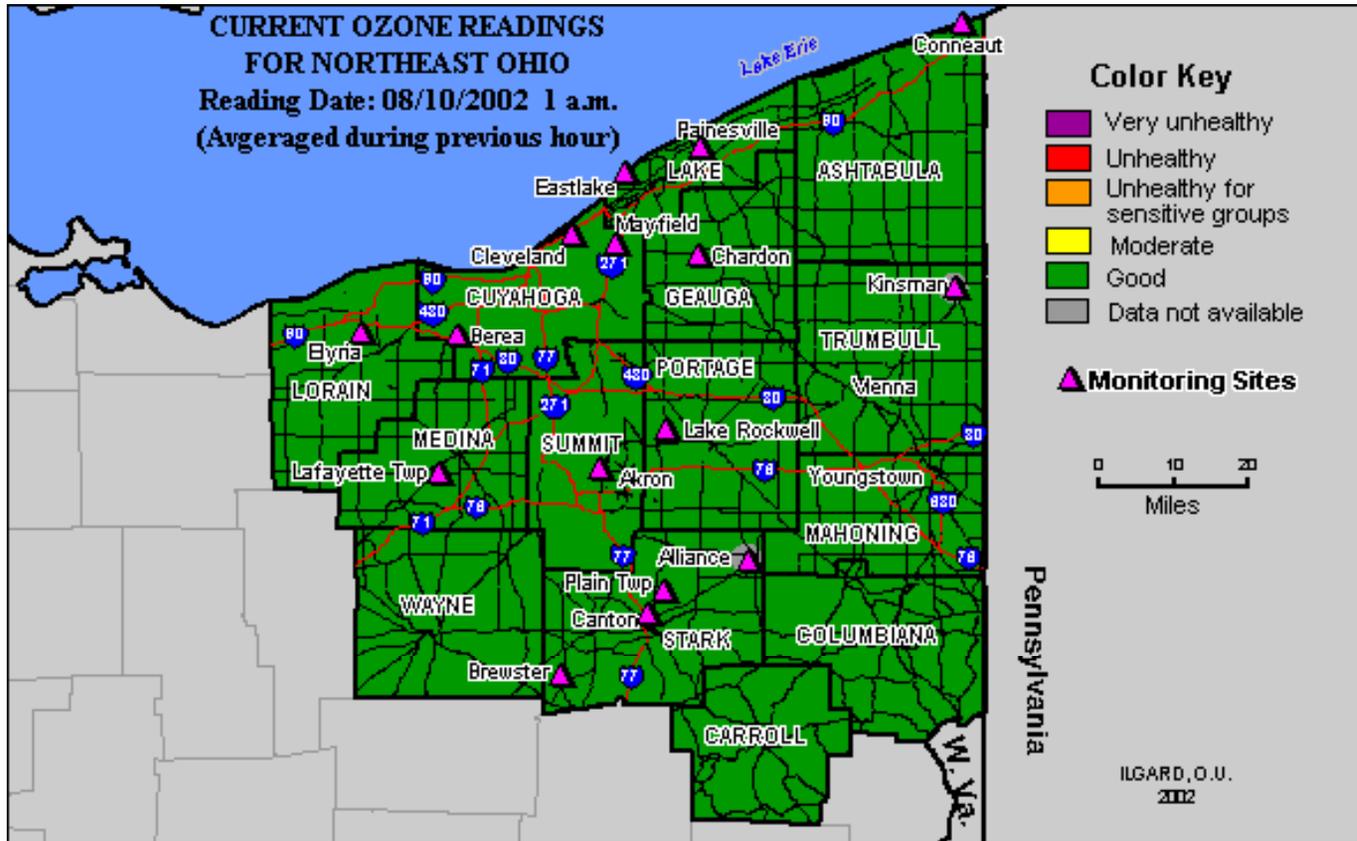
- Interactive mapping
- Linkages to Federal and regional efforts such as LADCO and EPA/OAQPS ozone-mapping projects
- Point and click display of pollutant concentrations as defined by the pollutant isopleths
- Historical trends in air pollution
- Population and potential health impacts of air quality



## Performance Test

- Beta testing period to find and replace faulty source code
- Thorough source code reviews by team members
- Thorough testing to ensure project objectives have been met
- May require revisiting and reworking original designs
- Ongoing exercise in Phase II of this project

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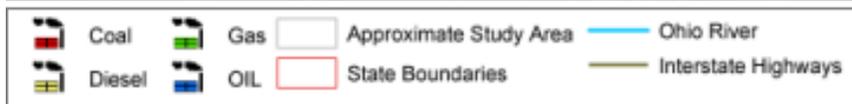
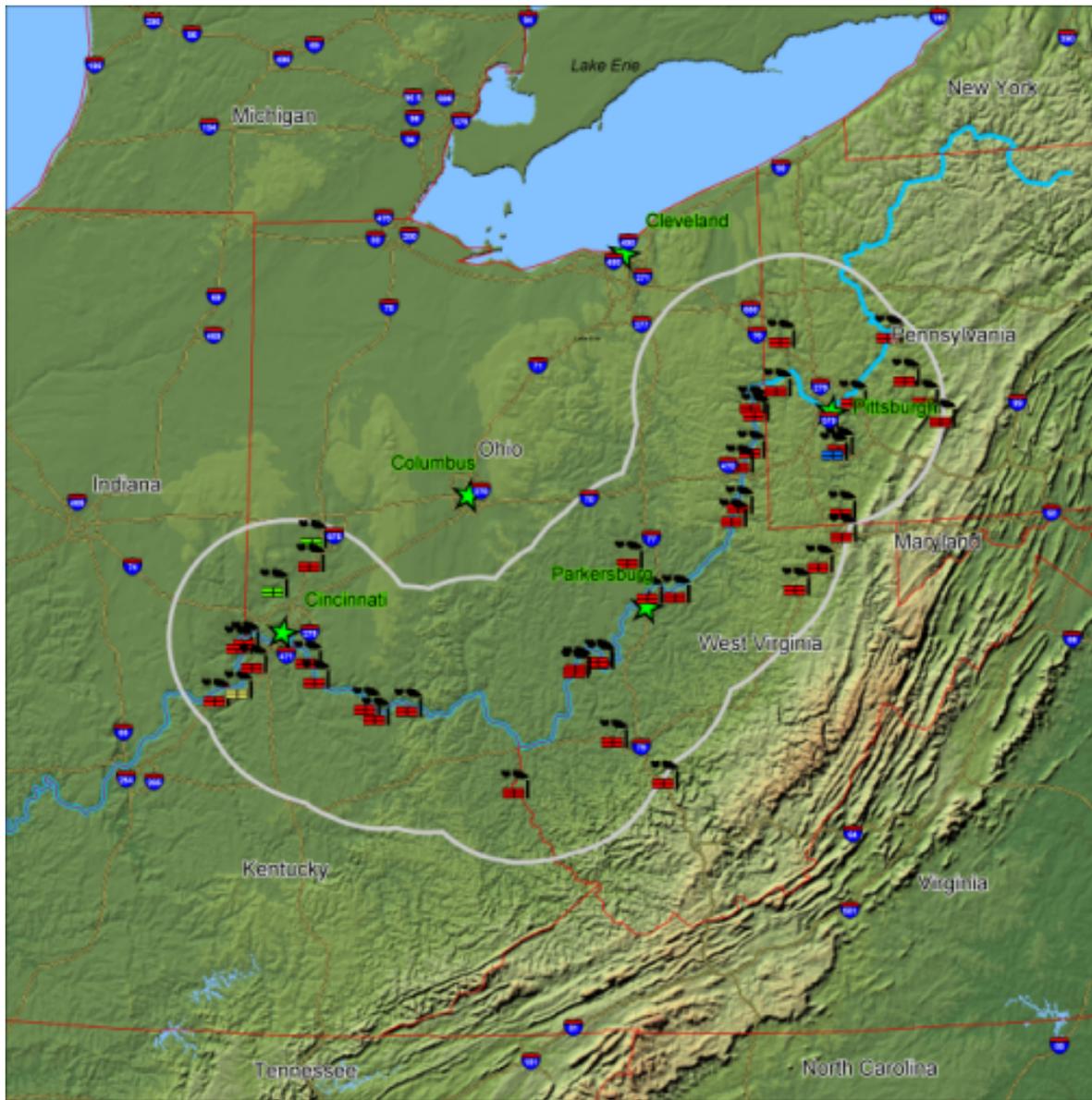


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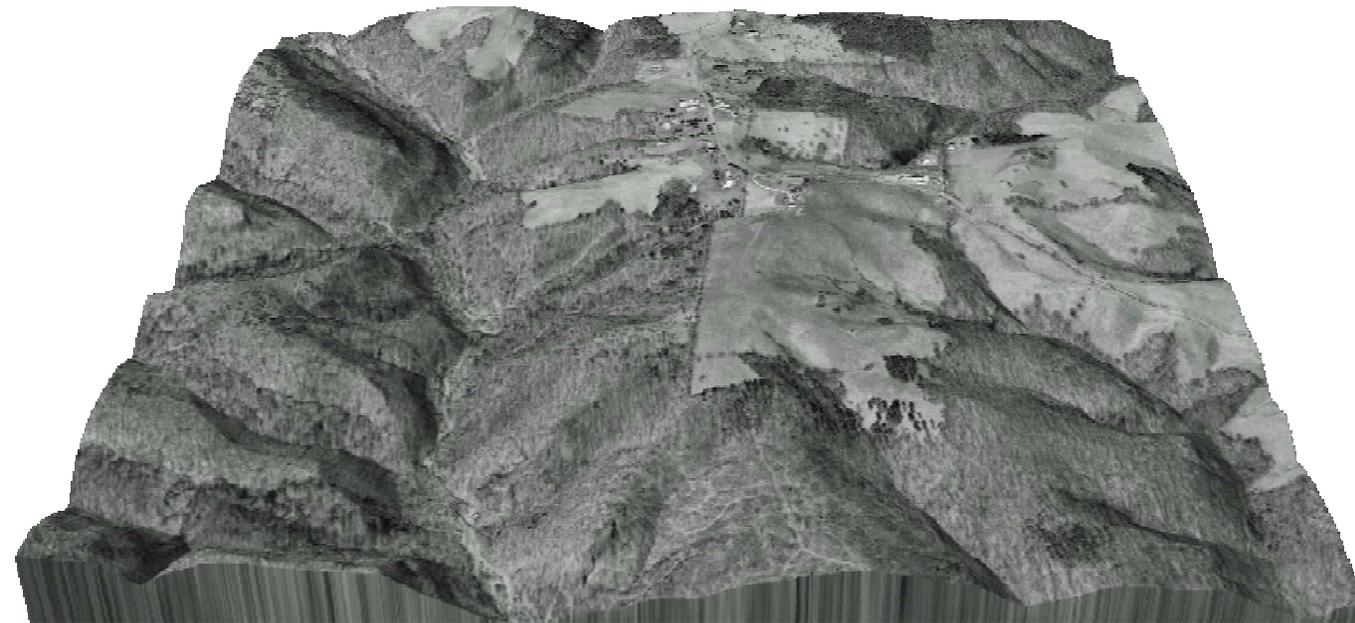
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## 3D Imaging and Mapping



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## ESRI ArcIMS Online GIS Application



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Data - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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• **UORVP Air Quality Data Analysis Project**

The map below highlights the Upper Ohio River Valley Project air quality monitoring sites. You can obtain data and analysis by clicking the yellow dot for each site.

Legend:

- Coal
- Gas
- Diesel
- OIL
- Approximate Study Area
- State Boundaries
- Ohio River
- Interstate Highways

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0 20 40 80 Miles

Internet



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**Pollution Chart for Holbrook - Microsoft Internet Explorer**

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**• Steubenville**

<b>Monitor Name</b>	Steubenville	<b>County</b>	Jefferson, OH
<b>Latitude</b>	40°36'17"	<b>Longitude</b>	80°6'147"

**Note**  
 This site is located at an elevation of 110m above the river.  
 The region from Steubenville OH, south to Moundsville WV contains several large point sources, including coal-fired power plants, steel mills and coke facilities.  
 Many of these point sources are in the Ohio River Valley close to Steubenville.



**• Sample Analysis Type**

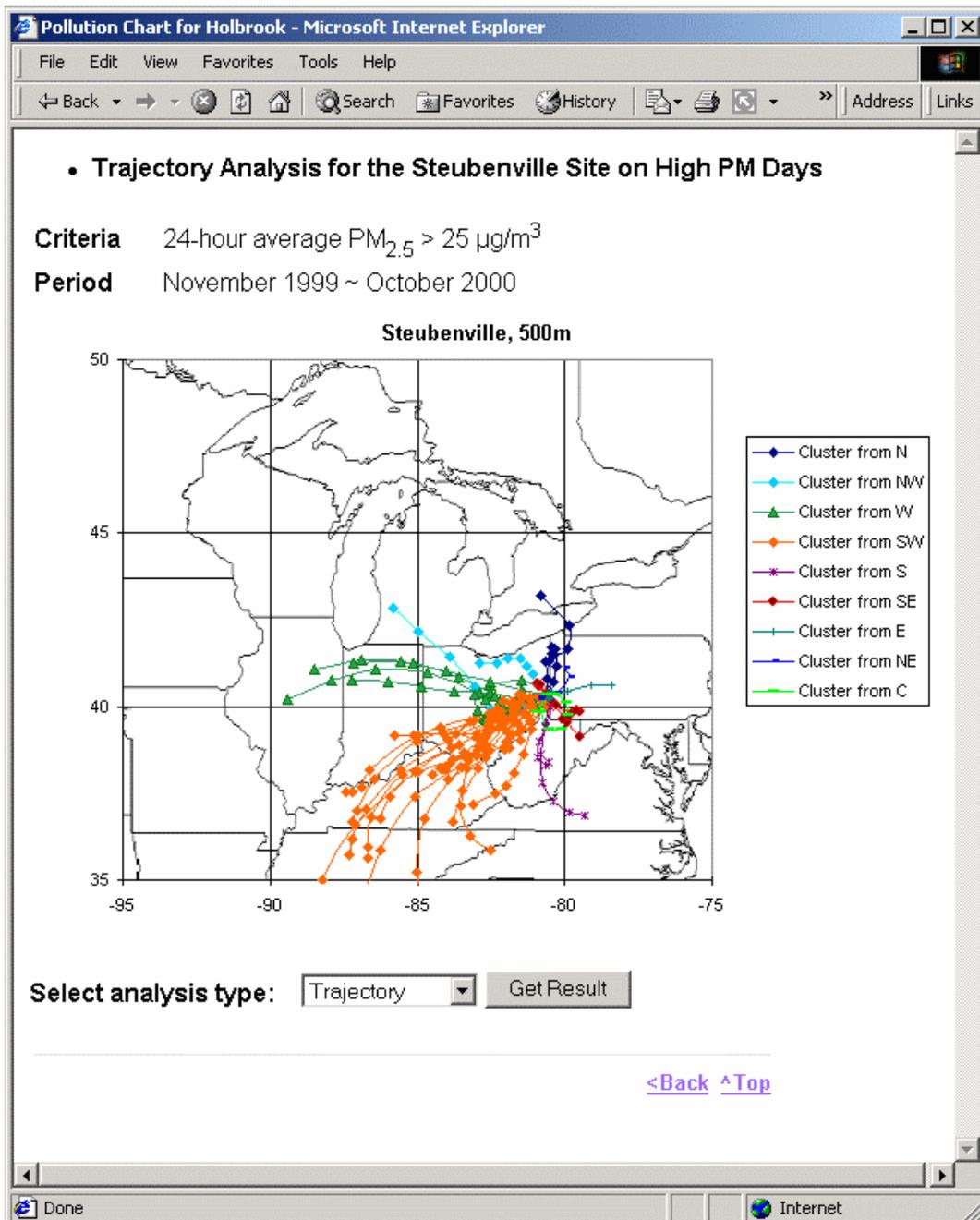
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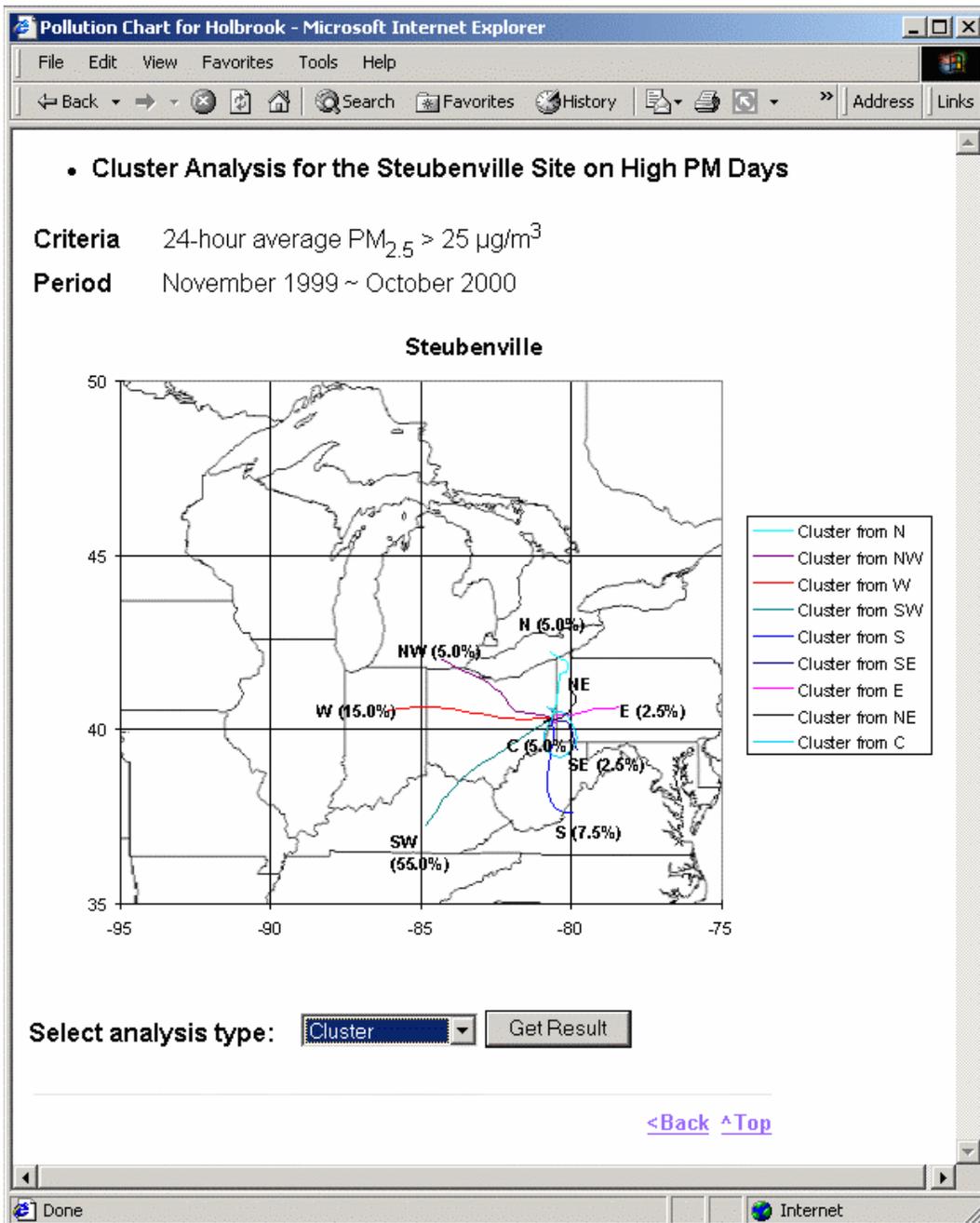
- Trajectory
- Cluster
- Pollution Rose

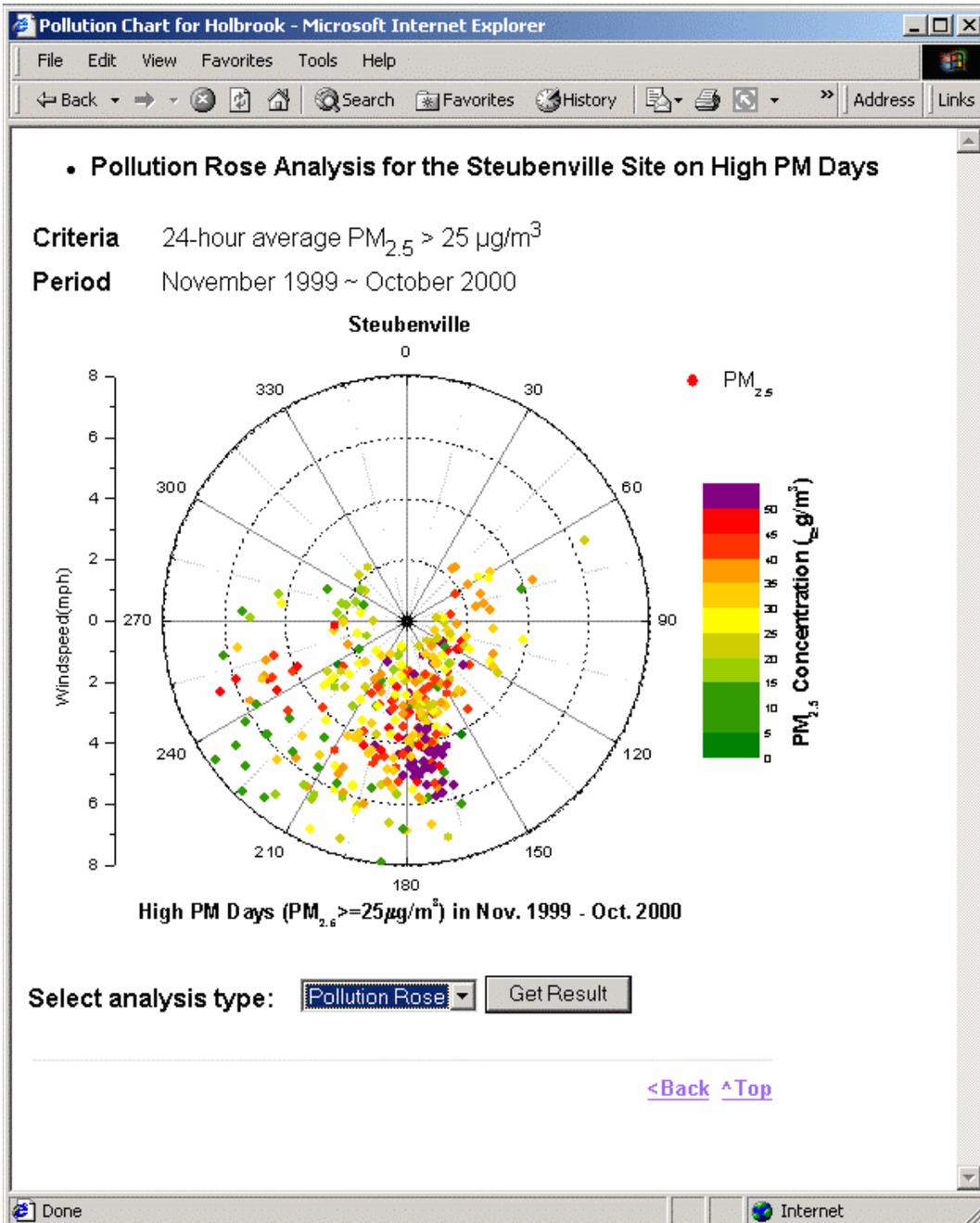
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# ACKNOWLEDGEMENTS

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