

# *How Environmental Public Health Tracking (EPHT) Can Benefit the EPA*

Enhancing Future Program Activities I:  
Needs, Barriers, and Successes of  
EPHT Partners

Environmental Public Health Tracking  
Workshop

October 13-15, 2004

# *Presentation Overview*

- An EPA Perspective on EPHT
  - Focus on air
- Brief Introduction to the Public Health Air Surveillance Evaluation (PHASE) Project



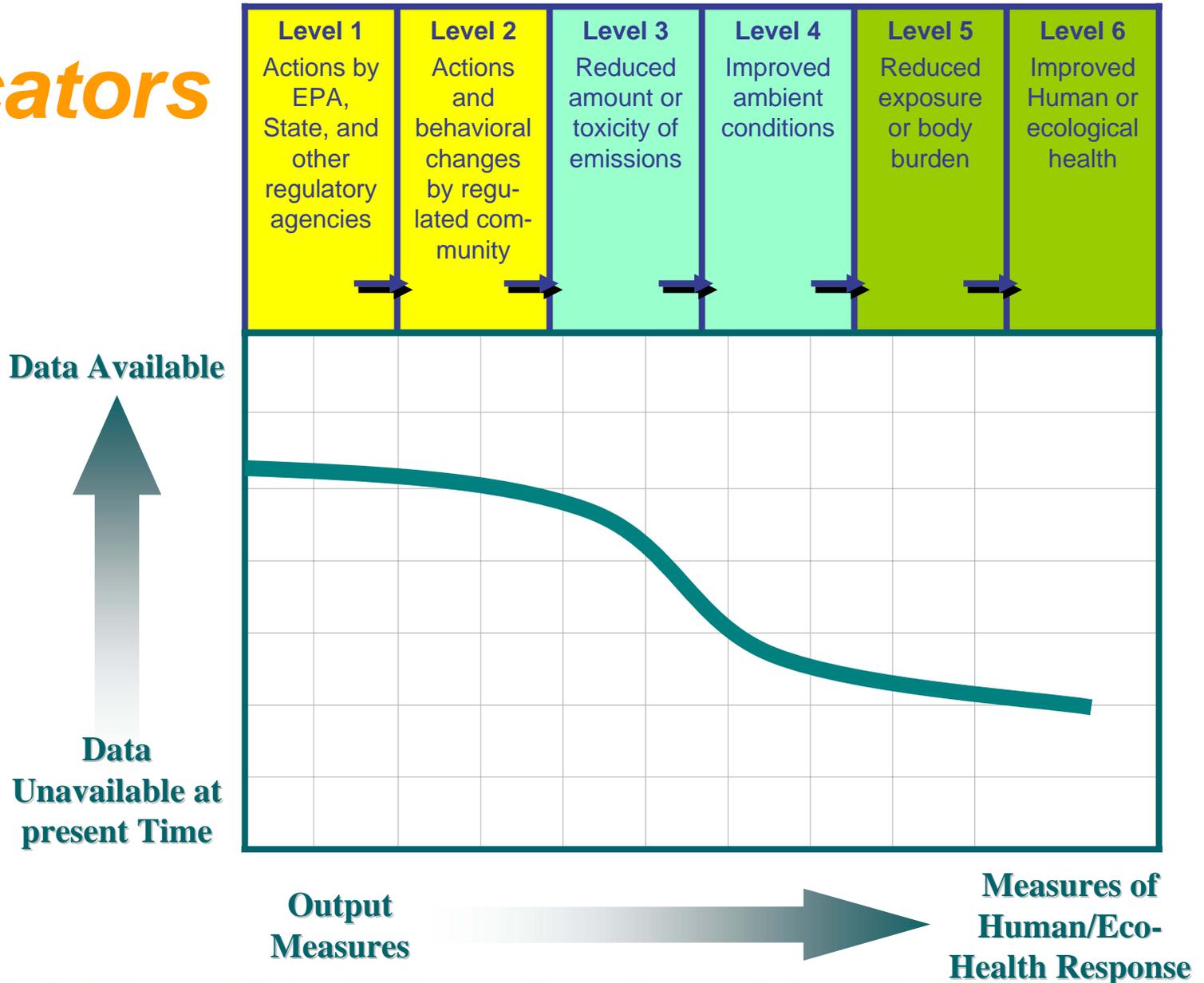


# *EPA's Mission*

- “To protect human health and to safeguard the natural environment — air, water, and land — upon which life depends.”
- How do we measure our effectiveness?



# Indicators

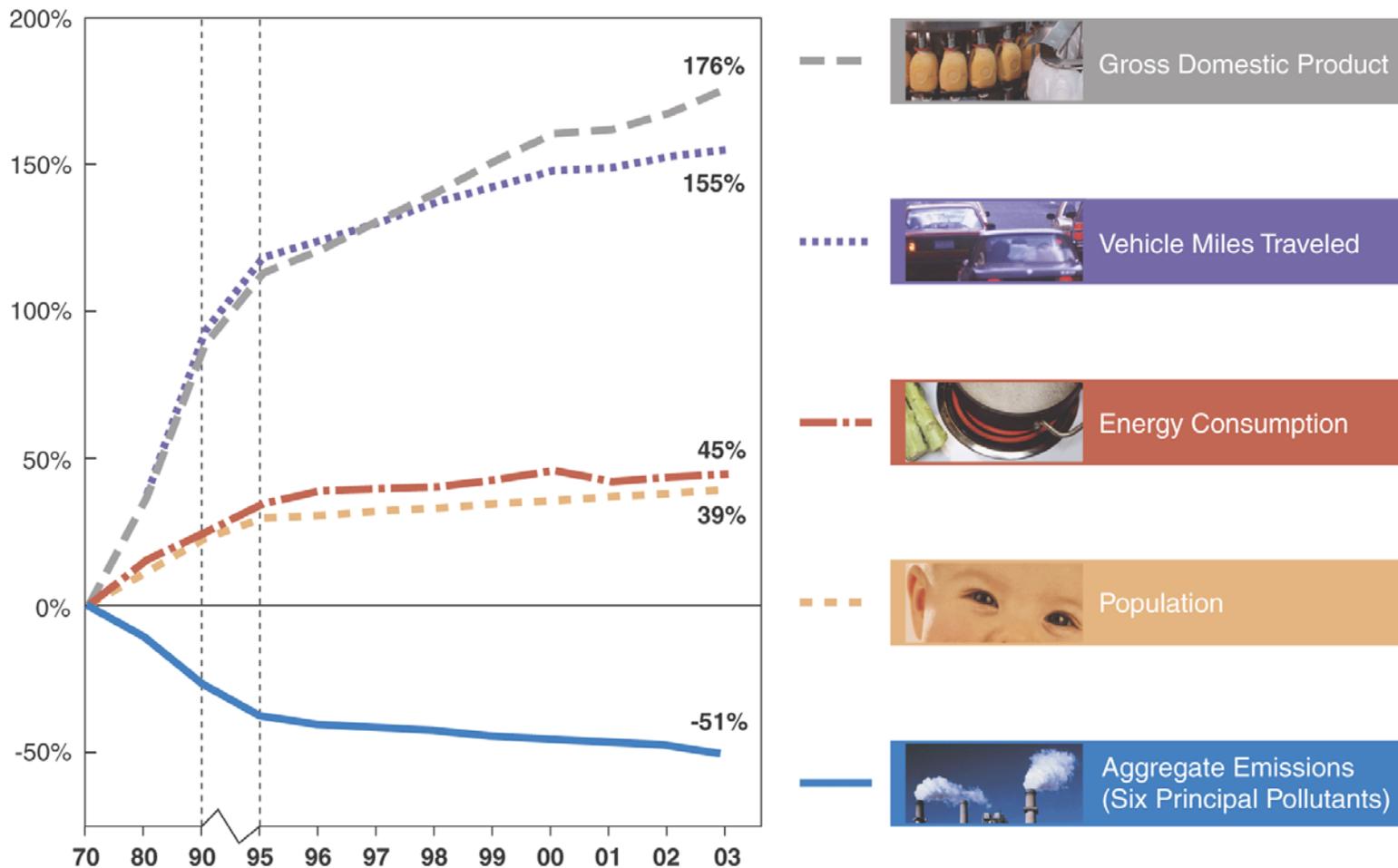


RESEARCH & DEVELOPMENT

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# EPA progress in reducing emissions (Level 3 Indicator)

## Comparison of Growth Areas and Emissions



Source: National Air Quality and Emissions Trends Report, 2003 Special Studies Edition

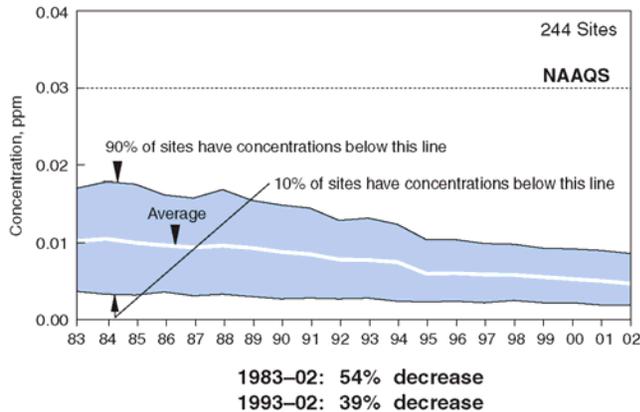


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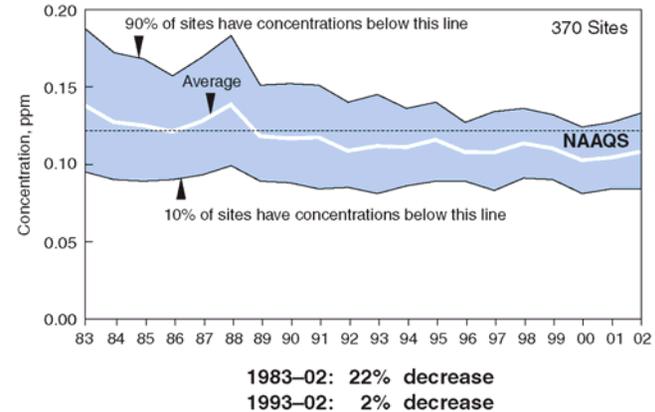
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# EPA progress in improving ambient air concentrations (Level 4 Indicator)

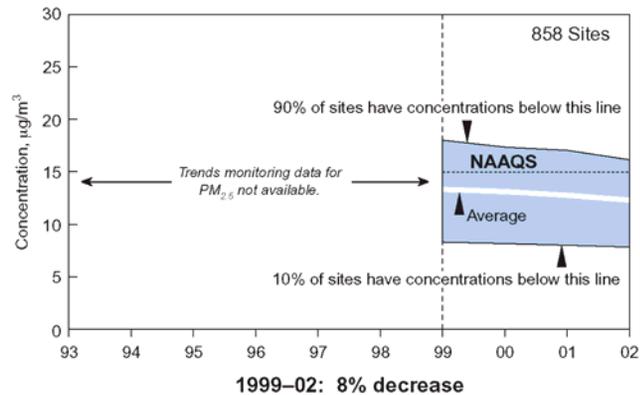
**SO<sub>2</sub> Air Quality, 1983–2002**  
Based on Annual Arithmetic Average



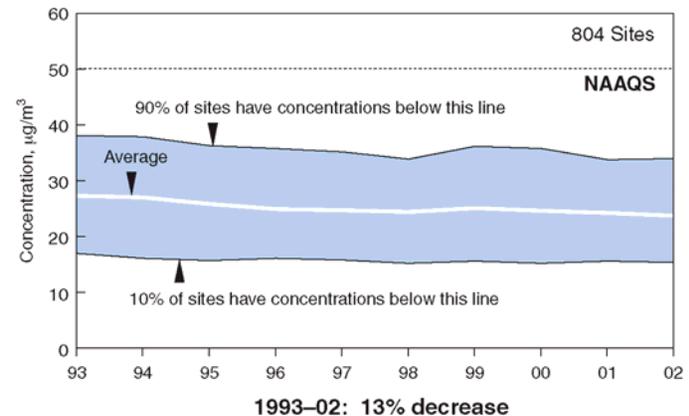
**Ozone Air Quality, 1983–2002**  
Based on Annual 2nd Maximum 1-Hour Average



**PM<sub>2.5</sub> Air Quality, 1993–2002**  
Based on Seasonally Weighted Annual Average



**PM<sub>10</sub> Air Quality, 1993–2002**  
Based on Seasonally Weighted Annual Average



Source: National Air Quality and Emissions Trends Report, 2003 Special Studies Edition



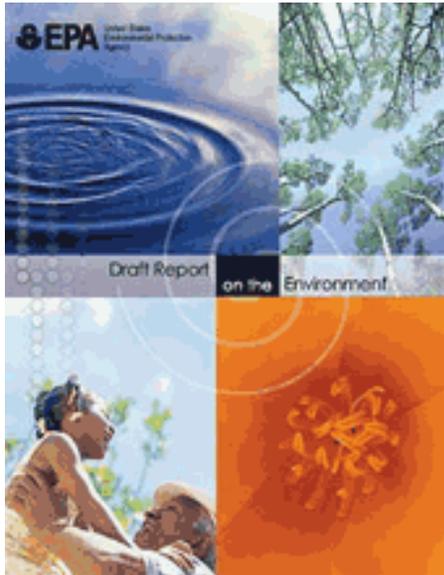
# Questions remain about the impact of EPA Activities on Public Health (Level 5 and 6 Indicators)

- Detroit News (May 7, 2000)
  - An evaluation of EPA's first 30 years
  - "Air and Water are cleaner, but health gains unclear"
- National Research Council
  - EPA needs accountability mechanisms
    - The Nation's "Air Quality Management system has not developed a program to track health (and ecosystem) exposures and effects and to document improvements in health (and ecosystem) outcomes achieved from improvements in air quality."
    - *Recommendation:* "Develop and implement a system to assess and monitor human health and welfare effects through the identification of indicators capable of characterizing and tracking the effects of air pollutants . . . "
- Health Effects Institute
  - RFA – "Measuring the Health Impact of Actions Taken to Improve Air Quality"



# *EPA's Draft Report on the Environment 2003*

- How can we measure the success of policies and programs to protect health and the environment?
- Describes what EPA knows - and doesn't know
  - Identifies measures/indicators to report on the status and trends and, where possible, their impacts on human health and the environment; and,
  - Discusses the challenges that the nation faces in improving these measures.



# *What does the 2003 Draft Report on the Environment say about environmental-public health relationships?*

- Need an integrated set of indicators to “understand relationships between stressors on the environment and their ultimate effects on ecological condition and human health.”
- Stresses the need for partnerships and collaboration with federal agencies (and others).
- For Air
  - “In general, there are some very good measures of outdoor air quality.”
  - However . . . “There is a need for measures to compare actual and predicted human health and ecological effects related to exposure to air pollutants.”



# *EPHT Presents a Great Opportunity*

- Support EPA efforts to evaluate the effectiveness of its programs and policies
  - Accountability mechanism / Level 6 indicator
- Can also assist EPA efforts to
  - Effectively target risk management/mitigation policies
  - Develop and evaluate models of environmental - public health relationships
- Similar benefits for other environmental agencies
  - Regional, state, and local organizations
- Driver to establish partnerships between health and environmental organizations
- The Public Health Air Surveillance Evaluation (PHASE) project is exploring these potential benefits for air pollution and air-related health concerns.



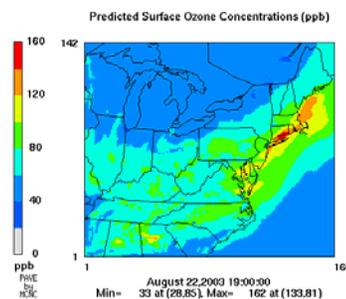
# *The Public Health Air Surveillance Evaluation (PHASE) Project*

- Collaborative effort involving EPA, CDC, and state partners
- Develop and evaluate alternative air quality characterization methods for environmental public health tracking
  - Air Pollutants
    - Ozone and Particulate Matter
  - Health Endpoints
    - Asthma and Cardiovascular Disease
- Working with 3 CDC State EPHT Partners
  - Maine
  - New York
  - Wisconsin



# PHASE Question

- Do different air quality characterization methods improve capabilities for environmental public health tracking?



# *Alternative Sources of Air Quality Characterization Data for PHASE*

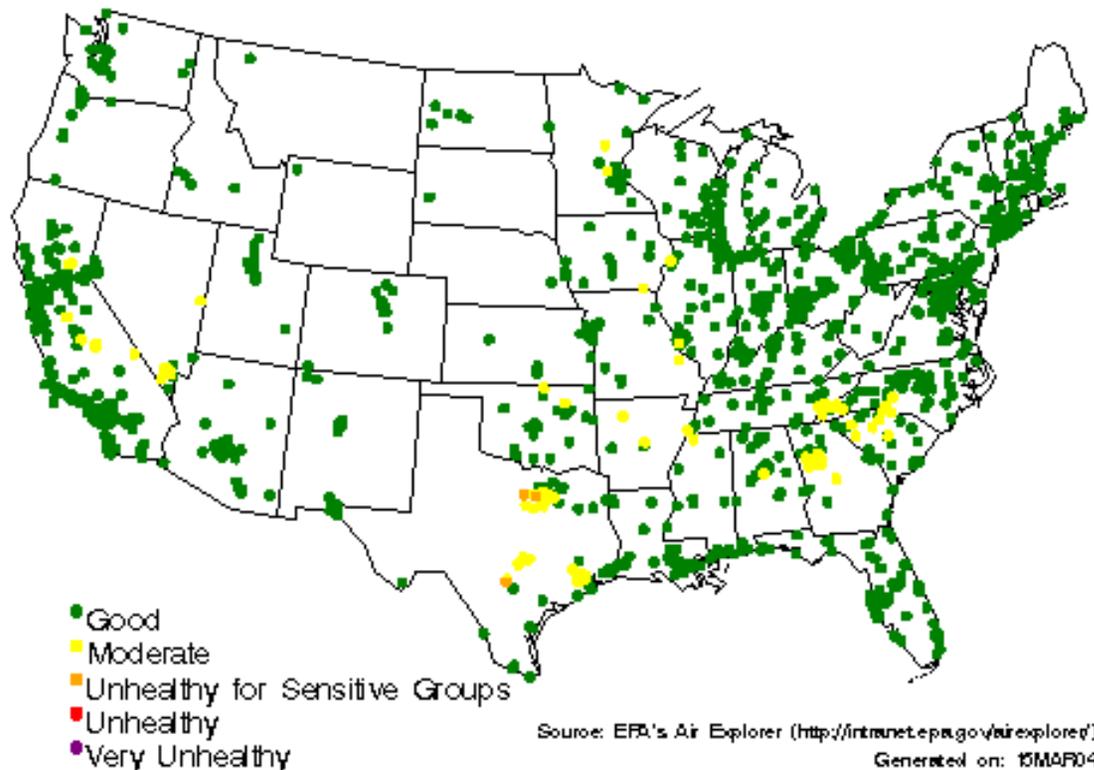
- Ambient Air Monitoring
- Satellite Data
- Air Quality Modeling
- Combined Data



# Ambient Air Monitoring

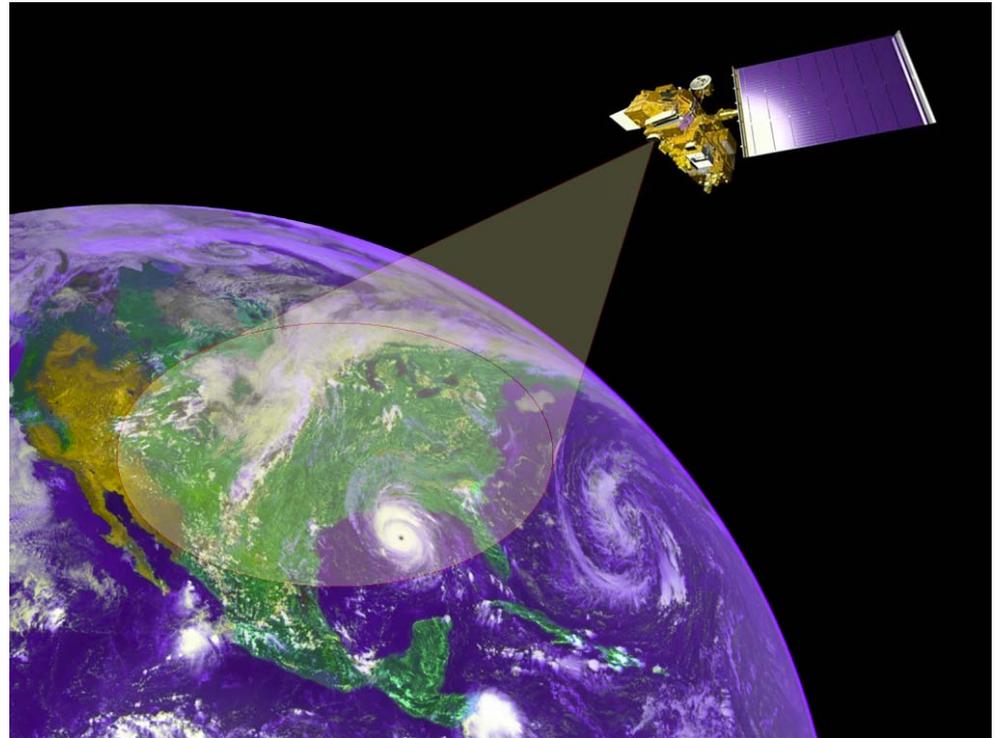
- True measure of air quality
- Spatial and Temporal Gaps
- Routinely available information

Ozone AQI Values by site on 06/20/2003



# Satellite Data

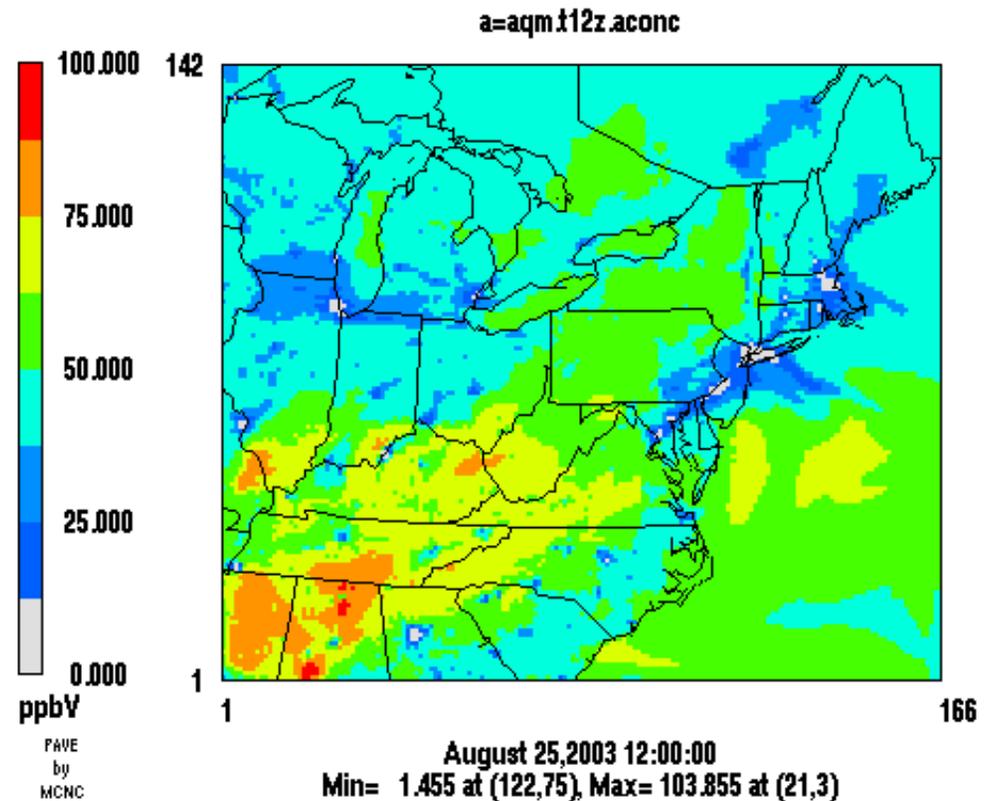
- Emerging source of data
- Spatial and Temporal Gaps
- Routinely available data



# Air Quality Modeling

- Estimate of air quality
- Good spatial and temporal coverage
- Air Quality Forecasting
  - Emerging source of routine data

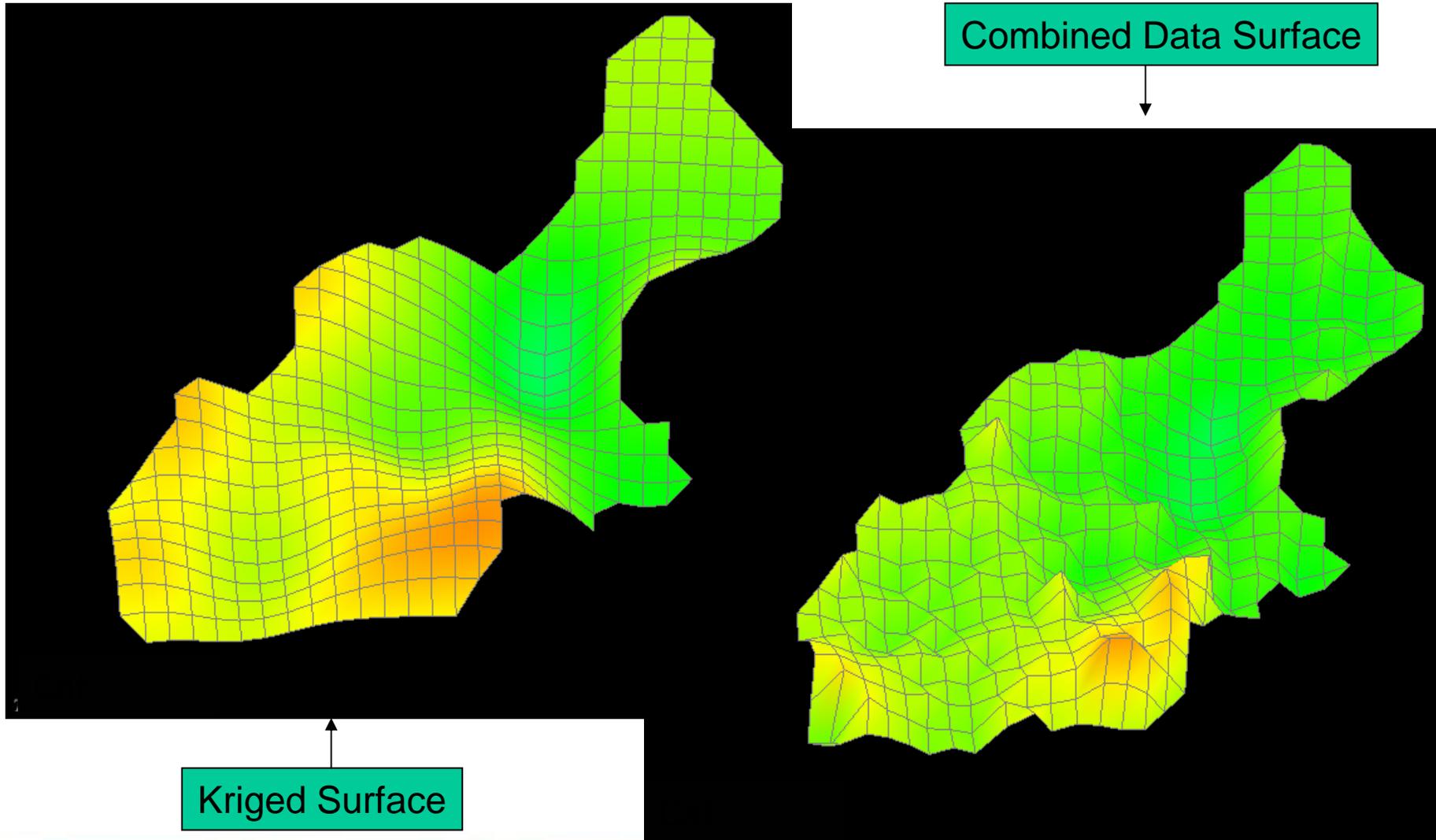
Layer 1 O3a



# Combining Air Quality Data

July 21, 2001 Ozone Levels:

*Kriging vs Combined Data (CMAQ and Observations)*



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# Ambient vs. Personal Exposure

- Methods estimate ambient concentrations, but . . .
- People experience health impacts from the air they breathe (i.e., their personal exposure)
- How do the outputs from the various air quality characterization methods relate to personal exposure?



Personal Monitor

# *PHASE Objective*

- Provide enhanced air quality information for use in Environmental Public Health Tracking
  - Supplement the ambient air monitoring network data with emerging data sources
    - Satellites
    - Air Quality Modeling (Forecasts)
    - Improved spatial and temporal coverage
  - Use statistical techniques to “combine” data from the various sources
    - Reduce uncertainty in monitoring gaps
  - Produce information that can be ROUTINELY used to track potential relationships between public health and air quality



# PHASE Process

- EPA will provide CDC State partners with alternative measures to characterize air quality (End of 2004)
- State partners “link” the alternative measures to available health surveillance data (Early 2005)
- Joint evaluation and comparison of the various air quality characterization methods (End of 2005)
  - Example evaluation criteria
    - Data generation costs
    - Ease of data access and use
    - Temporal/geographic coverage
    - Exposure misclassification
    - Data compatibility



# *Other Positive PHASE Outcomes*

- Environmental and Public Health staff interactions
  - Face-to-Face meetings
  - Learning and becoming familiar with each other's issues and jargon
  - Strengths and limitations of respective data sets
- Opportunity to develop new air quality characterization techniques



# Summary



- EPA is seeking better ways to measure the success of its programs.
  - Demonstrate impact on public health
- Environmental Public Health Tracking is possible mechanism for measuring EPA's progress toward its public health objectives.
- The PHASE Project will be evaluating EPHT's potential application to air issues.



## *Disclaimer*

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