--use of AQS data in EPA's regulatory program

AQS Data ….
The Building Blocks for Air Quality Decisions

Tom Helms

2006 AQS Conference
San Antonio, TX
June 5 - 9, 2006

The 16th annual AQS Conference
Holiday Inn San Antonio Riverwalk Hotel
217 N. St. Mary's Street

6/4/2006 …show

U.S. Environmental Protection Agency

Air Quality System (AQS)

2006 AQS Conference
San Antonio, TX

Wednesday, Day 1
June 7, 2006

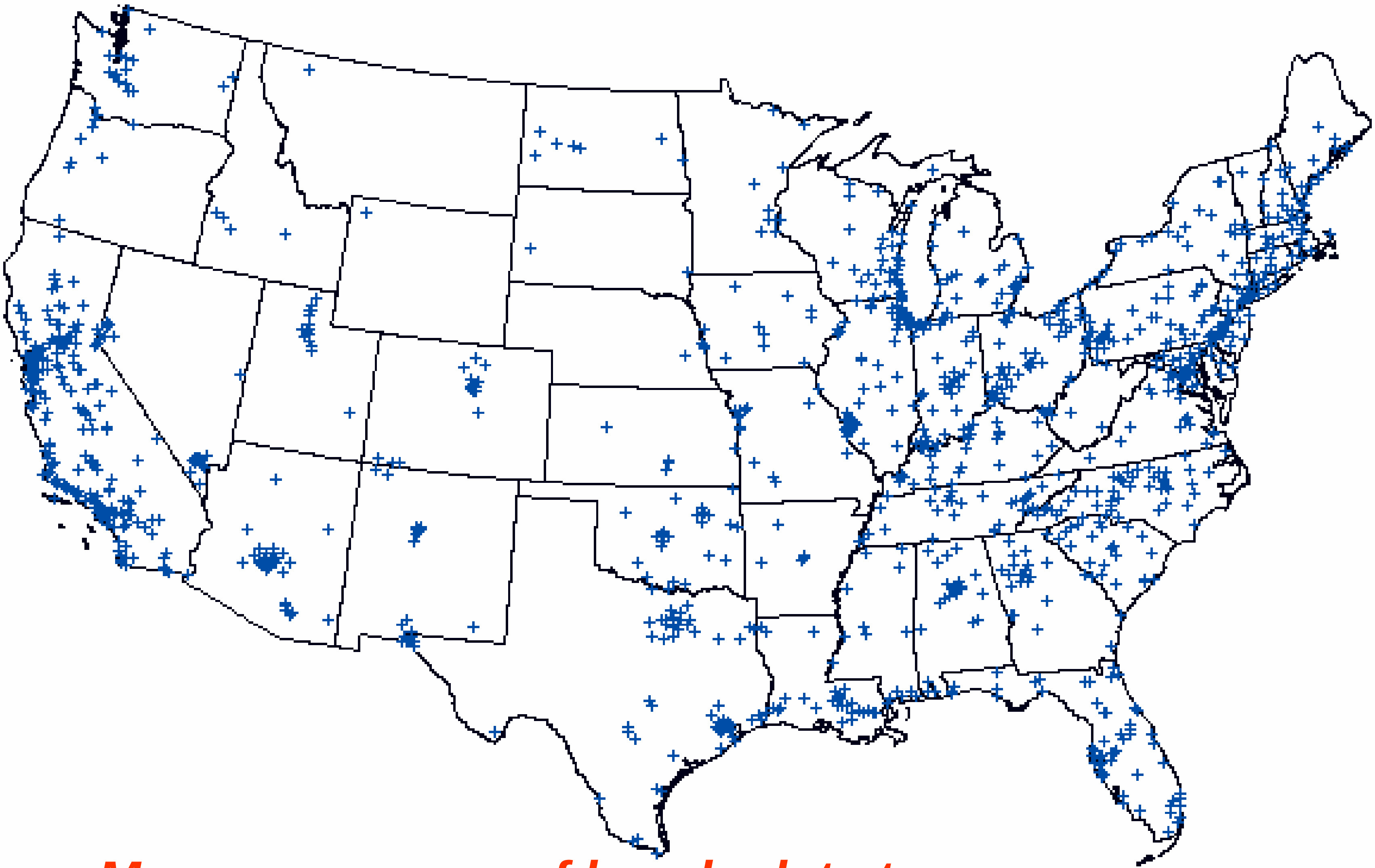
Time	Session Topic	
1:00 to 3:00	AMBIENT MONITORING AND ANALYSIS TOPICS	
	--use of AQS data in EPA's regulatory program	Tom Helms
	--AQS data certification process	David Lutz
	--new continuous PM submittal procedures	Lew Weinstock
	--proposed monitoring strategy	Lew Weinstock
	--precision gas method codes for NCOR	Lew Weinstock

--use of AQS data in EPA's regulatory program

Success for today ……

- Discuss the importance of valid, quality-assured air quality data …. key to the local and national air quality planning and evaluation processes.
- Focus on 5 activities that rely on air quality data for success.
- Show examples where data from the AQS system was (is) critical to national policy development and associated control efforts.

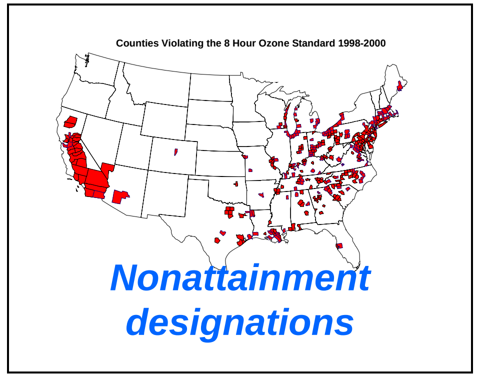
Lot of Ozone Air Monitors …

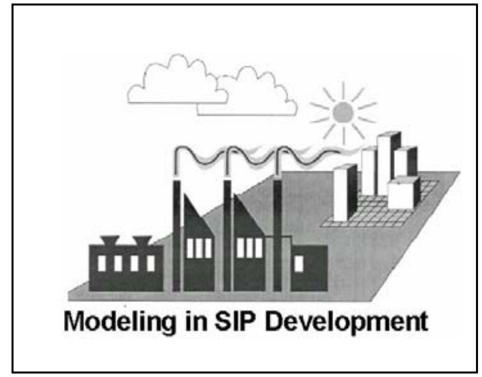


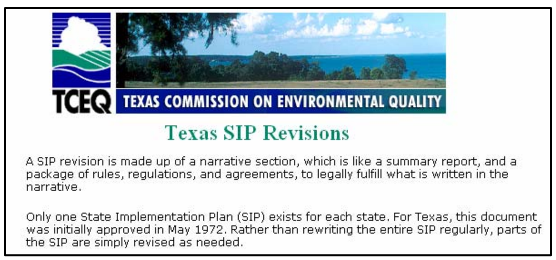
Means … reams of hourly data to process, validate, store, and retrieve ….

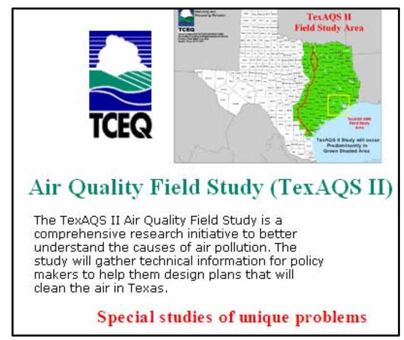
Overview ...

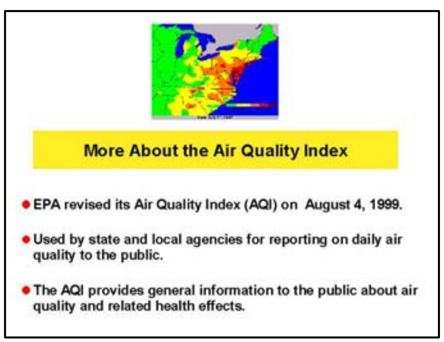
Let's take at how the data you collect, process, and review is used ….

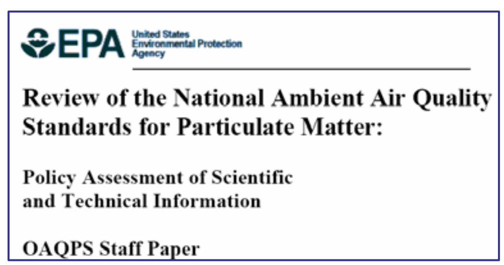


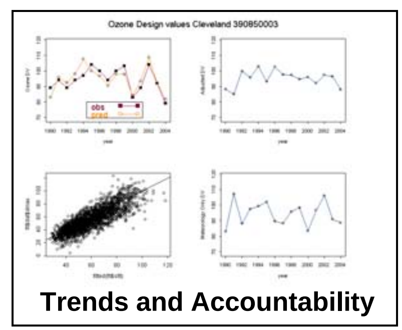








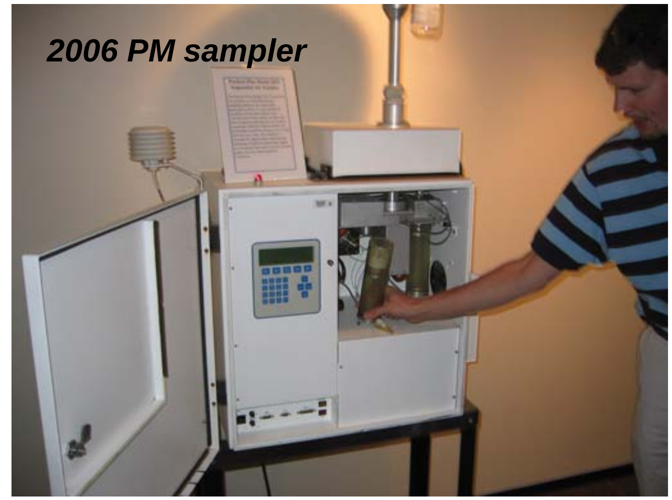




Air monitoring technology and data have come a long way ....

1967 type PM

1967 PM Hi-Vol



2006 PM sampler

2006 PM Sampler

2006 PM Site

Let's take a look at 5 efforts that must have accurate and timely air quality to succeed …

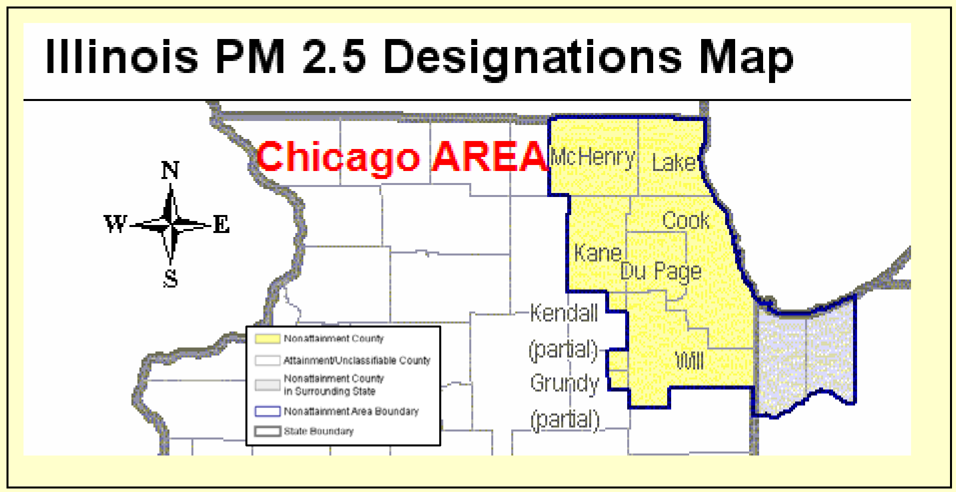
Actions that depend upon valid air quality data…

1. **Nonattainment Area designations/redesignations**
2. **Air quality modeling and strategy development for SIPs**
3. **Public air quality alerts and information reports …. like AIRNOW**
4. **Support National Ambient Air Quality Standard setting process**
5. **Progress and Accountability … data reviews, trends, program evaluations**

1st …

Actions that depend upon sound air quality data…

- **Nonattainment Area designations … and redesignations**



Areas that cause or contribute to violations of the NAAQS.

Designating "nonattainment areas … then re-designating them (plus "maintenance" plans)

8-hr ozone designations and classifications ...

Air Quality data was the 1st criteria used in the PM and Ozone nonattainment designations..

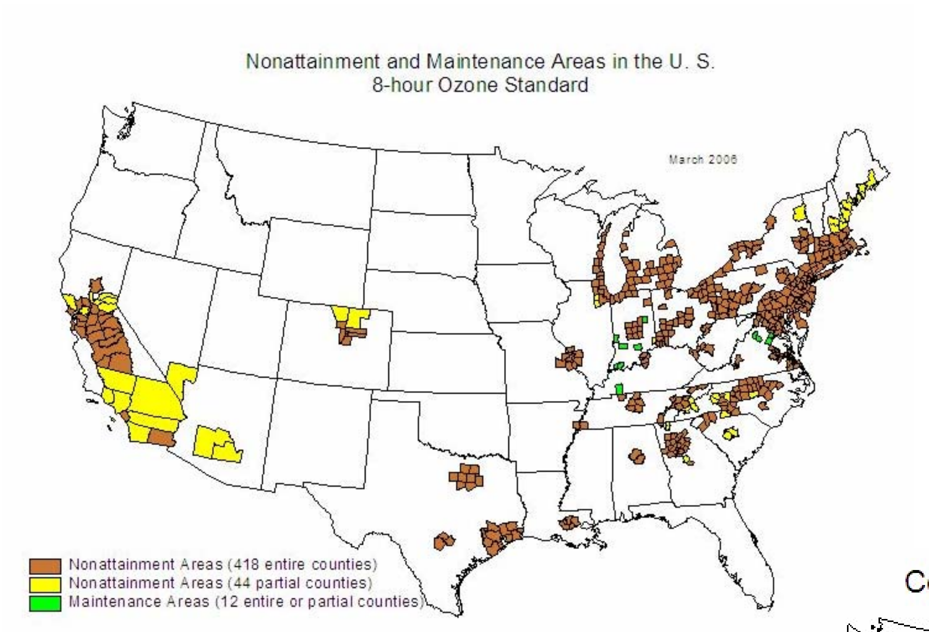
Chapter 2

8-Hour Ozone Designations and Classifications

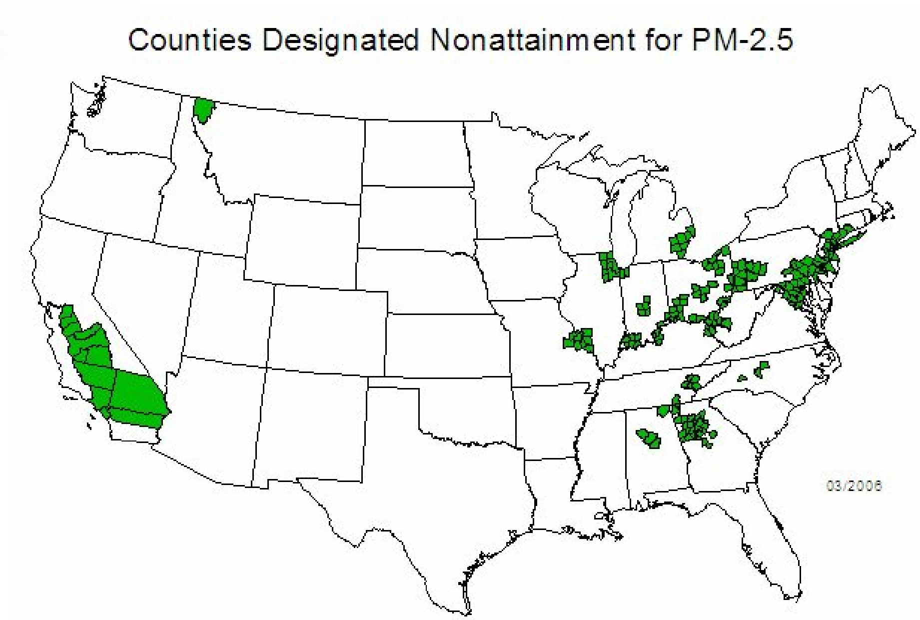
Key:
County - County name
Desig - Designation: W for whole county nonattainment, P for partial county nonattainment, U for unclassifiable
DV2003 - Design value for the county based on 2001-2003 data
EAC - Y if the county is participating in an Early Action Compact
Category - Subpart 1 or Subpart 2
Classification - Classification for the nonattainment area

County	Desig	DV2003	EAC	Category	Classification
California					
Amador and Calaveras Cos., CA: (Central Mountain Cos.)					
Amador	W	85		Subpart 1	
Calaveras	W	91		Subpart 1	
Chico, CA					
Butte	W	89		Subpart 1	
Imperial Co., CA					
Imperial	W	87		Subpart 2	Marginal
Kern County (Eastern Kern), CA					
Kern	P	115		Subpart 1	
Los Angeles-San Bernardino Cos.(W Mojave Desert), CA					
Los Angeles	P	126		Subpart 2	Moderate
San Bernardino	P	131		Subpart 2	Moderate
Los Angeles-South Coast Air Basin, CA					
Los Angeles	P	126		Subpart 2	Severe 17
Orange	W	86		Subpart 2	Severe 17
Riverside	P	118		Subpart 2	Severe 17
San Bernardino	P	131		Subpart 2	Severe 17

Designations based on ozone and PM $_{2.5}$ air quality data …



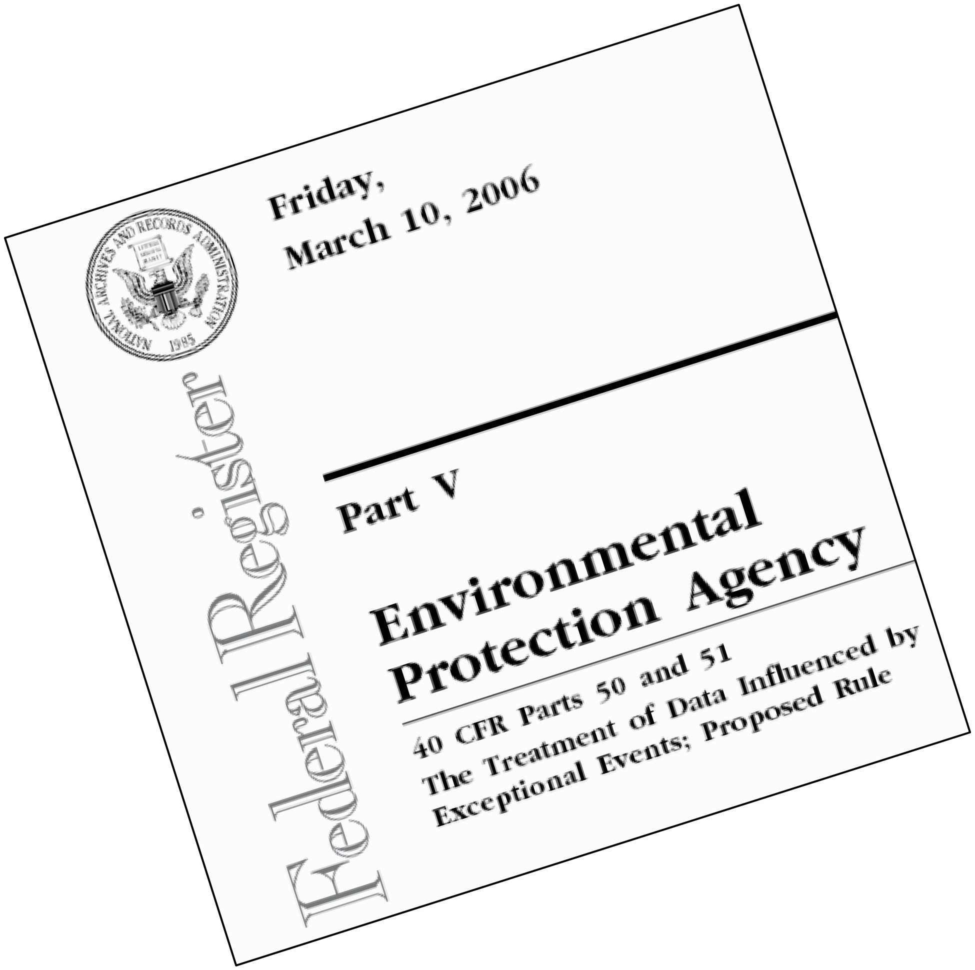
8-hr ozone …. 85 ppb or greater



PM $_{2.5}$ …. 15 ug/m^3 or greater

They can play a role … especially for PM…

Exceptional events and the EPA rulemaking …


Friday,
March 10, 2006

Federal Register

Part V

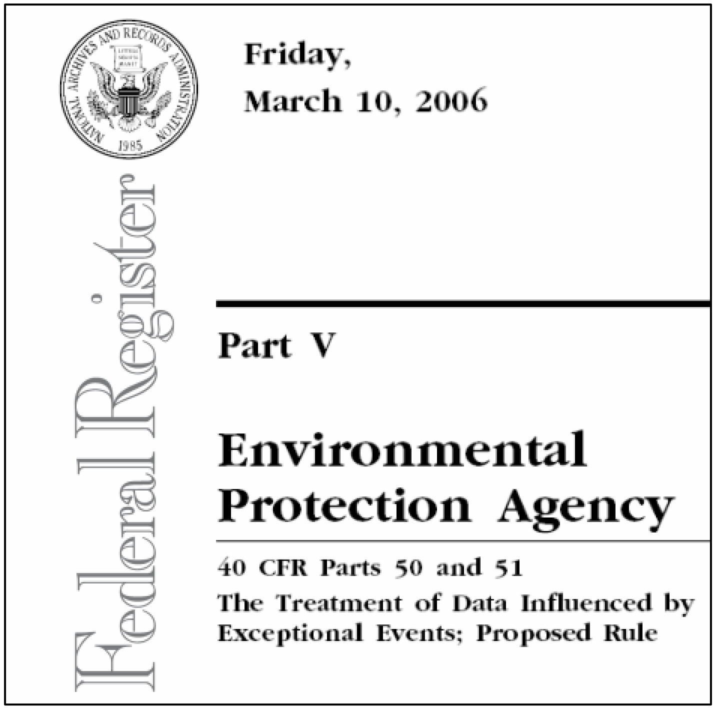
Environmental Protection Agency

40 CFR Parts 50 and 51
The Treatment of Data Influenced by Exceptional Events; Proposed Rule

Examples ….

- volcanic and seismic actives
- natural disasters
- high wind events
- unwanted fires
- strat ozone intrusions

Exceptional Events Rulemaking



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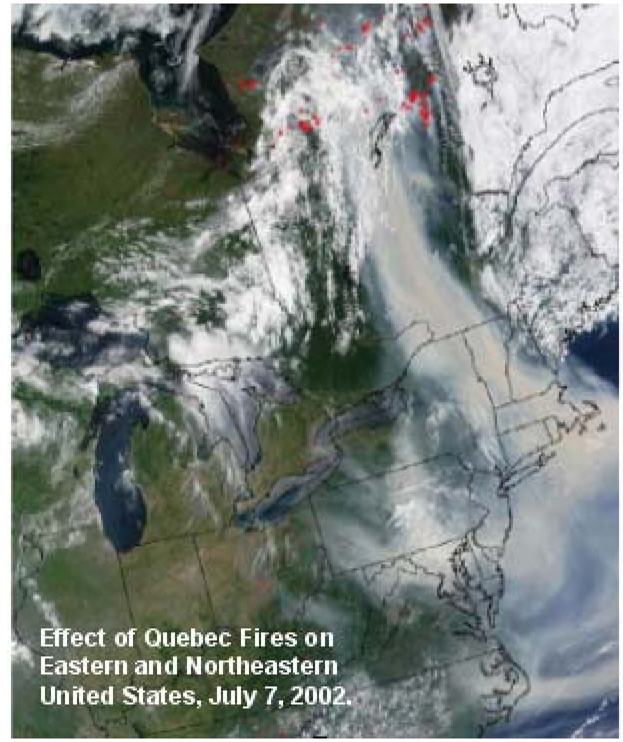
40 CFR Parts 50 and 51

The Treatment of Data Influenced by Exceptional Events; Proposed Rule

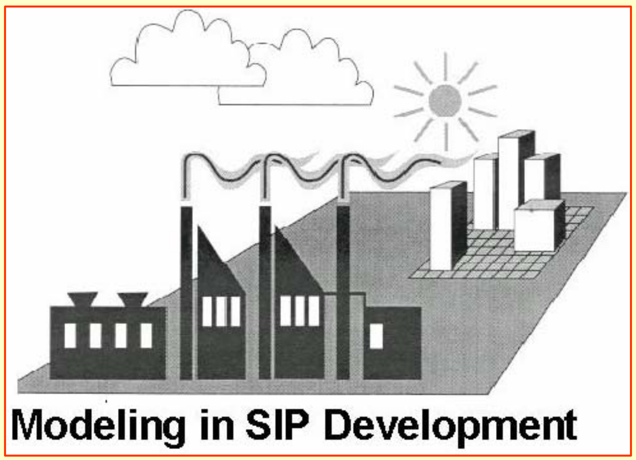


EPA is proposing to Implement section 319(b)(3)(B) and section 107(d)(3) authority to exclude air quality monitoring data from regulatory determinations related to exceedances or violations of the National Ambient Air Quality Standards (NAAQS) and avoid designating an area as nonattainment, redesignating an area as nonattainment, or reclassifying an existing nonattainment area to a higher classification if a State adequately demonstrates that an exceptional event has caused an exceedance or violation of a NAAQS.

2nd …

Actions that depend upon valid air quality data…

Air quality modeling and SIP strategy development



Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS

EPA-454/R-05-002
October 2005

SIP with attainment demos for 8-hr ozone and PM 2.5 due later in the 2000s …

Input for air quality modeling and strategy development for SIPs

Air Quality data is key to the use of relative reduction factors in modeling…

Modeled Attainment Tests

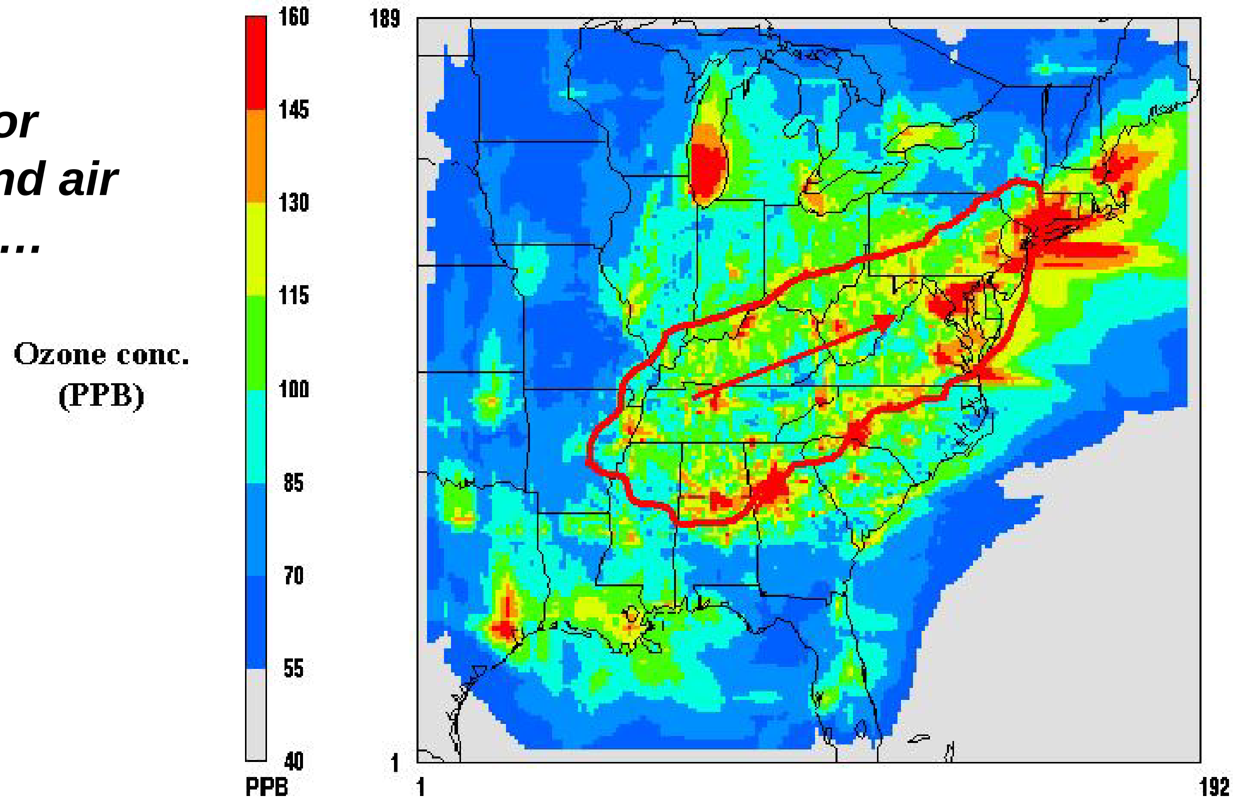
- All O3/PM2.5/RH modeled attainment tests use model estimates in a "relative" sense
  - Premise: models are better at predicting relative changes in concentrations than absolute concentrations
- Relative Reduction Factors (RRF) are calculated by taking the ratio of the model's future to current predictions of PM2.5
- RRFs are calculated for ozone and for each component of PM2.5 and regional haze

Applying the Modeled Tests

- Future concentrations are estimated using (component specific) RRF's and ambient measurements
  - RRF X ambient concentration = Future concentration
- Ambient data
  - Ozone- ozone data from AIRS
  - PM2.5- FRM and PM2.5 speciation measurements

Input for air quality modeling and strategy development for SIPs

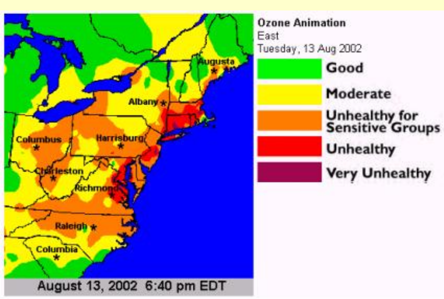
Modeling … adjusted for "reality" using RRFs and air quality measurements …

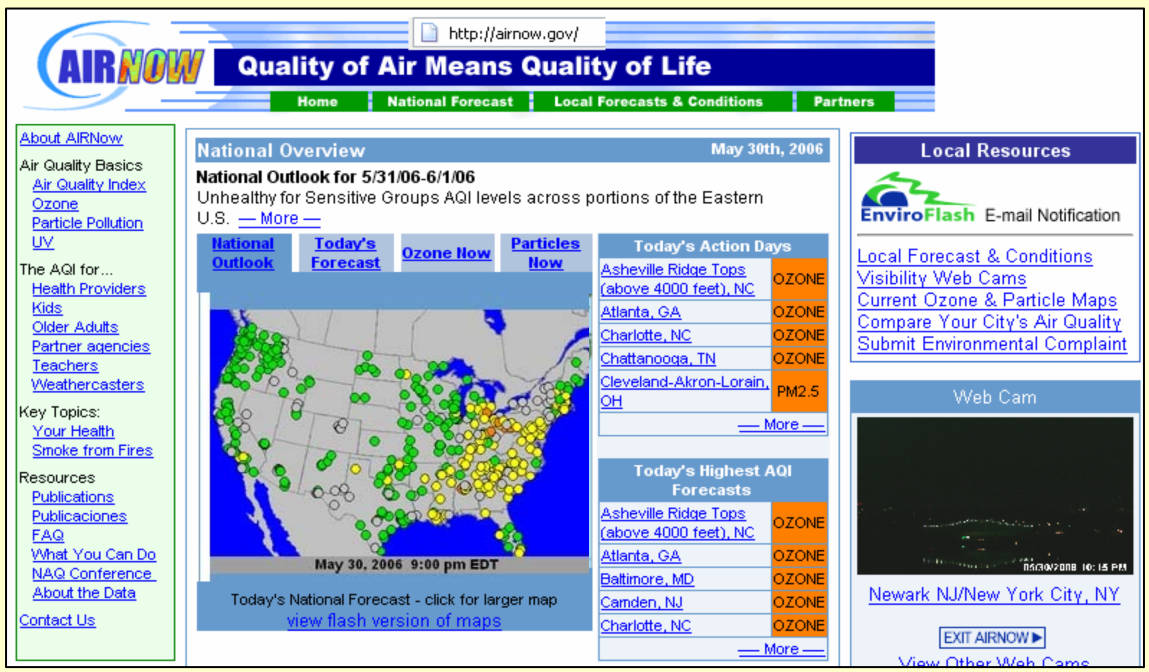


3rd ...

Actions that depend upon valid air quality data…

Public air quality alerts and information reports





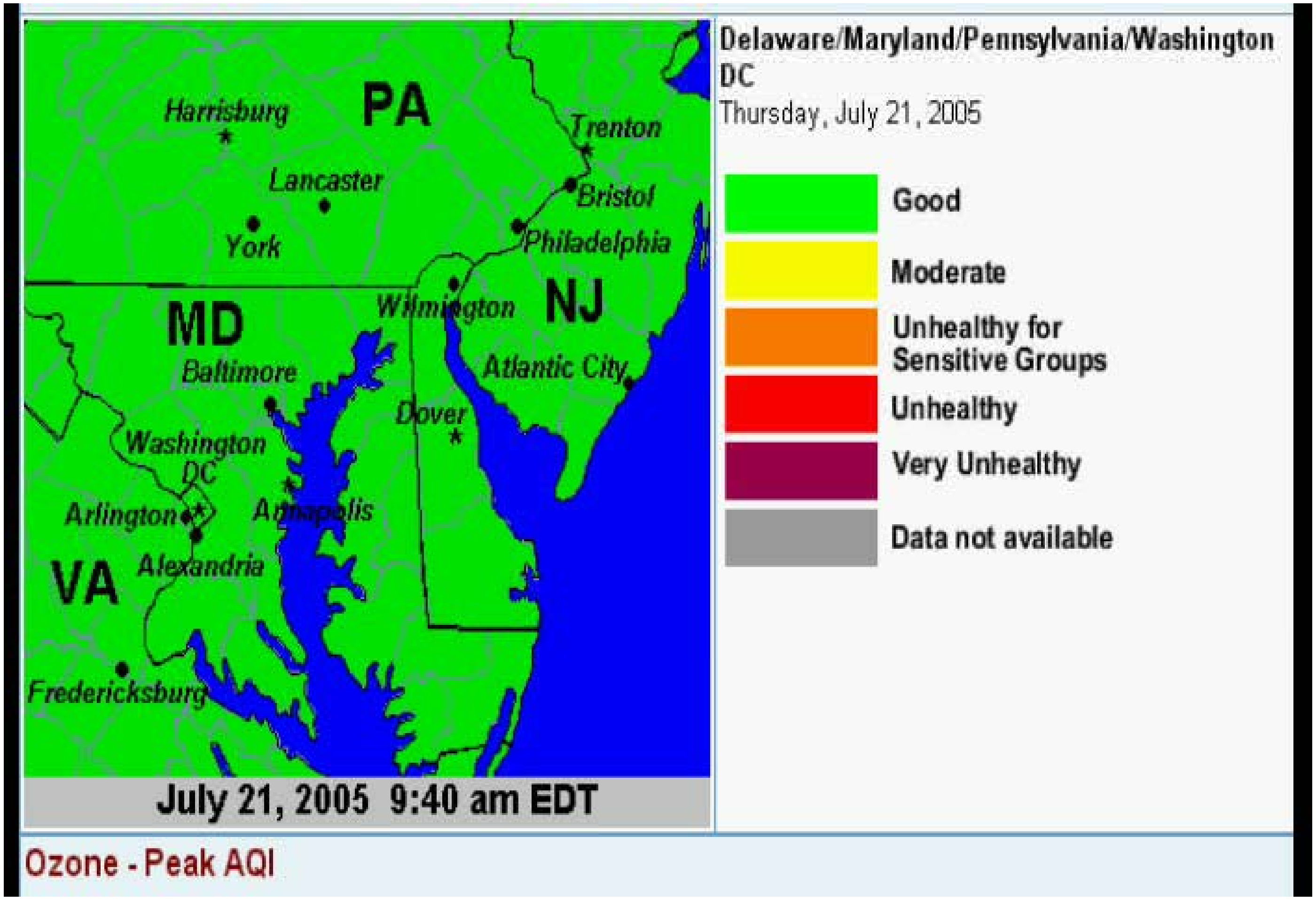
Public air quality alerts and reports…

I-20 EB Near Fulton Industrial

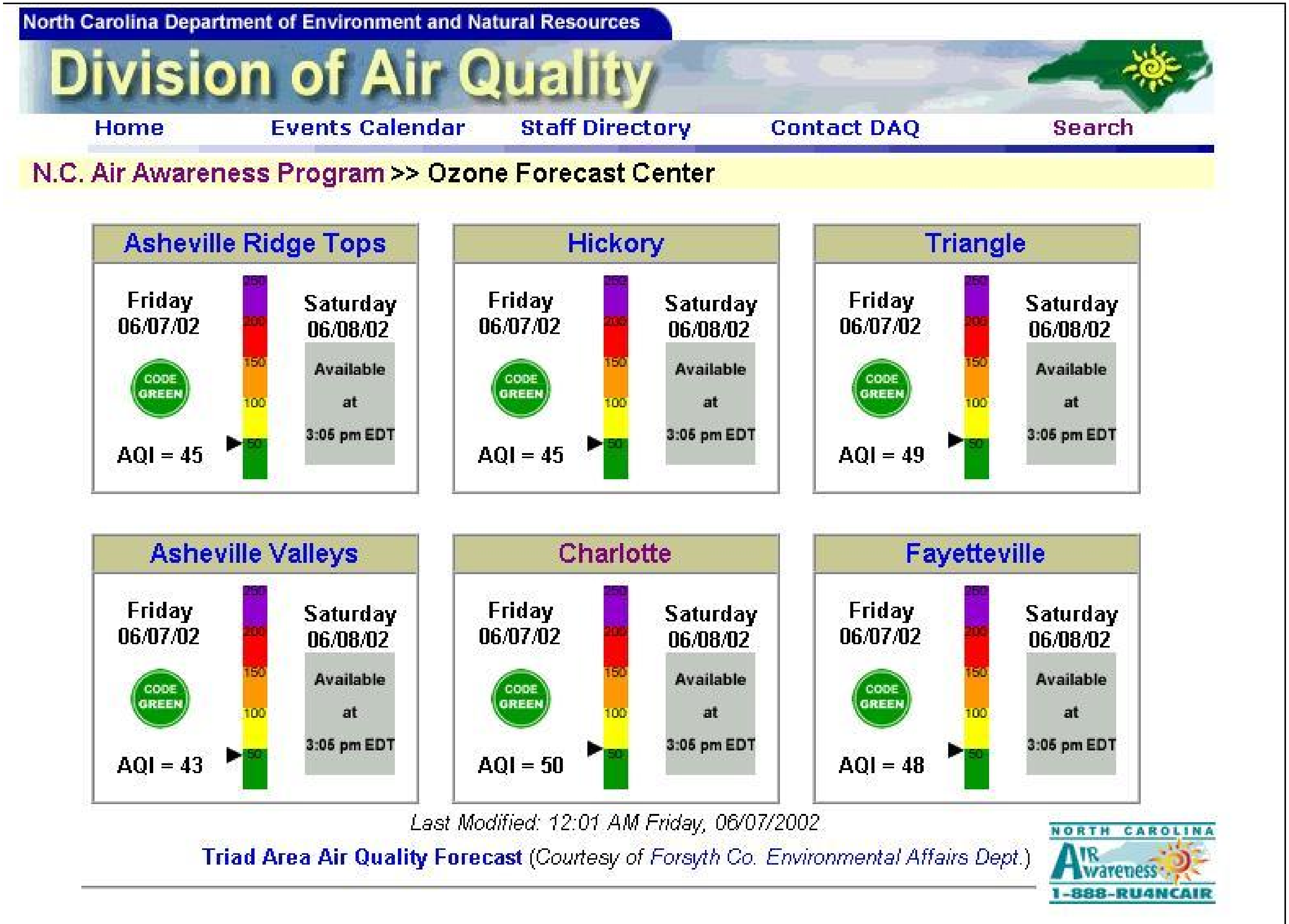
I-20 EB Near Ashby St

I-20 WB Near Wesley Chapel Rd

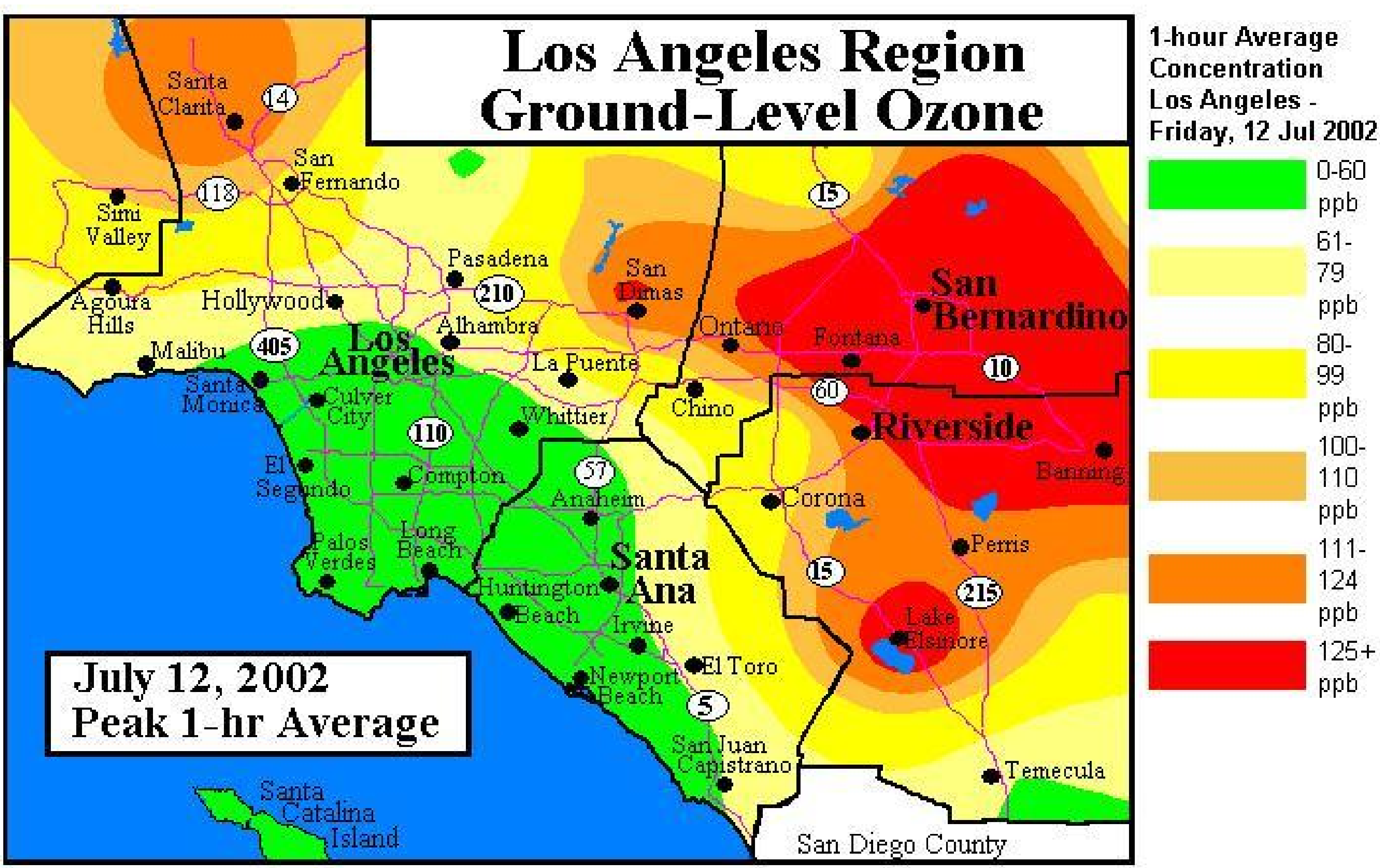
I-20 WB Near Boulevard



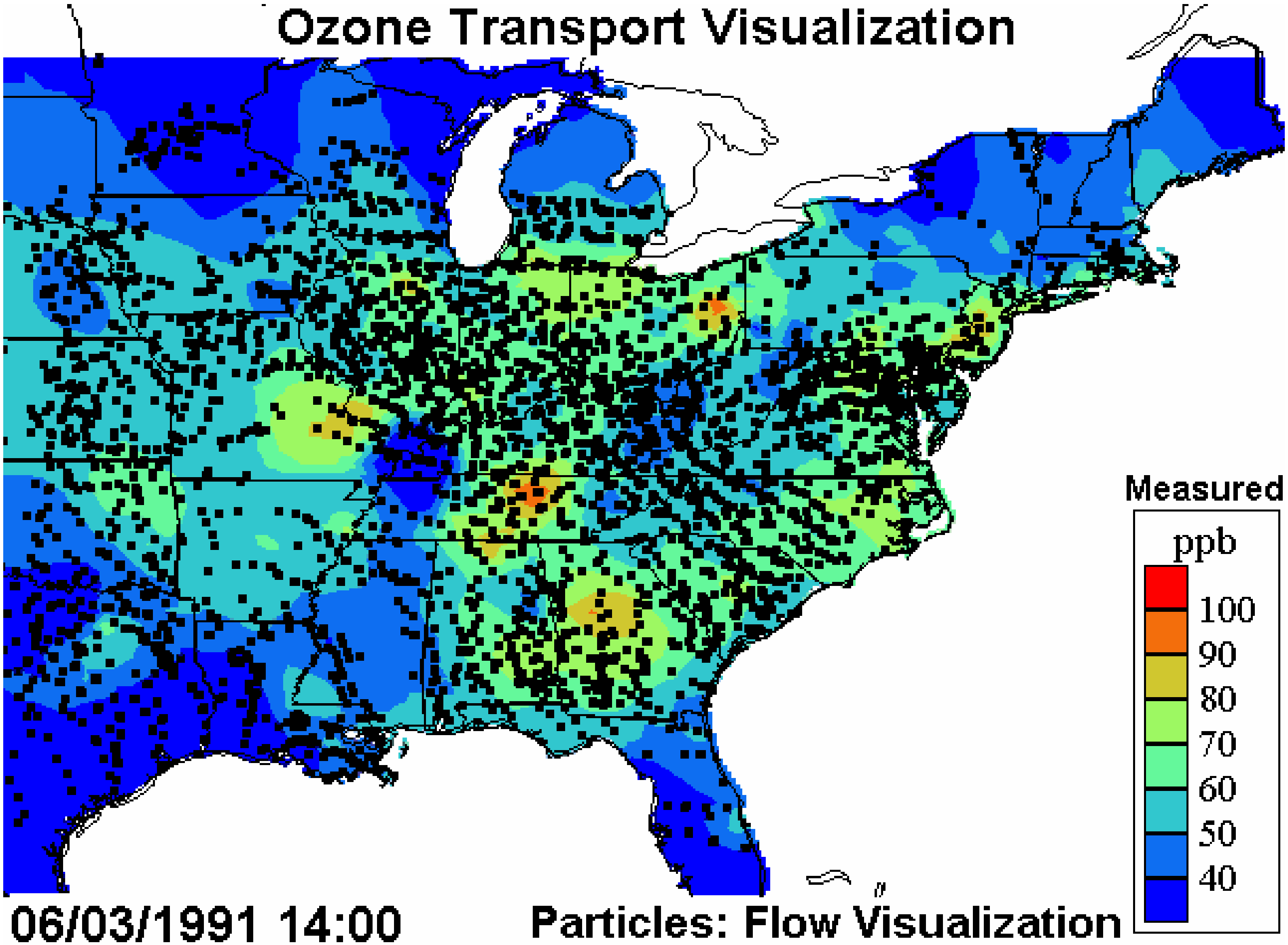
Public air quality alerts and reports…



Public air quality alerts and reports…



Public awareness ---picture is worth a thousand words …



Video developed by staff of the Ozone Transport Commission …

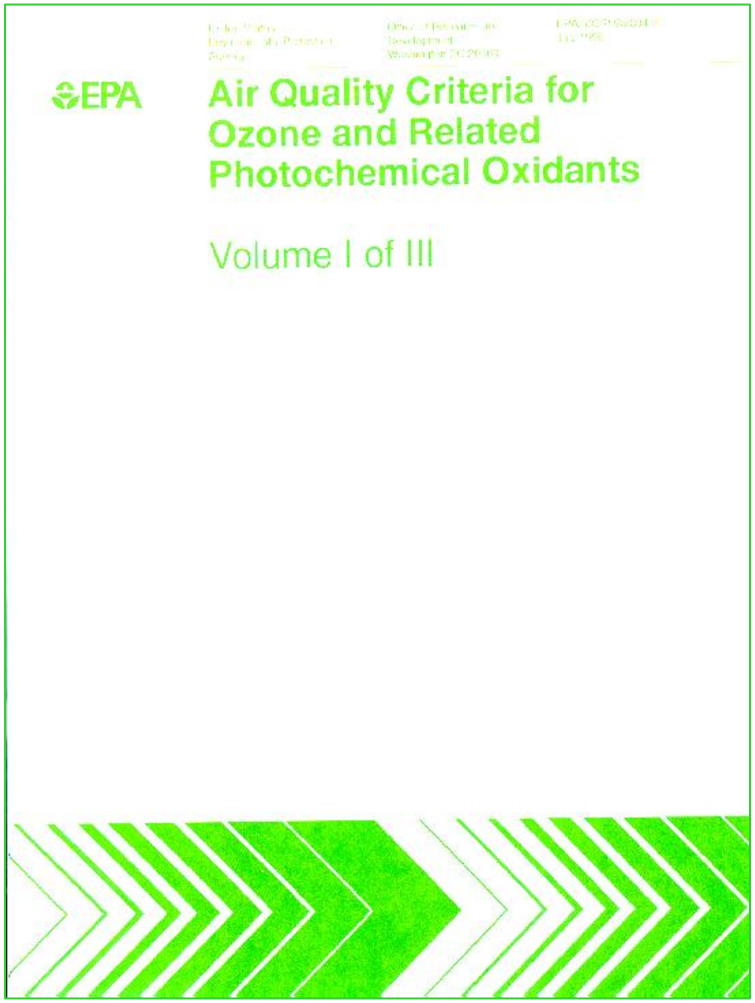
4th …

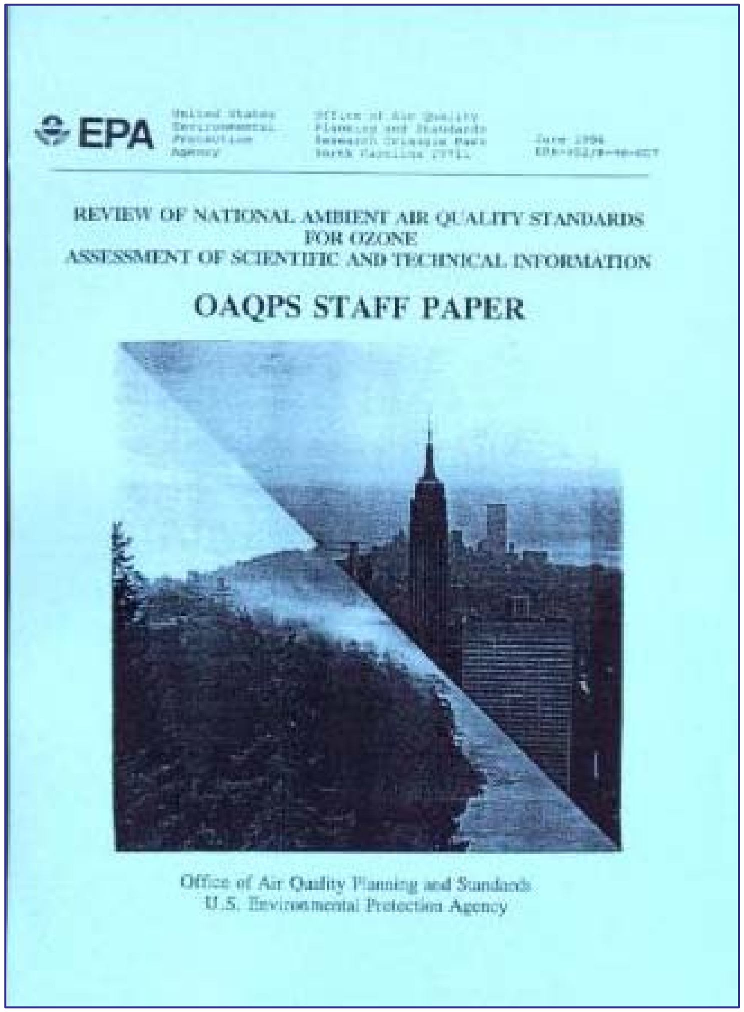
Actions that depend upon valid air quality data…

Support National Ambient Air Quality Standard setting process

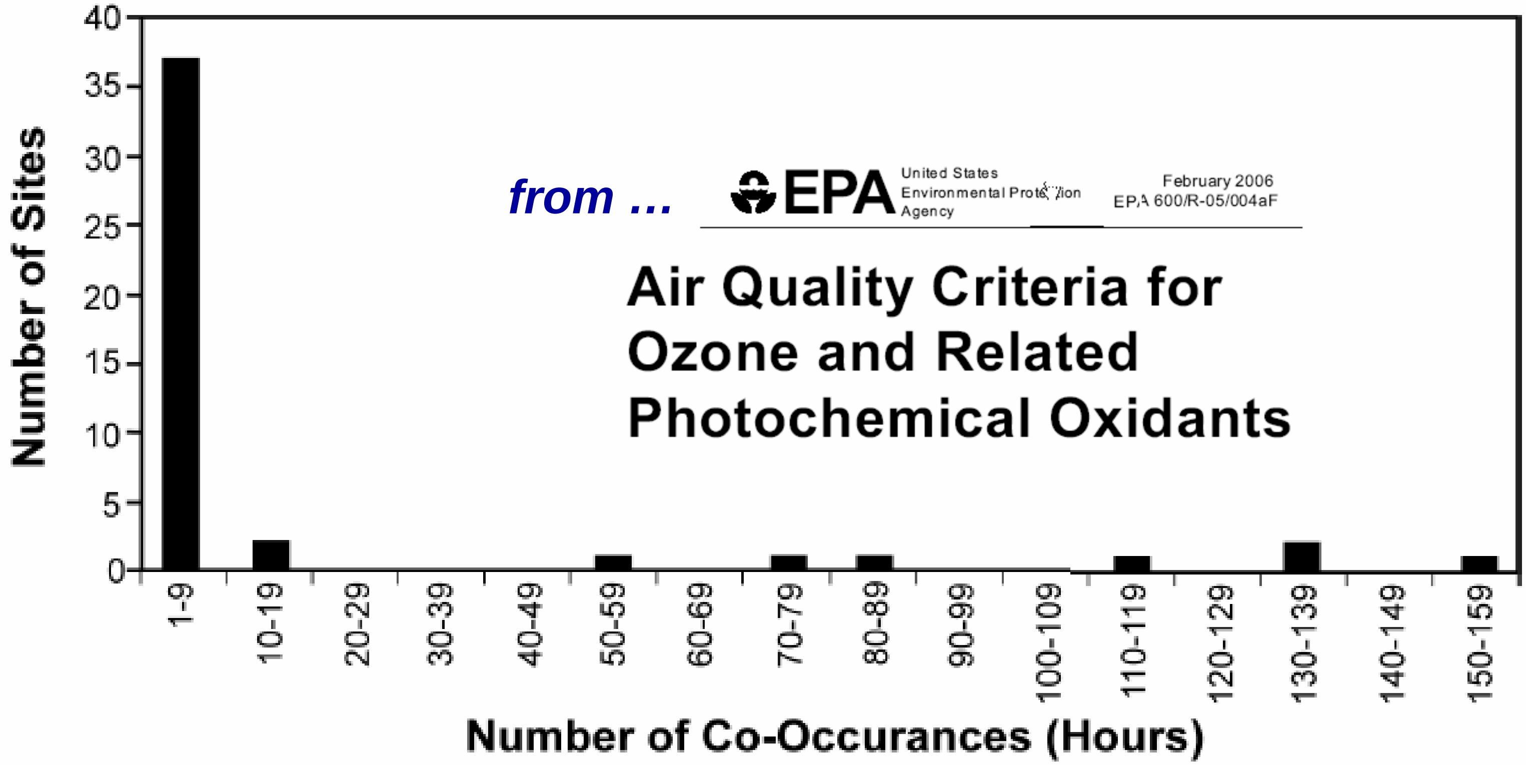
The 2 main sources of monitor data used for the NAAQS assessment are state-supplied data from various types of monitors housed in the Air Quality System (AQS) data base (which includes National Park Service monitors) and the Clean Air Status and Trends Network (CASTNET).

Data support National Ambient Air Quality Standard (NAAQS) setting process





Data support National Ambient Air Quality Standard (NAAQS) setting process

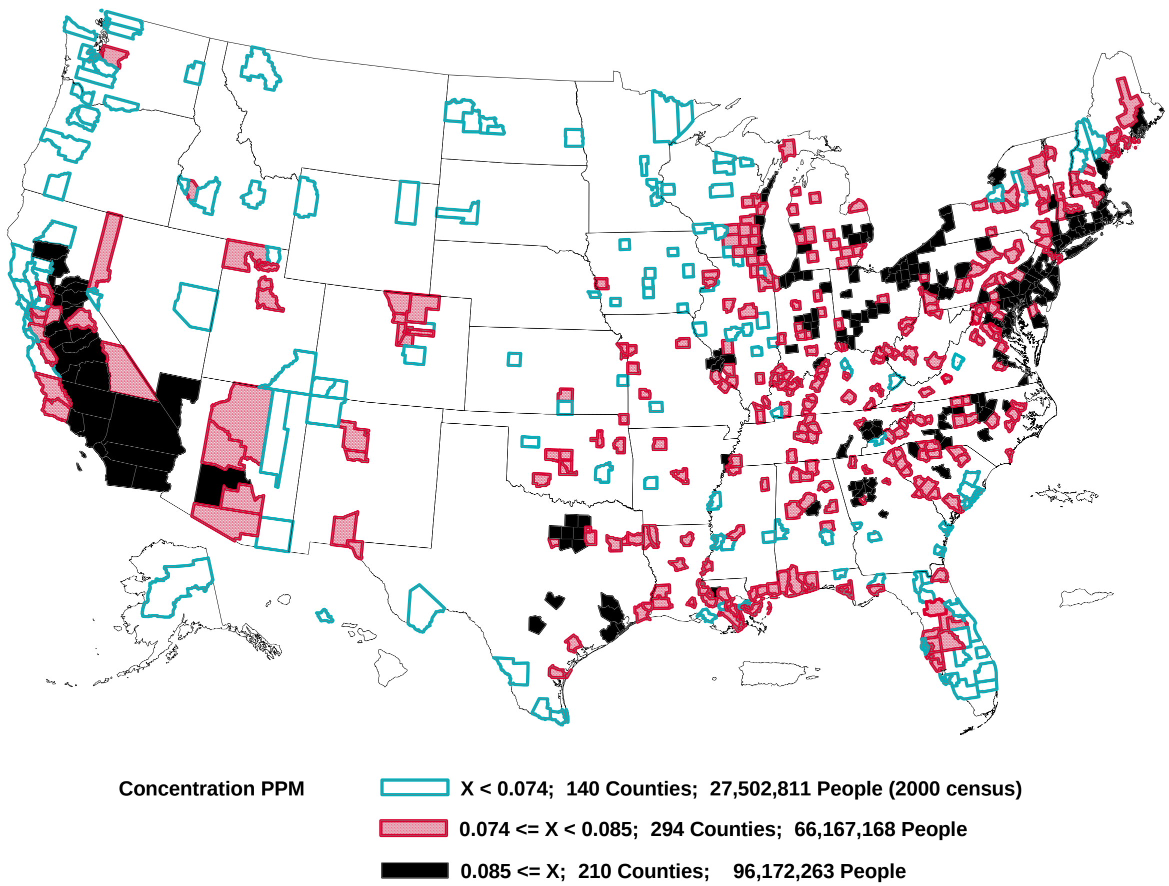


Example from Feb 2006

Figure 3-22. The co-occurrence pattern for O_3 and nitrogen dioxide using 2001 data from the AQS. There is co-occurrence when hourly average concentrations of O_3 and another pollutant are both ≥0.05 ppm.

Data support National Ambient Air Quality Standard (NAAQS) setting process

Example analysis … Ozone Staff Paper



High 8-hr average O_3 concentrations tend to occur near larger urban areas in the same patterns as the 1-hr concentrations

Also required ….

Regulatory impact analyses (RIA) work for new NAAQS and policy implementation rules

A Regulatory Impact Analysis (RIA) outlines the analyses EPA conducted on the costs and benefits of achieving a revised (NAAQS) such as PM2.5 … and some alternative PM standard options.

Also required ….

Regulatory impact analyses (RIA) work for new NAAQS and policy implementation rules

A Regulatory Impact Analysis (RIA) outlines the analyses EPA conducted on the costs and benefits of achieving a revised (NAAQS) such as PM2.5 … and some alternative PM standard options.

Example from PM 2.5 RIA

Annual Average Design Values

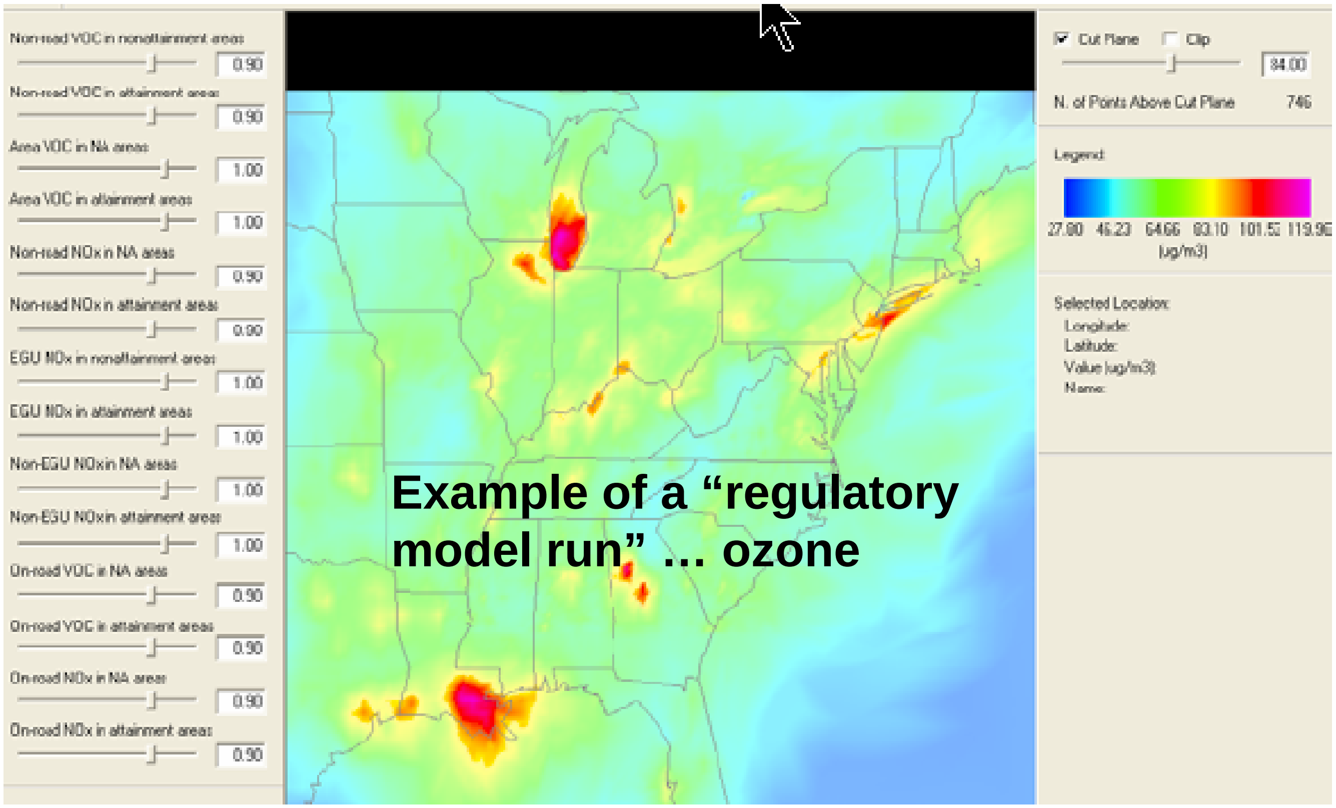
These projected annual design values were calculated using the Speciated Modeled Attainment Test (SMAT) approach, the details of which can be found in the report "Procedures for Estimating Future PM2.5 Values for the CAIR Final Rule by Application of the (Revised) Speciated Modeled Attainment Test (SMAT)" (EPA, 2004).

The starting point for these projections is a 5 year weighted average design value for each site. The weighted average is calculated as the average of the 1999-2001, 2000-2002, and 2001-2003 design values at each monitoring site. By averaging 1999-2001, 2000-2002, and 2001-2003, the value from 2001 is weighted three times, whereas, values for 2000 and 2002 are each weighted twice, and 1999 and 2003 are each weighted once. This approach has the desired benefits of (1) weighting the PM2.5 values towards the middle year of the five-year period (2001), which is the Base Year for our emissions projections, and (2) smoothing out the effects of year-to-year variability in emissions and meteorology that occurs over the full five-year period.

24-Hour Average Design Values

The daily design values are based on applying a similar projection method. As with the annual design value, monitor data for the years 1999 to 2003 are used as the basis for the projection. There are several steps in the projection for each of the base years of monitoring data:

Modeling for a Regulatory Impact Analysis …



Example of a "regulatory model run" … ozone

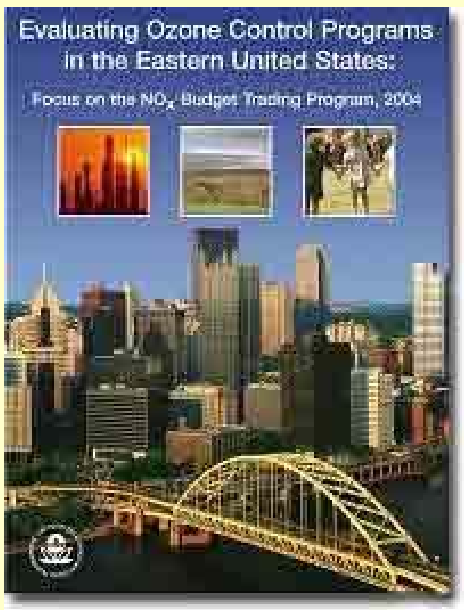
Cost evalvations and estimates

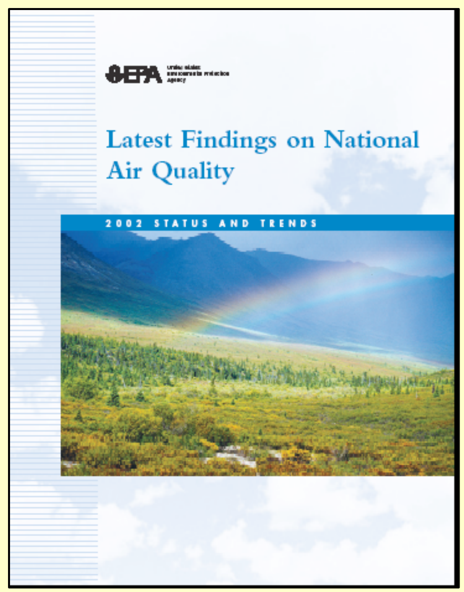
PM 2.5 RIA Costs of Attaining 15/65 Standard: 3% and 7% Discount Rate (Billion 1999$)			
Urban Area	*2015 Base case*	*Costs of Urban Area Controls (3%)*	*Costs of Urban Area Controls (7%)*
Atlanta	Regulatory Base Case for Each Urban Area	$1.9*	$2.1*
Chicago		$1.9 to $2.3*	$2.1 to $2.4*
NY/Philadelphia		*Attains standard with regulatory baseline*	
San Joaquin		$1.4 to $1.7*	$1.4 to $1.8*
Seattle		*Attains standard with regulatory baseline*	

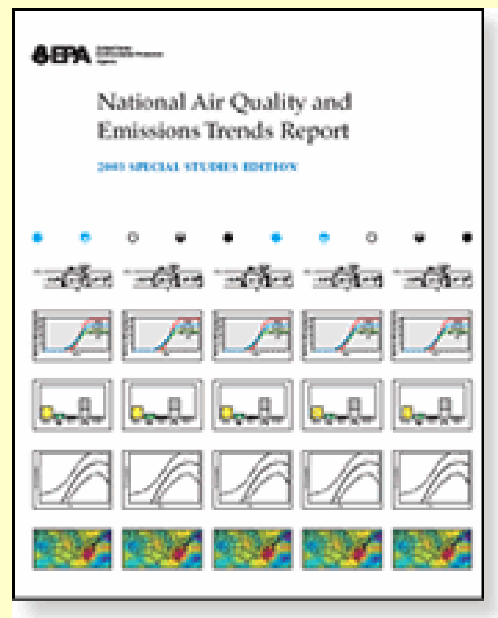
Lastly ...

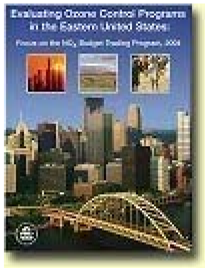
Actions that depend upon sound air quality data…

Progress and Accountability … Data reviews, trends, program evaluations… ………….. *measuring success*

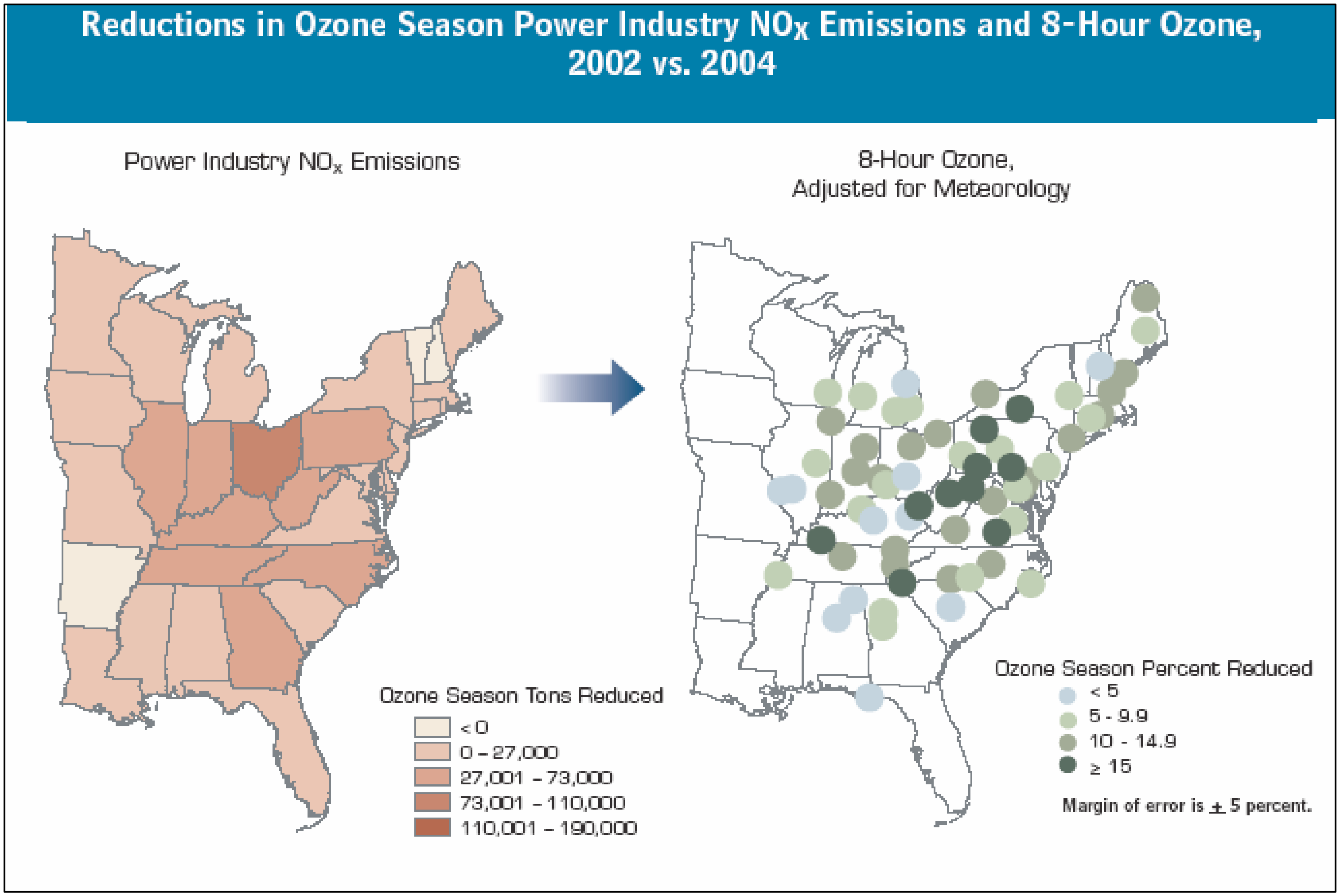








Progress and accountability example… air quality data trends …. used to gage success



Focusing on 2002-2004 …

Example of Ozone data output for analysis work …

MD (24) Maryland

	DV	Code	Near	Pct Comp Y1	Pct Comp Y2	Pct Comp Y3	Avg Pct	XF	4th Max Y1	4th Max Y2	4th Max Y3	Avg 4th	Days >= 85 Y1	Days >= 85 Y2	Days >= 85 Y3	Tot Exc	(C) MSA/County Name City	St:	Street Address	Monitor type
Anne Arundel C	**95**	3v										**95**				36	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-003-0014-1x	**95**	3v	n	99	96	95	97	2	**109**	**88**	**88**	**95**	27	5	4	36		QU:	QUEEN ANNE AND WAYSON ROADS	SLAMS
24-003-0019-1	**93**	3v	n	100	97	99	99		**108**	84	**87**	**93**	22	3	5	30	FORT MEADE	90	9001 'Y'STREET,FT.MEADE,ANNE ARUNDEL MD	SLAMS
Baltimore Co	**88**	3v										**88**				24	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-005-1007-1	**85**	3v	n	97	100	100	99		**103**	76	77	**85**	21	2	1	24	COCKEYSVILLE	GR:	GREENSIDE DRIVE COCKEYSVILLE MD	SLAMS
24-005-3001-1	**88**	3v	n	95	100	100	98		**104**	81	80	**88**	16	3	2	21	ESSEX	WO	WOODWARD & DORSEY RDS ,ESSEX MD	NAMS, SLAMS
Carroll Co	**85**	3v										**85**				13	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-013-0001-1	**85**	3v	n	99	100	95	98		**95**	81	79	**85**	10	2	1	13		13	1300 W. OLD LIBERTY ROAD, WINFIELD,MD	SLAMS
Cecil Co	**94**	3v										**94**				28	**Philadelphia-Wilmin-Atlantic Ci,PA-**		**Ci,PA-NJ-MD-DE**	
24-015-0003-1x	**94**	3v	n	98	96	95	96	2	**112**	**89**	83	**94**	19	6	3	28		RT:	RTE.273,FAIR HILL,CEIL CO.,MARYLAND	SLAMS
Charles Co	**91**	3v										**91**				22	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-017-0010-1	**91**	3v	n	96	94	95	95		**98**	**93**	83	**91**	15	6	1	22		SO	SO MD CORRECTIONAL CAMP, HUGHESVILLE MD	SLAMS
Frederick Co	83	3a										83				17	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-021-0037-1	83	3a	n	99	100	94	98		**95**	77	77	83	13	3	1	17	FREDERICK	FR:	FREDERICK MUNICIPAL AIRPORT	SLAMS
Harford Co	**96**	3v										**96**				40	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-025-1001-1x	**96**	3v	n	99	99	99	99	2	**113**	**89**	**87**	**96**	27	7	6	40	EDGEWOOD	ED	EDGEWOOD ARMY CHEM CENTER EDGEWOOD MD	NAMS, SLAMS
24-025-9001-1x	**94**	3v	n	100	99	99	99	2	**115**	**85**	82	**94**	24	4	3	31		35:	3538 ALDINO ROAD,HARFORD COUNTY MARYLAND	SLAMS
Kent Co	**89**	3v										**89**				22	**Kent Co, MD**			
24-029-0002-1x	**89**	3v	n	100	100	100	100	2	**104**	**86**	78	**89**	17	4	1	22		KE:	KENT COUNTY; MILLINGTON	SLAMS
Montgomery Co	83	3a										83				16	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-031-3001-1	83	3a	n	86	93	100	93		**92**	78	80	83	11	3	2	16	ROCKVILLE	LO	LOTHROP E SMITH ENV.ED CENTER ROCKVILLE	SLAMS
Prince George'	**94**	3v										**94**				25	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-033-0002-1			n	99	94	*0*	*64*		**98**	83			17	3	0	20	GREENBELT	GO:	GODDARD SPACE FLIGHT CENTER	NAMS, SLAMS
24-033-8003-1	**94**	3v	n	90	97	99	95		**101**	**97**	**86**	**94**	16	4	5	25		PR	PRINCE GEORGES EQUESTRIAN CENTER	
Washington Co	83	3a										83				21	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-043-0009-1	83	3a	n	96	100	100	99		**96**	78	77	83	17	3	1	21	HAGERSTOWN	18	18701 ROXBURY RD,HAGERSTOWN,MARYLAND	SLAMS
Baltimore city																9	**Washington-Baltimore, DC-MD-VA-WV**		**A-WV**	
24-510-0053-1			n	93	97	*0*	*63*		**102**	54			9	0	0	9		29:	299 PONCA STREET	UNKNOWN

MD (24) Maryland

	DV	Code	Near	Pct Comp Y1	Pct Comp Y2	Pct Comp Y3	Avg Pct	XF	4th Max Y1	4th Max Y2	4th Max Y3	Avg 4th	Days >= 85 Y1	Days >= 85 Y2	Days >= 85 Y3	Tot Exc
Anne Arundel C	**95**	3v										**95**				36
24-003-0014-1x	**95**	3v	n	99	96	95	97	2	**109**	**88**	**88**	**95**	27	5	4	36
24-003-0019-1	**93**	3v	n	100	97	99	99		**108**	84	**87**	**93**	22	3	5	30
Baltimore Co	**88**	3v										**88**				24
24-005-1007-1	**85**	3v	n	97	100	100	99		**103**	76	77	**85**	21	2	1	24
24-005-3001-1	**88**	3v	n	95	100	100	98		**104**	81	80	**88**	16	3	2	21
Carroll Co	**85**	3v										**85**				13
24-013-0001-1	**85**	3v	n	99	100	95	98		**95**	81	79	**85**	10	2	1	13
Cecil Co	**94**	3v										**94**				28
24-015-0003-1x	**94**	3v	n	98	96	95	96	2	**112**	**89**	83	**94**	19	6	3	28
Charles Co	**91**	3v										**91**				22
24-017-0010-1	**91**	3v	n	96	94	95	95		**98**	**93**	83	**91**	15	6	1	22
Frederick Co	83	3a										83				17
24-021-0037-1	83	3a	n	99	100	94	98		**95**	77	77	83	13	3	1	17
Harford Co	**96**	3v										**96**				40
24-025-1001-1x	**96**	3v	n	99	99	99	99	2	**113**	**89**	**87**	**96**	27	7	6	40
24-025-9001-1x	**94**	3v	n	100	99	99	99	2	**115**	**85**	82	**94**	24	4	3	31
Kent Co	**89**	3v										**89**				22

Example of Ozone data … 2002-2004…continued

Data completeness

MD (24) Maryland	DV	Code	Near	Pct Comp Y1	Pct Comp Y2	Pct Comp Y3	Avg Pct	XF	4th Max Y1	4th Max Y2	4th Max Y3	Avg 4th	Days >= 85 Y1	Days >= 85 Y2	Days >= 85 Y3	Tot Exc
Anne Arundel C	**95**	3v										**95**				36
24-003-0014-1x	**95**	3v	n	99	96	95	97	2	**109**	**88**	**88**	**95**	27	5	4	36
24-003-0019-1	**93**	3v	n	100	97	99	99		**108**	84	**87**	**93**	22	3	5	30
Baltimore Co	**88**	3v										**88**				24
24-005-1007-1	**85**	3v	n	97	100	100	99		**103**	76	77	**85**	21	2	1	24
24-005-3001-1	**88**	3v	n	95	100	100	98		**104**	81	80	**88**	16	3	2	21
Carroll Co	**85**	3v										**85**				13
24-013-0001-1	**85**	3v	n	99	100	95	98		**95**	81	79	**85**	10	2	1	13
Cecil Co	**94**	3v										**94**				28
24-015-0003-1x	**94**	3v	n	98	96	95	96	2	**112**	**89**	83	**94**	19	6	3	28
Charles Co	**91**	3v										**91**				22
24-017-0010-1	**91**	3v	n	96	94	95	95		**98**	**93**	83	**91**	15	6	1	22
Frederick Co	83	3a										83				17
24-021-0037-1	83	3a	n	99	100	94	98		**95**	77	77	83	13	3	1	17
Harford Co	**96**	3v										**96**				40
24-025-1001-1x	**96**	3v	n	99	99	99	99	2	**113**	**89**	**87**	**96**	27	7	6	40
24-025-9001-1x	**94**	3v	n	100	99	99	99	2	**115**	**85**	82	**94**	24	4	3	31
Kent Co	**89**	3v										**89**				22

Example of Ozone data … 2002-2004…continued

3 years and 4th
high over 3 years

MD (24) Maryland

	DV	Code	Near	Pct Comp Y1	Pct Comp Y2	Pct Comp Y3	Avg Pct	XF	4th Max Y1	4th Max Y2	4th Max Y3	Avg 4th	Days >= 85 Y1	Days >= 85 Y2	Days >= 85 Y3	Tot Exc
Anne Arundel C	**95**	3v										**95**				36
24-003-0014-1x	**95**	3v	n	99	96	95	97	2	**109**	**88**	**88**	**95**	27	5	4	36
24-003-0019-1	**93**	3v	n	100	97	99	99		**108**	84	**87**	**93**	22	3	5	30
Baltimore Co	**88**	3v										**88**				24
24-005-1007-1	**85**	3v	n	97	100	100	99		**103**	76	77	**85**	21	2	1	24
24-005-3001-1	**88**	3v	n	95	100	100	98		**104**	81	80	**88**	16	3	2	21
Carroll Co	**85**	3v										**85**				13
24-013-0001-1	**85**	3v	n	99	100	95	98		**95**	81	79	**85**	10	2	1	13
Cecil Co	**94**	3v										**94**				28
24-015-0003-1x	**94**	3v	n	98	96	95	96	2	**112**	**89**	83	**94**	19	6	3	28
Charles Co	**91**	3v										**91**				22
24-017-0010-1	**91**	3v	n	96	94	95	95		**98**	**93**	83	**91**	15	6	1	22
Frederick Co	83	3a										83				17
24-021-0037-1	83	3a	n	99	100	94	98		**95**	77	77	83	13	3	1	17
Harford Co	**96**	3v										**96**				40
24-025-1001-1x	**96**	3v	n	99	99	99	99	2	**113**	**89**	**87**	**96**	27	7	6	40
24-025-9001-1x	**94**	3v	n	100	99	99	99	2	**115**	**85**	82	**94**	24	4	3	31
Kent Co	**89**	3v										**89**				22

Example of Ozone data … 2002-2004…continued

Days over 85ppb

by year … total

MD (24) Maryland

Site	DV	Code	Near	Pct Comp Y1	Pct Comp Y2	Pct Comp Y3	Avg Pct	XF	4th Max Y1	4th Max Y2	4th Max Y3	Avg 4th	Days >= 85 Y1	Days >= 85 Y2	Days >= 85 Y3	Tot Exc
Anne Arundel C	95	3v										95				36
24-003-0014-1x	95	3v	n	99	96	95	97	2	109	88	88	95	27	5	4	36
24-003-0019-1	93	3v	n	100	97	99	99		108	84	87	93	22	3	5	30
Baltimore Co	88	3v										88				24
24-005-1007-1	85	3v	n	97	100	100	99		103	76	77	85	21	2	1	24
24-005-3001-1	88	3v	n	95	100	100	98		104	81	80	88	16	3	2	21
Carroll Co	85	3v										85				13
24-013-0001-1	85	3v	n	99	100	95	98		95	81	79	85	10	2	1	13
Cecil Co	94	3v										94				28
24-015-0003-1x	94	3v	n	98	96	95	96	2	112	89	83	94	19	6	3	28
Charles Co	91	3v										91				22
24-017-0010-1	91	3v	n	96	94	95	95		98	93	83	91	15	6	1	22
Frederick Co	83	3a										83				17
24-021-0037-1	83	3a	n	99	100	94	98		95	77	77	83	13	3	1	17
Harford Co	96	3v										96				40
24-025-1001-1x	96	3v	n	99	99	99	99	2	113	89	87	96	27	7	6	40
24-025-9001-1x	94	3v	n	100	99	99	99	2	115	85	82	94	24	4	3	31
Kent Co	89	3v										89				22

Example of ozone data trends from 1985 ---2004 …

Ozone 8-Hour Design Value Trends

Data from AQS on 04/01/2005, with combined sites.
Web page generated on 05/24/2005.

Area name (short)	1985 1987	1986 1988	1987 1989	1988 1990	1989 1991	1990 1992	1991 1993	1992 1994	1993 1995	1994 1996	1995 1997	1996 1998	1997 1999	1998 2000	1999 2001	2000 2002	2001 2003	2002 2004	02-04 Diff.	2002 2004	Avg. Comp.	2004 Comp.
Albany, GA							81	79					83	85	86	81	74	70	-4	70	91%	97%
Albany, NY	79	84	88	89	83	85	85	85	83	84	81	80	84	80	84	83	87	86	-1	86	95%	95%
Albuquerque, NM	75	72	73	73	71	71	69	70	74	74	71	74	74	75	75	75	77	77	0	77	95%	93%
Alexandria, LA					73	67	57				75	76	80	83	81	78	74	73	-1	73	97%	96%
Allentown, PA	97	105	104	99	94	93	90	84	92	94	95	96	100	97	97	93	91	88	-3	88	100%	100%
Altoona, PA	93	100	96	89	81	84	85	85	89	88	90	92	95	89	84	84	85	81	-4	81	99%	100%
Amador/Calaveras, CA								91	91	97	93	96	96	100	94	92	91	90	-1	90	98%	98%
Amarillo, TX																						
Anchorage, AK																						
Appleton, WI	83	84	86	82	78	74	73	66		78	81	77	80	76	80	78	82	73	-9	73	100%	100%
Asheville, NC	75	83			69	66	64	66	70	73	75	79	83	88	83	85	78	77	-1	77	98%	100%
Athens, GA																		78		78	91%	100%
Atlanta, GA	114	124	113	107	104	105	101	101	109	105	110	113	118	121	107	99	91	93	2	93	99%	99%
Augusta, GA	80	91	86	89	85	87	81	83	87	87	87	91	92	93	87	88	83	83	0	83	99%	99%
Austin, TX	85	84	84	86	84	84	81	82	84	84	81	81	88	88	88	85	84	85	1	85	100%	100%
Baltimore, MD	119	132	125	115	104	106	107	103	107	105	107	104	109	107	104	104	103	94	-9	94	99%	99%
Bangor, ME						67			77	73	73	72	75	72	76	79	83	75	-8	75	97%	98%
Baton Rouge, LA	97	98	98	101	99	96	90	87	91	94	96	94	92	96	91	86	86	89	3	89	98%	97%
Beaumont, TX	85	97	93	100	101	100	97	93	94	91	93	91	88	87	89	90	91	92	1	92	100%	100%
Bellingham, WA					51	58	57	57	57	58	56	56	52	52	50	51	53	57	4	57	95%	98%
Benton Harbor, MI								76	87	94	98	96	96	88	87	87	91	86	-5	86	99%	98%
BerkeleyJefferson,WV																	86	80	-6	80	98%	97%

Closer look …

Example of ozone data trends from 1985 ---2004 …

Evaluating the ozone air quality progress ….. …

Ozone 8-Hour Design Value Trends

Data from AQS on 04/01/2005, with combined sites.
Web page generated on 05/24/2005.

Beginning ---119 ppb

Ending ---94 ppb

Area name (short)	1985 1987	1986 1988	1987 1989	1988 1990	1989 1991	1990 1992	1991 1993	1992 1994	1993 1995	1994 1996	1995 1997	1996 1998	1997 1999	1998 2000	1999 2001	2000 2002	2001 2003	2002 2004
Baltimore, MD	119	132	125	115	104	106	107	103	107	105	107	104	109	107	104	104	103	94

18 years of 8-hr ozone design values for Baltimore ...

More ….

8-hr Ozone …

How have the numbers changed????

2001-2003
2002-2004
2003-2005

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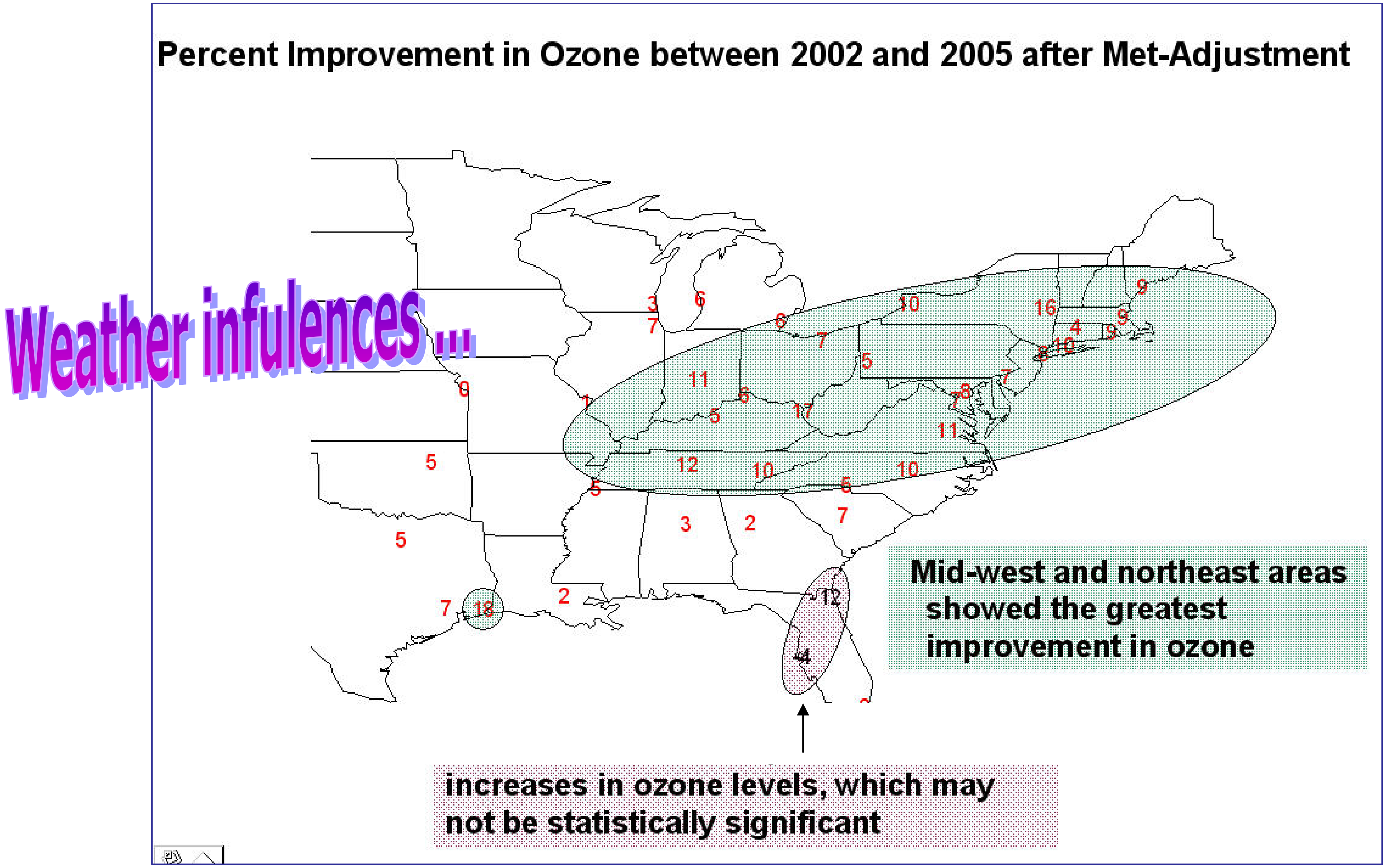
Ozone Nonattainment Areas	2001-2003 Design Value (ppm)	2002-2004 Design Value (ppm)	2003-2005 Design Value (ppm)*
Los Angeles South Coast Air Basin, CA	0.131	0.127	**0.127**
San Joaquin Valley, CA	0.115	0.116	**0.113**
Los Angeles-San Bernardino Cos(W Mojave),CA	0.106	0.107	**0.105**
Riverside Co, (Coachella Valley), CA	0.108	0.104	**0.104**
Houston-Galveston-Brazoria, TX	0.102	0.101	**0.103**
Nevada Co. (Western Part), CA	0.098	0.097	**0.098**
Sacramento Metro, CA	0.107	0.102	**0.097**
Baton Rouge, LA	0.086	0.089	**0.096**
Dallas-Fort Worth, TX	0.1	0.098	**0.095**
Philadelphia-Wilmin-Atlantic Ci,PA-NJ-MD-DE	0.106	0.099	**0.094**
Baltimore, MD	0.103	0.094	**0.091**
Cleveland-Akron-Lorain, OH	0.103	0.095	**0.091**
New York-N. New Jersey-Long Island,NY-NJ-CT	0.102	0.095	**0.091**
Ventura Co, CA	0.095	0.094	**0.091**
Washington, DC-MD-VA	0.099	0.096	**0.091**
Amador and Calaveras Cos (Central Mtn), CA	0.091	0.09	**0.091**
Atlanta, GA	0.091	0.093	**0.09**
Detroit-Ann Arbor, MI	0.097	0.092	**0.09**
Door Co, WI	0.094	0.088	**0.09**
Kern Co (Eastern Kern), CA	0.098	0.092	**0.09**
Providence (All RI), RI	0.095	0.09	**0.089**
Sheboygan, WI	0.1	0.092	**0.089**
Allegan Co, MI	0.097	0.093	**0.089**
Cincinnati-Hamilton, OH-KY-IN	0.096	0.091	**0.089**
Jamestown, NY	0.094	0.093	**0.089**
Charlotte-Gastonia-Rock Hill, NC-SC	0.1	0.094	**0.088**
Milwaukee-Racine, WI	0.101	0.094	**0.088**
Beaumont-Port Arthur, TX	0.091	0.092	**0.088**
Columbus, OH	0.095	0.091	**0.088**
Mariposa and Tuolumne Cos (Southern Mtn),CA	0.091	0.09	**0.088**
Allentown-Bethlehem-Easton, PA	0.091	0.088	**0.087**
Indianapolis, IN	0.096	0.092	**0.087**
Manitowoc Co, WI	0.09	0.083	**0.087**
Boston-Lawrence-Worcester (E. MA), MA	0.095	0.091	**0.086**
Chicago-Gary-Lake County, IL-IN	0.101	0.094	**0.086**
Greater Connecticut, CT	0.095	0.089	**0.086**

Example---
Removing the influence of “Weather” from Ozone Air Quality Data



PM 2.5 ...

What are the preliminary numbers????

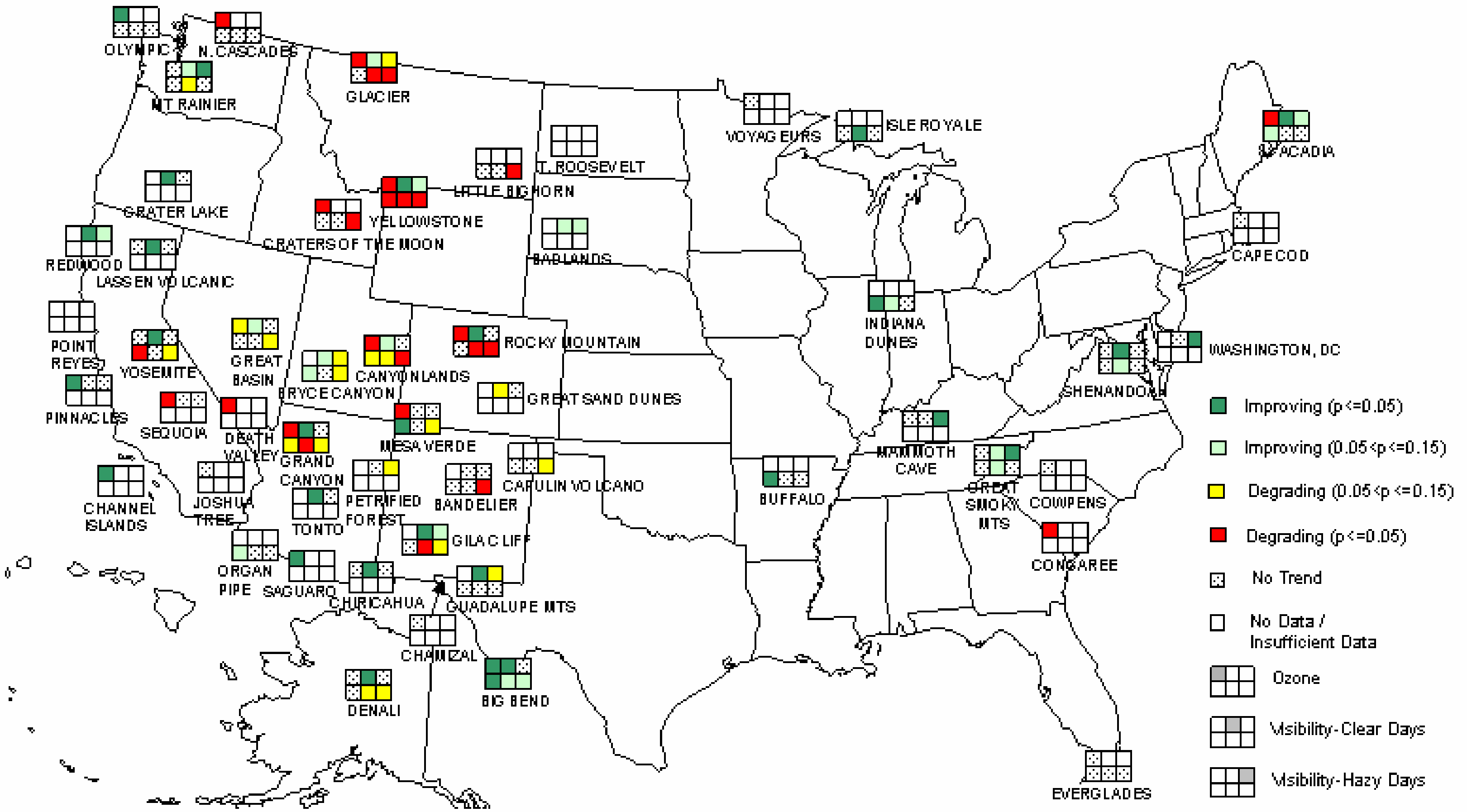
2003-2005

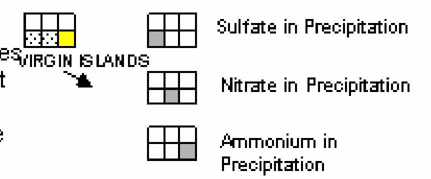
state_postal	county_name	designated area	site	dva9901	dva0002	dva0103	dva0204	dva0305
CA	Riverside	NA area: Lo	060658001	29.8	28.9	27.8	24.8	22.6
CA	San Bernardino	NA area: Lo	060710025	25.3	25.3	25.2	23.4	21.2
PA	Allegheny	NA area: Pit	420030064	20.9	21.4	21.2	20.4	20.8
CA	Riverside	NA area: Lo	060651003	26.7	26.9	25.9	23.5	20.5
CA	San Bernardino	NA area: Lo	060719004	25.8	25.9	24.7	23.3	20.5
CA	San Bernardino	NA area: Lo	060712002	25.1	24.6	23.8	22.1	20.3
CA	Los Angeles	NA area: Lo	060371002	23	23.3	23.6	21.7	19.7
CA	Los Angeles	NA area: Lo	060371103	22.6	22.2	22	21	19.6
TX	El Paso		481410044	9.2	9.7	9.9	10.2	19.2
CA	Kern	NA area: Sa	060290010	23.6	22.8	21.8	20.6	19.0
CA	Los Angeles	NA area: Lo	060371301	23.9	23.6	22.7	20.7	18.7
CA	Los Angeles	NA area: Lo	060371601	25	24.4	23.3	21.5	18.6
CA	Kern	NA area: Sa	060290016	20.6	21.5	20.7	19.6	18.4
AL	Jefferson	NA area: Bir	010730023	21.6	19.6	18	17.5	18.2
CA	Los Angeles	NA area: Lo	060370002	21.8	20.8	20.6	19.4	18.2
MI	Wayne	NA area: De	261630033	18.9	19.9	19.5	18.6	18.2
OH	Cuyahoga	NA area: Cle	390350038	20.3	19.2	18.3	17.6	18.1
CA	Kern	NA area: Sa	060290014	22.5	22.1	20.3	19.6	18.0
CA	Tulare	NA area: Sa	061072002	24.7	23.2	21.3	19.5	18.0
OH	Hamilton	NA area: Cir	390618001	19	17.8	17.1	16.9	17.9
IN	Marion	NA area: Inc	180970066	18.4	18.6	18.1	17.5	17.8
IL	Madison	NA area: St.	171190023	20.3	20	19.1	17.9	17.7
OH	Cuyahoga	NA area: Cle	390350060	18.6	18.2	17.4	17	17.7
OH	Jefferson	NA area: Ste	390810016	19	18.3	17.8	17.6	17.7
TX	El Paso		481410053	20.4	19.3	16.9	17.8	17.7
IN	Lake	NA area: Ch	180890026	17.7	17.7	17.7	17.2	17.5
OH	Hamilton	NA area: Cir	390610014	19.3	18.6	17.8	16.9	17.5
PA	Lancaster	NA area: La	420710007	16.9	17.1	17	16.8	17.5
GA	Fulton	NA area: Atl	131210039	21.2	19.3	18	17.5	17.4
CA	Los Angeles	NA area: Lo	060374002	20.5	20.1	19.6	18.5	17.3
CA	Los Angeles	NA area: Lo	060374004			20.6	18.6	17.3
IN	Marion	NA area: Inc	180970043	17.9	17.7	17.3	16.6	17.3
OH	Hamilton	NA area: Cir	390610042	19.1	18.4	17.1	16.5	17.3
PA	York	NA area: Yc	421330008	16.3	16.8	17	16.9	17.3
CA	Fresno	NA area: Sa	060195025	18.5	19.4	19.2	18.7	17.2
IL	Cook	NA area: Ch	170311016	21	19.6	18.4	17	17.2
OH	Jefferson	NA area: Ste	390811001	18.2	17.8	17.8	16.9	17.2
CT	New Haven	NA area: Ne	090090018	16.8	16.4	16.6	16	17.1
CA	Kings	NA area: Sa	060310004	16.6	19	19	18.4	17.0
IL	Madison	NA area: St.	171191007	17.3	17.5	17.5	16.9	17.0
IN	Lake	NA area: Ch	180890022	17.1	17.3	17.1	16.4	17.0
NY	New York	NA area: Ne	360610056	17.8	17.6	17.7	16.8	17.0
OH	Cuyahoga	NA area: Cle	390350045	16.7	17.5	16.7	16	17.0

Draft… not certified

Air Quality Trends in National Parks, 1995-2004

FY2005 Annual Performance Report For NPS Government Performance and Results Act (GPRA) Air Quality Goal Ia3





Colored boxes indicate the existence of air quality trends during 1995-2004. Dark green and red boxes indicate statistically significant improving or degrading trends at the .05 significance level while the light green and yellow boxes represent similar trends but not statistically significant with probabilities (p values) between 0.05 and 0.15. These last two symbols are included to indicate which parks had trends that would have been considered statistically significant under the procedures used in past years. A significance level of .05 means there is a 5% chance of concluding there was a trend when in fact the change was due to chance.

Some final thoughts from the "data user's perspective" ….

Facts that are "key" to the satisfactory use of air quality data:

- **Valid, representative air quality measurements**
- **Comprehensive, properly located sampling sites**
- **Understanding of the purpose of each sampling site**
- **Sound Q/A programs … proper record keeping**
- **Expeditious review of measurements … flagging where appropriate.**
- **Validating elevated measurements … checking these samples against other area and regional measurements.**

In summary ….

- Data is power …. It's the key to successful air quality planning!
- Air quality models, state implementation plans, and progress tracking must be built on a solid air quality data foundation.
- Rapid collection, evaluation, and reporting are central to informing the public of health-related air quality problems and issues.
- The Air Quality System (AQS) is the backbone of EPA's NAAQS setting, regulatory impact analysis work, and future national program evaluations!