

Section 812 Second Prospective Background, Status, and Emissions/Air Quality Foundation for Ecological Benefits

**EES Review
March 9, 2010**



Jim DeMocker
Office of Policy Analysis and Review
Office of Air and Radiation

Project Team Present

- ⇒ Jim DeMocker, EPA
 - ↳ Background and status of overall study
 - ↳ Emissions and air quality modeling method summary

- ⇒ Maura Flight, Industrial Economics
 - ↳ Outline of the ecological report
 - ↳ Overview of updated literature review
 - ↳ Maps highlighting distribution of pollutants across the U.S.
 - ↳ Summary of acidification case studies
 - Recreational fishing
 - Commercial timber
 - ↳ Summary of ozone effects analysis
 - Timber and agricultural production

- ⇒ Jim Neumann, Industrial Economics (by phone)

1990 Clean Air Act, Section 812

- ⇒ EPA “... shall conduct a comprehensive analysis of the impact of this Act on the public health, economy, and environment of the United States.”

- ⇒ Retrospective + biennial Prospectives

- ⇒ Review by outside experts
 - ↳ Advisory Council on Clean Air Compliance Analysis



Goals and Uses of the 812 Studies

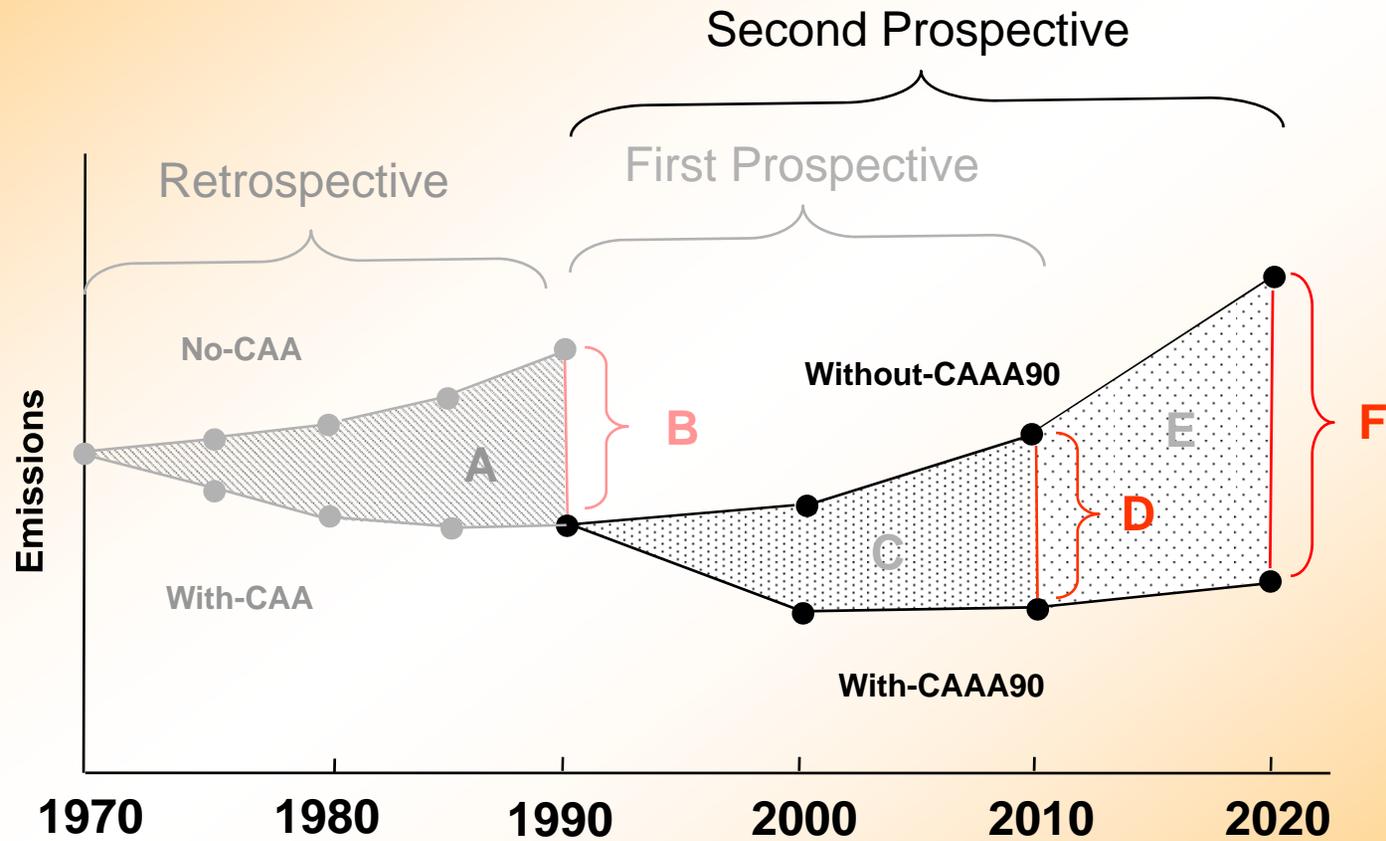
⇒ Stated Goals

- ↪ Support CAA and related legislative efforts
- ↪ Capture interaction effects between programs
- ↪ Improve analytical methodologies for OAR, EPA
- ↪ Help identify program and research priorities

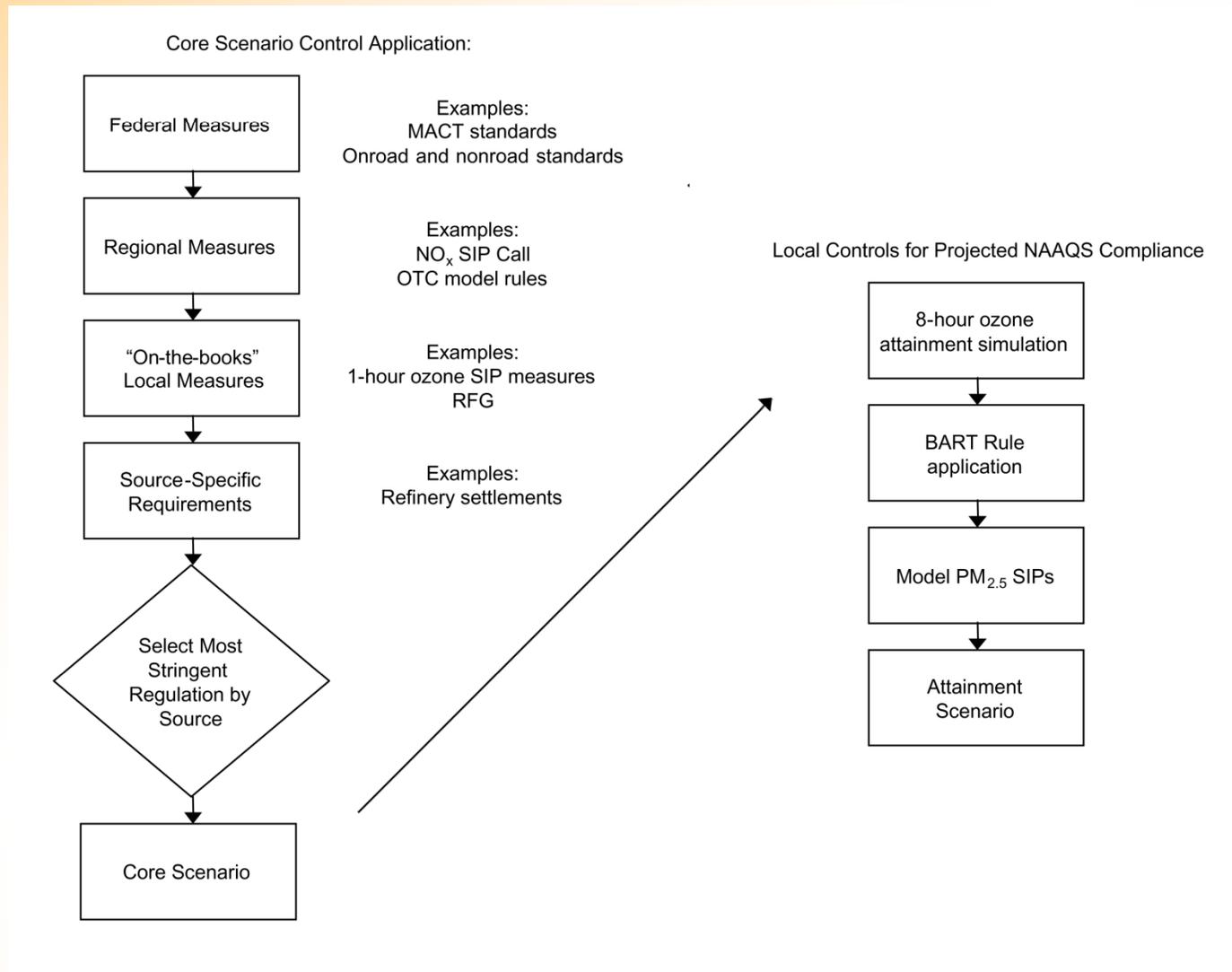
⇒ Anticipated Uses

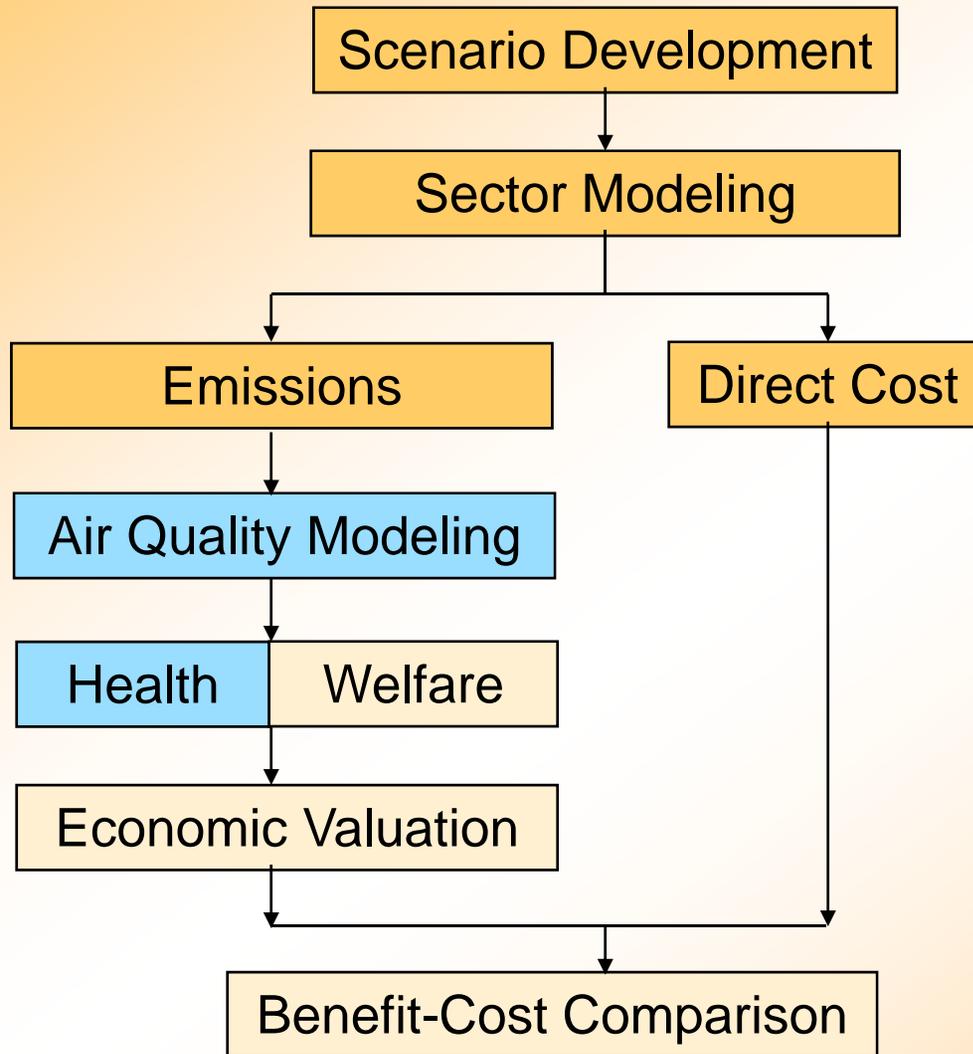
- ↪ Add refined perspective on value of CAA programs *per se* and co-benefits of GHG control
 - Example: better foundation for energy externalities work
- ↪ Input to EPA strategic planning processes
- ↪ Methods development laboratory
 - Examples: use of EE results, dynamic pop, CGE
- ↪ Data and tools for other researchers, States

812 Scenarios -- Schematic



Control Scenario Development





Scenarios:
 Core
 Hi Econ Growth
 Lo Econ Growth
 Marginal Changes

Supplemental Analyses:

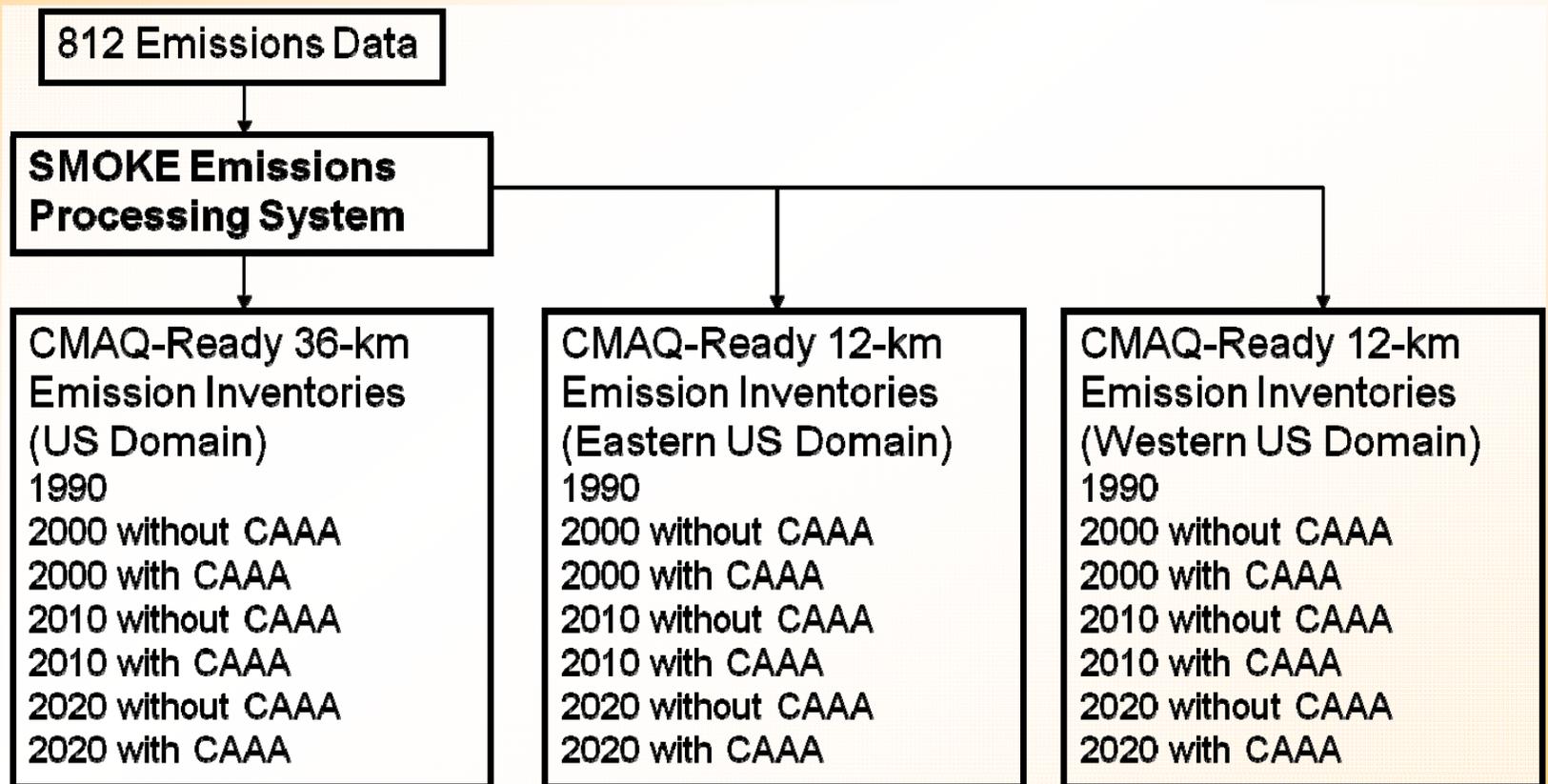
- HAP case study
- Eco lit review
- Eco case study
- ~~Title VI reanalysis~~
- Uncertainty
- CGE modeling

Final

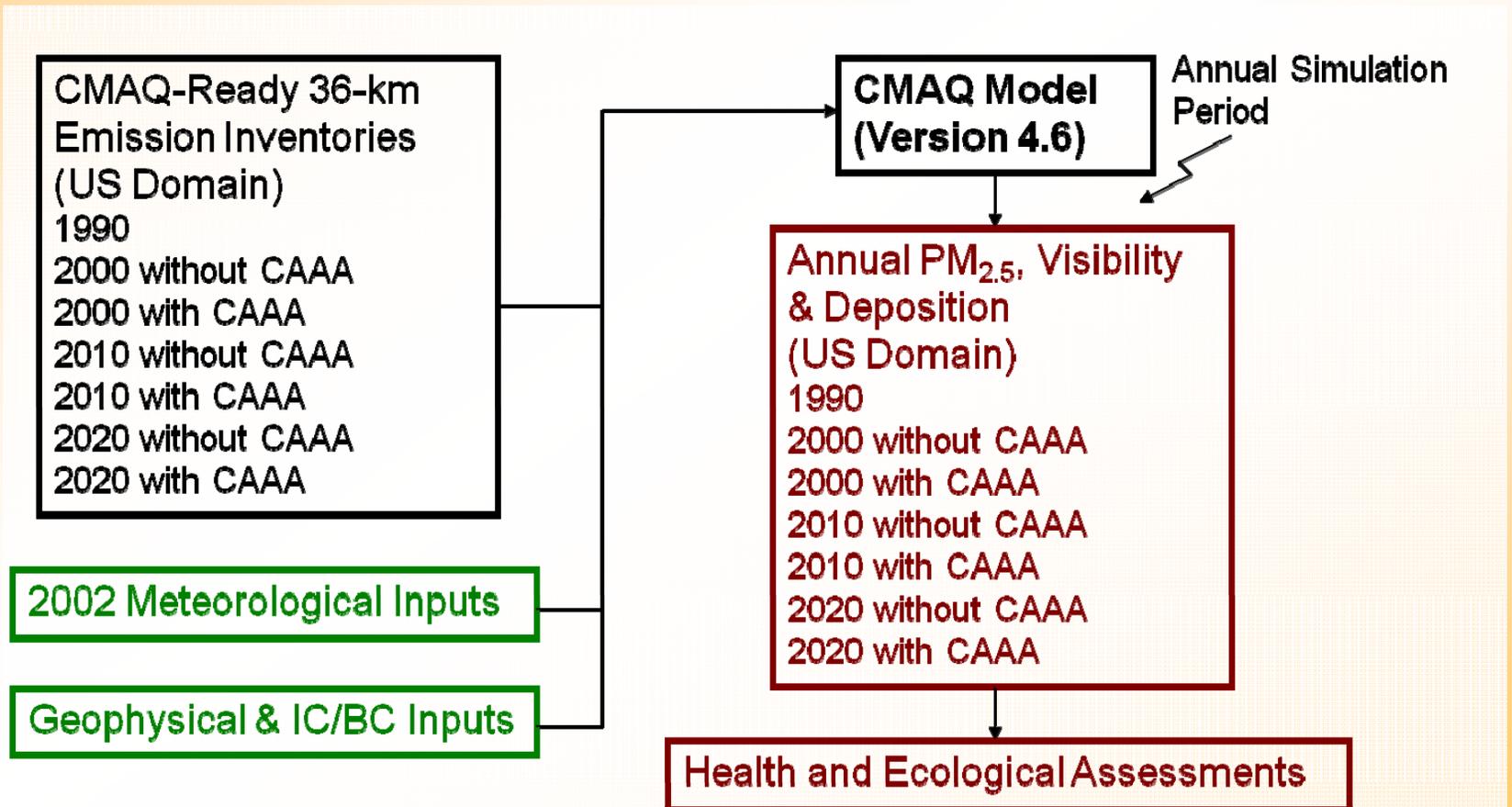
Draft Final

In Progress

SMOKE Emissions Processing

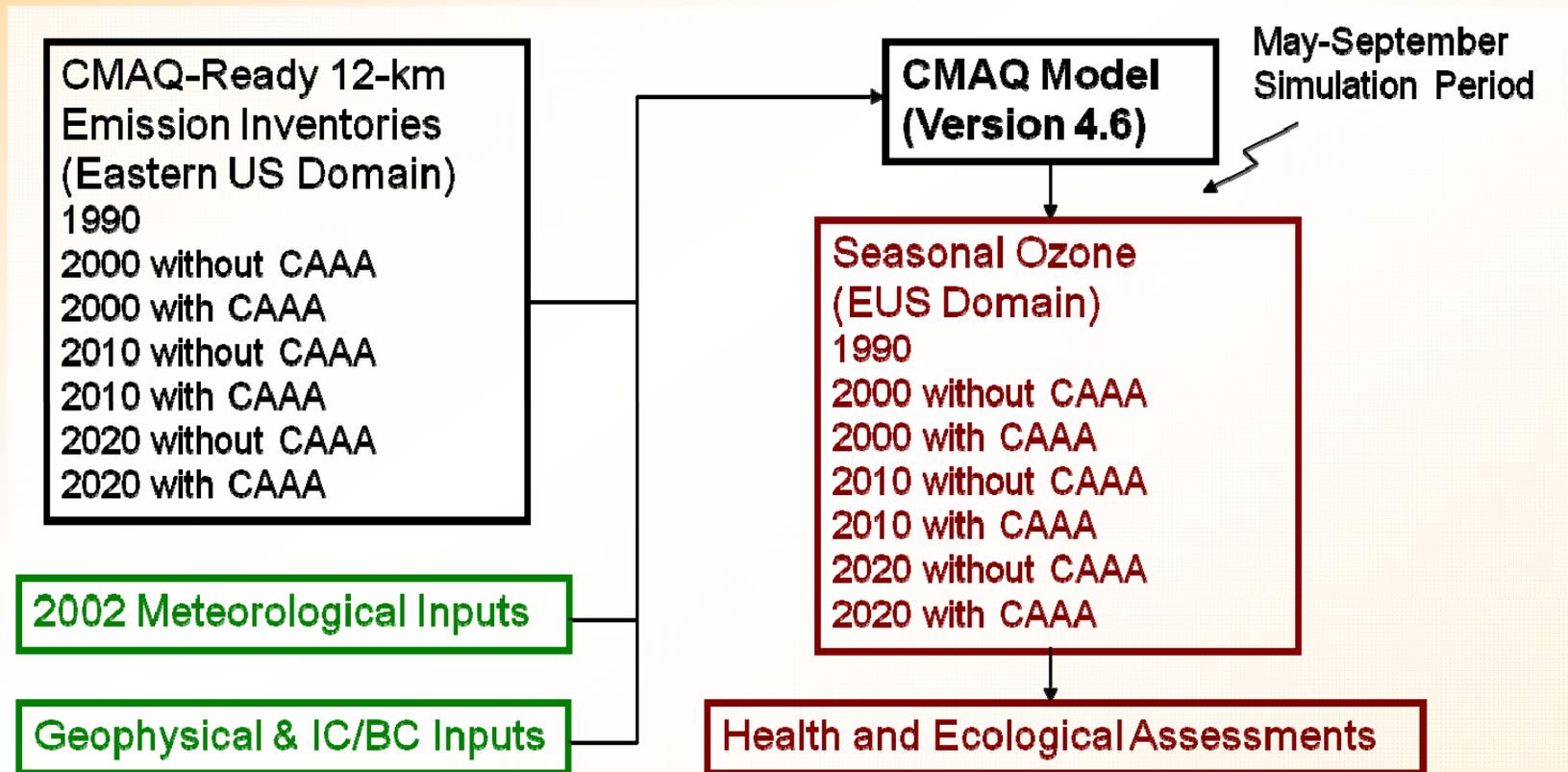


CMAQ 36-km 48-State Model Runs



CMAQ EUS 12-km Model Runs

(similar for WUS domain)

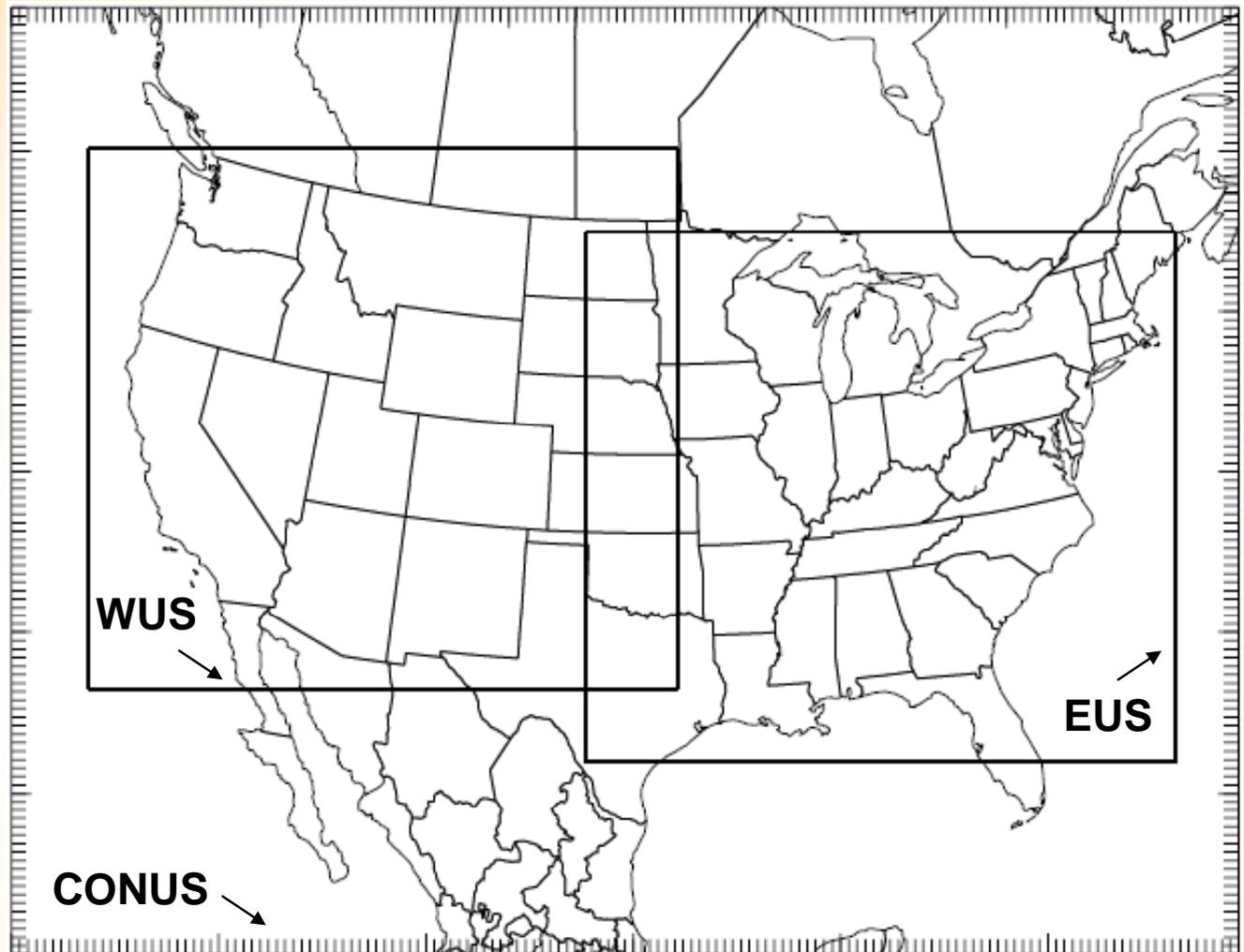


Modeling Domains

Continental
U.S.
(CONUS)
36 km
PM_{2.5},
(Ozone),
Deposition

Eastern U.S.
(EUS)
12 km
Ozone

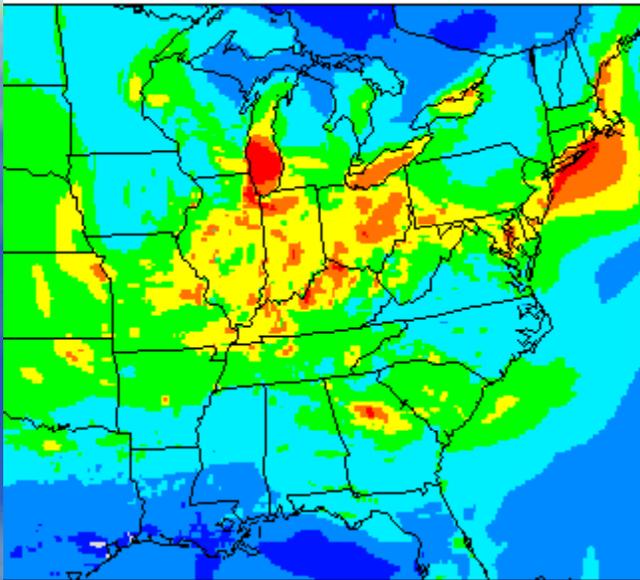
Western U.S.
(WUS)
12 km
Ozone



Ozone Modeling Results (EUS): 2010

O₃

CMAQ 12km Domain
Max 8-hr Conc: 2010 Without CAAA



213

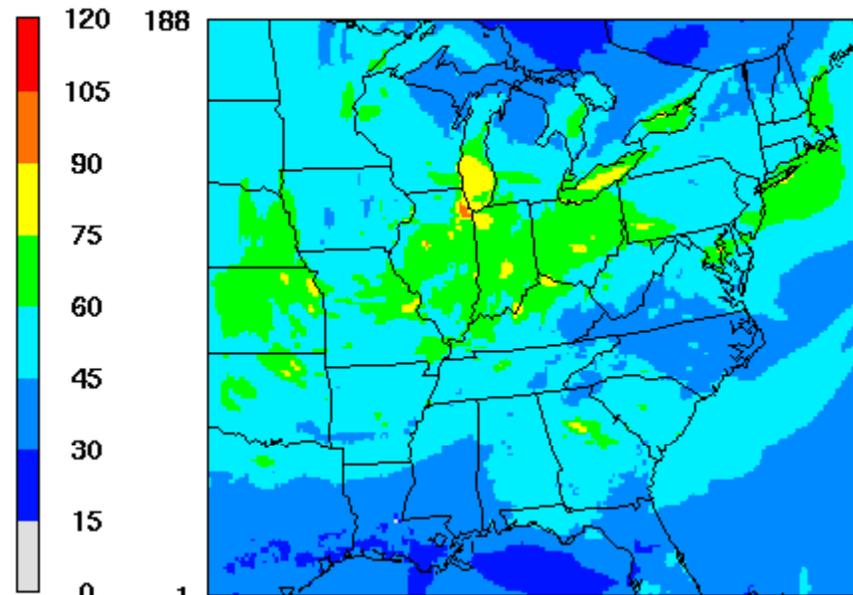
ppb

July 15, 2002 0:00:00
Min= 4 at (39,9), Max= 124 at (84,140)

Without CAAA

O₃

CMAQ 12km Domain
Max 8-hr Conc: 2010 With CAAA



1

213

July 15, 2002 0:00:00
Min= 14 at (63,25), Max= 102 at (85,127)

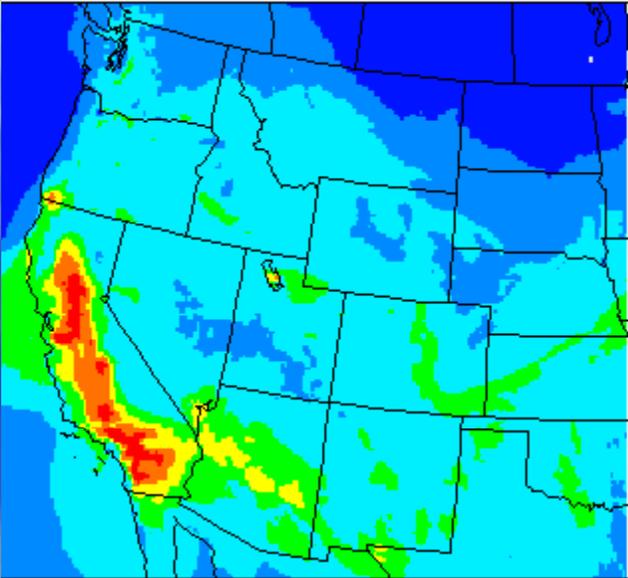
With CAAA

Daily Maximum 8-Hour Ozone; Units are ppb

Ozone Modeling Results (WUS): 2010

O3

CMAQ 12km WUS Domain
Max 8hr Conc: 2010 WithoutCAAA



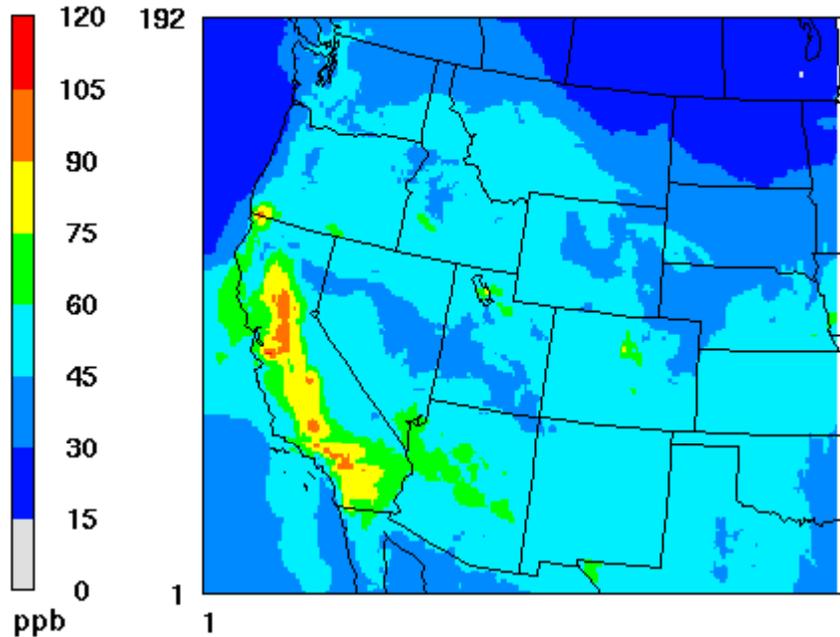
213

August 15, 2002 0:00:00
Min= 14 at (201,173), Max= 139 at (24,81)

Without CAAA

O3

CMAQ 12km WUS Domain
Max 8hr Conc: 2010 WithCAAA



1

213

August 15, 2002 0:00:00
Min= 14 at (201,173), Max= 111 at (24,81)

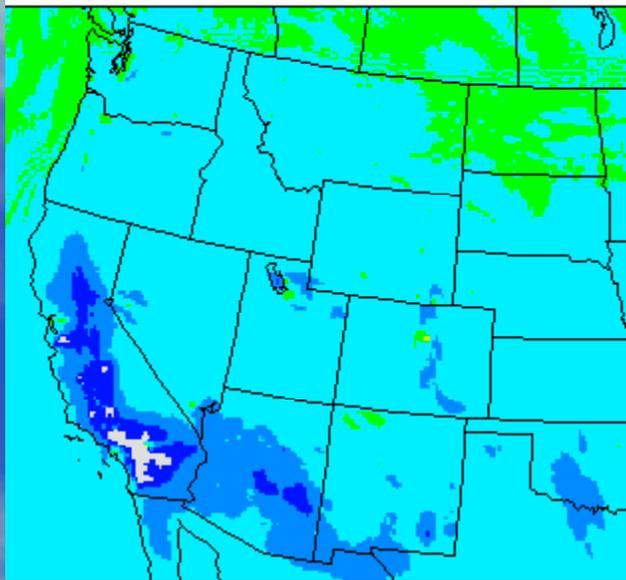
With CAAA

Daily Maximum 8-Hour Ozone; Units are ppb

Difference in Simulated 8-Hr Ozone With CAAA – Without CAAA: 2010

O3

CMAQ 12km WUS Domain
Difference of Max 8-hr Conc: 2010 (With - Without) CAAA

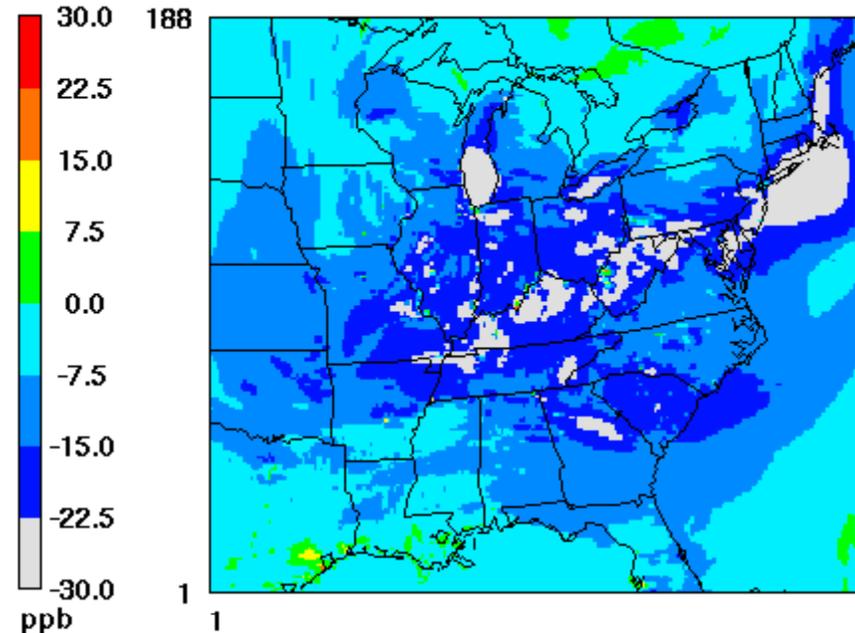


213

August 15, 2002 0:00:00
Min=-35.4 at (41,49), Max= 10.4 at (145,82)

O3

CMAQ 12km Domain
Difference of Max 8-hr Conc: 2010 (With - Without) CAAA



1

213

July 15, 2002 0:00:00
Min=-38.9 at (192,138), Max= 42.2 at (73,115)

Daily Maximum 8-Hour Ozone; Units are ppb

Draft 812 Benefits Report – Fig. 1-3

Benefit Category	Exposure Estimation	Physical Effects Estimation	Economic Value Estimation
Health Effects	Model Attainment Test Software (MATS) for PM; Enhanced Voronoi Neighbor Averaging (eVNA) for ozone	Benefits Mapping and Analysis Program (BenMAP)	
Visibility	CMAQ-derived deciview estimates		Custom benefits transfer models
Agriculture and Productivity	eVNA extrapolation , BenMAP procedure, and offline GIS analysis	NCLAN-based concentration-response functions	and Agricultural Sector Optimization Model (FASOM)
Materials Damage	Air Pollution Emissions Experiments and Policy (APEEP) model		
Lake Acidification	CMAQ deposition outputs	Model of Acidification of Groundwater in Catchments (MAGIC)	Custom random-utility model for lakes
Note: Models and approaches are described in detail in Chapters 2 through 5 of this report.			

Draft 812 Benefits Report – Fig. 1-4

Benefit Category	Monetized Benefits (million 2006\$) by Target Year			Notes
	2000	2010	2020	
Health Effects				
- PM Mortality	\$460,000	\$730,000	\$1,100,000	- PM mortality estimates based on Pope et. al (2002) - Ozone mortality estimates based on pooled C/R function
- PM Morbidity	32,000	52,000	76,000	
- Ozone Mortality	4,300	14,000	26,000	
- Ozone Morbidity	420	1,300	2,100	
Subtotal Health Effects	\$500,000	\$800,000	\$1,200,000	
Visibility				
- Recreational				
- Residential				
Subtotal Visibility	[Not available for this draft]			
Agricultural and Productivity	[Not available for this draft]			
Materials Damage	[Not available for this draft]			
Ecological	[Not available for this draft]			
Total: all categories	[Not available for this draft]			
<p>Note: See Chapters 2 through 5 of this report for detailed results summaries. All estimates are mean values from distributions of the primary estimate results. Additional, alternative estimates are provided in the separate companion report on uncertainty. Estimates presented with two significant figures.</p> <p>Red = undergoing revision</p>				

Next Steps

- ⇒ Air Quality Modeling Subcommittee
 - ↳ March 15 teleconference follow-up to February 19 review
- ⇒ Complete remaining analytical work, draft overall report
- ⇒ Council
 - ↳ May 4-5 review
- ⇒ Final fixes and revised draft overall report