

Utah's Air Quality Program

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Utah Department of
**Environmental
Quality**

Air Quality Issues

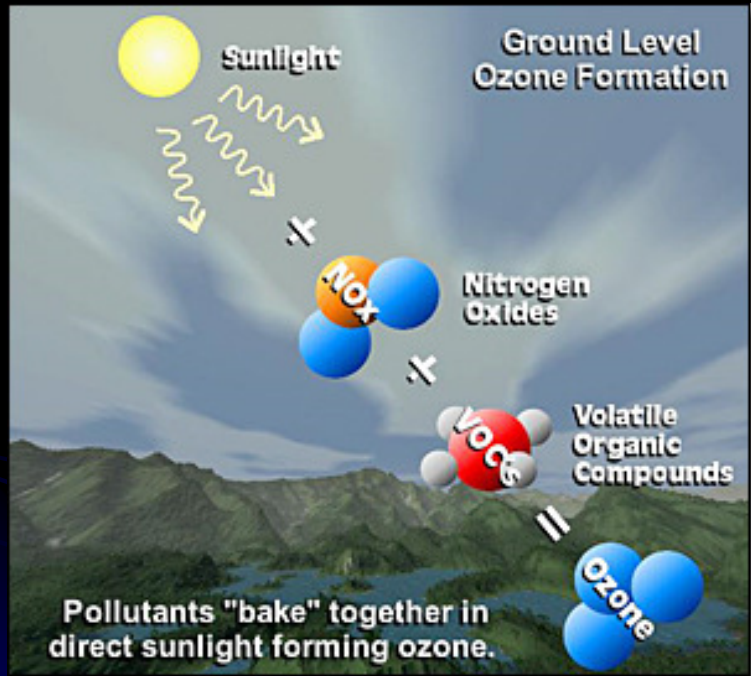
- Current Status Update
 - Air Quality Trends
 - Recent Actions
 - Solid Fuel Burning Analysis
- Key Upcoming Issues
 - New ozone standard
 - Clean Power Plan

Utah experiences good air quality, except for about 5% of days on average when we exceed current federal health standards



Air Pollutants

Ground Level Ozone



Particulate Matter PM₁₀ and PM_{2.5}

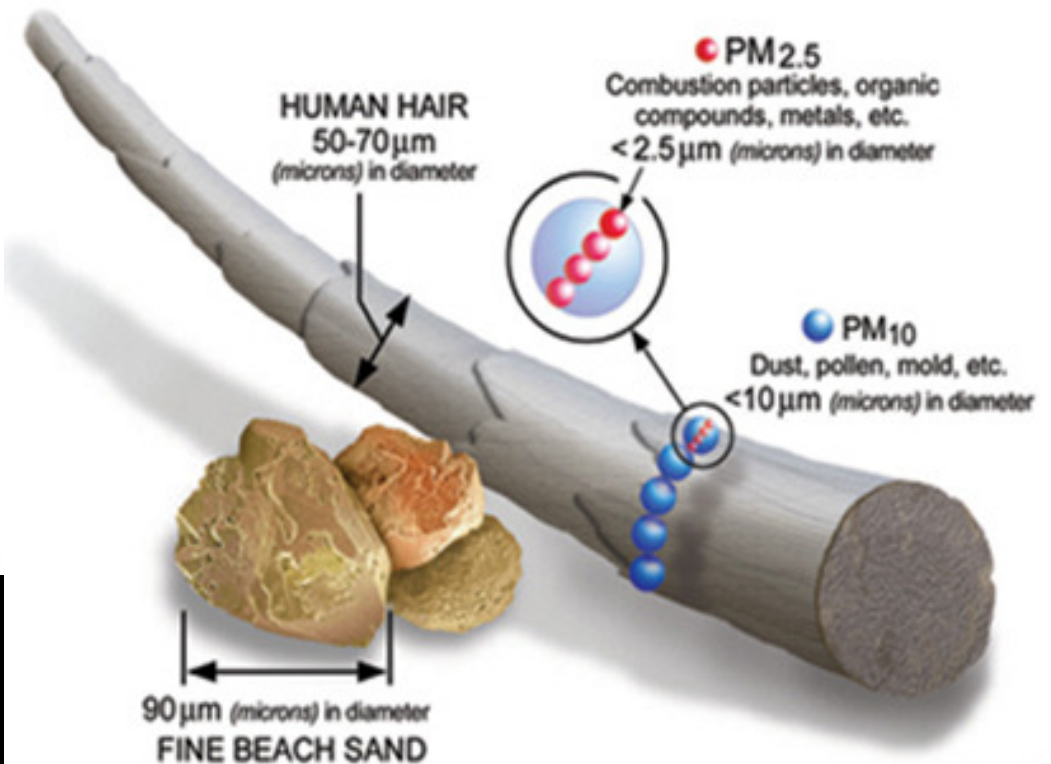


Image courtesy of the U.S. EPA

National Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾		
Lead	0.15 µg/m ³ ⁽²⁾	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m ³	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb (0.053 ppm)	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour ⁽³⁾	None	
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour ⁽⁴⁾	Same as Primary	
Particulate Matter (PM _{2.5})	12 µg/m ³	Annual ⁽⁵⁾ (Arithmetic Average)	Same as Primary	
	35 µg/m ³	24-hour ⁽⁶⁾	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour ⁽⁷⁾	Same as Primary	
	0.08 ppm (1997 std)	8-hour ⁽⁸⁾	Same as Primary	
	0.12 ppm	1-hour ⁽⁹⁾	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm (1300 µg/m ³)	3-hour ⁽¹⁾
	0.14 ppm	24-hour ⁽¹⁾		
	75 ppb ⁽¹⁰⁾	1-hour	None	

Revised

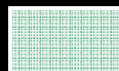
2006



2008



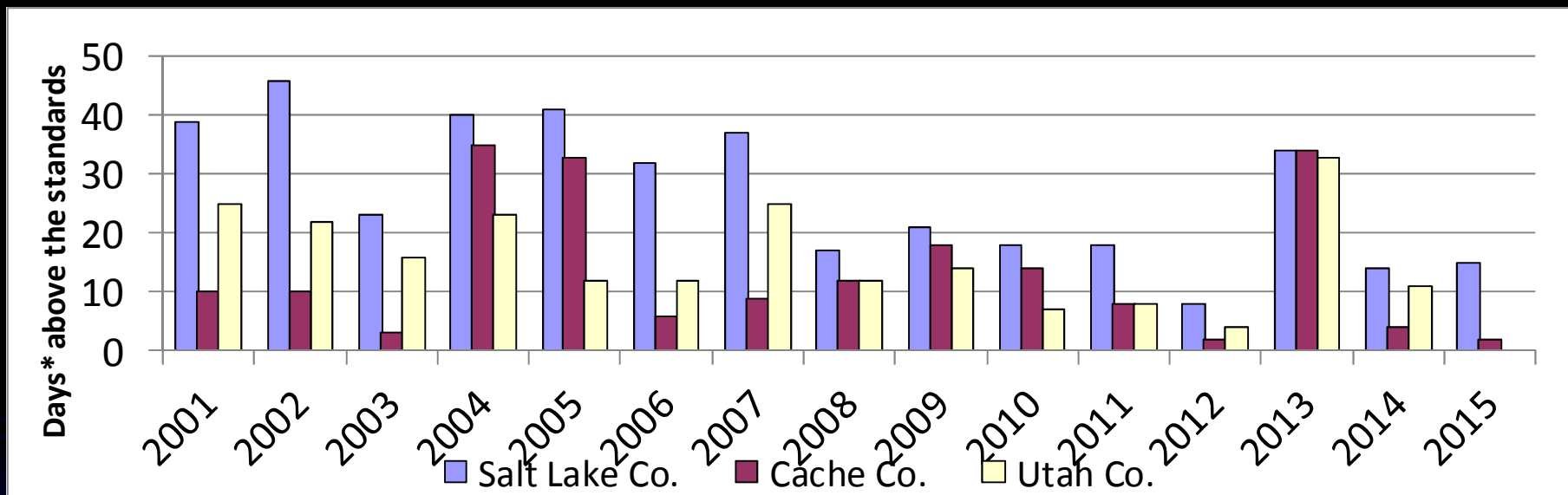
2010



2012

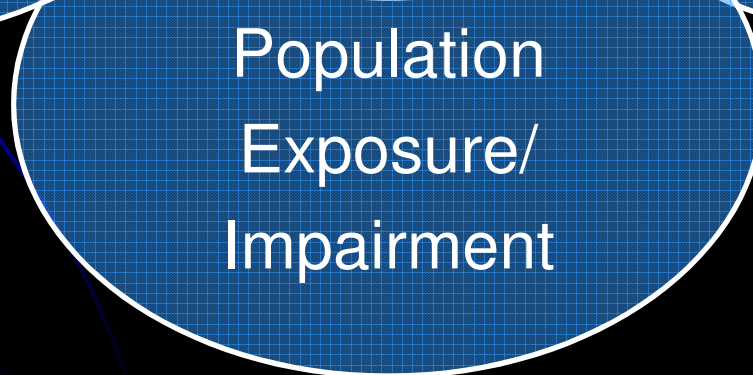
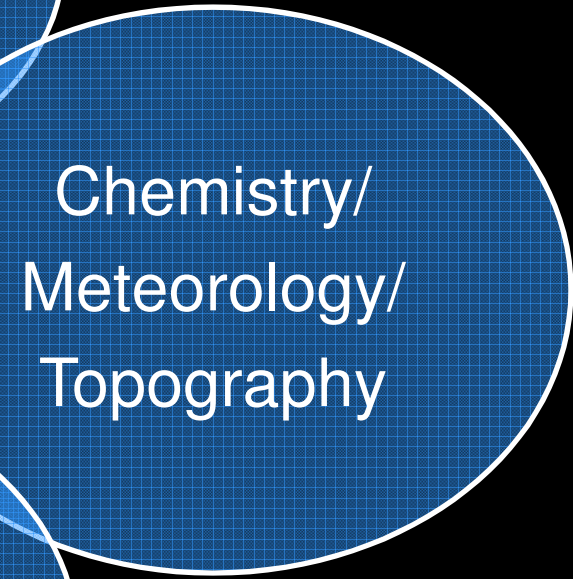
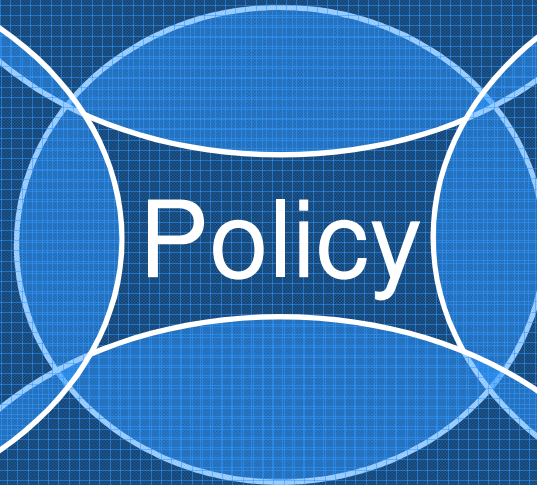
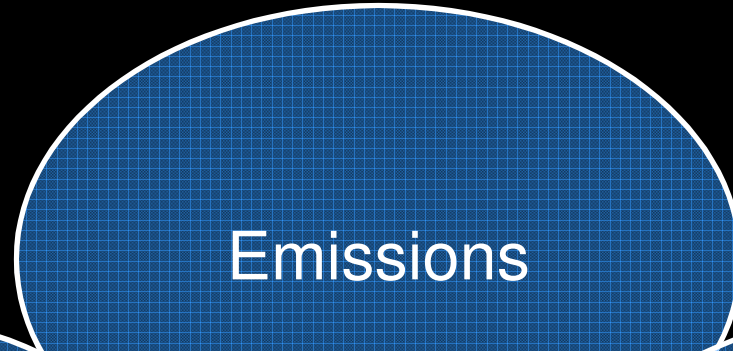
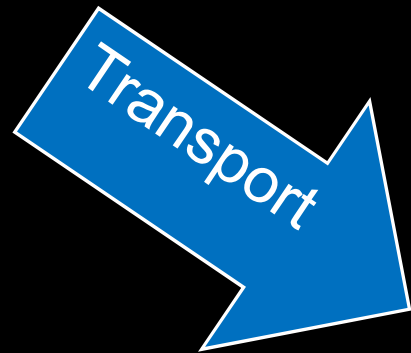


Number of Days That Are and Those That Would Have Been Above the Current Federal Standards Salt Lake, Cache, and Utah County Areas

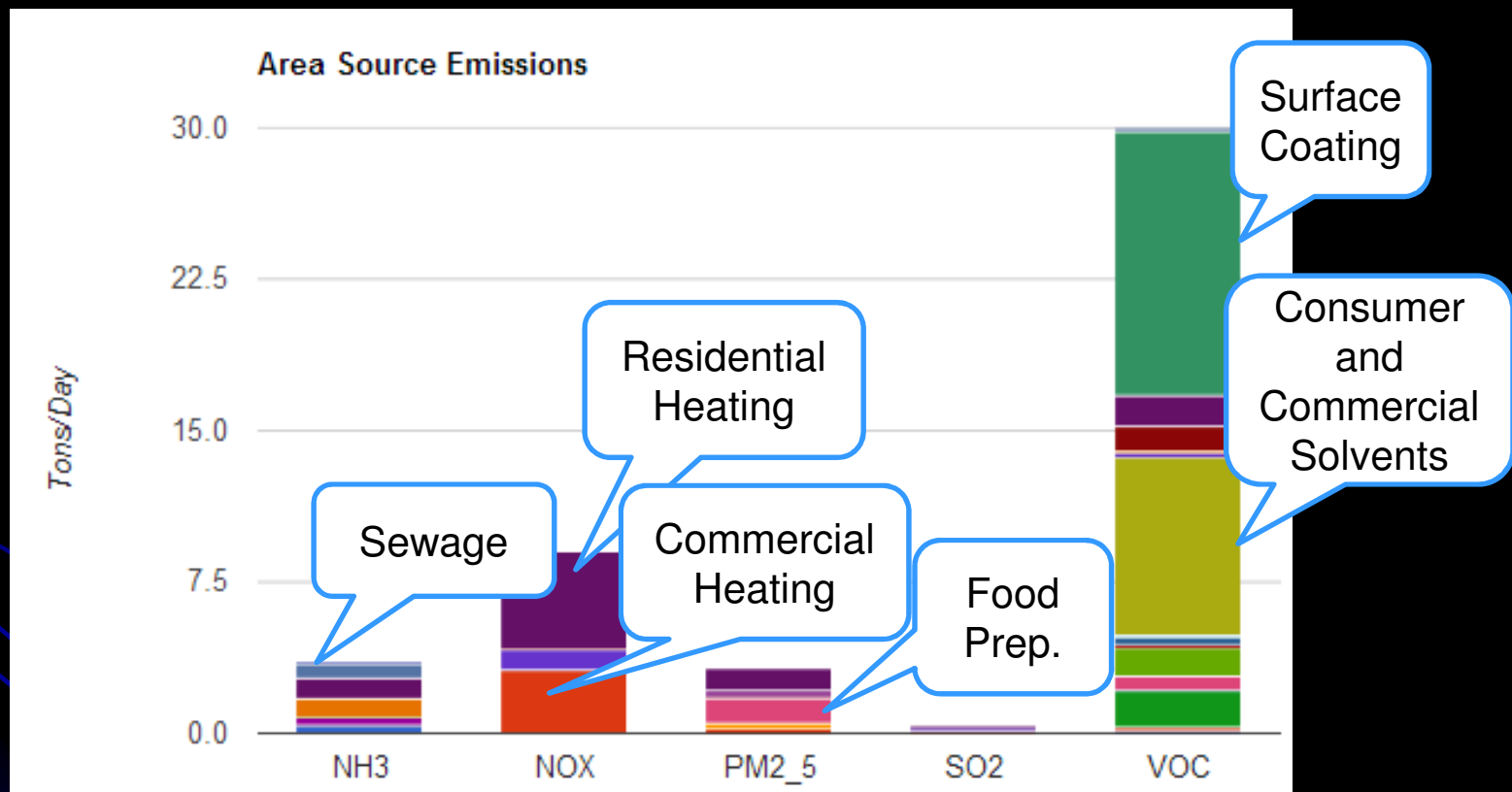


* Days with monitored values above the level of the **current** National Ambient Air Quality Standards combined for PM2.5 and ozone (PM2.5 standard revised in 2006, ozone standard revised in 2008) through 7/14/2015

Air Quality



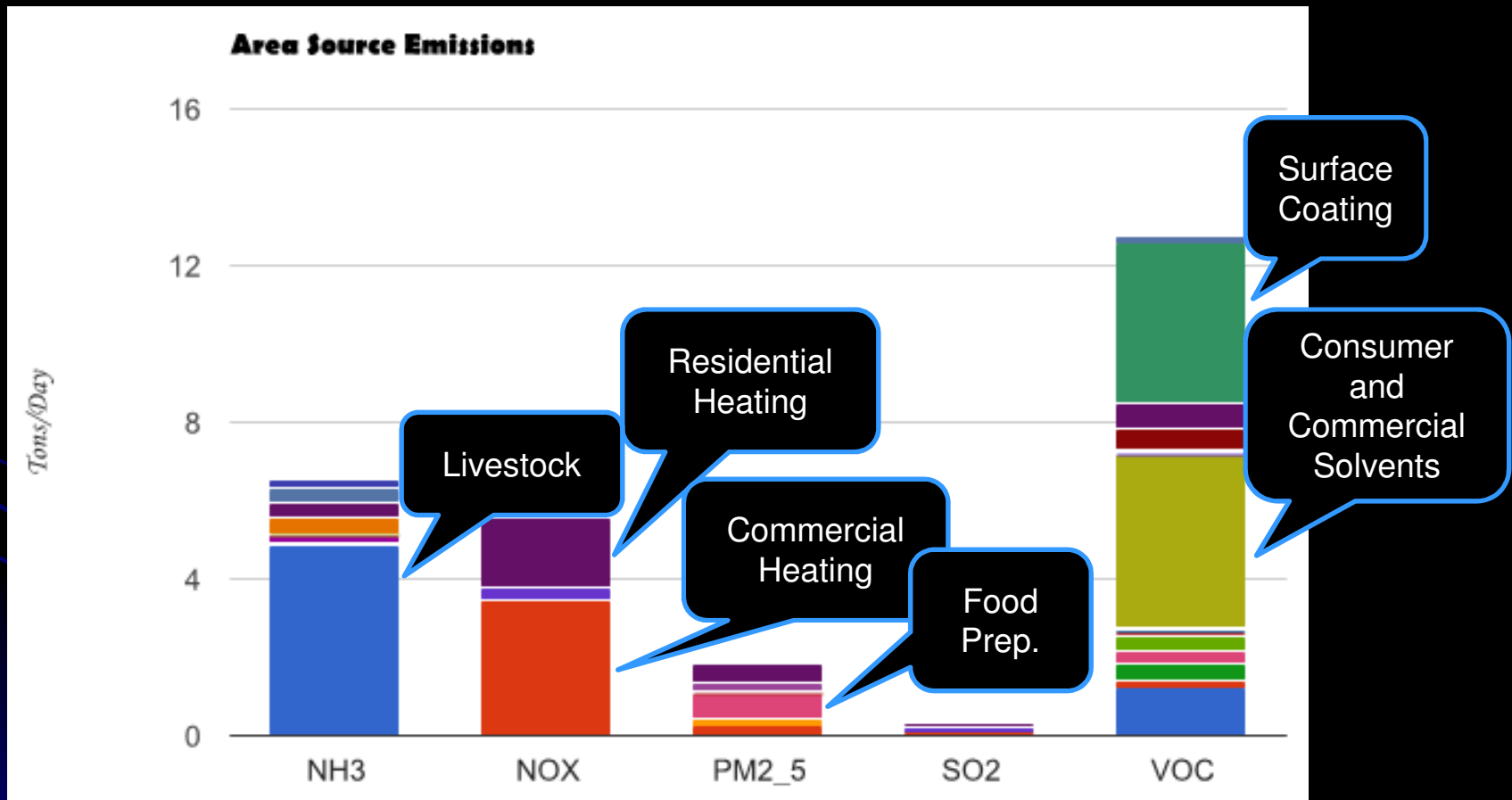
SL County Area Source Emissions



Download emissions data at:

<http://www.airquality.utah.gov/Pollutants/ParticulateMatter/PM25/presentations/index.html>

Utah County Area Source Emissions



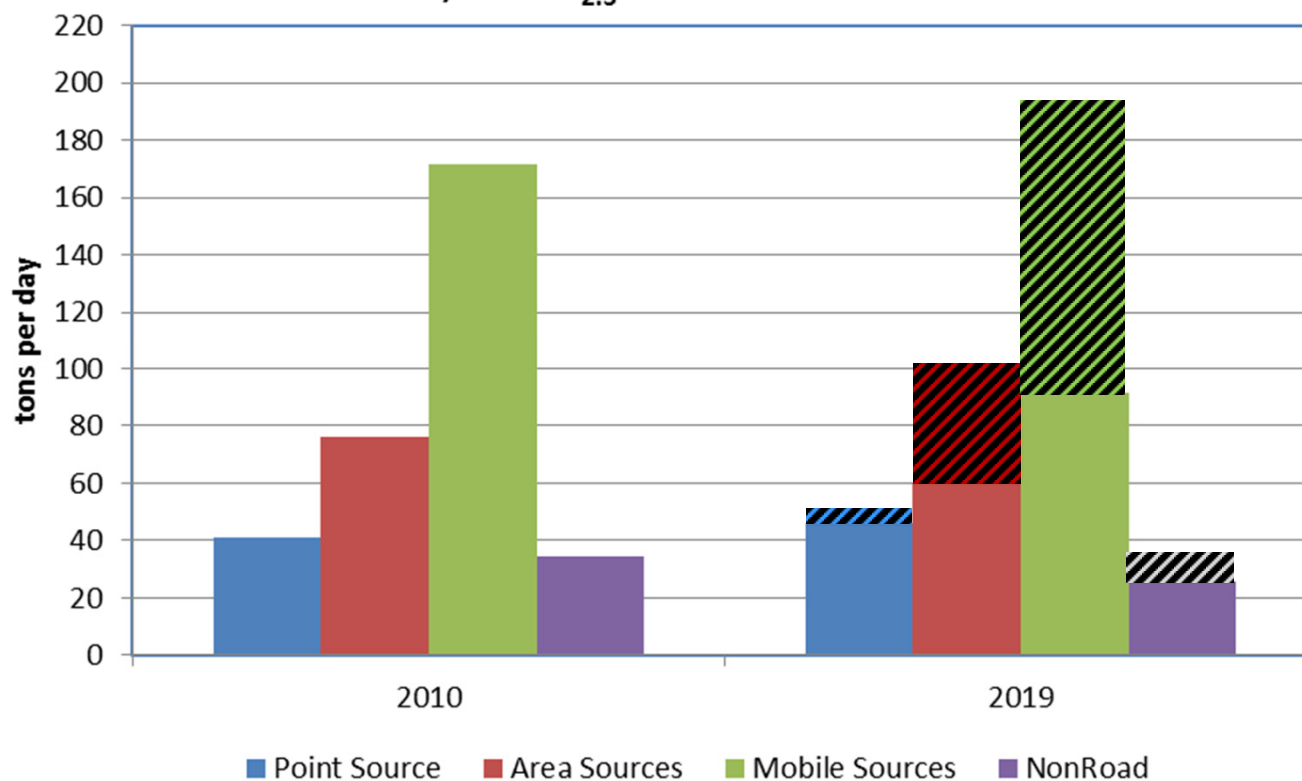
Download emissions data at:
<http://www.airquality.utah.gov/Pollutants/ParticulateMatter/PM25/index.html>

Emission Reductions by Source Category

Identified In the SLC, UT PM_{2.5} SIP

/// Hashed = SIP reductions

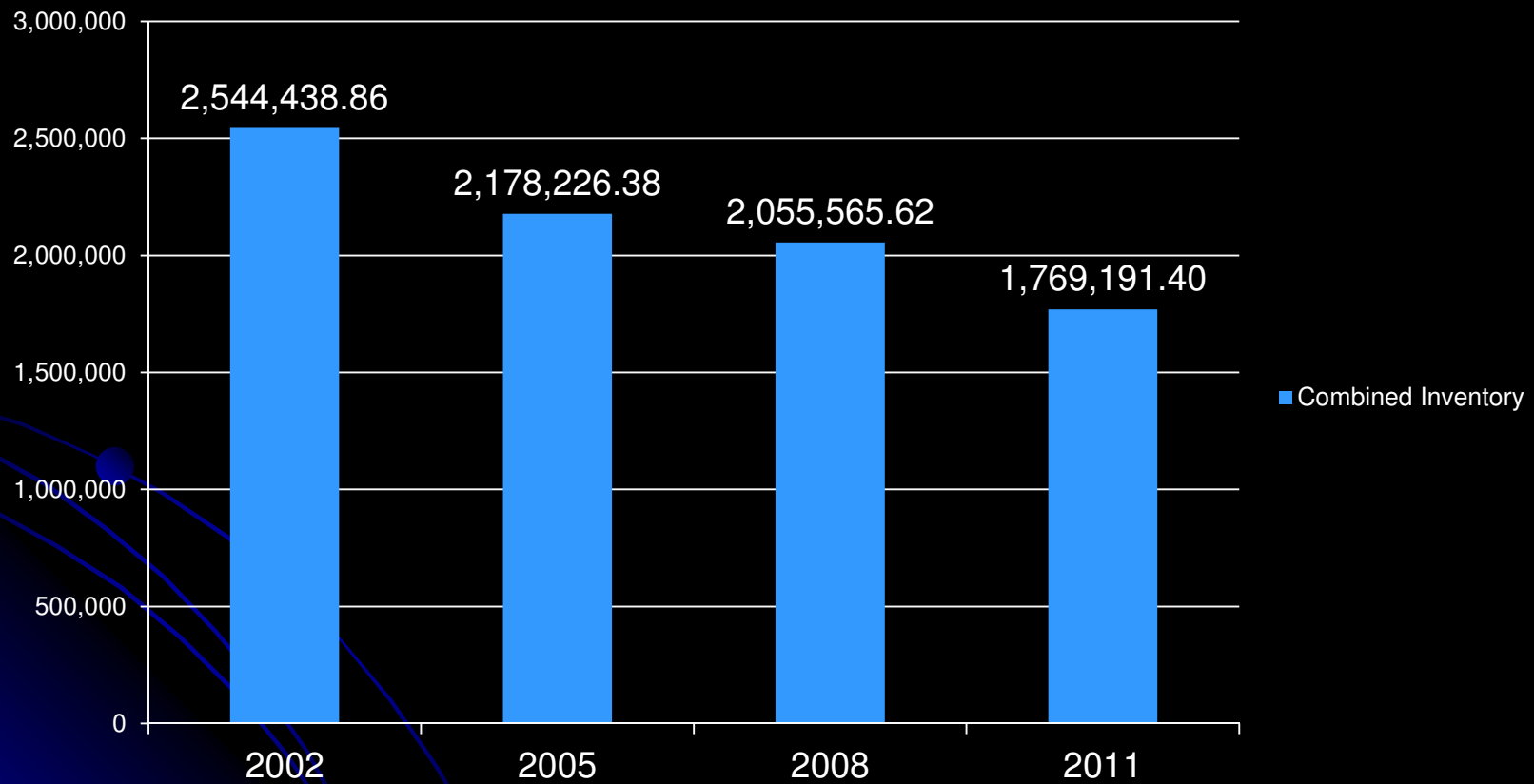
Aggregate Emissions (PM_{2.5} + SO₂ + NO_x + VOC)
SLC, UT PM_{2.5} Nonattainment Area



Utah Summary of State Air Emissions

Total Tons Emittted

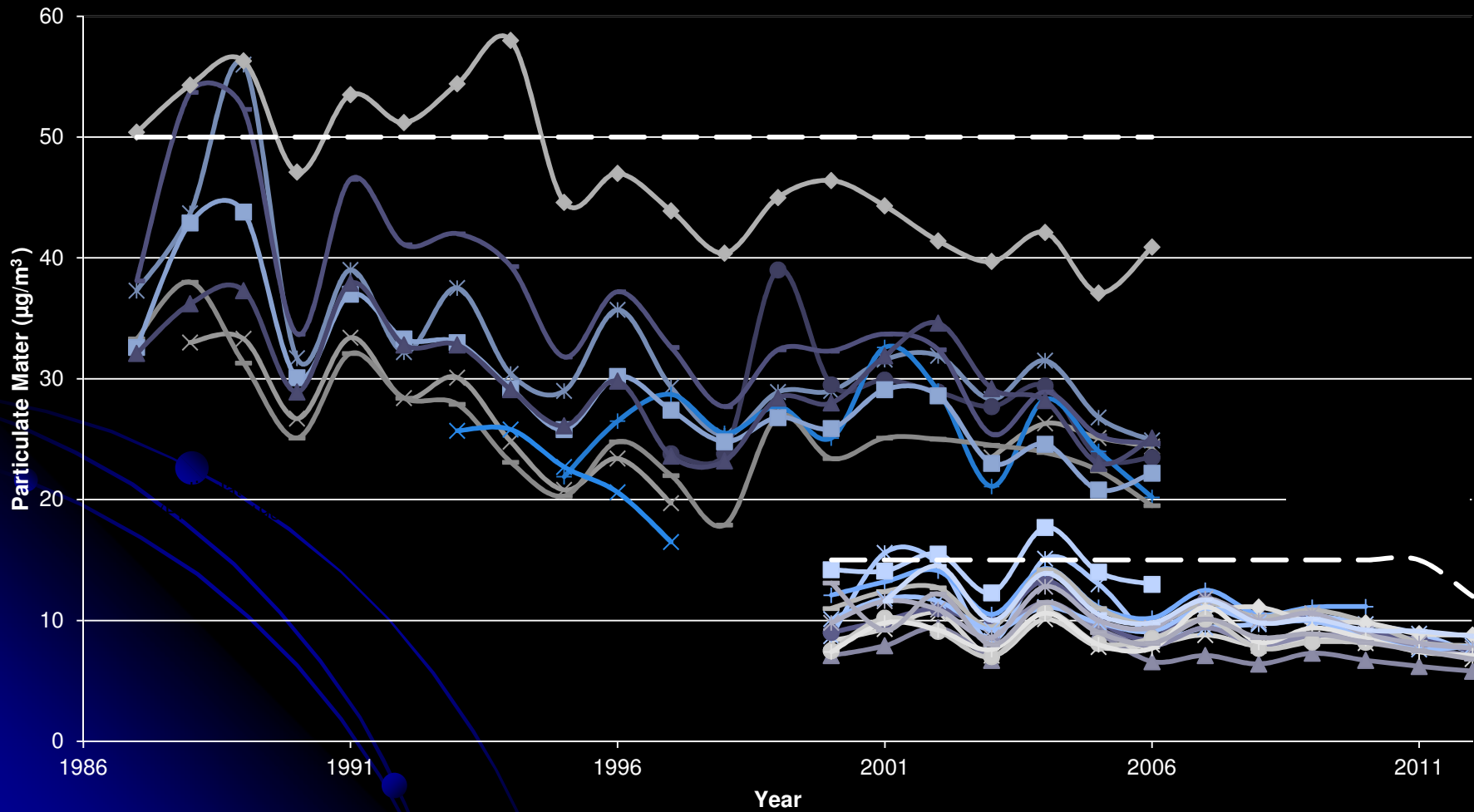
Statewide Emissions



<http://www.deq.utah.gov/ProgramsServices/programs/air/emissionsinventories/inventories/index.htm>

Particulate Matter (PM) Standards - Annual

- | | | | | |
|--|---|-----------------------------|------------------------|-----------------------|
| —x— PM10-Bountiful (BT/BV) | —x— PM10-Cottonwood | —●— PM10-Hawthorne | —+— PM10-Logan | —●— PM10-Lindon |
| —●— PM10-Magna | —●— PM10-N. Salt Lake | —■— PM10-North Provo | —▲— PM10-Ogden (O2/RV) | —x— PM10-Tooele (GV) |
| —x— PM2.5-Brigham City | —x— PM2.5-Logan | —●— PM2.5-Bountiful (BT/BV) | —+— PM2.5-Cottonwood | —●— PM2.5-Magna |
| —●— PM2.5-Hawthorne | —●— PM2.5-Rose Park | —■— PM2.5-N. Salt Lake | —▲— PM2.5-Tooele (T3) | —x— PM2.5-North Provo |
| —x— PM2.5-Lindon | —●— PM2.5-Highland | —+— PM2.5-Spanish Fork | —●— PM2.5-Ogden (O2) | —●— PM2.5-Harrisville |
| — - - - PM10 Standard (Annual)($\mu\text{g}/\text{m}^3$) | — - - - PM2.5 Standard (Annual)($\mu\text{g}/\text{m}^3$) | | | |



Effects of Regional Haze



Regional Haze Key Points

- Utah was one of the first states to develop and implement a regional haze State Implementation Plan (RH SIP) in 2003
- The RH SIP was updated in 2008 following a revision to the implementation requirements by EPA
- The RH SIP was substantially approved in 2012 by EPA including a determination that Utah had met the reasonable progress demonstration for the first planning period (77 FR 74355, December 14, 2012)
- EPA determined that two technical elements were not adequately addressed in the RH SIP but again determined that the overall plan was adequate. The Air Quality Board addressed these elements through a SIP revision on April 4th, 2015

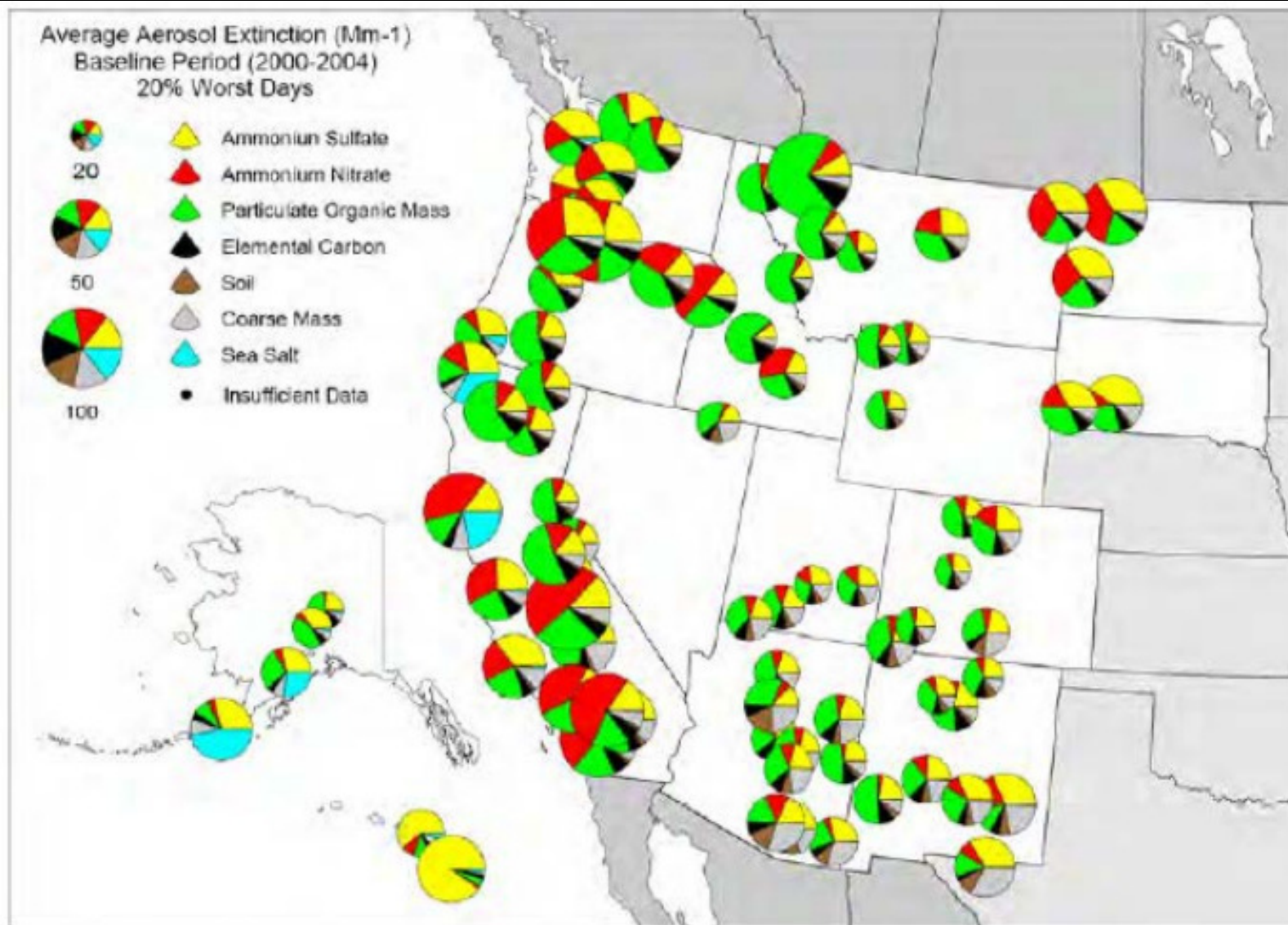
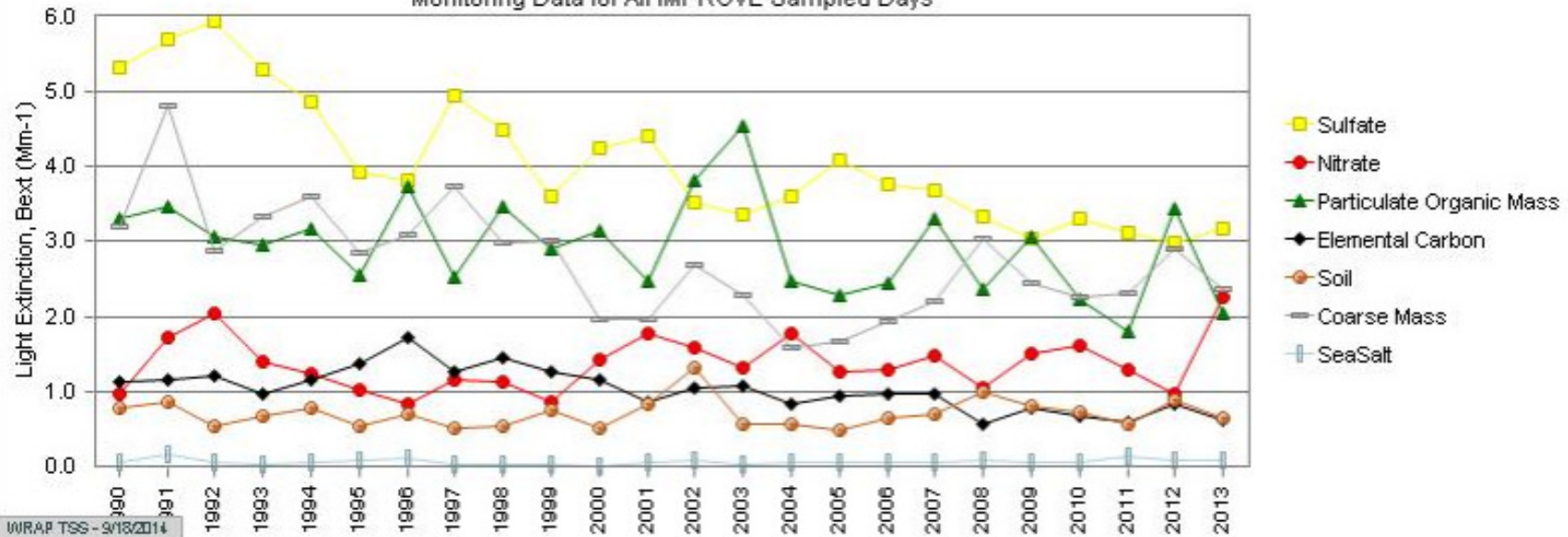
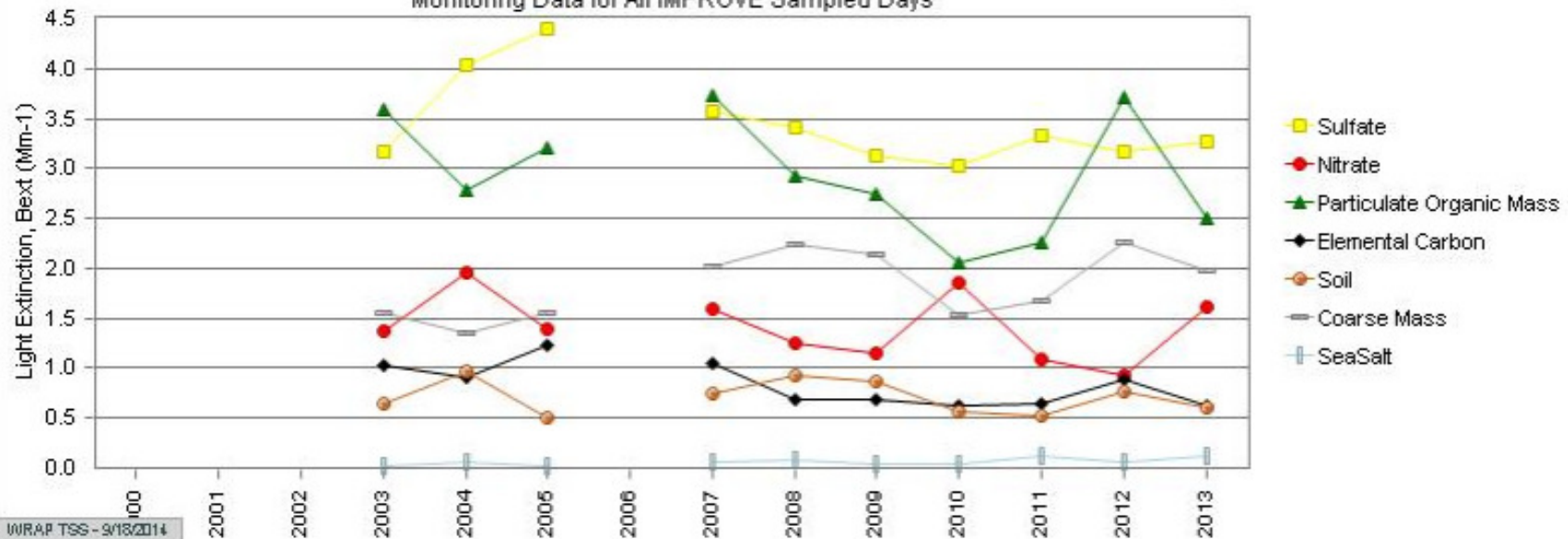


Figure 3.4. Regional Average of Aerosol Extinction by Pollutant for Baseline Period average (2000-2004) for 20% Worst Days.

Arches NP, UT: Canyonlands NP, UT Class I areas
Monitoring Data for All IMPROVE Sampled Days

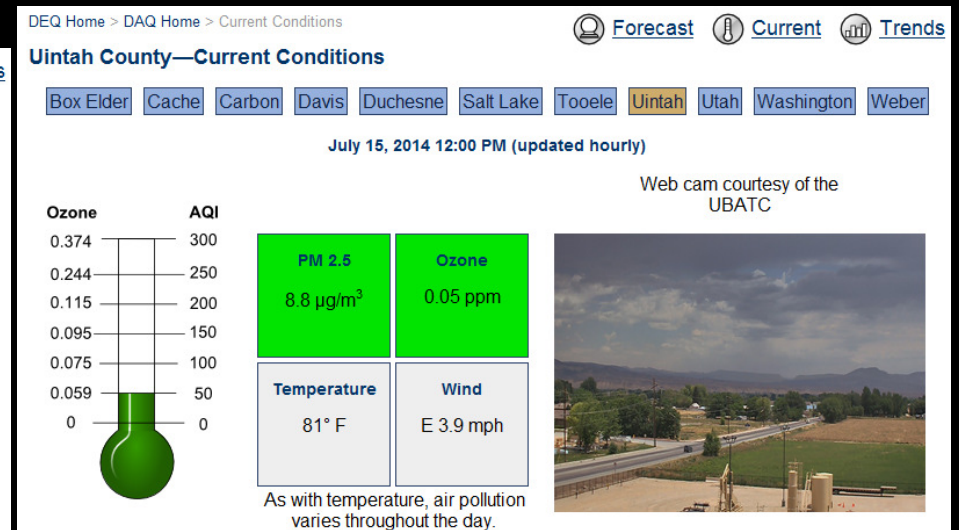
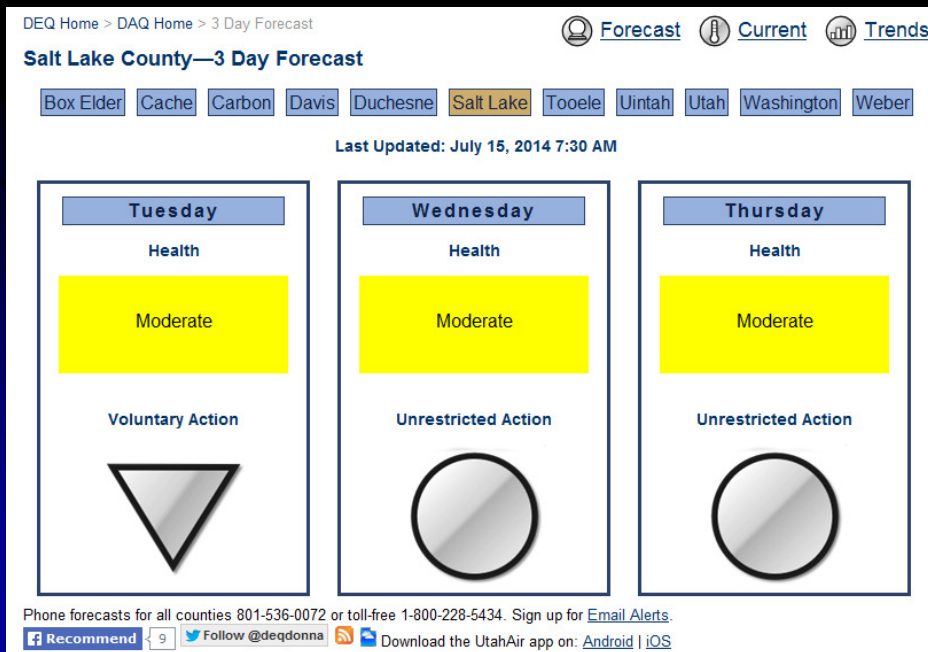


Capitol Reef NP, UT Class I area
Monitoring Data for All IMPROVE Sampled Days



Three Day Forecast

- Notify the Public of:
 - Forecast Air Quality Conditions to allow the Public to Plan Activities
 - Public Health Advisories
- Air Pollution Alert and Action Days



Workload Challenges

- New Standards and development of State Implementation Plans
- New Monitoring Equipment Requirements
- Increased expectations for real-time access to air monitoring information
- More public participation in agency actions including appeals

2014 Compliance Activities

2009 Activities

● Inspections	1931	978
● Audits/Reviews	5287	
● Complaints Received	472	149
● Compliance Advisories	321	124
● Warning Letters	110	81
● Settlements	62	43
● Penalties Assessed	\$2,510,829	
● SEPs Credited	\$1,161,268	

Air Quality Partnerships



Hot Topics

Summer Ozone White Paper June 9,



Did you know that s season? Summer tin combined with high harder to see than cause... [Read More](#)



Envision Utah *How we grow matters.*

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CLEAR THE AIR CHALLENGE

Drive Down Your Miles

Like <1.2k

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CLEAR THE AIR UTAH

Last year, we came together and made a huge difference in Utah's air quality. This year, we're planning to surpass our goals once again by eliminating 300,000 single-occupant vehicle trips, averting 2 million miles.

Starting July 1st, the heat is on. Register for the Challenge now and get ready to blow away the competition.

TAKE THE CHALLENGE
JULY 1st - 31st, 2014

[REGISTER HERE](#)

TOTAL TRIPS ELIMINATED: 176,193 = 1,973,771 MILES SAVED = \$1,204,000 SAVED = 23,653 POUNDS OF EMISSIONS REDUCED

Utah Department of
**Environmental
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YOUR UTAH. YOUR FUTURE.

Our state's population has doubled in the last thirty years, and we're projected to add another 2.5 million people by 2050. We all love our high quality of life, our beautiful natural surroundings, and our strong economy. To protect those things that we value about living here, we need to establish a vision **together** for our Utah and our future.

How we grow matters.

Will we have **clean air to breathe**? Enough **water** for our needs? **Transportation** choices that promote a high quality of life? An affordable cost of living, with **good housing options** for everyone? **Open space**, including natural lands, agriculture, and recreational options? **Quality jobs** for all of us? An **educated** population? **Affordable energy** supplies that don't damage our air and environment? The **answers to all of these questions depend on the choices we make.**

Governor Gary Herbert has kicked off the *Your Utah, Your Future* effort which will tackle the following issues:



Incentives Update

\$100,000 in grants to reduce emissions from heavy-duty diesel engines:

- Jordan School District: \$30,642 to replace an old school bus with a new bus
- Logan City: \$40,000 to retrofit 19 city vehicles with Diesel Oxygenation Catalyst (DOCs) and Diesel Particulate Filters (DPFs)
- Nibley City: \$10,500 to retrofit three city vehicles with DOCs
- Uintah City: \$4,006 to retrofit one city vehicle with a DOC
- Utah State University: \$14,852 to retrofit a piece of equipment with a DPF

Lawnmower Exchange Program

- 388 Electric Lawnmowers were purchased at the May event
- 20 Sole Source Burning Exchanges to Natural Gas or Propane

Incentives Update (CARROT)



Environmental
Quality

<http://deq.utah.gov/ProgramsServices/programs/air/carrot/index.htm>

Research Update

Portable Monitoring Trailer*	Increase DAQ's flexibility in monitoring in different area for specific purposes. —DAQ
Toxics Study	Expand DAQ analysis of toxics monitoring; compare new, temporary WV site with 2000-2002 data; temporary site in Provo; more frequent monitoring.—DAQ & U of U
Exceptional Events Modeling (Wildfire, Aerosols, Ozone, Wind-blown Dust)	Inventory development; source apportionment; STILT & STILTCHEM model.—U of U
Cold Start Emissions	Comprehensive study of cold start emissions for policy and regulatory purposes.—USU & WSU (NCAST)
Uinta Basin Oil & Gas Emissions	Formaldehyde emissions from non combustion sources. (Identified in the UBOS study as an important contributor to ozone.)—Bingham Research Center/USU
Oil & Gas Projection/Decline Curve Analysis (Extension of DAQ Whitepaper Methodology)	Improve assumptions in the projection of Uinta Basin development and emissions growth.—U of U
Winter Ozone Photochemical Modeling I	Addresses temperature dependent reactions or organic nitrate. Builds upon the work of Dr. William Carter done for UGR Wyoming. Add SAPRC chemistry and speciation profile to CMAQ.—USU/BYU
Winter Ozone Photochemical Modeling II (CB05/CB06 Low Temperature Organic Nitrate & HONO Chemistry—Sole-source Contract with ENVIRON)	A different approach from the SAPRC mechanism but important because it can apply to summer O3 modeling. Includes consulting for implementation of the HONO chemistry improvement.—ENVIRON
Improve Winter Atmospheric Modeling (Along Wasatch Front)	Incorporate model improvements for winter conditions that were developed for the Uinta Basin into Wasatch Front cold pool conditions.—U of U
Wasatch Front Wood Burning Emissions*	Survey of residential wood burning emissions; ground truth are-source inventory.—U of U/DAQ
GSL O3 Measurement Study (Summer 2015)	Atmospheric boundary layer analysis; air quality model conceptual understanding & model verification; mobile/van surface ozone monitoring on lake perimeter; stationary monitors to compare against mobile data.—U of U/DAQ
Inversion Vertical Profile Study	Using a weather balloon to obtain detailed vertical measurements of many pollutants before, during, and after an inversion.—WSU

Education – Results

TV



OUTDOOR
(billboard)



ONLINE



RADIO



Total Impressions: **61,753,238**

Total Estimated Audience Reach: **99.7 percent**

Total Estimated Average Frequency: **32.1**

Education – Results

Have you changed any of your personal behavior to help improve Utah's air quality?



Which of the following air quality strategies have you tried in the past two months in order to help improve Utah's air quality?

- 65% Lowered Thermostat
- 64% Stopped Idling Vehicle
- 38% Carpooled
- 38% Reduced Wood Burning
- 34% Used Public Transit
- 21% Other
- 14% None

Solid Fuel Burning

- Survey of burning practices in non-attainment areas
- Additional analysis of air monitoring for source identification
- Additional consideration will follow the completion of the analysis



32% of households have burning appliances
42% of those burned in the past 12-months
95,000 cords of wood were burned

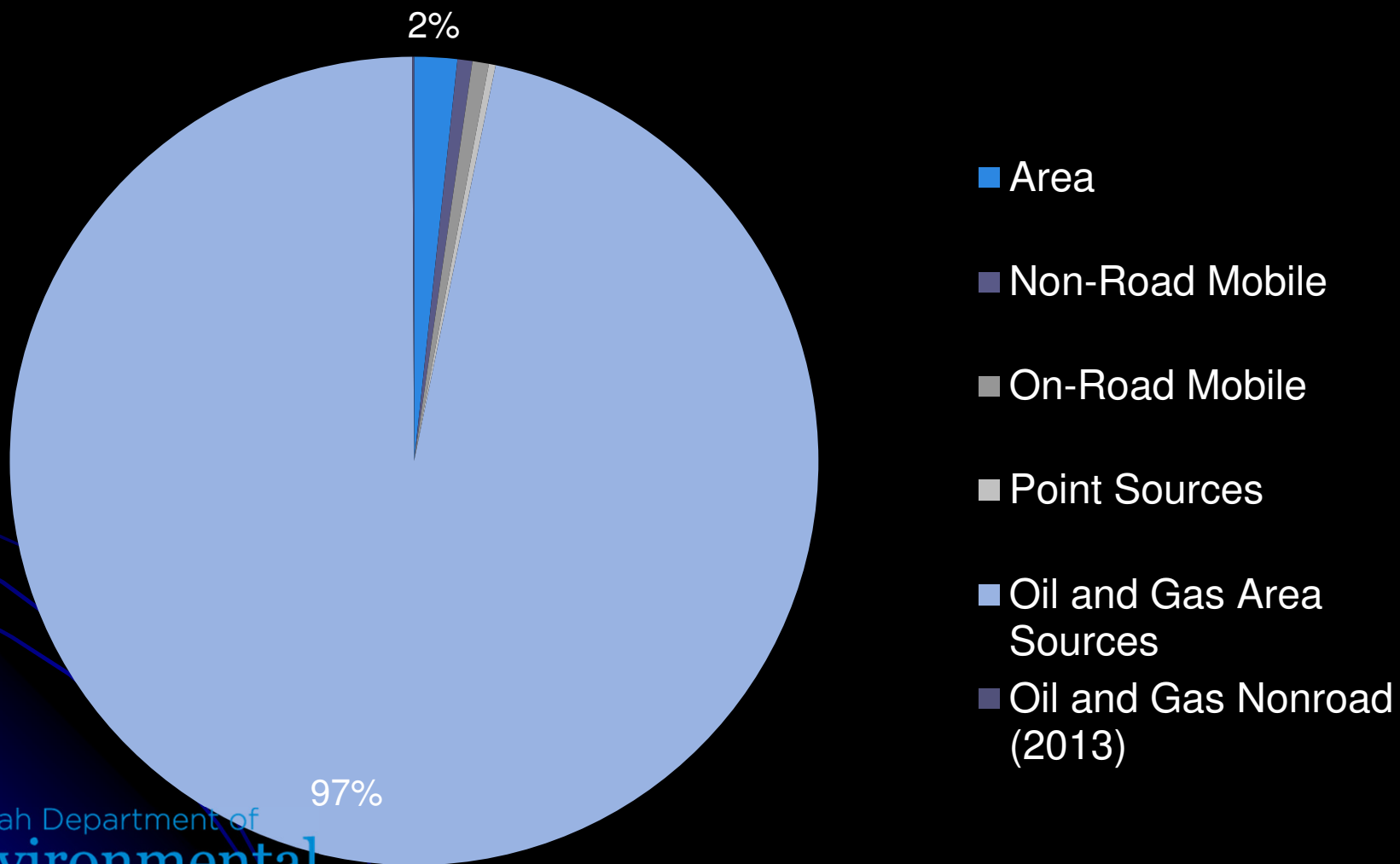
Immediate Issues

- PM2.5 Plan – Implementing 31 new rules
 - Increased incentives and education about voluntary measures (UCAIR and Envision Utah)
- PM10 SIP revision (December 2015)
- Ozone – Uinta Basin winter
 - Clean up existing equipment, Streamlined permitting for cleanest new equipment, Improved inventory through connection with Oil Gas and Mining
 - Coordination with Counties, Tribe, Industry and Land Managers to cut emissions and facilitate production
- Carbon Emissions Regulations for Electrical Generation under CAA 111(d)

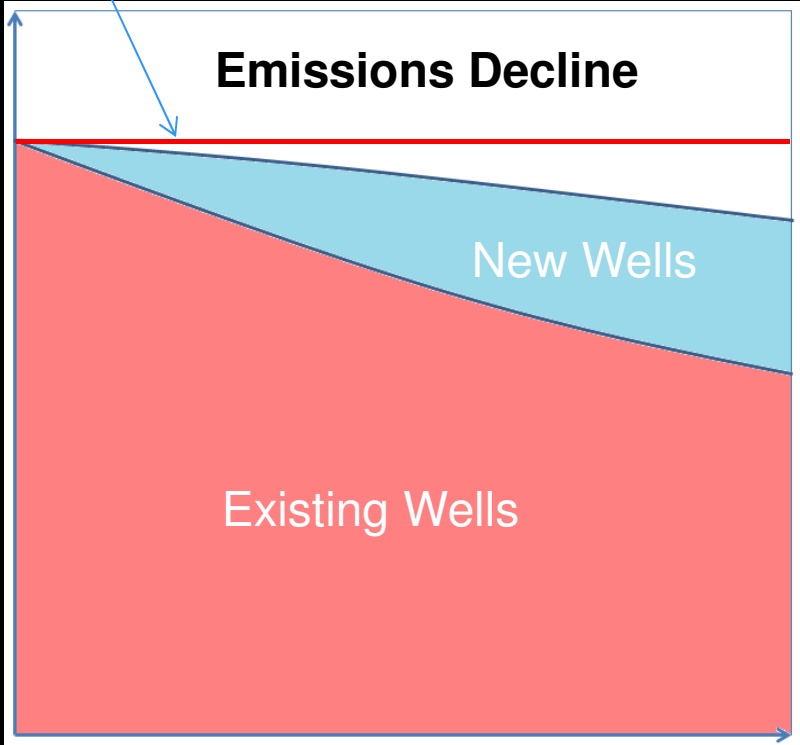
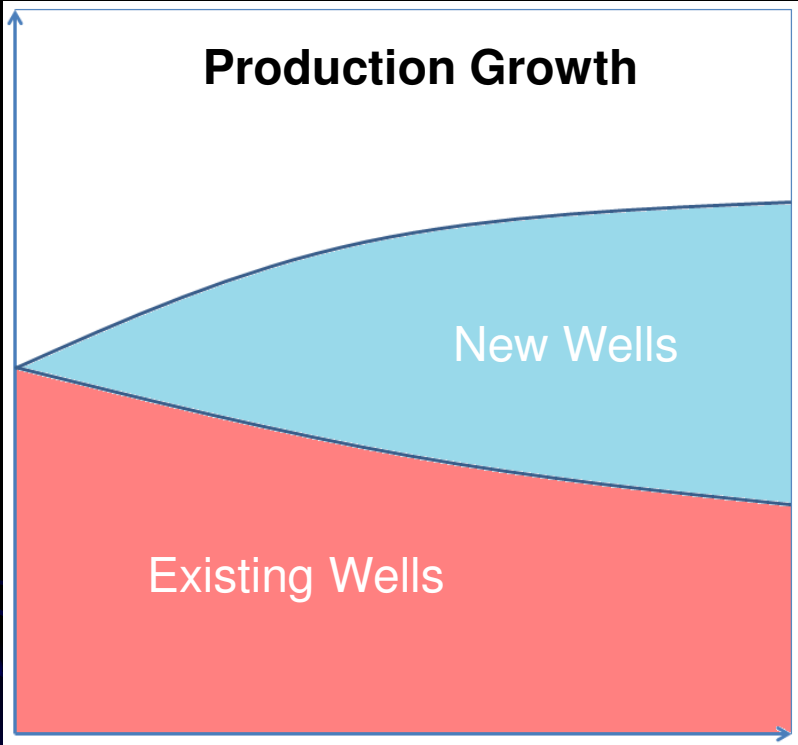
Uinta Basin Multi-Prong Approach

- Science based solutions - monitoring coupled with winter studies
- Enforcement of existing rules – review of DOGM production data
- Optimize permitting program for Oil and Gas – new GAO BACT on *new* equipment
- Reduce emissions from *existing* equipment - new rules for Oil and Gas
- Public awareness – publish air pollution data to the web with forecasts

Uinta Basin 2011 Annual Anthropogenic VOC Emissions



Current Emissions Level



* Using growth and decline factors to project VOC emissions from oil and gas production, Journal of the Air & Waste Management Association Volume 65, Issue 1, 2015

Green House Gas Regulations

EPA proposed state reduction goals for electricity generation under Section 111(d) of the Clean Air Act on June 2, 2014 (Published on June 17, with an October 16th end of comment period)

EPA to finalize the requirements in June of 2015

State "SIP-like" plans are due in June of 2016 with possible extensions to 2018

Block 1 - Efficiency Improvements at Coal-Fired Power Plants

Block 2 - Additional utilization of existing Combined Cycle Natural Gas Generation (using peaking plants for base load)

Block 3 - New Nuclear and Renewable Energy (Wind, Water, Solar and Geothermal)

Block 4 - New Demand Side Management Energy Efficiency Improvements

Utah's reduction goals:

Block 1 - 5.52%

Block 2 - 11.31%

Block 3 - 2.98%

Block 4 - 7.28%

Total reduction goal from 2012 rates - 27.08%

Western States 111(d) Goals

	Block 1	Block 2	Block 3	Block 4		
	Eff. Imp.	NG redisb	NUC&RE	DS EE	Total	
Alaska	0.81%	7.62%	3.40%	13.92%	25.76%	
Arizona	4.06%	37.92%	2.00%	7.71%	51.69%	
California	0.14%	5.01%	6.73%	11.17%	23.07%	
Colorado	5.43%	16.74%	6.53%	6.65%	35.36%	
Hawaii	1.82%	0.00%	1.75%	11.62%	15.19%	
Idaho	0.00%	0.00%	14.16%	18.58%	32.74%	
Montana	5.88%	0.00%	7.93%	7.35%	21.15%	
Nevada	1.82%	17.31%	8.00%	7.39%	34.51%	
New Mexico	4.60%	14.88%	7.19%	7.25%	33.92%	
N. Dakota	5.97%	0.00%	0.50%	4.11%	10.58%	
Oregon	2.23%	18.97%	15.76%	11.16%	48.12%	
S. Dakota	5.99%	29.52%	-14.80%	14.01%	34.71%	
Utah	5.52%	11.31%	2.98%	7.28%	27.08%	
Washington	3.70%	37.57%	19.31%	10.98%	71.56%	
Wyoming	6.00%	1.47%	8.79%	2.70%	18.96%	
	3.60%	13.22%	6.02%	9.46%	32.29%	Average

Future Issues

- Local research that informs local decisions
- Ozone – State-wide under expected 2015 revised standard
 - Understanding long-range transport, exceptional events and chemical pathways of formation
- Increased Monitoring and Modeling
 - Mercury
 - Air Toxics
- Regional Haze planning

New Ozone Standard?

Annual 4th highest PRB ozone for 2006-2008

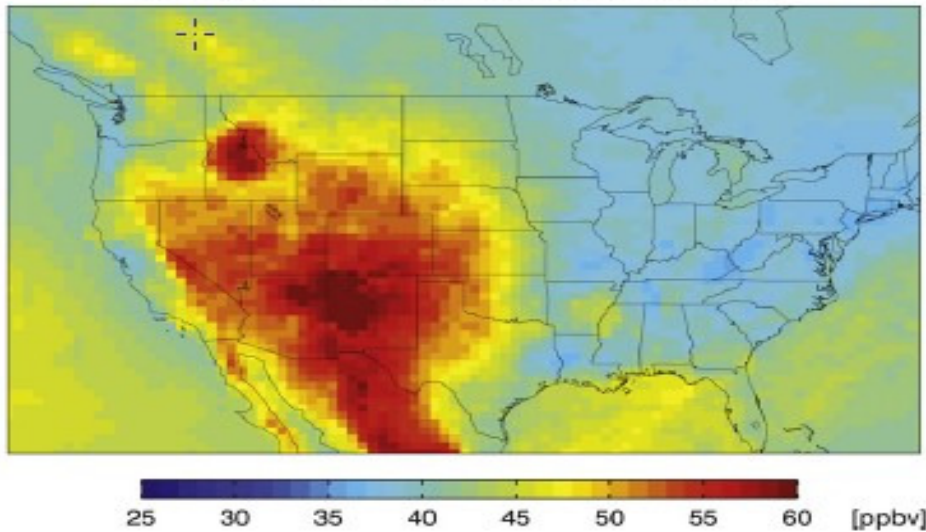
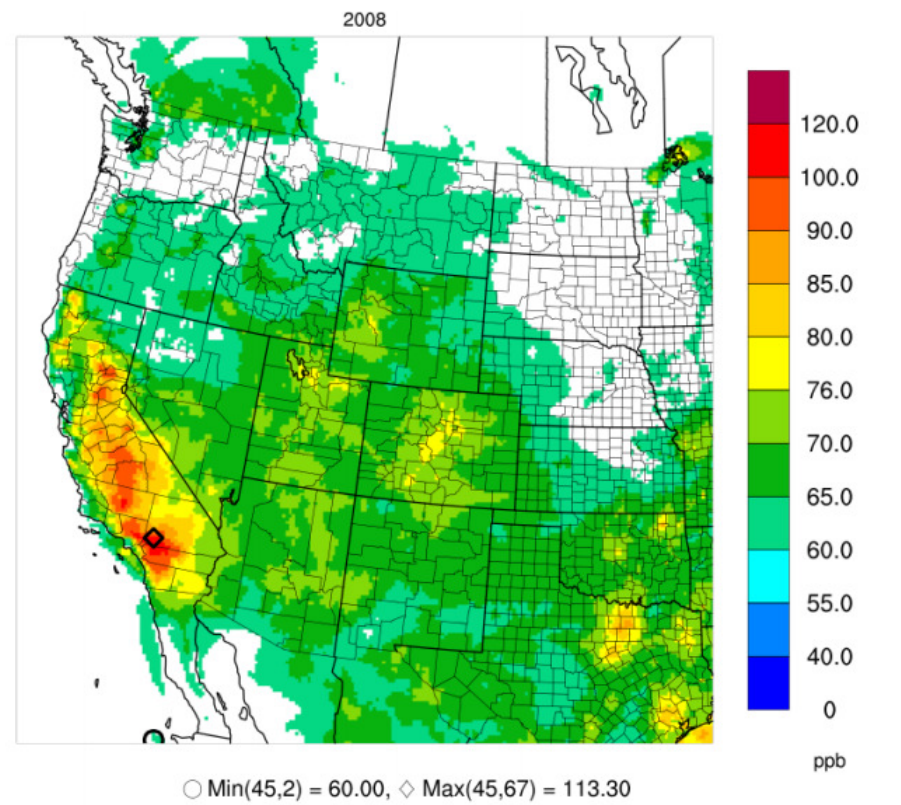


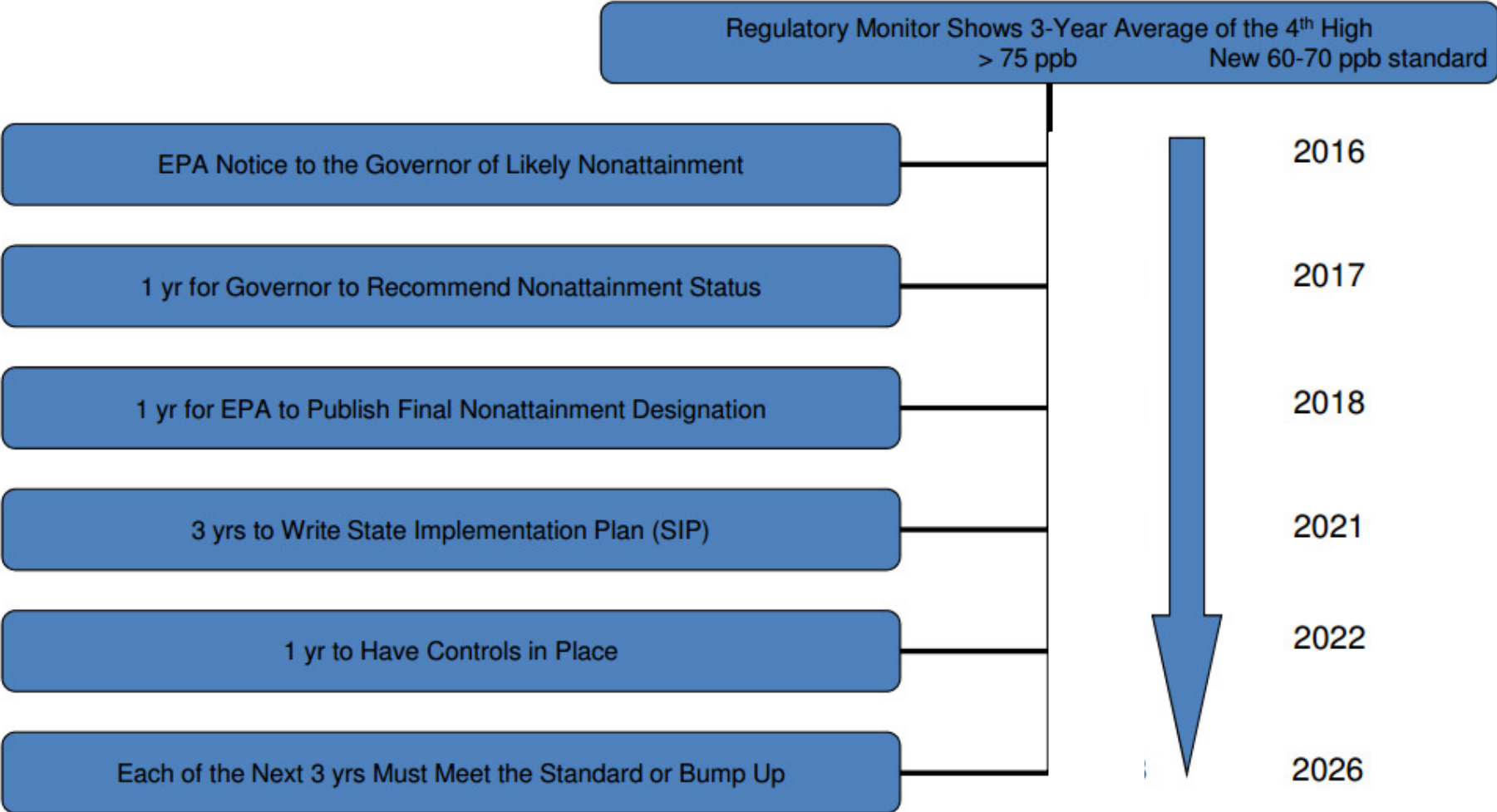
Fig. 7. Annual 4th-highest value of North American background ozone (PRB) calculated in GEOS-Chem as daily 8-h max and averaged for 2006–2008.

Zhang et al., 2011 Atmospheric Environment



Designation and SIP Process – Ozone

(Sequential Timeline)





Questions?

www.deq.utah.gov

www.airquality.utah.gov

www.cleanair.utah.gov