Utah Air Quality Priorities: Ozone and 179B(b)

Ryan Bares



UTAH DEPARTMENT of ENVIRONMENTAL QUALITY

AIR QUALITY



Priorities

- PM_{2.5} redesignations
- Regional Haze SIP approval
- Uintah Basin
- Ozone nonattainment status
 - Moderate RFP NO x substitutions
 - Boundary Adjustment
 - 179B demonstration
 - \circ Emission reduction policies



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- PM_{2.5} redesignations
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Northern Wasatch Front Ozone Nonattainment Area



Pollution

The Northern Wasatch Front is not attaining the 2015 NAAQS for ozone: 70 ppb

Path Forward

The State submitted a 179B(b)

demonstration showing attainment of

the standard by the moderate

attainment date.

A reconsideration for the serious

redesignation has been requested.



Note: Annual statewide emissions from EPA's trend data website: https://www.epa.gov/air-emissions-inventories/air-pollutant-emissions-trends-data, "State Tier1 CAPS Trends (xlsx)".

Emissions data does not include emissions from biogenic sources, prescribed fires, or wildfires.

Ozone and emissions trends in the Intermountain West

Northern Wasatch Front Ozone Challenges

The region faces a range of challenges when working to reduce ozone:

- High elevation
- Natural emissions of VOCs
- Transported pollutants
- Wildfire emissions
- Longer, hotter, drier summers
- Change in ozone chemistry
- Some of the fastest growing populations in the nation

~ 80% of ozone and ozone forming emissions are naturally occurring or transported to Utah.

Summertime average background concentrations can be as high as 50 ppb.

Background Ozone in the Intermountain West



CMAQ estimates of <u>average</u> background (USB) ozone at monitoring locations across the U.S. in 2007

EPA modeled background ozone concentrations in the continental United States. This demonstrates the effect of elevation and transport on background ozone concentrations in the west.

"background ozone can exceed 60 ppb in the intermountain west"

Emissions Trends and Wildfires







Figure 18. As in Figure 17, but with a revised ozone DV trendline reflecting the removal of the 2021 4th high MDA8 ozone from the 3-year DV calculations due to the large frequency of possible wildfire impacts during that year.

VOC Emissions Northern Wasatch Front on an ozone season

day



Biogenic emissions play a critical role in the VOC budget for the air shed.

The majority of the anthropogenic NOx and VOC sectors are already extensively controlled or fall under federal purview.

Pathway to Attain & Changing Chemistry

Demonstration utilized in Utah's amended moderate SIP pursuing NO_x substitutions to fulfill Reasonable Further Progress.

A paired NO_x and VOC approach is the most beneficial pathway to attaining the standard.

Good example why greater flexibility in what emissions are targeted is needed, especially early on in the SIP process.



8-hour ozone isopleths representing NO_x and VOC reductions and the resulting predicted ozone concentrations at Bountiful monitoring station in the NWF NAA. Analysis was conducted using CAMx version 7.1 High-Order Decoupled Direct Method (HDDM) and demonstrates the sensitivity of the NWF NAA to changes in anthropogenic NO_x and/or VOC reductions.

Aims of USOS:

Complete picture of ozone production

Improving photochemical modeling

NO_v/VOC sensitivities

Wildfire Smoke

Topography

Biogenic emissions

Background concentrations

Slide courtesy of Dr. Caroline Womack

The Utah Summer Ozone Study (USOS) and other summer campaigns measured O₃ and precursors across the SLV



Aims of USOS:

Complete picture of ozone production

Improving photochemical modeling

NO_v/VOC sensitivities

Wildfire Smoke

Topography

Biogenic emissions

Background concentrations

Acknowledgments



+ many more!

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NOAA CSL Alex Baron

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Kelvin Bates Rachel Edie Luke Leclair-Marzolf Alan Brewer Chuck Brock Olivia Mondlock Steve Brown Chris Pennell Brian Carroll Shauna Ward Wyndom Chace University of Utah Lauren Chartier Dawson Adams Matt Coggon Victoria Brown Zach Decker Trevor Coyle Sara Gibbons Maria Garcia Jessica Gilman Gannet Hallar Max Holloway Nate Howard Nicholas Hoffman Renee Jeona Sebastian Hoch Chris Jernigan Drew Hooker Samantha Lee John Horel Meng Li Nate Malarich Daniel Mendoza Richard Marchbanks James Mineau Brandi McCarty Megan Ostlie Brian McDonald Haley Scott Megan Melamed Ilana Pollack Mike Robinson Mike Hannigan Drew Rollins Mikyla Harjamaki Scott Sandberg Christopher Lee Nell Schafer Clara Lietzke Morgan Selby Max Muter Chris Senff Valentina Osorio Chelsea Stockwell Emma Rieves Troy Thornberry Colleen Reid Victoria Treadaway Mago Reza Siyuan Wang Eleanor Waxman Nicole Silver Carsten Warneke Rainer Volkamer Mike Zucker Kristen Zuraski JPL Fernando Chouza Kell

Wayne State

Vaoxian Huang Noribeth Mariscal Like Wang

SUNY ESF

Jiaiue Chai Lin Lyu Maxwell Horsford

Weber State/Aerodyne

Megan Claffin Demetrios Pagonis

Colorado State University

Emily Fischer Daniela Guevara Emily Lill

University of Wisconsin Tim Bertram Subi Thakali

University State University Randy Martin

Donald Olsen

NOAA ARL University of Colorado

Winston Luke Xinrong Ren Phil Stratton Jiayang Sun

NOAA Aircraft Operations Center

Mason Carroll Kyler Johnson Rob Militec Justin Mivano Chelsea Parrish Nick Pawlenko Joshua Rannenberg Devin Schaefer Nick Underwood

Questions? Caroline.womack@noaa.gov

East Asian Transport of Pollutants



Figure 14. Schematic conceptual model of pollutant transport from Asia to North America (from HTAP, 2010). Blue text on left refers to Asian continental boundary layer processes, red text along bottom refers to low level transport, and black/white text along top and right refers to high altitude transport.

"Most ozone exceedance days were analyzed except those noted with medium and heavy smoke impacts (as reported by UDAQ), resulting in a set of 33 exceedance days. Four types of distinct transport patterns were subjectively identified with 29 of the 33 trajectory days (88%) indicating air parcel origins reaching toward/over Asia or passing over Mexico."



Figure 15. Examples of modeled surface background ozone (ppb) from Baker et al. (2015; left) showing July 2011 average US background from the CAMx regional photochemical model, and from Zhang et al. (2020; right) showing tracked ozone from Asia on May 24, 2017 from the AM4 global model.



103

10²

10¹

Count of day 7-10 trajectory points per 2-degree grid cell







179B(a)

- Prospective (will attain the standard)
- Included in a State Implementation Plan
- Can rely on the other info in the SIP
- "Completeness requirement"
- Serves as a weight of evidence element in a SIP attainment demonstration

"

Utah included a prospective 179B(a) demonstration in the moderate State Implementation Plan for the Northern Wasatch Front.

– 179B(b)

- Retrospective (would have attained)
- Stand alone demonstration
- Submitted independent of a SIP
- Requires more information to be included
- Not contingent on "completeness requirement" of an associated SIP
- Serves to prevent further reclassification

Utah Submitted a retrospective 179B(b) demonstration for both the reclassification to moderate and recently for the serious redesignation.

Would have attained the national ambient air quality standard for ozone by the applicable attainment date, but for emissions emanating from

Ozone Source Contributions



CAA Section

- Demonstration shows that the area would have attained the standard by the moderate attainment date but for the presence of international contributions.
- Modeling funded by the Utah legislature was conducted by Ramboll.

Table 1: Observed 2023 DVs (3-year average of 2021-2023 4th high MDA8 ozone) and RRF determined modeled ozone concentrations without (2023 DV) and with international anthropogenic contributions removed (Future DV IA Adjusted). All sites with international anthropogenic emissions removed demonstrate meeting the 70 ppb standard. *Represents a 2023 DV adjusted for impacts of wildfire smoke (see APPENDIX | Section 5.5.2 and APPENDIX || for details)

Site	County	2023 DV (ppb)	RRF	Future DV IA Adjusted (ppb)
Bountiful	Davis	76	0.932	70
Hawthome	Salt Lake	75	0.934	70
Herriman	Salt Lake	75	0.942	70
Erda	Tooele	71	0.933	66
Harrisville	Weber	72	0.931	67
Copper View	Salt Lake	75*	0.944	70
Rose Park	Salt Lake	74	0.936	69

Average Ozone Contributions



(previous)179B Guidance

Exceedance vs. non-exceedance days

International contributions are relatively consistent from day to day.

CAA says nothing about this requirement. International contributions are less than local

Both local and international and local contributions are small.

CAA says nothing about this requirement.

RACM

Demonstrate that all "feasible" emission reduction strategies implemented.

Pointed to the SIP and that the CAA makes no mention of this requirement.

"The test for meeting the criteria of a 179B demonstration in the CAA is simply whether or not the area has attained the standard by the relevant attainment date, but for the presence of international emissions."

179B Guidance

SEPA United Sta Environme Agency	tes ntal Protection		Search EPA,gov		
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April 7, 2025

Contact Information EPA Press Office (press@epa.gov)

What a CAA Section 179B(b) would mean for Utah

An approved 179B would not:

- Negate the requirement to reduce emissions and attain the standard.
- Remove sanctions from previously disapproved SIP elements.

An Approved 179B(b) would:

Give the state greater flexibility in how it approaches attaining the standard:

- What emission reductions are targeted;
- What programs are required; and
- Timeframe for implementation.

Opportunity for the State to remain on the record regarding the significant challenges facing it under current, and future, ozone NAAQS.

More time for the science to catch up and for the area to identify and follow the best pathway to attain.

Questions?





rbares@utah.gov

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY AIR QUALITY





Cumulative Number of Days 8-hr Ozone Daily Max > 0.070 ppm

2024 vs. 2023 in Salt Lake City, UT



Source: U.S. EPA AirData https://www.epa.gov/air-data Generated: November 7, 2024

Number of Days 8-hr Ozone Daily Max > 0.070 ppm 2000-2024 in Salt Lake City, UT





Hazardous (>=0.405 ppm 1-hour)

Historic NWF Ozone Concentrations

3 Year Average 4th Highest Ozone Concentration



Ozone Source Contributions



Pathway to Attain

Exceedance Day (O3 >= 70 ppb) Average MD8A Ozone at HW n = 8 days of 48 days in episode



Exceedance Day (O3 >= 70 ppb) Average MD8A Ozone at BV n = 6 days of 48 days in episode



8-hour ozone isopleths representing NO_x and VOC reductions and the resulting predicted ozone concentrations at Bountiful monitoring station in the NWF NAA. Analysis was conducted using CAMx version 7.1 High-Order Decoupled Direct Method (HDDM) and demonstrates the sensitivity of the NWF NAA to changes in anthropogenic NO_x and/or VOC reductions.

Pathway to Attain





8-hour ozone grid cells represented as the average MD8A ozone value over exceedance days (highest value each day). Maxima may not occur at exactly the same time period.

Anthropogenic NOx and VOC Emissions Northern Wasatch Front on an ozone season day



More than half of anthropogenic emissions driving local ozone formation are very difficult to regulate at the state level



Model Performanc e Evaluation



Figure 30. Isopleth plots of simulated hourly ozone within the 1.33 km modeling grid at 3 PM during July 13-15 when monitored ozone was high.