

# IMPROVE – Data and Metrics

luma\*10<sup>15</sup>, October 23, 2019

Scott Copeland, CIRA/USDA Forest Service

IMPROVE Steering Committee Chair

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- 2018 Data is in FED/WRAP TSS
  - Provisional site LOST1, WICA1.
  - Slight change in chloride below mdl code and sea salt patch coding.
  - Substituted data for 2008, 2011, and 2013-2017 added to IMPROVE data set.
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  - Multiple-patching algorithm.
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- Baseline Calculation w/r to EPA rule language
- EPA modeling results
  - Rx Fire Writeup

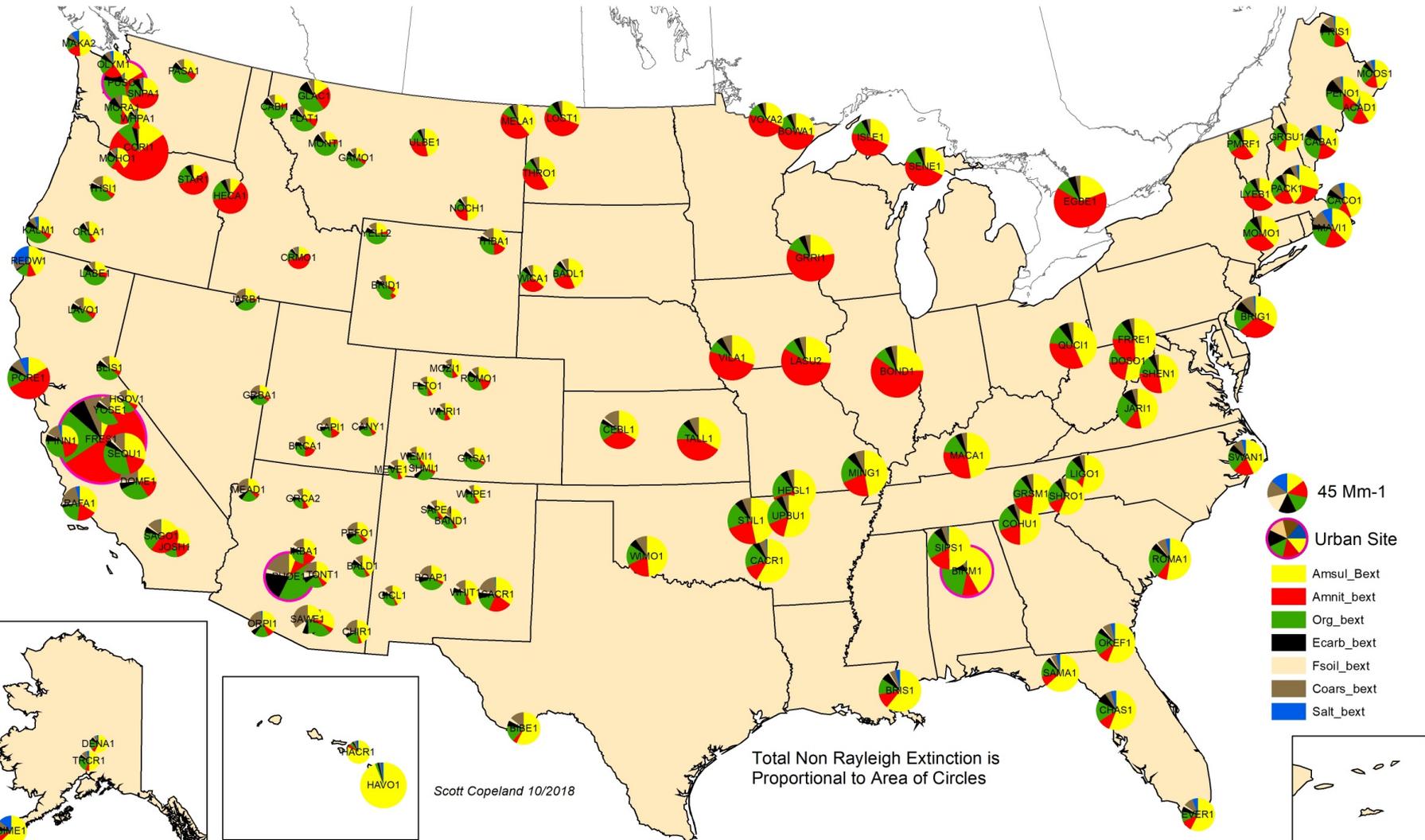


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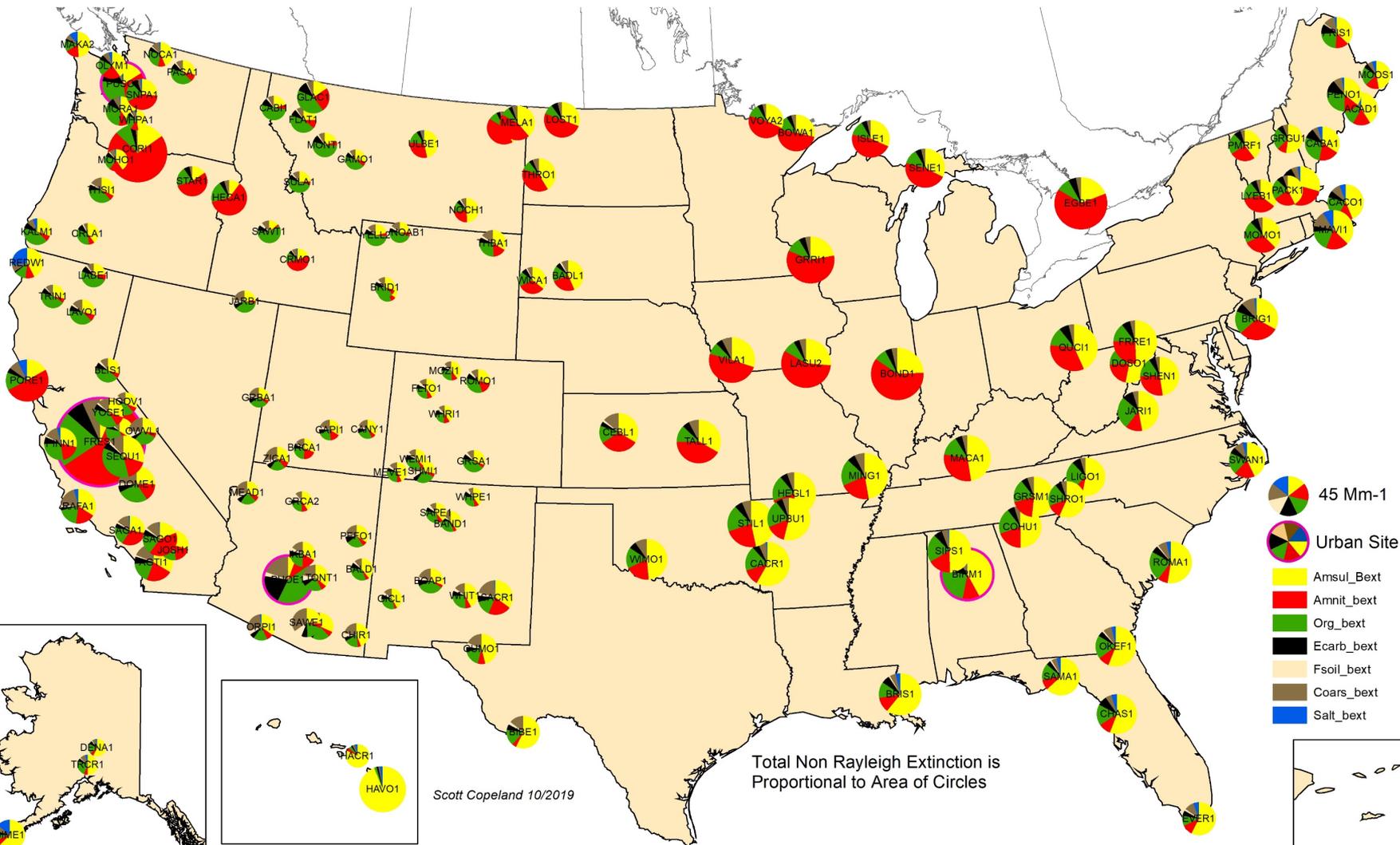
# IMPROVE Data - 2017 Second IMPROVE Algorithm

\*DRAFT\* Non Rayleigh Mean of 20% Most Impaired



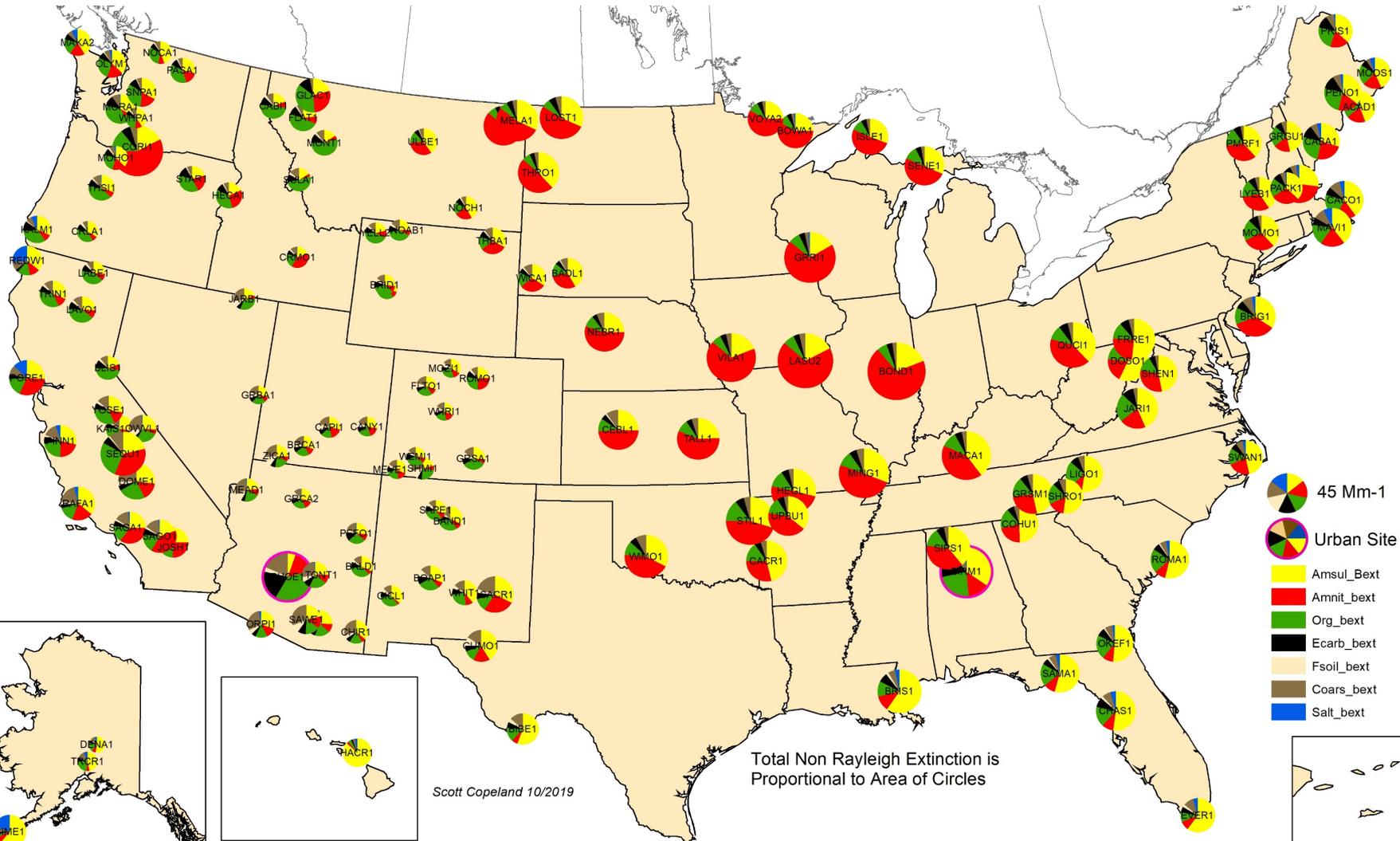
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## **“Provisional” Sites**

### **LOST1 Lostwood NWR, ND - 08/26/2017-12/31/2018**

During the UCD site maintenance trip, the field group discovered that a tissue was stuck in the "A" module stack. The sulfur/sulfate concentrations are observed to compare well despite the tissue being stuck in the stack. Further, the "A" module flow rate also seems to correlate well. The data do not indicate that a null code is warranted for this time period, thus the filters will be marked as 'SA' and a sampling event comment will be added accordingly.

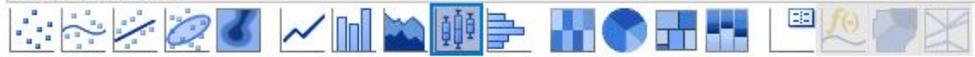
*Note that the provisional status will retroactively apply to 2017 at LOST1 as well.*

### **WICA1 Wind Cave NP, SD - 07/1/2018-12/31/2018**

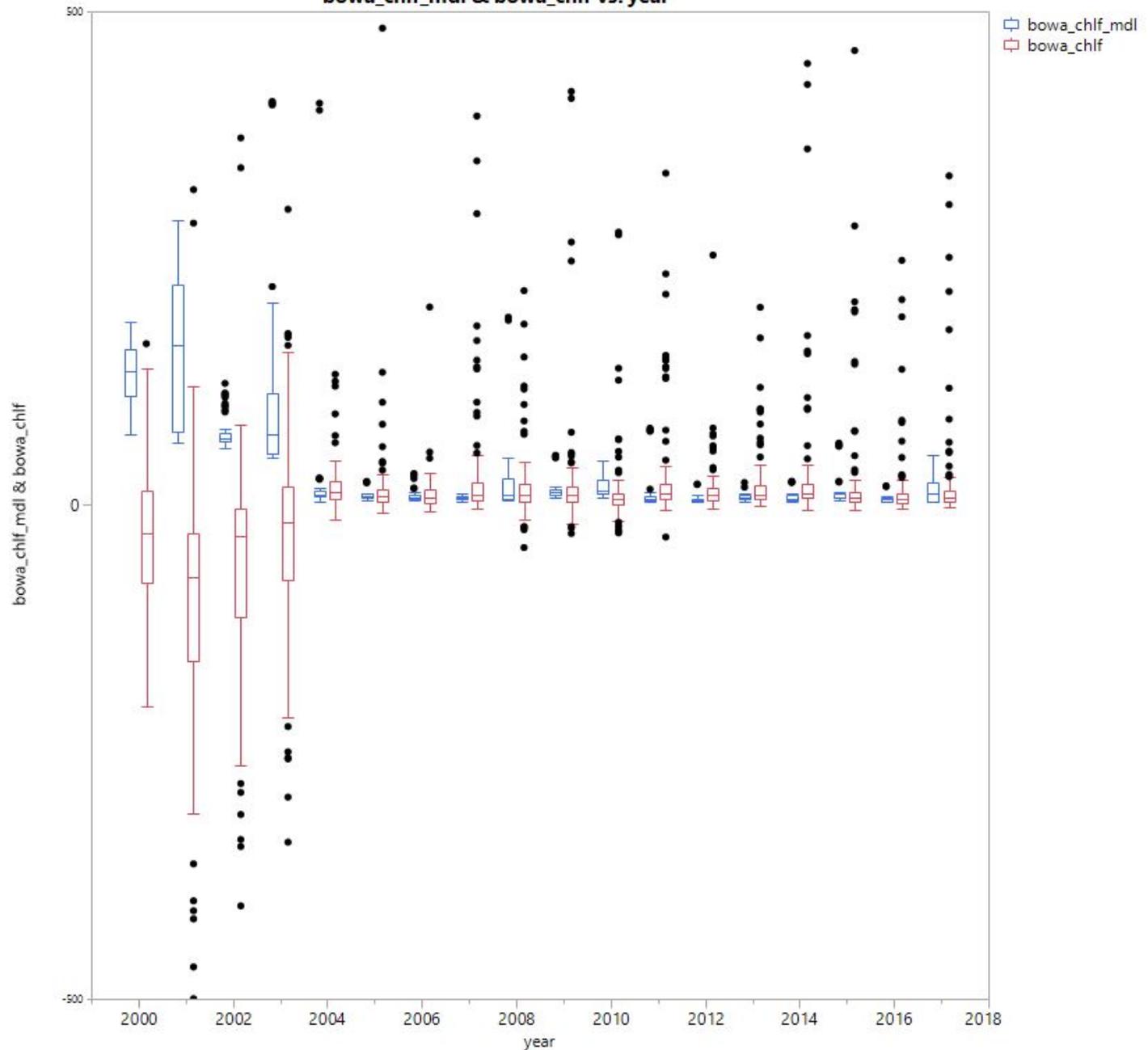
During the UCD site maintenance trip, the field group found that the "B" module stack was not fully inserted. The sulfur/sulfate concentrations are observed to compare well despite the stake not being fully inserted. The data do not indicate that a null code is warranted for this time period, thus any filters marked with a 'NM' status will be changed to being marked as 'SA' and a sampling event comment will be added accordingly.

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bowa\_chlf\_mdI & bowa\_chlf vs. year

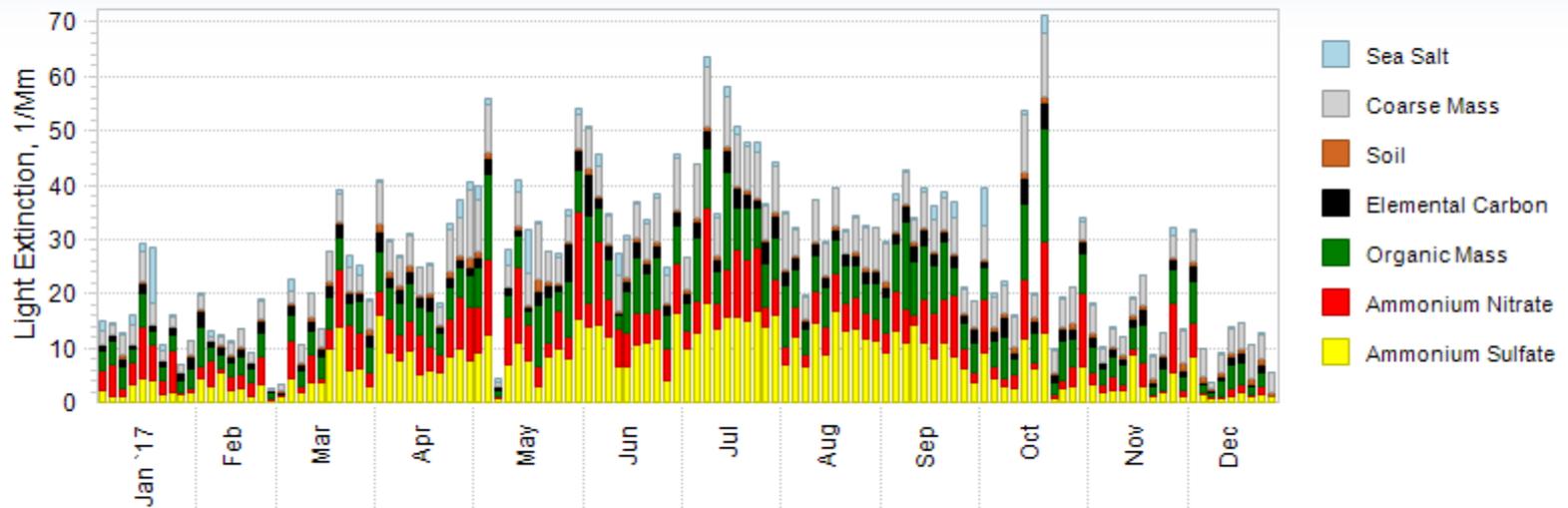


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# Agua Tibia

## Daily Extinction Budgets, 2017



IMPROVE Monitor ID: AGT11, CA

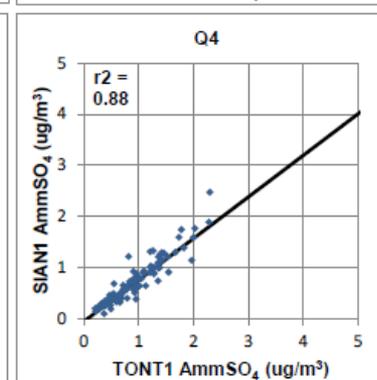
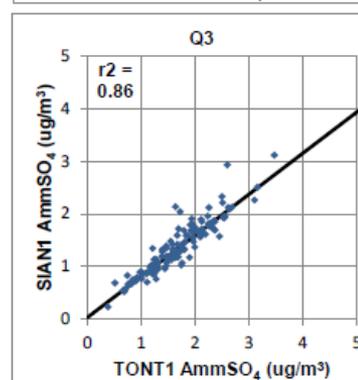
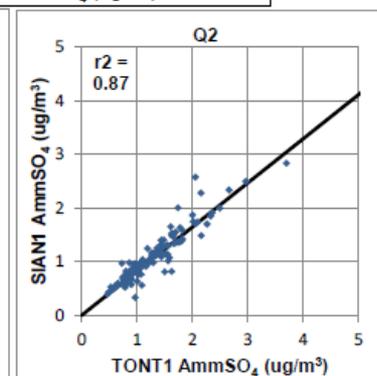
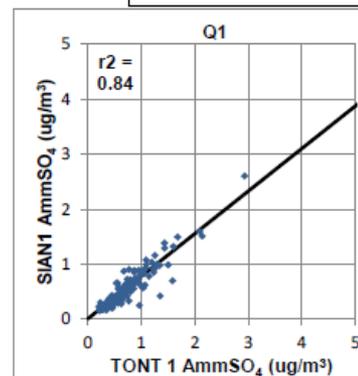
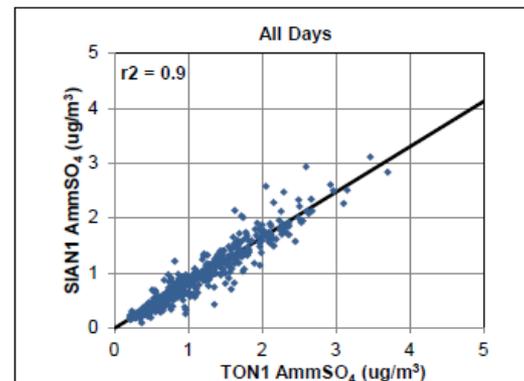
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# Correlations: SIAN1 and Candidate Donor Sites

		TONT1	IKBA1	BALD1	PEFO1
AmmSO4	Slope=	0.83	0.89	1.01	1.07
	Intercept=	-0.01	0.06	0.10	0.01
	r2=	0.90	0.85	0.72	0.56
AmmNO3	Slope=	0.81	0.71	1.04	0.88
	Intercept=	-0.02	0.01	0.03	0.01
	r2=	0.66	0.46	0.40	0.35
EC	Slope=	0.76	0.78	0.41	0.38
	Intercept=	0.03	0.04	0.08	0.05
	r2=	0.04	0.05	0.00	0.08
OC	Slope=	0.78	0.79	0.44	0.67
	Intercept=	0.15	0.19	0.38	0.27
	r2=	0.04	0.05	0.00	0.08
SOIL	Slope=	0.73	0.85	1.07	0.88
	Intercept=	-0.01	-0.04	0.11	0.01
	r2=	0.72	0.54	0.66	0.56
CM	Slope=	0.61	0.77	0.98	0.69
	Intercept=	0.24	0.57	0.99	0.92
	r2=	0.65	0.38	0.42	0.35
SeaSalt	Slope=	0.65	0.65	1.17	1.12
	Intercept=	0.00	0.01	0.02	0.01
	r2=	0.87	0.82	0.53	0.86

SIAN1 (Recipient) vs. TONT1 (Donor)  
Ammonium Sulfate



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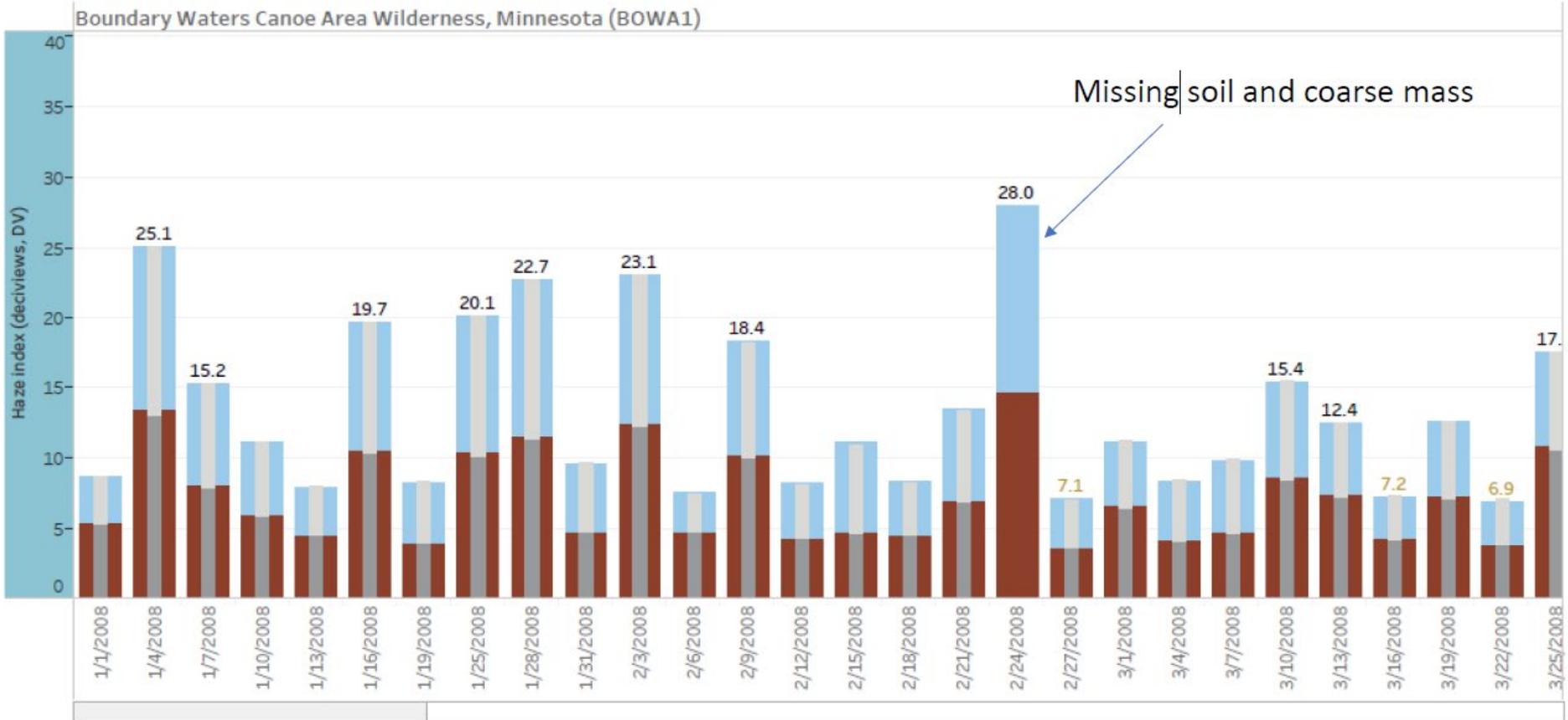
EPA-454/B-03-004, September 2003

## Guidance for Tracking Progress Under the Regional Haze Rule

Instances in which data on more than one aerosol component are missing in the same sample are likely to be rare. As a result, the process for dual substitution is not presented at length here. However, substitution of two variables in the same sample could be done, subject to adequate justification and testing, such as in the substitution test described previously. The same acceptance criterion of less than 10% difference in best values in 90% of the data should apply. For example, currently, light absorbing carbon and organic carbon data are likely to either be present or missing in the same samples because of the common analysis method for these species. As a result, this substitution test could also be carried out for those two species simultaneously. That is, the quarterly median values for both species could be substituted for their individual values at a site, the best values could be calculated, and the comparison made to assess whether simultaneous replacement of missing LAC and OC data with averages is appropriate.”

## Minnesota estimated 20 percent most and least impaired visibility days at select IMPROVE monitoring sites

Comparison of Minnesota and CIRA calculated haze index. Each day haze index value is partitioned by episodic and routine, and anthropogenic source estimates. Haze index totals at top of bar flag 20 percent most impaired days (**black font**) and 20 percent least impaired days (**gold font**) by IMPROVE site and year as estimated by Minnesota. Missing CIRA haze index bars indicate a failure to meet criteria for patching quarterly 4-year average median values for any one component species in the CIRA calculations.



Click below on IMPROVE site, Year and/or Month to explore data. Use slider above to scroll through days

Minnesota ■ Episodic & routine ■ Anthropogenic  
 CIRA ■ Episodic & routine ■ Anthropogenic

IMPROVE site  
 Boundary Waters Canoe Area Wilderness, Minnesota (BOWA1)

Year 2008  
 Month All

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All IMPROVE Sites 2000-2017		
	Combined Test	Individual Test
3 Missing	451	671
2 Missing	384	2136
	Described in 2003 Guidance	Recommended by LADCO
	~0.2%	~0.8%

I recommend that IMPROVE allow individual tests of up to 3 missing parameters, subject to revisions at a later date.

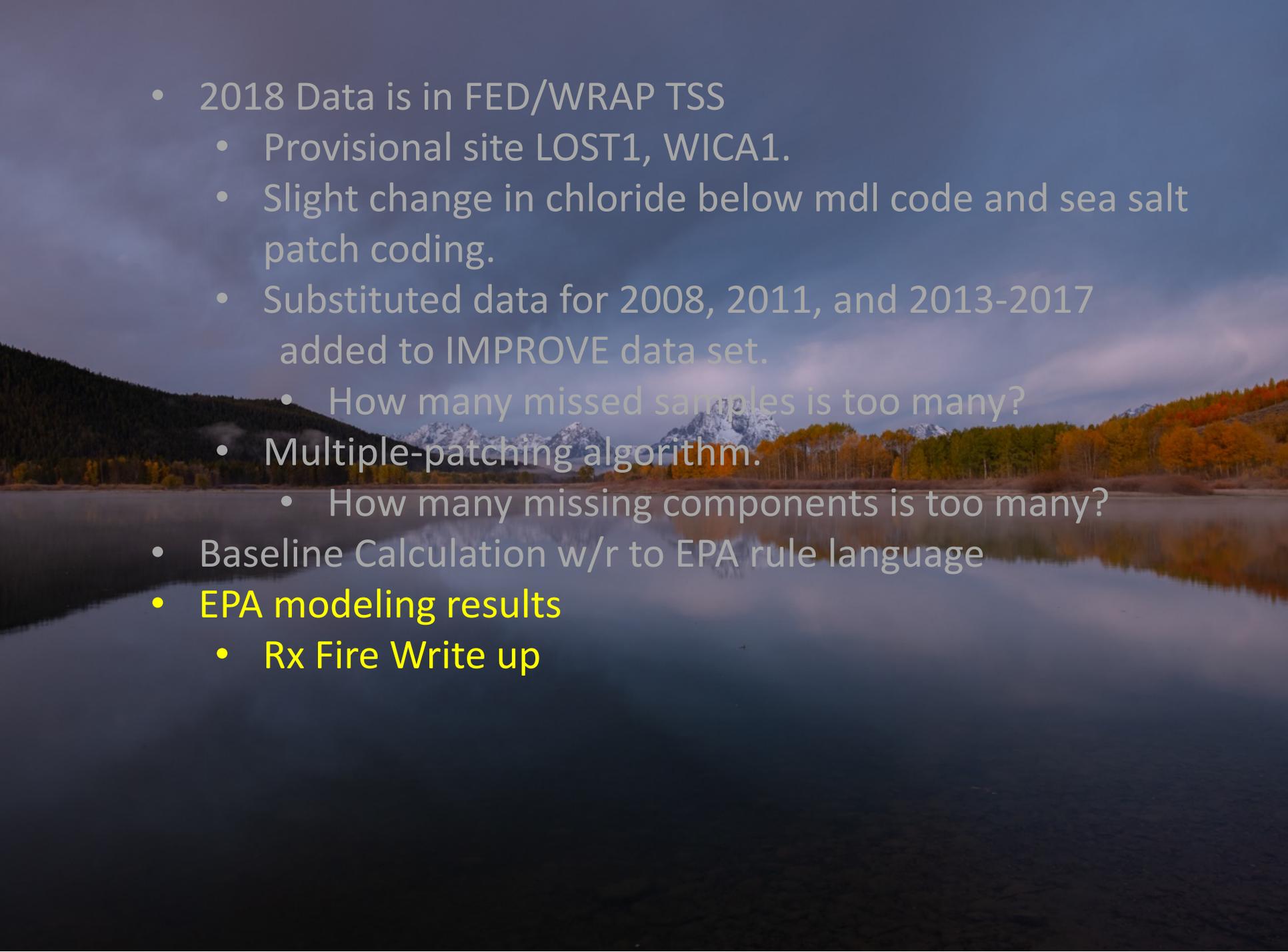
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§ 51.308 (f) (1)

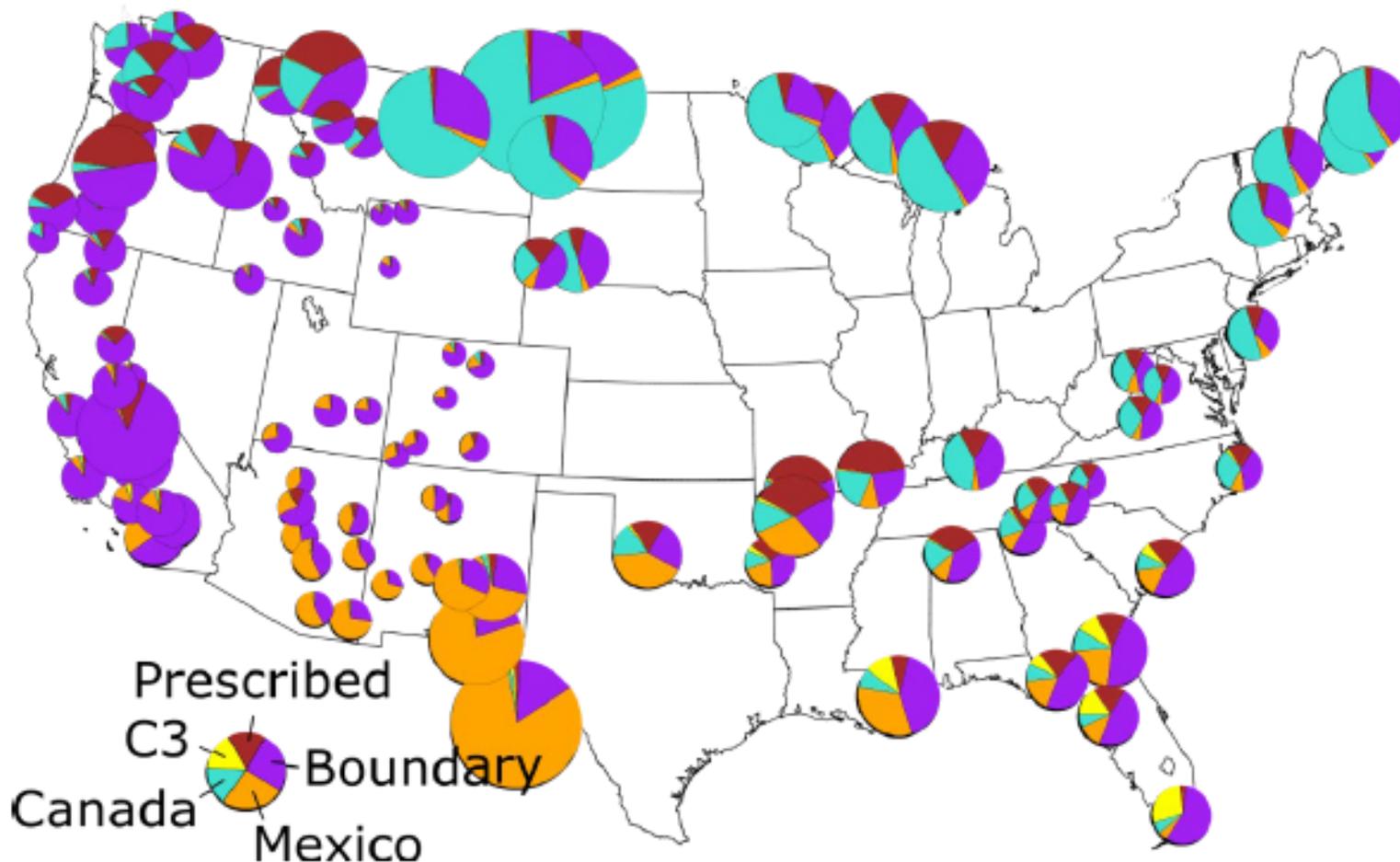
“For mandatory Class I Federal areas with **incomplete monitoring data** for 2000–2004, the State must establish baseline values using the 5 complete years of monitoring data closest in time to 2000–2004.”

The phrase “incomplete monitoring data” is not defined, and I am interpreting it to refer to the 3 of 5 year requirement for any 5-year-average referenced in the 2003 guidance because, in context, the rule is describing a complete 5 year baseline, not a given calendar year. Said another way, a site with “incomplete monitoring data” would have fewer than 3 complete years of data after data substitution. Including data substitution work (supported in the December 2018 guidance, see attached) and based on the 3 of 5 year requirement in the 2003 guidance, all mandatory Class I Federal areas have complete monitoring data for establishing the 2000-2004 baseline.

**As a result, I do not intend to change any baseline calculations in the published IMPROVE data sets at this time, pending further direction.**

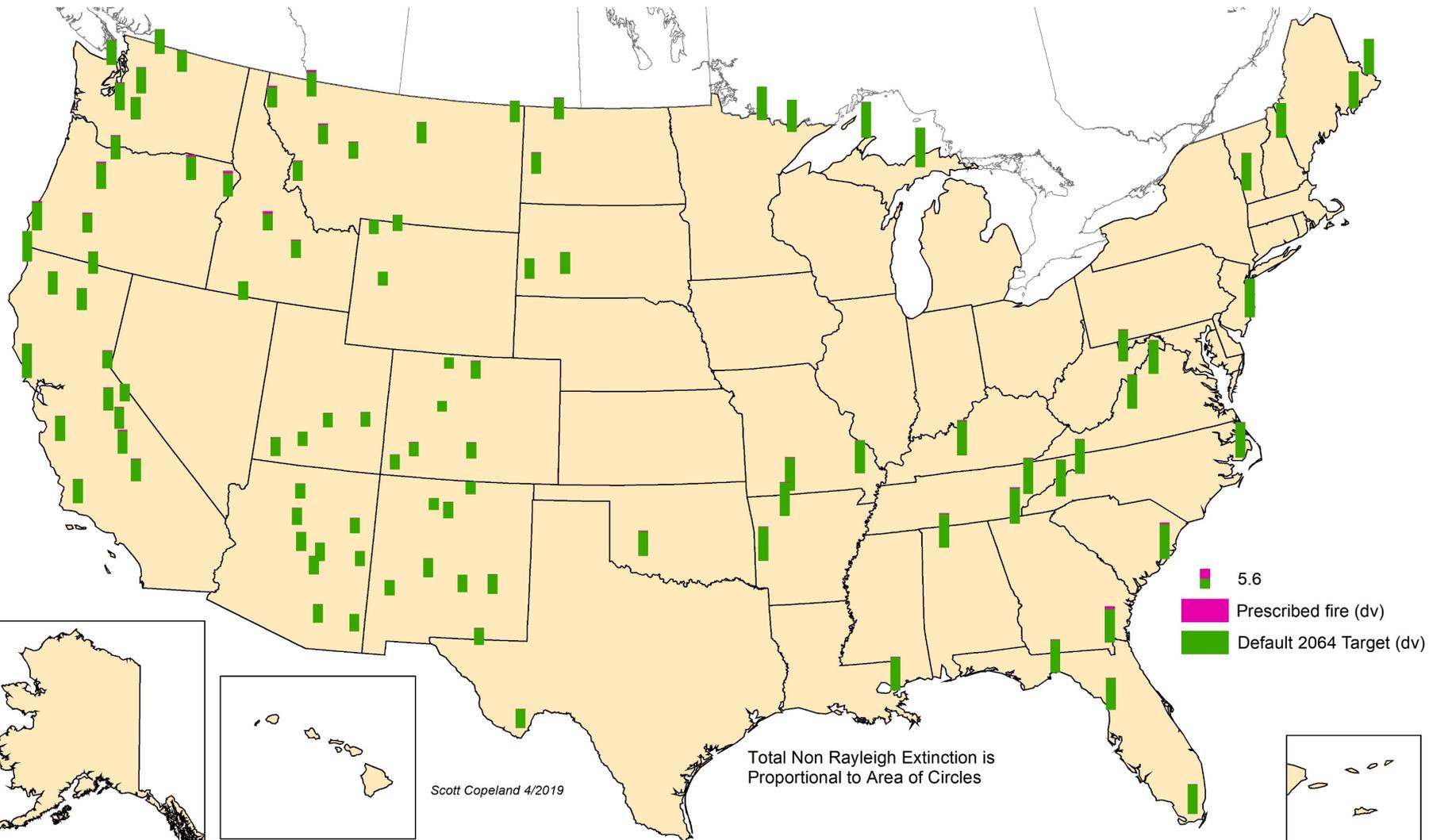
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Technical Support Document for EPA's Updated 2028 Regional Haze Modeling  
Office of Air Quality Planning and Standards United States Environmental Protection Agency  
September 2019



*Figure 5-1- 2028 International anthropogenic and prescribed fire components- contribution to impairment on the 20% most impaired days*

# Estimated Additional Contribution to Regional Haze Rule 2064 Targets to Account for Prescribed Fire



## EPA's Roadmap for the Second Planning Period

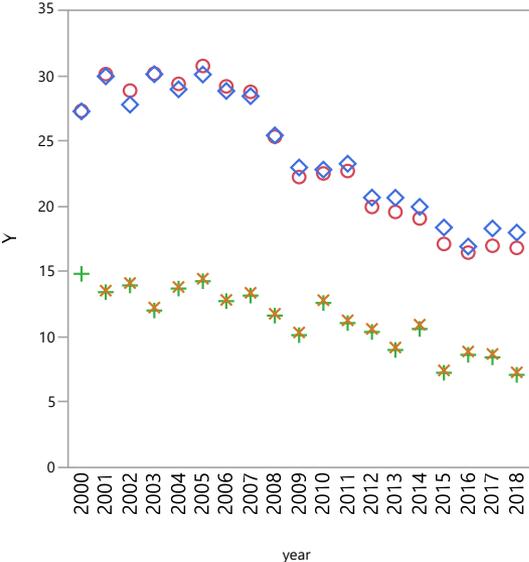
- On September 11, 2018, Acting Administrator Wheeler signed the Regional Haze Reform Roadmap.
- This roadmap outlines the implementation tools and guidance products that EPA will release over the next year to help states during their 2021 SIP development.
- Timeline for implementation tools outlined in the roadmap:
  - Fall 2018 – Final recommendations on selecting the 20% most impaired days, including methods for adjusting the glidepath (Section 5 of 2016 Draft Guidance).
  - Spring 2019 – Updated, as necessary, natural visibility conditions estimates.
  - Spring/Summer 2019 – Updated 2028 visibility modeling (incl. estimates of US and international source contributions for Class I Areas).
  - Spring 2019 – Final guidance on regional haze SIP development will focus on topics such as:
    - Additional information and context regarding screening sources before in-depth analysis, including relevance of previous decisions to adopt emission controls to meet other CAA requirements.
    - Consideration of visibility benefits along with the four statutory factors.
- Rulemaking: EPA will continue to explore further regulatory changes to impact future planning periods.



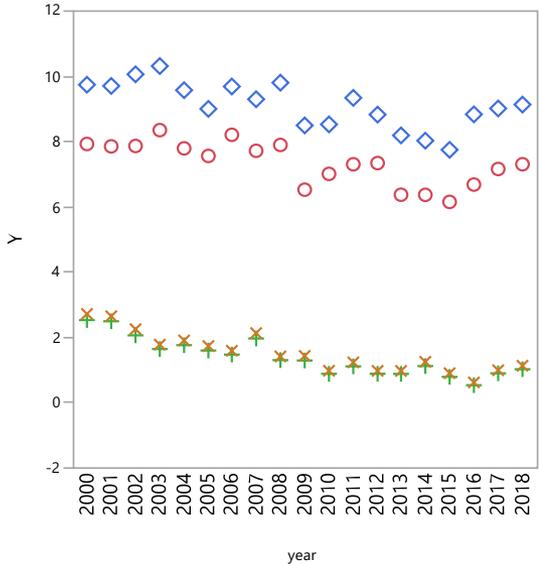




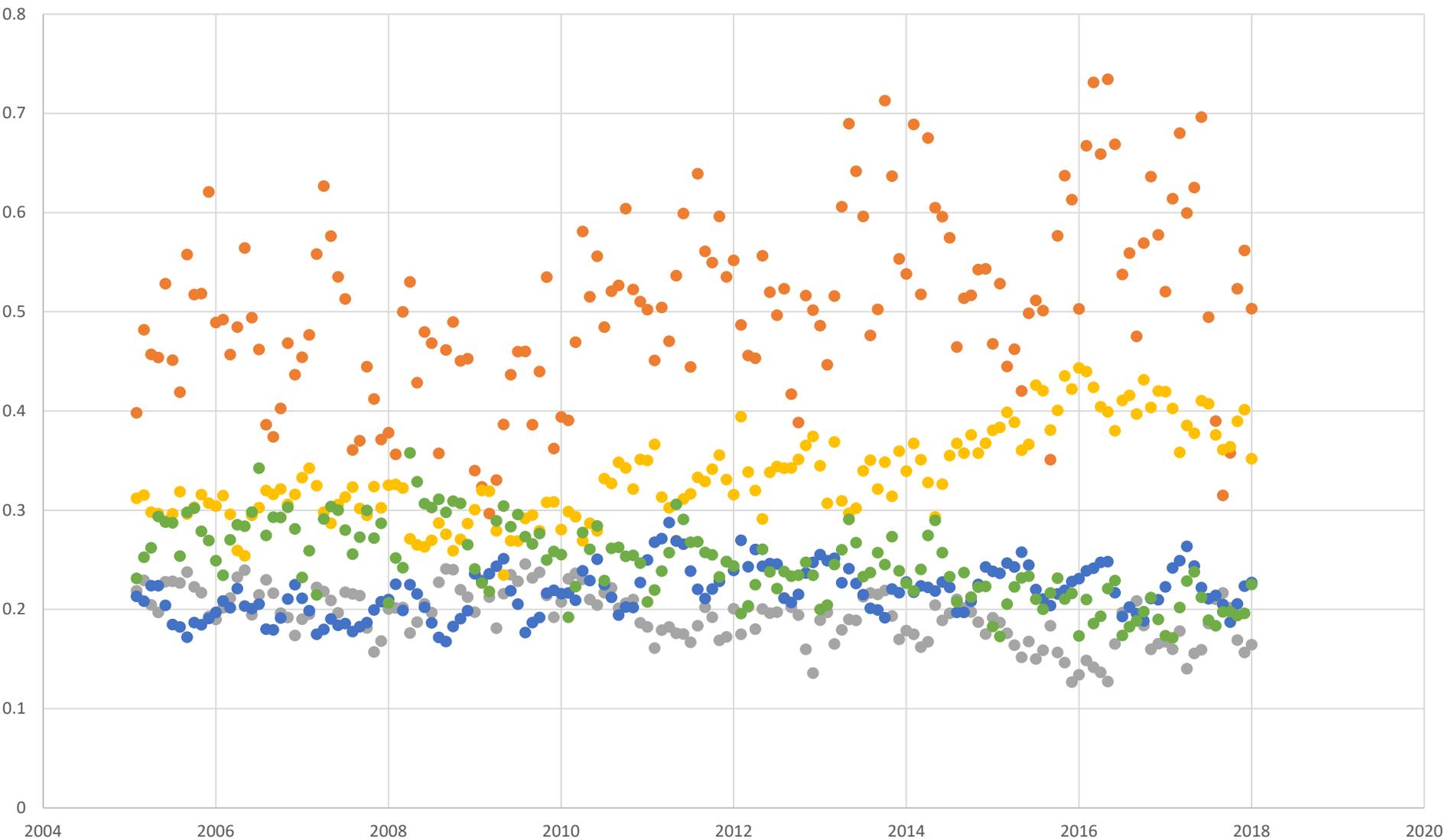
# Chart site=GRSM1



# Chart site=BRID1



# Trends in Western US Long Term IMPROVE Sites



- Median Blank Corrected E2 fraction of EC
- Median Blank Corrected O2 fraction of OC
- Median Blank Corrected O3 fraction of OC
- Median Blank Corrected O4 fraction of OC
- Median Blank Corrected OP fraction of OC