

WESTAR-WRAP regional analysis and planning support efforts:

Considerations for applying NASA data and information

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Session I: Strategies for Linking NASA Data and User Applications

Health & Air Quality Applied Science Team – Meeting 5

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Transmissometer - used to assess visibility impairment between 2 elevated building platforms 2-3 miles apart in an urban area by measuring the amount of light lost over a known distance.



Integrating nephelometer - used to assess visibility impairment by estimating the particle scattering coefficient (bsp) at a point location.



Particulate Sample (IMPROVE design used for Regional Haze)

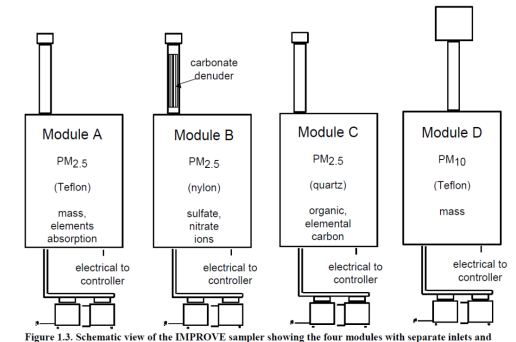


Figure 1.3. Schematic view of the IMPROVE sampler showing the four modules with separate inlets and pumps. The substrates with analyses performed for each module are also shown.





What do the remote sensors see?

How are those data integrated so they are usable for Clean Air Act programs?



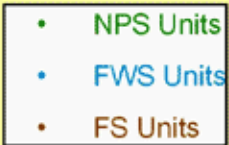
9 $\mu\text{g}/\text{m}^3$, 20-21 deciviews

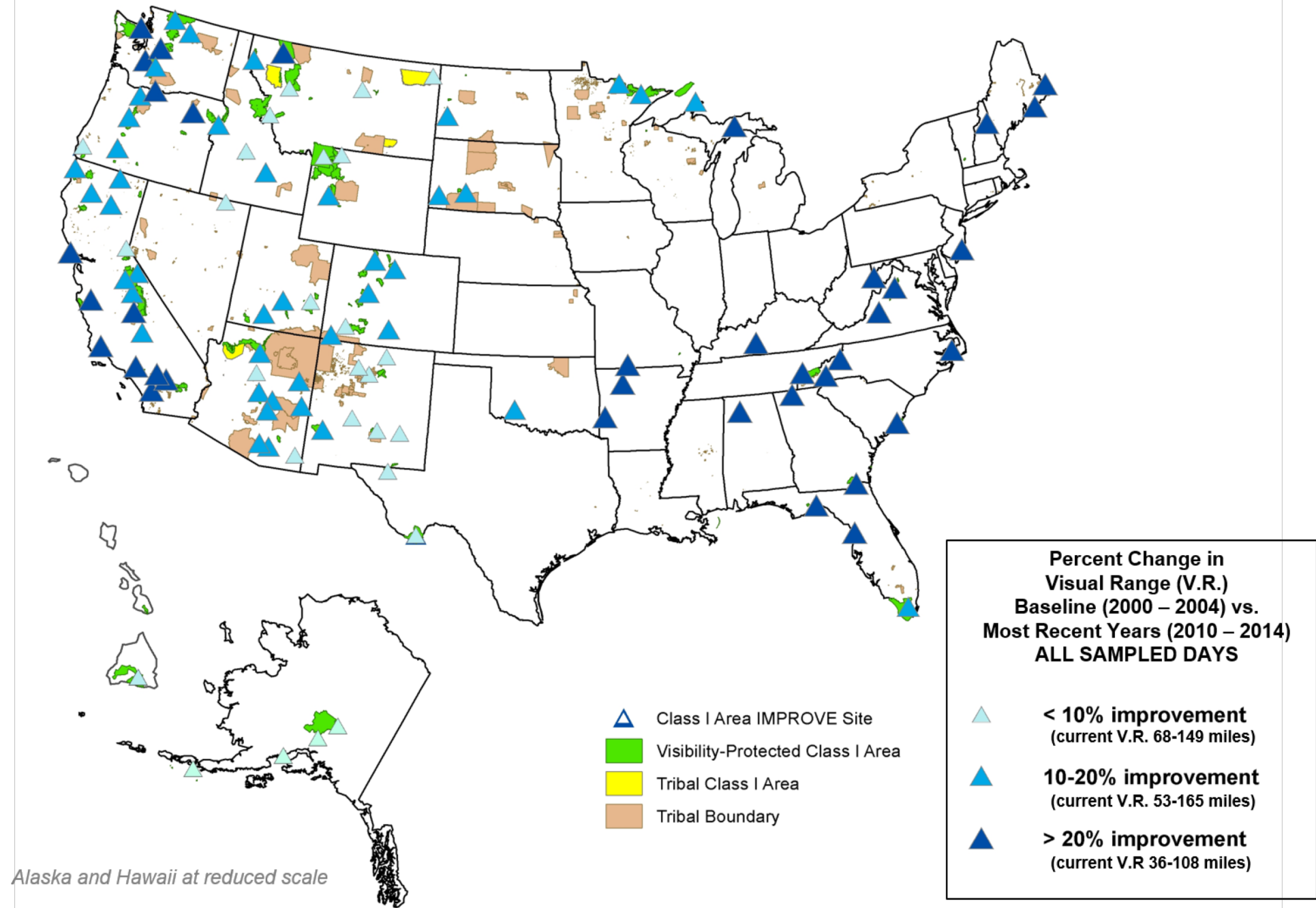
Regional Drivers for Western Air Agencies

- Regional Haze Rule planning for 2028 milestone year
 - SIPs due July 2021
 - Uncertainty with RHR and draft guidance
- Related analysis of ozone background and transport
 - Affecting both urban and rural monitoring sites
 - Attainment years for ozone – 2020, 2023, and onward
- Areas of Concern
 - Effects of mobile, international, and (other) uncontrollable emissions for regional haze
 - Profound impacts of fire and smoke on air quality health standards and regional haze
 - Evaluation of “rules-on-the-books” and consideration of potential additional Reasonable Progress controls



* Rainbow Lake, WI and Bradwell Bay, FL are Class 1 Areas where visibility is not an important air quality related value

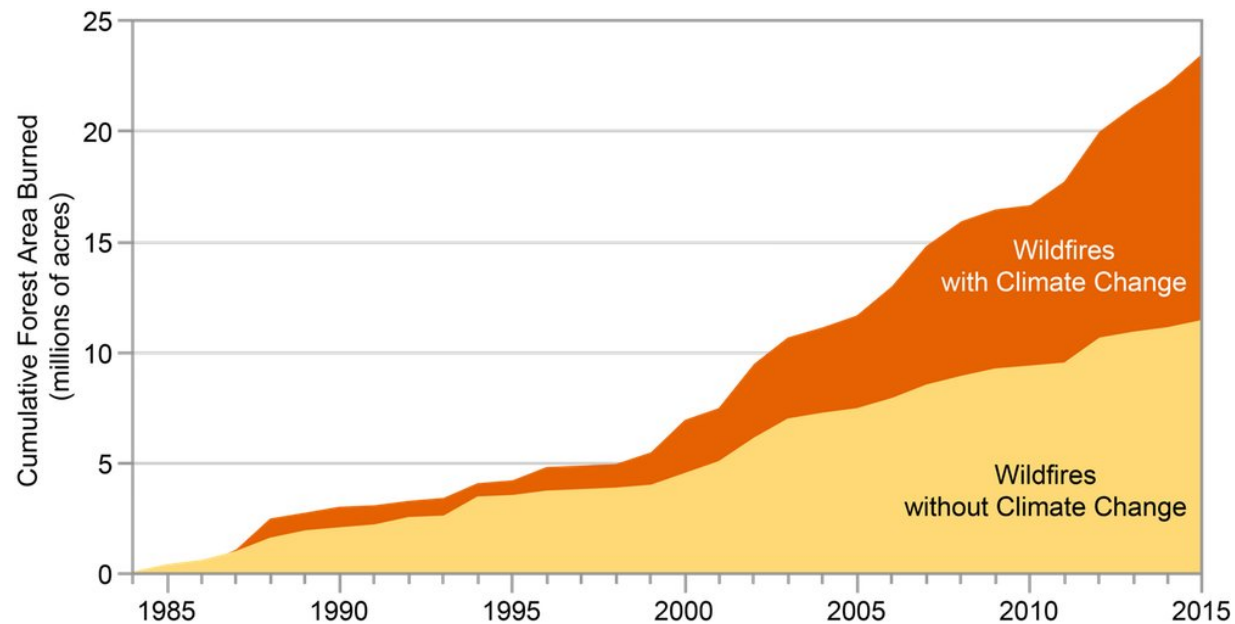




unplanned natural?! wildfire



planned prescribed fire



Climate change is driving wildfires in the western U.S., and not just in California

Adapted from Reference #99 in USGCRP, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

Fire and Smoke Work Group

Analysis and Planning Activities

- Improve activity data to support emission inventory development for fires
- Assess present and range of future contributions by smoke
- Review treatment of fire emissions in modeling studies
- Evaluate Smoke Management Programs
- Compile information about EE assessment efforts
- Improve coordination between state, tribal, and federal agencies

Outcome

- WRAP Tools/FETS update and operation
- Evaluation of Smoke Management Plans
- Historic and future fire activity and emissions
- Exceptional Events: identification of key data to collect for demonstrations
- Wildfire coordination between states/Tribes on wildfire response and smoke management



Regional Technical Operations Work Group

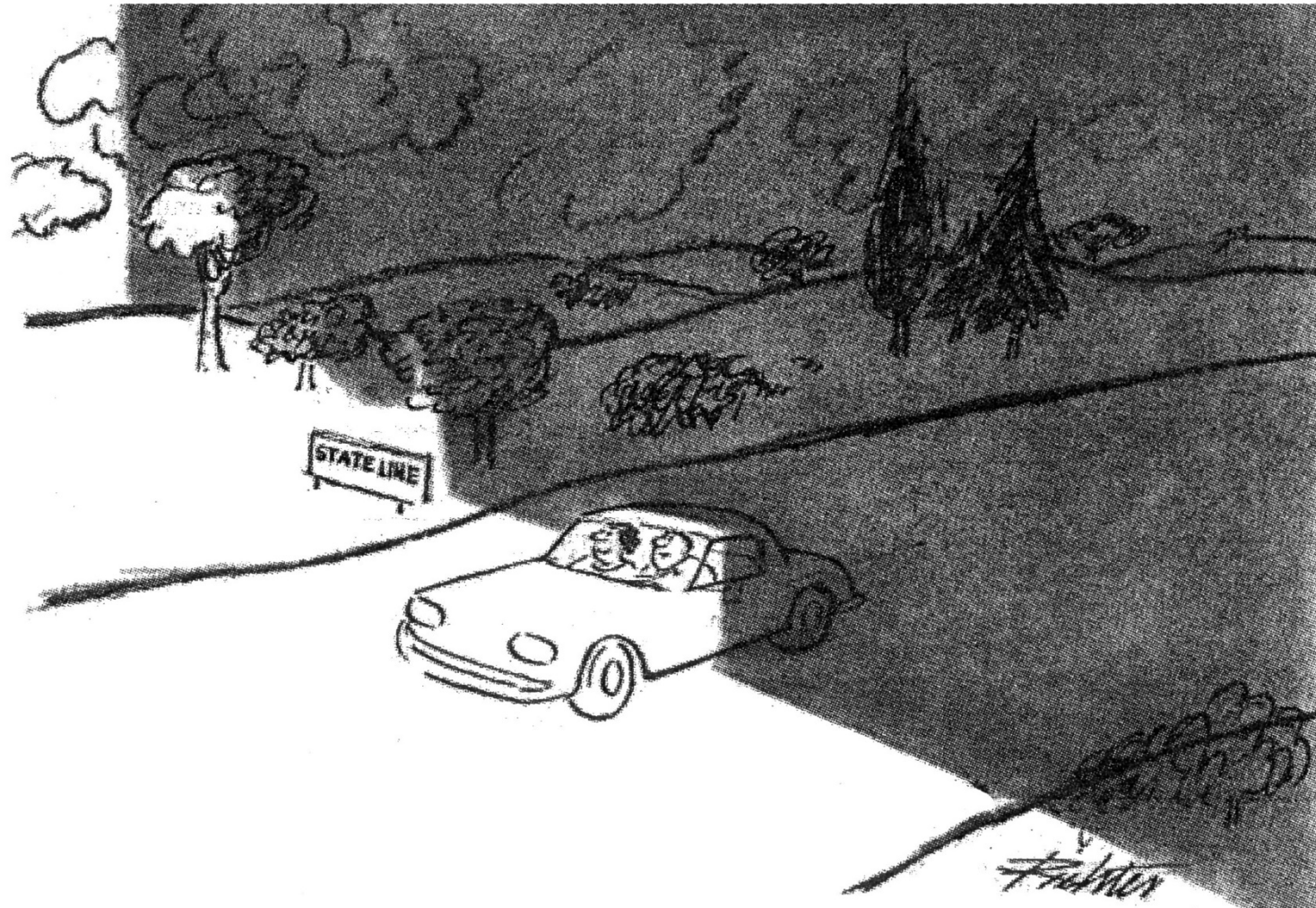
Analysis and Planning Activities

- Coordinate with other Work Groups to produce air quality modeling products
- Direct contractor services to accomplish Work Group tasks
- Participate in upcoming science conferences
- Leverage opportunities and work by others
 - Investigate “background ozone”
 - Provide guidance on Model Performance Evaluations
 - Protocol to use IWDW-WAQS capabilities



Outcome

- Contractor reports
 - [Modeling Representativeness project](#) – complete July 2018
- Through modeling platform jointly funded by IWDW-WAQS project and combined states’ Regional Haze funding – contract through WESTAR
 - **Dynamic model evaluation**
 - **Selection of global model simulations**
 - **Base year emissions processing**
 - **Base year meteorological modeling and MPE**
 - **Base year air quality modeling**
 - **Future year emissions processing**
 - **Future year air quality modeling**
 - **Source apportionment/sensitivity modeling**
- **Make modeling platform available**



"They have very strict anti-pollution laws in this state."

EGU Emissions Data for western interconnect + Dakotas

2014 Western EGU Emissions	SO ₂ (tons)	NO _x (tons)	Avg. NO _x Rate (lb/MMBtu)
Coal	221,476	321,306	0.253
Natural Gas	520	12,017	0.016
Coal %	100%	96%	Coal = NG x 16
Natural Gas %	0%	4%	

13 Western State EGU Emissions

	SO ₂ (tons)	NO _x (tons)
2014 to 2017	-38%	-33%

Meaning of “necessary to make reasonable progress on anthropogenic emissions”

- **Quoting EPA draft guidance:**

- CAA section 169A(b)(2) requires states to develop a [regional haze] SIP that includes “emission limits, compliance schedules and other measures as may be necessary to make reasonable progress toward meeting the national [visibility] goal.”



Considerations for HAQAST work and ongoing NASA support

- Problem identification – what questions are to be answered, what are most important?
- What can HAQAST do explicitly, and NASA Applied Sciences ongoing programming assure continued implementation of those results?
- Priority order...
 - Characterize international transport at time-space-chemistry source scales usable for air quality planning
 - Reduce uncertainty for those same scales and source for uncontrollable / natural emissions including trends
 - (continue to) Ask state and local air agencies which controllable anthropogenic sources already regulated by rule and permit, need further attention – this would suggest for remote sensing, ubiquitous sources with generally lower emissions rates that vary in space/time/magnitude but need analysis to determine their contribution in the context regional air quality planning, and as background for urban problem areas (this topic is the lower of these priorities but is inherently linked to 1 and 2)

Thank you.

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