WESTAR-WRAP
Regional Haze analysis and planning efforts

Tom Moore

EGU Emissions Analysis project workshop

November 6, 2018

Salt Lake City, UT

WESTAR
Western States Air Resources Council

WRAP
Western Regional Air Partnership

Western air quality analysis and planning

Regional Haze analysis and planning

WESTAR-WRAP support for SIPs

Emissions and “Reasonable Progress”

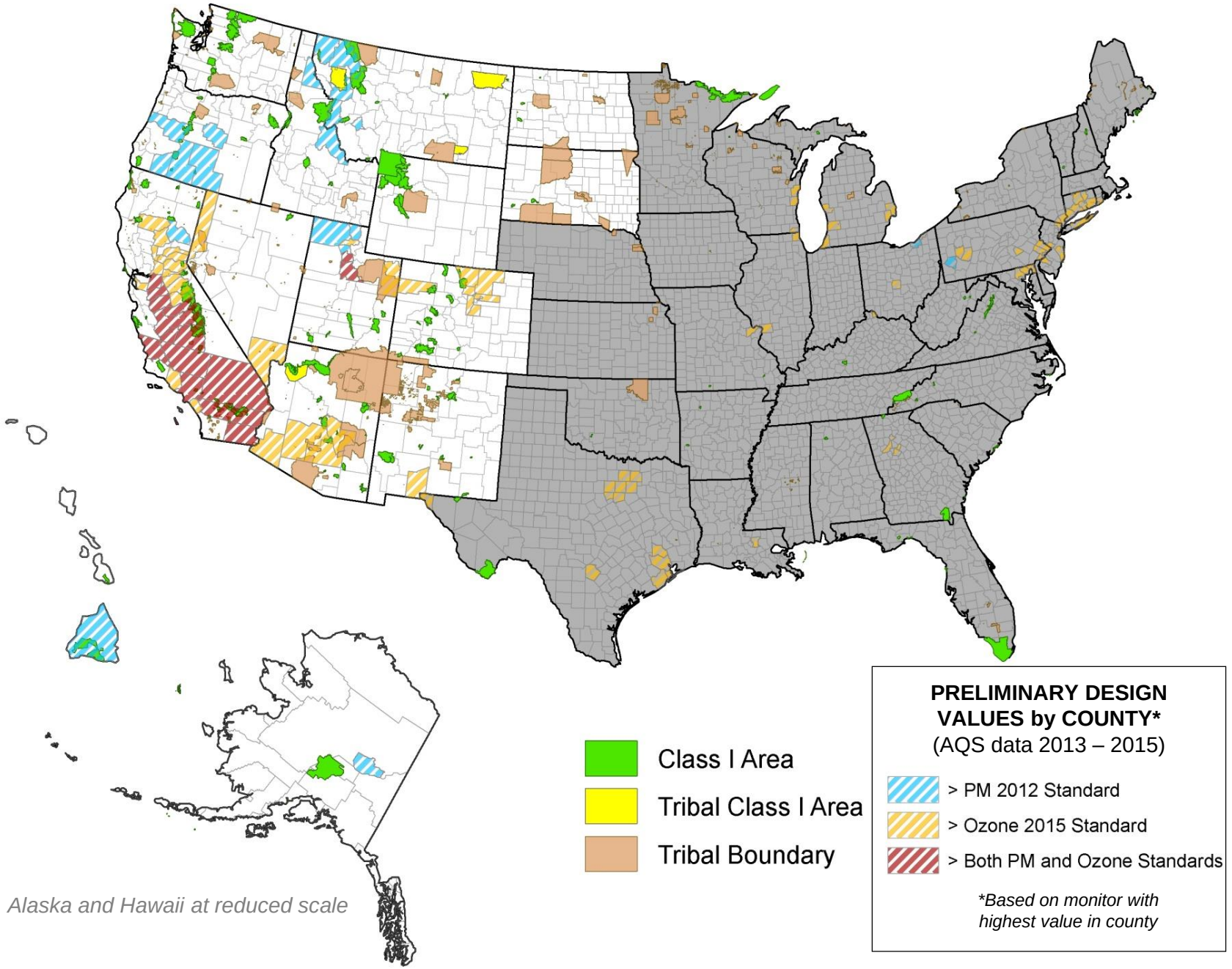
Overview of WESTAR and WRAP

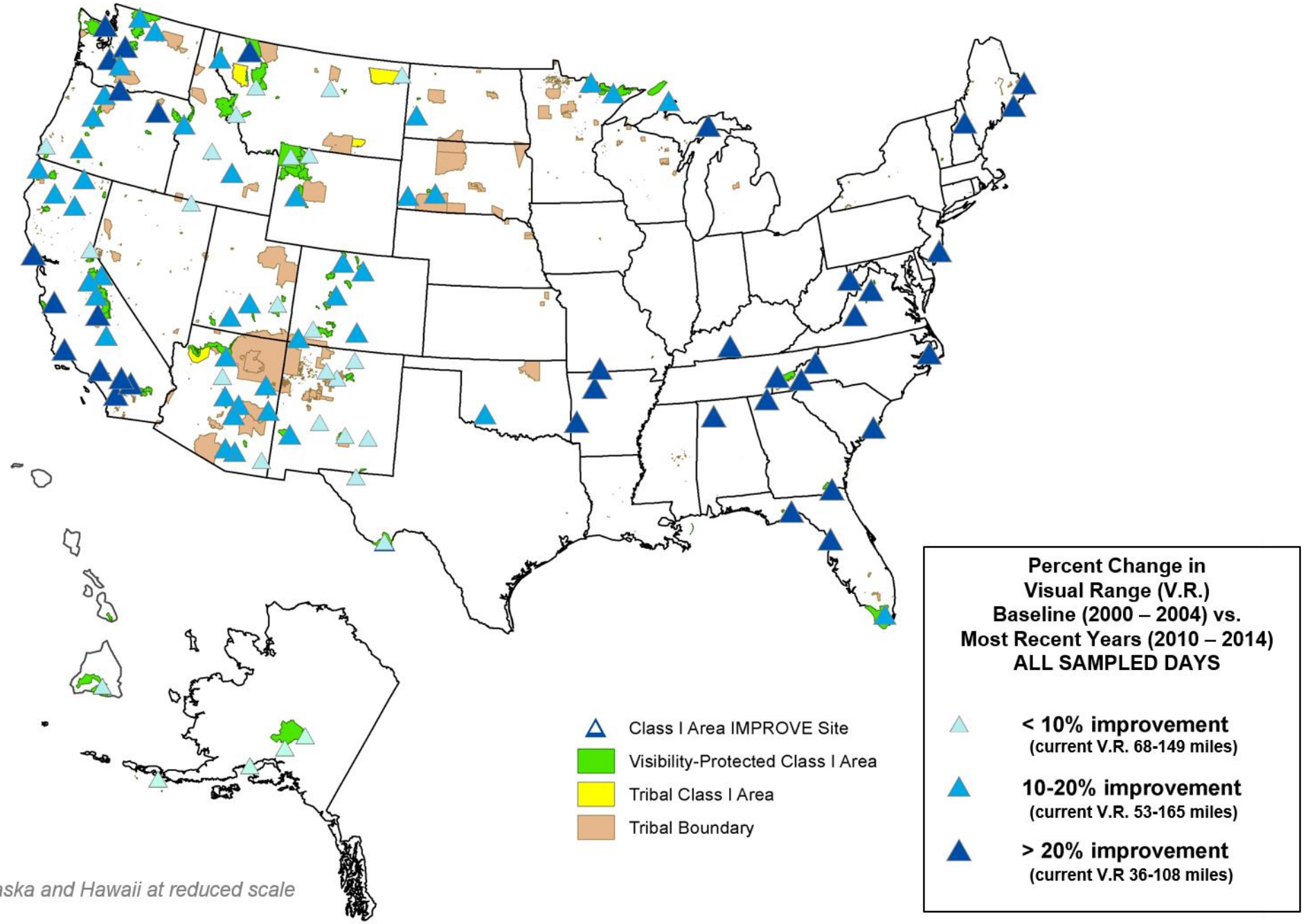
- Purposes
  - Service organizations
  - Assist members in achieving their air quality management goals
  - Shared footprint
- WESTAR – state air agency association
  - Training
  - Provide a forum for discussion
  - Inform policy-related discussions
  - www.westar.org
- WRAP - provides regional technical support
  - Virtual organization, not incorporated – state/tribal partnership
  - 70+ member agencies include 15 state air agencies, NPS, FWS, BLM, USFS, EPA, and interested tribes and local air agencies/districts in the WRAP region
  - Board and technical committees have representatives across states, tribes, federal, and local agencies
  - www.wrapair2.org

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  - Uncertainty with RHR and draft guidance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
  - Interstate transport “Good Neighbor” SIPs due October 2018
- Areas of Concern
  - Address mobile, international, and uncontrollable emissions for regional haze
  - Profound impacts of fire and smoke on regional haze
  - Evaluation of “rules-on-the-books” and consideration of potential additional Reasonable Progress controls


Mandatory Class I Areas
North Cascades
Olympic
Pasayten
Glacier Peak
Alpine Lake
Cabinet Mtn
Glacier
Mount Rainier
Goat Rocks
Mission Mtn
Bob Marshall
Medicine Lake
Lostwood
Mount Adams
Scapegoat
UL Bend
Mount Hood
Selway-Bitterroot
Gates of the Mountains
Mount Jefferson
Mount Washington
Eagle Cap
Anaconda-Pintler
Theodore Roosevelt
Three Sisters
Hells Canyon
Diamond Peak
Strawberry Mtn
Red Rock Lakes
Yellowstone
Crater Lake
Kalmiopsis
Mountain Lakes
Sawtooth
North Absaroka
Teton
Washakie
Redwood
Gearhart Mtn
Grand Teton
Badlands
Lava Beds
Craters of the Moon
Marble Mountain
Fitzpatrick
South Warner
Thousand Lakes
Jarbidge
Bridger
Wind Cave
Lassen Volcanic NP
Caribou
Yolla Bolly Middle Eel
Desolation
Point Reyes
Mokelumne
Mount Zirkel
Rawah
Emigrant
Hoover
Flat Tops
Rocky Mountain
Yosemite
Kaiser
Eagles Nest
Arches
Maroon Bells-Snowmass
Pinnacles
Minarets
John Muir
Capitol Reef
West Elk
Sequoia
Canyonlands
Black Canyon
Ventana
Kings Canyon
Zion
La Garita
Bryce Canyon
Great Sand Dunes
Dome Land
Weminuche
Mesa Verde
San Rafael
Grand Canyon
San Pedro Parks
Wheeler Peak
San Gabriel
Cucamonga
Sycamore Canyon
Bandelier
Pecos
San Gorgonio
Petrified Forest
San Jacinto
Pine Mtn
Mazatzal
Agua Tibia
Joshua Tree
Sierra Ancha
Bosque del Apache
Superstition
Mount Baldy
Salt Creek Wilderness
Gila
White Mountain
Galiuro
Saguaro
Chiricahua
Carlsbad Caverns
Chiricahua
Guadalupe Mountains
Big Bend
Denali Preserve
Tuxedni
Bering Sea
Simeonof
Virgin Islands NP
Haleakala
Hawaii Volcanoes
Roosevelt Campobello IP
Moosehorn
Voyageurs
Isle Royale
Acadia
Great Gulf
Boundry Waters Canoe Area
Presidential Range-Dry River
Seney
Rainbow Lake
Lye Brook
Brigantine
Otter Creek
Dolly Sods
Shenandoah
James River Face
Mammoth Cave
Swanquarter
Linville Gorge
Mingo
Hercules-Glades
Joyce-Kilmer-Slickrock
Great Smoky Mountains
Shining Rock
Upper Buffalo
Cohutta
Sipsey
Wichita Mountains
Caney Creek
Cape Romain
Wolf Island
Okefenokee
Bradwell Bay
Saint Marks
Breton
Chassahowitzka
Everglades
NPS Units
FWS Units
FS Units
* Rainbow Lake, WI and Bradwell Bay, FL are Class 1 Areas where visibility is not an important air quality related value
Produced by NPS Air Resources Division


Class I Area
Tribal Class I Area
Tribal Boundary
PRELIMINARY DESIGN VALUES by COUNTY*
(AQS data 2013 – 2015)
> PM 2012 Standard
> Ozone 2015 Standard
> Both PM and Ozone Standards
*Based on monitor with highest value in county
Alaska and Hawaii at reduced scale


Class I Area IMPROVE Site
Visibility-Protected Class I Area
Tribal Class I Area
Tribal Boundary
Percent Change in
Visual Range (V.R.)
Baseline (2000 – 2004) vs.
Most Recent Years (2010 – 2014)
ALL SAMPLED DAYS
< 10% improvement
(current V.R. 68-149 miles)
10-20% improvement
(current V.R. 53-165 miles)
> 20% improvement
(current V.R 36-108 miles)
Alaska and Hawaii at reduced scale

WESTAR and WRAP Regional Analysis

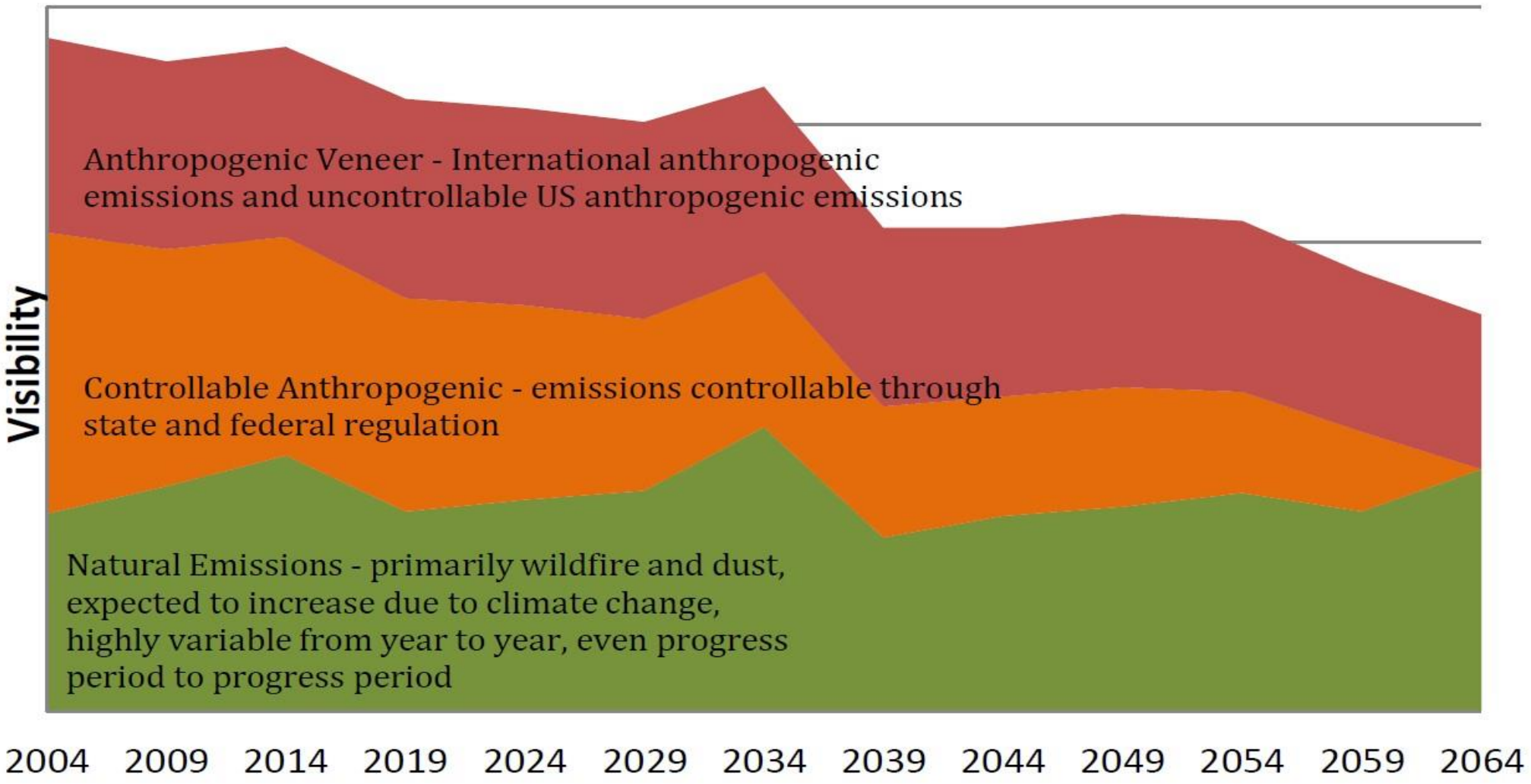
- WRAP organization leading regional analysis
- 2018-19 Workplan approved by WRAP Board April 4, 2018
  - Monthly cross-WRAP Work Groups' Co-Chairs / Subcommittee leads call led by TSC
  - Regular individual WGs' and Subcommittees calls on a biweekly to bimonthly cycles
- Funding is (mostly) from states, funds are at or on the way to WESTAR
- Oversight by WRAP Board and WESTAR Council
- Performance period for regional analysis is Spring 2018 through Spring 2020

- Related studies:
  - EPA working with states and regional organizations to build a 2016 emissions platform with future year projections
  - EPRI and WEST sponsoring 2016-based International Haze study

unplanned natural?! wildfire

planned prescribed fire

Trend in emission types – western U.S.



Emissions sources – western U.S. air quality planning

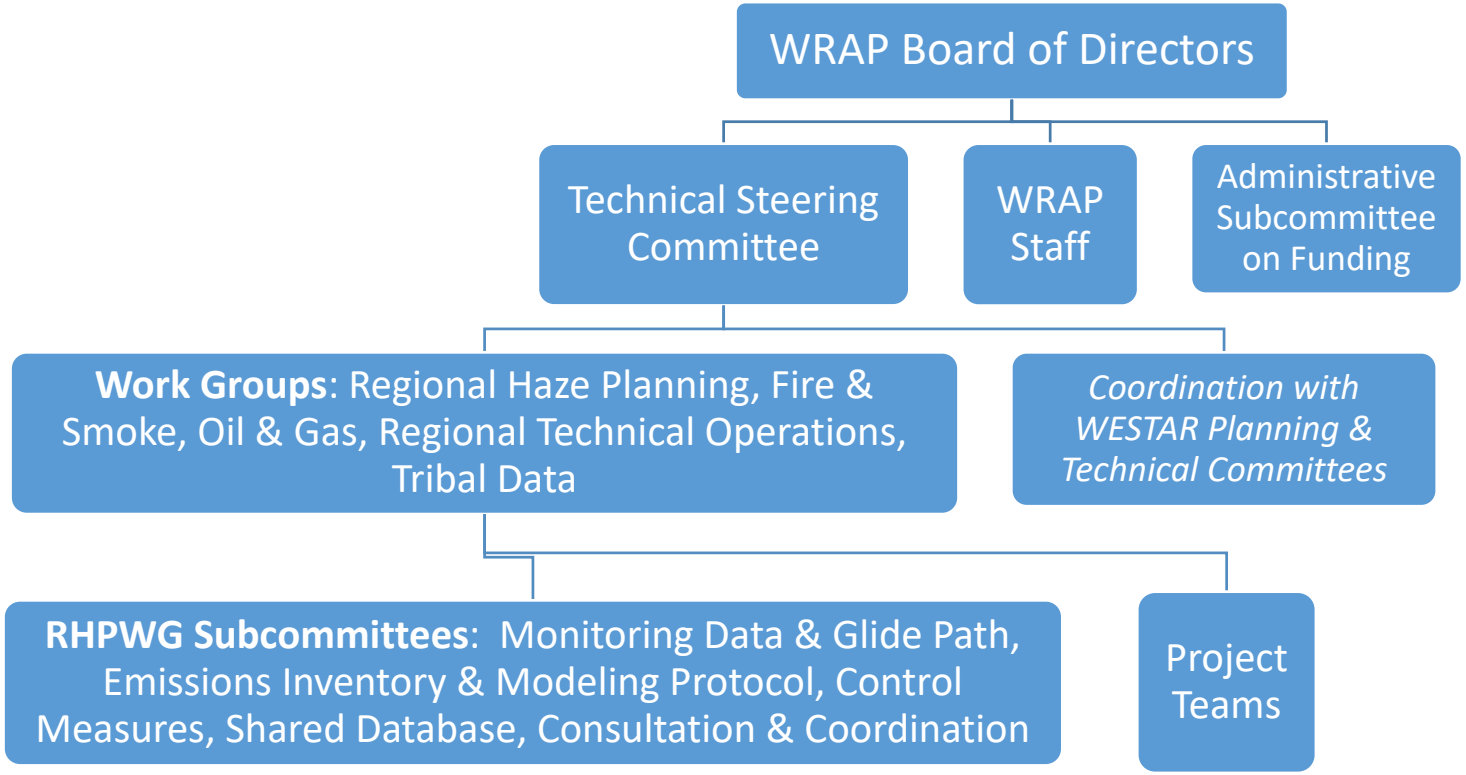
	Source	Controllability	Trend	Variability
Anthropogenic	US Anthropogenic	Some emissions are controllable	Downward as sources are controlled	Relatively stable
		Some emissions will remain after all reasonable controls implemented	Could rise because of population increases	Relatively stable
	International Anthropogenic	Not controllable by state or federal regulations	Likely increasing due to increased development worldwide and rising population	Relatively stable
Natural	Fire, Dust, Sea Salt	Natural, not controllable	Increases due to climate change	Highly variable
	Volcanic	Natural, not controllable	Unpredictable	Highly variable
	Other Natural Sources	Not controllable	Potentially affected by climate change, e.g., changes in temperature	Relatively stable

Table Note: Shaded areas represent emissions that states cannot control.

WRAP Organizational Structure

Technical Steering Committee

- Organizes and coordinates WRAP project activities and Work Groups
- Lead responsibility for the WRAP Workplan
- Reports progress and tracks budget for Board
- Maintains WRAP process
  - Open and transparent communication
  - Pursuing opportunities for collaboration
  - Providing TSC leadership on behalf of Board
  - Coordinate WRAP Work Groups-Subcommittees-Project Teams, as well as with WESTAR committees
  - Encourage engagement and participation to reach consensus



Tribal Data Work Group

Analysis and Planning Activities

- Continue data gathering on the size, complexity, and scope of Tribal air needs
- Continue efforts to provide services to Tribes
- Continue efforts to help solve Tribal needs
- Efforts to build Tribal capacity (staffing) and capability (training) and ensure funding

Outcome

- Promote Tribal membership in WRAP and participation in TDWG
- Promote benefits of using WRAP and WESTAR products and services
- Summary Assessments: Tribal Air Quality Monitoring and AQS Submittal Status / Tribal Emissions Inventory Status
- Support RH and other WRAP projects with Tribal data
- Provide educational opportunities for WRAP member Tribes

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

and

Oil and Gas Work Group

Analysis and Planning Activities

- Improve activity data to support emission inventory development for oil and gas emissions
- Assess present and range of future year scope of emissions management programs across a variety of western jurisdiction
- Coordinate agencies' oil and gas programs
- Review of modeling, monitoring and control program assessment studies for oil and gas sector

Outcome

- OGWG Road Map: Phase I Report
- OGWG Road Map: Phase II project started June 2018, runs through 2019
- Regionally consistent base and future year oil and gas emission inventories
- Emission factor, speciation profiles, and spatial surrogate information for oil and gas sources
- Identification of historic growth, supply, demand, and production decline; on-the-way and on-the books oil and gas controls
- A range of forecast year oil and gas scenarios based on additional reasonable controls, and rule penetration and effectiveness

Oil and Gas Work Group

Analysis and Planning Activities

- Improve activity data to support emission inventory development for oil and gas emissions
- Assess present and range of future year scope of emissions management programs across a variety of western jurisdiction
- Coordinate agencies' oil and gas programs
- Review of modeling, monitoring and control program assessment studies for oil and gas sector

Outcome (cont.)

- Identification and review of agency oil and gas regulatory and emission management programs
- Assessment of impacts from oil and gas production
- Develop and implement a oil and gas tool box
- Identify opportunities for sub-regional oil and gas management

Project Teams

- Drill Rig 1-hour NO2 Collaborative Study (on-going)
- *Collaborative Air Landscape-Scale Management Pilot (CALM) study – not active, no FLM funding*

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

Work Groups / Subcommittees and Tasks

WRAP Work Groups

Fire and Smoke

Oil and Gas

Regional Technical Operations

Tribal Data

Regional Haze Planning w/ Subcommittees

- Monitoring Analysis and Glideslope
- Emission Inventory and Modeling Protocol
- Control Measures
- Shared Database
- Consultation and Coordination

WRAP Workplan Regional Haze Tasks

Task 1 - Monitoring Data Analysis

Task 2 - Emission Inventory

Task 3 - Air Quality Modeling

Task 4 - Analyze Future Year Modeling Results

Task 5 - Control Measures Analysis

Task 6 - Embedded Progress Report

Task 7 - Technical Support System v2

Task 8 - State Planning and Adoption Process

Regional Haze Rule calls for "Reasonable Progress" to improve visibility

- **Every 10 years a goal is set for each Class I area, i.e., 2018, 2028, etc.**
- **RHR assumes that "Natural Conditions" is a viable outcome**
- **States manage (some) emissions affecting visibility and RHR requires SIPs to determine measures "necessary to make reasonable progress"**
- **Quoting EPA draft guidance:**
  - The very definition of "regional haze" recognizes that progress towards natural visibility conditions will require the accumulation of reductions in air pollution and associated light extinction, achieved through emission control measures applied to many sources over a broad geographic area. The visibility benefits of these measures may not be individually perceptible.
- **Reasonable progress goal accounts for projected emissions changes in host state and upwind regions/sources contributing at that Class I area**

Meaning of “necessary to make reasonable progress”

- **Quoting EPA draft guidance:**
  - CAA section 169A(b)(2) requires states to develop a SIP that includes “emission limits, compliance schedules and other measures as may be necessary to make reasonable progress toward meeting the national goal.”

Process / considerations around "reasonable progress"

- Outcome of this decision-making process will most often depend on the outcome of a state weighing the costs of compliance and visibility benefits
  - State has already included their estimates of "on-the-books" emissions reductions from existing state and federal rules

- States are required in the CAA to consider 4 factors:
  - Remaining useful life of a source
  - The time necessary for compliance by setting a compliance deadline that provides a reasonable amount of time for the source to implement the measure
  - Energy and non-air quality impacts primarily as components of the costs of compliance
  - Cost of the control measure

  - Optional "5th factor" is to weigh the visibility benefits

  - Each state will use regional analysis results that provide related "upwind transport contribution" information for each western Class I area

Western Regional Haze Analysis – WRAP 2018-19 Workplan

- Large regional effort than underpins more local analysis work of WRAP member agencies
- Purpose is to set Reasonable Progress Goals to improve visual air quality at over 100 individual protected Class I areas
  - Also used to assess regional transport of ozone and other pollutants
- Focus is on continuing SOx and NOx emissions reductions
- Evaluation work:
  - Monitoring data chemical species mix and trends 2000 through 2019
  - Emissions data for 2014 through 2017 timeframe and 2028 projection year
  - Regional air quality modeling to apportion contributions of upwind source categories and states
  - Control strategy analysis results for individual sources by each state to be summed for testing in regional modeling

Thank you.

Tom Moore
WRAP Air Quality Program Manager, WESTAR