

2016 Annual WRAP Workplan

approved by the WRAP Board – May 9, 2016

Julie Simpson, Technical Steering Committee - Tribal Co-Chair

Patrick Barickman, Technical Steering Committee - State Co-Chair

Tom Moore, WRAP Air Quality Program Manager

June 16, 2016

Pullman, WA



Acknowledgements – many thanks

Workplan drafting team

- Gordon Pierce
- Mike George
- [Phil Allen](#)
- [Julie Simpson](#)
- Mary Uhl
- Patrick Barickman

WRAP Technical Steering Committee and Advisors

- Patrick Barickman
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- Gail Tonnesen
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- Minnie Grant
- Ryan Eberle
- Mary Uhl



WRAP – the partnership

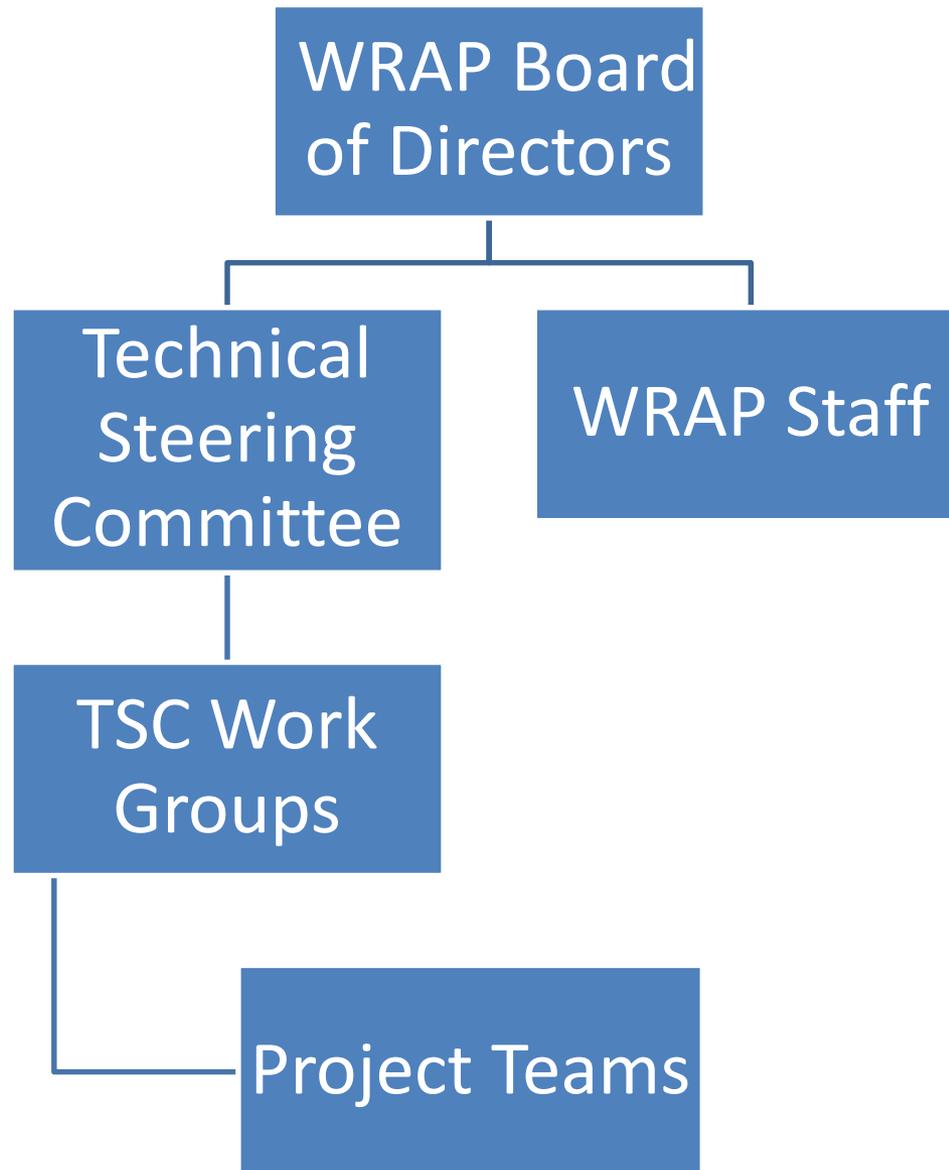
- The Partnership continues to promote, support and monitor the implementation of regional haze plans to improve visibility in all Western Class I areas through a process that strives for consensus among its partners and stakeholders
- Western U.S. Class I areas are national treasures constituting 75% of the nation's visibility-protected areas
- WRAP assists its membership to explore, understand, and address a variety of regional air quality issues including regional haze, climate change, ozone, particulate matter, and deposition of nitrogen and mercury

WRAP membership has changed over time

- Current WRAP is open to all states, federally recognized tribes, and local air agencies in the geographic region encompassed by the fifteen western states, and includes federal agencies as members
- At present, the membership includes a diverse group of air quality management professionals from the 15 western states, 21 tribes, 28 local air agencies, 4 federal land management agencies, and EPA
 - 69 member agencies



WRAP Organization





WRAP Board

- WRAP Board of Directors consists of five state, five tribal, five federal and two local air agency representatives
 - Board acts on behalf of all WRAP members
 - Activities, powers, duties of Board described in [WRAP Charter](#)
 - Charter authorizes the Board to provide overall policy direction
- The WRAP Board resolves all issues on a consensus basis
- The WRAP Board may vote on administrative matters when consensus cannot be reached



WRAP Vision

- WRAP's vision is to be the leading technical and planning information source for air quality management in the western United States



WRAP Goals

The goals of the Western Regional Air Partnership are to:

1. Provide a forum for regional collaboration on technical and planning topics of common interest to the members.
2. Share and act on the current and future priority technical support needs of the members.
3. Provide timely and efficient access to needed technical information that is credible, current, comprehensive, and consistent for air quality management decisions.
4. Deliver technical support, training, products, and other services that meet the priority needs of the members.
5. Advocate and advance western technical issues for resolution.

WRAP Board established near-term strategic objectives in February 2016:

- Create and operate the TSC and topical Work Groups;
- Create stable, sufficient funding for staff to support WRAP, organizational activities, and enable participation by all member agencies;
- Approve and utilize the WRAP Workplan to measure and track WRAP activities;
- Design and bring the Regional Technical Center on-line; and
- Continue implementation of the March 2015 WRAP Strategic Plan and Vision Statement.

Work Plan Overview

I. Purpose and Objectives

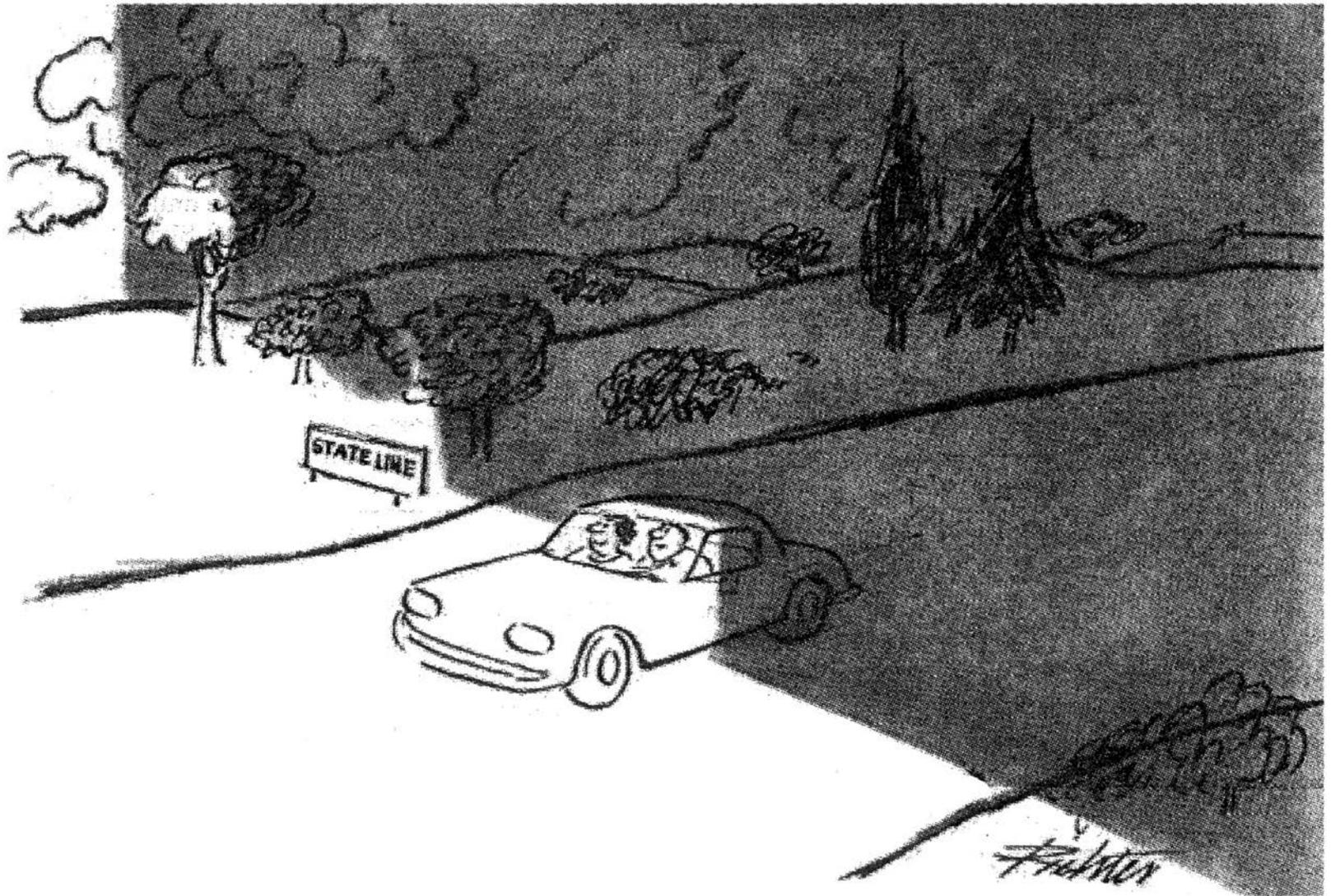
- A. Implement and Manage Coordination: Technical Steering Committee
- B. Support Technical and Planning Analysis for Regional Haze State Implementation Plans (SIPs)
- C. Promote Understanding of Role of Fire and Smoke in Regional and Local Air Quality Plans
- D. Promote Understanding of Role of Oil and Gas in Regional and Local Air Quality Plans
- E. Provide Regional Technical Capabilities
- F. Support Development of Tribal Air Quality Capacity and Tribal Implementation Plans (TIPs)

II. WRAP Organizational Structure

III. Deliverables, Funding Sources, and Budget

Appendix A - Technical Steering Committee description

Appendix B - Work Group workplan template



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



Technical Steering Committee

- Organize, direct, and coordinate WRAP Work Groups and project activities in the Annual WRAP Workplan, tracking progress and budget for the Board.
- Elements for the Committee:
 1. Oversee the preparation of a calendar year annual workplan and budget for Board approval, to coordinate among and provide oversight for the activities conducted under grants, cooperative agreements, and other Board-authorized WRAP projects;
 2. Work with the WRAP Board to establish the topical WRAP Work Groups;
 3. Provide oversight and coordination for the Work Groups and their projects and tasks;
 4. Maintain the WRAP process; and
 5. Maximize coordination within WRAP and leverage work of other related partner organizations.



Regional Haze

- Regional Haze Planning Work Group (when formed) is responsible for addressing the RHR data and planning analysis elements, topics, and issues
 1. Elements for Work Group
 - a. Inputs and tasks from WRAP Fire and Smoke, Oil and Gas, Regional Technical Operations, and Tribal Data Work Groups;
 - b. WRAP data and decision support systems – managing updates to TSS and FETS/WRAP Tools;
 - c. **Update the 2014 WESTAR Regional Haze plan (this plan relies heavily on technical support from the WRAP for completing regional analysis);**
 - d. Emissions and Modeling for regional haze – leverage IWDW and potentially other regional modeling systems for western regional haze planning;
 - e. **Conduct needed IMPROVE monitoring data analysis for revised visibility metric by EPA;**
 - f. **Define and execute process for projecting emissions for regional haze planning; and**
 - g. **Define and execute process for analyzing controls and state-on-state impacts from changes in emissions on western Class I areas.**



Fire and Smoke

- Fire and Smoke Work Group (when formed) is responsible for addressing the data and analysis elements, topics, and issues related to air quality impacts from fire and smoke management programs
1. Elements for Work Group
 - a. Inputs from and task coordination with WRAP Regional Technical Operations, Tribal Data, and Regional Haze Planning Work Groups.
 - b. WRAP data and decision support systems – modified/updated TSS and FETS/WRAP Tools:
 - i. **Implement regionally-consistent fire emissions inventories and make technical improvements;**
 - ii. **Identify and evaluate emissions and modeling for fire-related ozone background and transport evaluation for regional haze;**
 - iii. **Specify modeling studies of fire emissions and impact analysis;**
 - iv. **Determine present and range of future year contributions of natural fire sources; and**
 - v. **Track, reference, and apply effects of fire management-related regional haze controls on regional ozone and PM.**





Oil and Gas

- Oil and Gas Work Group (when formed) is responsible for addressing the data and analysis elements, topics, and issues related to air quality impacts from the oil and gas sector

1. Elements for Work Group

- Inputs and tasks from WRAP Regional Technical Operations, Tribal Data, and Regional Haze Planning Work Groups;
- **Emissions and Modeling for O&G-related background and regional transport evaluation (coordinate scope with Regional Technical Operations Work Group);**
- **Identify and evaluate modeling studies of Oil and Gas Emissions and impact Analysis – results on IWDW data and decision support web system;**
- Pending funding, continue Drill Rig NO₂ Study and implement CALM Project
- **Implement regionally-consistent Oil and Gas emissions inventories and make technical improvements;**
- **Determine present and range of future year contributions of Oil and Gas sources for the entire upstream and midstream sectors; and**
- **Track, reference, and apply effects of state-, tribal-, producer-, and EPA-mandated Oil and Gas emissions management- related controls on regional haze, regional ozone, and other air pollution indicators**



Regional Technical Operations

- Regional Technical Operations Work Group (when formed) is responsible for addressing the data and analysis elements, topics, and issues related to regional air quality analyses and the Regional Technical Center
1. Elements for Work Group
 - a. Inputs and tasks from WRAP Fire and Smoke, Oil and Gas, Tribal Data, and Regional Haze Planning Work Groups
 - b. Emissions and Modeling for regional haze, ozone, PM, and other indicators' background and regional transport evaluation**
 - **Leverage IWDW and potentially other regional modeling systems for data and visualization for western air agencies' planning needs.**



Tribal Data

- Tribal Data Work Group (when formed) is responsible for addressing the data and analysis elements, topics, and issues related to tribal data needs and TIPs in the context of regional air quality planning analyses
1. Elements for Work Group
 - a. Inputs from and coordination with WRAP Fire and Smoke, Oil and Gas, Regional Technical Operations, and Regional Haze Planning Work Groups;
 - b. Emissions and Modeling for Tribal Data background and regional transport evaluation;
 - c. **Make Tribal data improvements and include in western regional analyses;**
 - d. **Identify and evaluate modeling studies of Tribal Data emissions and impact analysis;**
 - e. **Implement regionally-consistent and complete Tribal emissions inventories and make technical improvements;**
 - f. **Determine present and range of future year contributions of Tribal sources for the entire upstream and midstream Oil and Gas sectors; and**
 - g. Track, reference, and apply effects of state-, tribal-, producer-, and EPA-mandated O&G emissions- related controls on regional haze, regional ozone, and other air pollution indicators.

Work Groups' membership and representation

- Strong, experienced leadership for Co-Chairs
- Topical expertise
- Commitment to participate and develop agency and regional capacity
- Balanced and representative
 - Geographic
 - Across WRAP member agencies



2016 Annual Work Plan - development schedule

Step	Activity	Q1			Q2			Q3			Q4		
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1	Draft 1	■	■	■									
2	Workplan orientation for Board - initial review			■									
3	Draft 2			■	*								
4	Board review and discussion at WESTAR-WRAP meeting				■								
5	Workplan approval by WRAP Board					**							
6	Outreach for Work Groups' members and Co-Chairs					■	■	■					
7	Approval of Work Groups' Co-Chairs by Board						■	■	■	■			
8	Work Group Co-Chairs and TSC recruit members for Work Groups						■	■	■	■			
9	Work Groups develop initial drafts of their workplans						■	■	■	■	■		
10	TSC & Work Groups meeting - review and finalize Work Groups' workplans, prioritizing work tasks/budget needs										■		
11	Work Groups & TSC compile and update Annual Workplan										■	■	
12	Board reviews and adopts updated Annual Work Plan, begin work task implementation												■

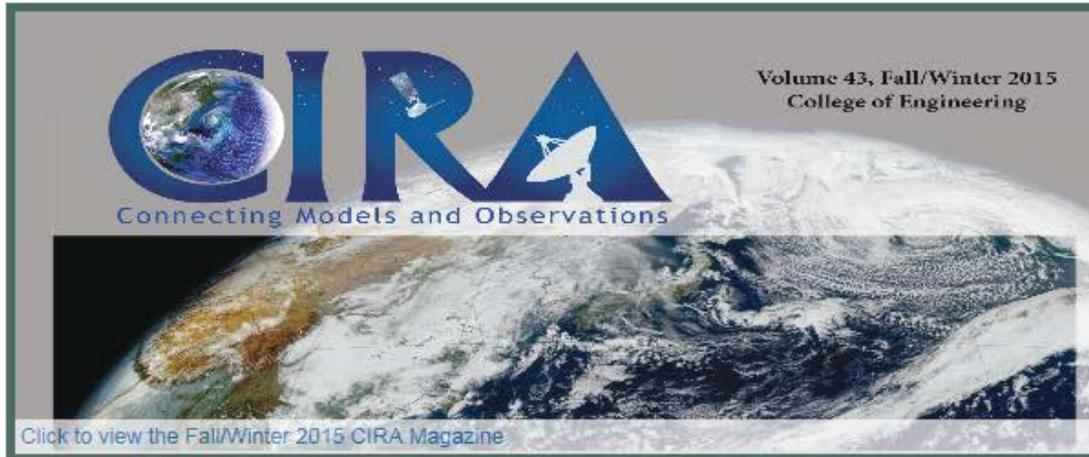
* - April 11th Board call

** - May 9th Board call

Workplan – Next Steps

- Soliciting names from WRAP states, tribe, local air agencies, FLMs, and EPA ROs for Work Groups
 - Expect WGs to be formed by Fall and begin meeting regularly by phone before the end of 2016
- WRAP Technical Steering Committee and Work Groups’ meeting in October to discuss WGs’ workplans and priorities - for Board to then review and approve as 2017 WRAP Annual Workplan
- High priority to prepare “white papers” on western regional technical work, data, and analysis needs by topical WGs





Intermountain West Data Warehouse – Western Air Quality Study (IWDW-WAQS)

Please login into website to access Help Desk. Request a [new password](#) if you do not know your account info.

CIRA is a cooperative institute that is also a research department within [CSU's College of Engineering](#), in partnership with the [Department of Atmospheric Science](#). Its vision is to conduct interdisciplinary research in the atmospheric sciences by entraining skills beyond the meteorological disciplines, exploiting advances in engineering and computer science, facilitating transitional activity between pure and applied research, leveraging both national and international resources and partnerships, and assisting

Current Conditions

Temp:	75.6 F
Dew Point:	43.6 F
Relative Humidity:	32 %
Wind:	3.0 mph (NE)
Precip:	0.00 in
Barometer:	29.554 in

NPS Air Quality
Conditions & Trends Tools
(nps.gov)

Partners: NPS/ARD

Federal Land Manager
Environmental Database
([FED](#))

Partners: NPS, USFS

Databases



Websites



Hardware



Software



Intermountain West
Data Warehouse
([IWDW](#))

Partners: NPS, BLM, USFS, EPA,
CO, WY, UT, NM

Southeastern
Modeling, Analysis, and
Planning
([SEMAP](#))

Partners: EPA, AL, FL, GA, KY, MS,
NC, SC, TN



NPS Air Quality
Conditions & Trends
(nps.gov)

Partners: NPS

Databases

- Schema design
- Data import & update
- Administration
- Query design



Relational database:

- 800,000,000 records
- 62 air quality networks
- 63 water quality networks
- 24 modeling and satellite datasets

Partners: NPS, USFS

File server:

- ~107 Terabytes of online data
- ~100 Terabytes of offline data
- ~85 Terabytes downloaded/transferred
- 7 complete modeling platforms

Hardware

Software

Intermountain West
Data Warehouse

Partners: NPS, BLM, USFS, EPA, CO, WY,
UT, NM

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NPS Air Quality
 Conditions
 (nps.gov)

Partners: NPS

Websites:

- FED
- SEMAP
- IWDW
- NPSCAT
- TSS
- IMPROVE

Websites

- Website design
- Web hosting
- Tool development
- Web services



National Land Manager
 Environmental Database

Partners: NPS, USFS

Hardware

Software

Intermountain West
 Data Warehouse

Partners: NPS, BLM, USFS, EPA, CO, WY,
 UT, NM

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Partners: NPS

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Websites



Hardware

Intermountain West
Data Warehouse

Partners: NPS, BLM, USFS, EPA, CO, WY,
UT, NM



Software

- Data access libraries
- Data manipulation
- Visualization tools
- Data analysis

theastern
analysis, and
Planning
(SEMAP)

S: AL, FL, GA, KY, MS, NC, SC, TN



NPS Air Quality
Conditions & Trends Tools
(nps.gov)

Partners: NPS

Federal Land Manager
Environmental Database

Partners: NPS, USFS

Databases

Websites



Hardware



- Server configuration
- Server maintenance
- Networking
- Troubleshooting & repair

Software

Intermountain
Data Warehouse

Partners: NPS, BLM, USFS,
UT, NM

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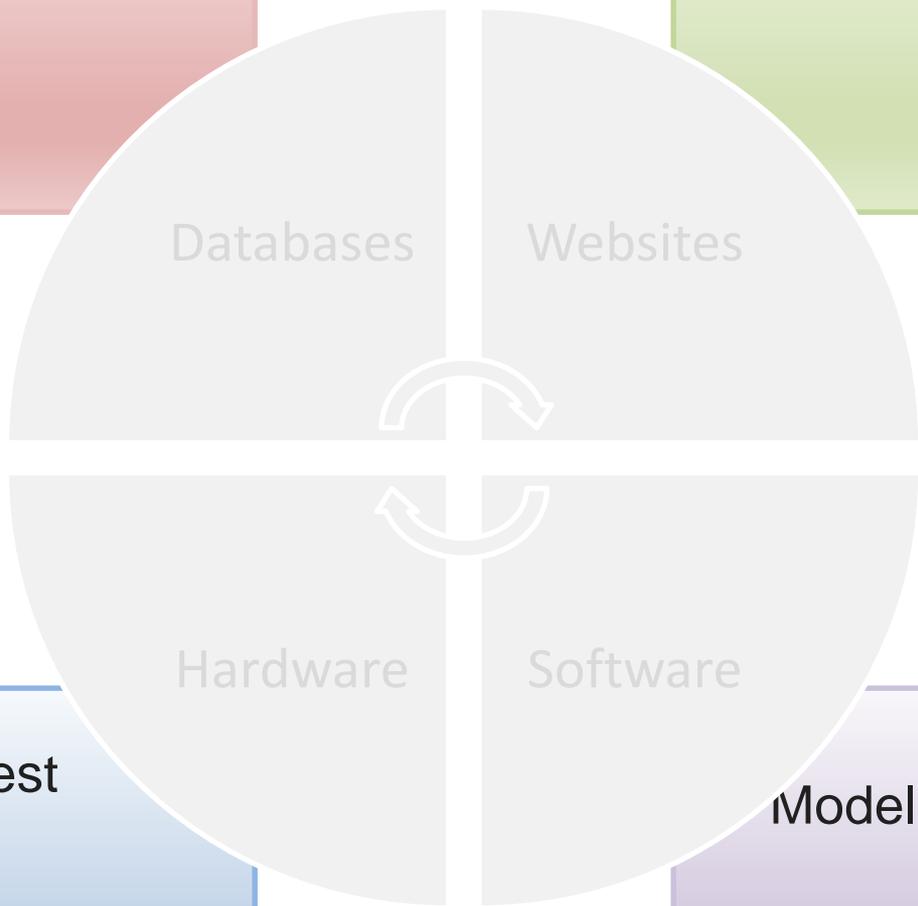


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([nps.gov](https://www.nps.gov))

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UT, NM

Federal Land Manager Environmental Database Sign In | Register

AQRV Summaries Data Exploration Data Access Resources

Database Query Wizard

The query wizard allows you to selectively download data and metadata from the integrated database by specifying datasets, sites, parameters, date ranges, data quality flags, and other criteria. You can request raw data and graphical reports in variety of output formats, including delimited text files, Excel files, charts, graphs, and maps. Click through the tabs from left to right to select the data you want.

Reports Datasets Sites Parameters Dates Aggregations Options

Select one or more Sites 2 of 213 selected

Site	Code	ST	LAT	LOD	ELEV	START	END
Acadia NP	ACAD1	ME	44.3773	-68.281	157	1984	2004
Addison Pinnacle	ADPT1	WV	42.4912	-77.2055	512	2001	2010
Agua Tibia	AGTI1	CA	33.4636	-116.9706	507	2000	2014
Andler	ANBL1	NE	47.8993	-107.8628	77	2003	2004
Arches NP	ARCH1	UT	38.7833	-109.8323	1722	1988	1992
Arendsville	ARENL	PA	39.9232	-77.3079	267	2001	2010
Badlands NP	BADL1	SD	43.7435	-101.9412	794	1988	2014
Baltimore	BALTI	MD	39.2847	-76.7093	78	2004	2006
Bandelier NM	BAND1	NH	39.7797	-106.2664	1988	1988	2014
Barrier Lake	BALAL	AB	51.029	-119.0336	1391	2011	2014
Big Bend NP	BIBEN1	TX	29.3827	-109.378	1606	1988	2014
Bliss SF (TOPA)	BLISS1	CA	38.9761	-120.1025	2130	1990	2014
Blue Mounds	BLMND1	WI	43.7168	-84.1913	473	2000	2014
Bondville	BOVD1	IL	40.052	-88.3733	263	2001	2014
Bonnie Del Apache	BOAP1	NH	33.8695	-106.852	1389	2000	2014
Boulder Lake	BOLAL	WV	42.88	-100.64	2206	2009	2014
Boundary Waters Canoe Area	BOUAL	WV	47.9466	-91.4955	524	1991	2014
Bratton	BRATT1	LA	29.1163	-93.2066	11	2000	2004

Show Report Log Immediate Mode **Submit...**

Selections Report #1

<http://views.cira.colostate.edu/fed>

Federal Land Manager Environmental Database (FED)

Partners: NPS, USFS

osites

ware

Southeastern Modeling, Analysis, and Planning (SEMAP)

Partners: AL, FL, GA, KY, MS, NC, SC, TN

<http://views.cira.colostate.edu/semap>

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Partners: NPS, USFS

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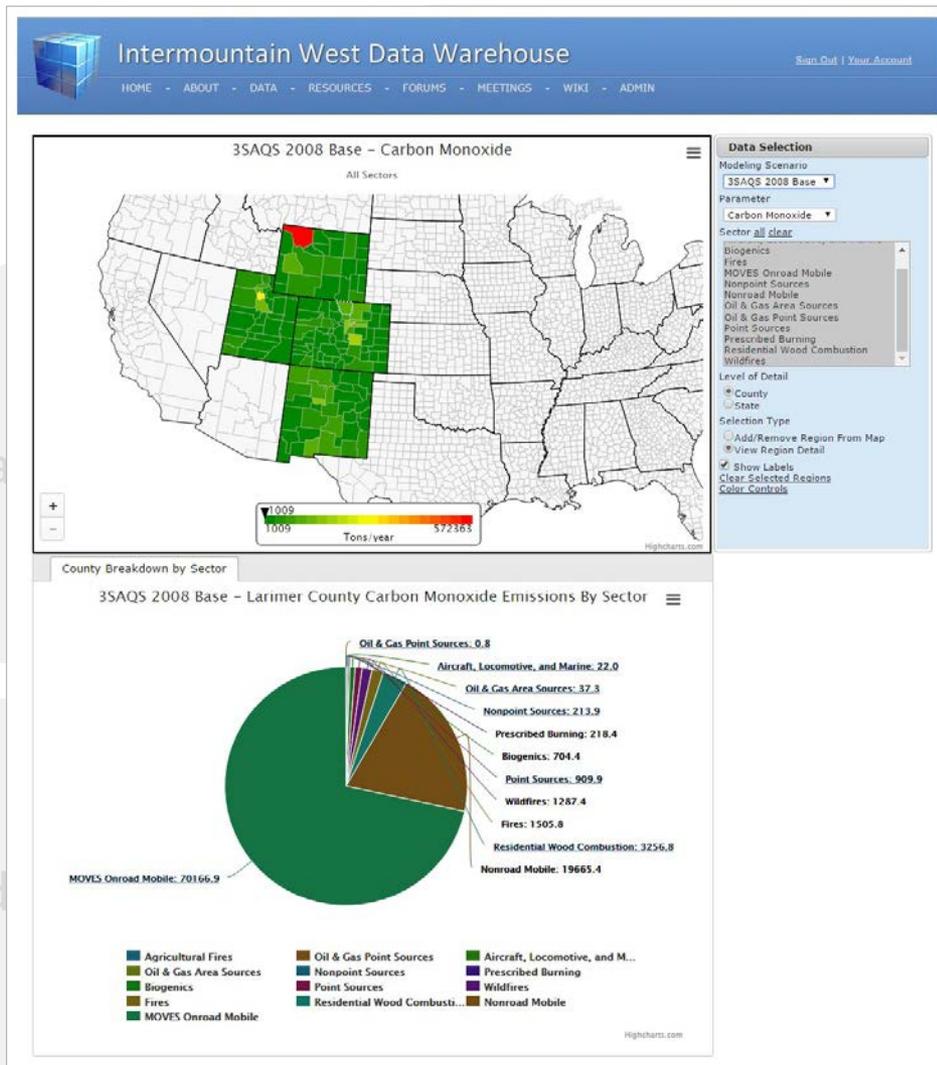
Partners: EPA, AL, FL, GA, KY, MS, NC, SC, TN

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<http://views.cira.colostate.edu/iwdw>

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NPS » Explore Nature » Air Resources

Air Quality Conditions & Trends

by Park

Find and visualize park-specific air quality data, conditions, and trends based on NPS analysis methods.

Find products for: End year:

About:

Overall Air Quality
 Ozone
 Visibility
 Nitrogen Deposition
 Sulfur Deposition

Acadia NP - Visibility

Visibility is a measure of how far and how well we can see color and detail in distant views ([learn more](#)). Fine particles and gaseous air pollution form haze in the atmosphere that reduces visibility. The Clean Air Act visibility goal requires improvement on the 20% haziest days and no degradation on the 20% clearest days. Look at the tabs below to learn how visibility has changed over time, what is in the air on the clearest and haziest days, and the status of visibility at the park.

10-Year Trends | Long Term Trends | Clearest Days Composition | Haziest Days Composition | Summary Table

Haze on the Clearest Days

Clearest Days by Year

Acadia NP

Note: Clearest days are the 20% of sampled days where visibility is most clear.

*Light extinction: the loss in light intensity due to scattering and absorption measured in inverse megameters (1/Mm).
IMPROVE Monitor ID: ACAD1, ME

[+ Show chart data](#) [Chart data in Microsoft Excel](#)

Components of Haze on Clearest Days

Acadia NP

Note: Clearest days are the 20% of sampled days where visibility is most clear.

* Light extinction: the loss in light intensity due to scattering and absorption measured in inverse megameters (1/Mm).
**Natural visibility conditions are those estimated to exist in a given area in the absence of human-caused visibility impairment.
IMPROVE Monitor ID: ACAD1, ME

[+ Show chart data](#) [Chart data in Microsoft Excel](#)

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<http://www.nature.nps.gov/air/data/products/parks/index.cfm>

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Modeling Platform Inventory and File Transfer Status

Internal (WAQS-developed)

2008b

- WestJumpAQMS Met
- 3SAQS 2008b emissions - Base and Future
- 3SAQS 2008b CAMx - Base and Future

2011a

- 3SAQS Met
- 3SAQS 2011a emissions (Phase I O&G) - Base and Future
- 3SAQS 2011a CAMx - Base and 2020 Future Case
- 3SAQS 2011a CMAQ output - Base

2011b

- 3SAQS Met
- WAQS Winter O3 Met
- WAQS 2011b emissions (Phase II O&G) Base and 2025 Future Case
- WAQS 2011b CAMx – Base and Future
- WAQS 2011b CMAQ - Base and Future

2014

- WAQS Met (WRF, WRFCAMx, MCIP)
- Other modeling platform components pending new WAQS contract

External (non-WAQS-developed) modeling studies

- CARMMS 1.0/Mancos Shale – **underway**
- Utah ARMS – **pending**
- Denver RAQC O3 SIP – **pending**
- OKT - CAPs, HAPs, GHG emissions for O&G and mining sectors - **pending**

Summary of Data Requests

2016

- Organic PM Reduced-form modeling for public health (Cornell) – 2011b
- CARMMS 2.0 (BLM) – 2011b
- Crescent Point EIS (BLM) – 2011b
- Source Apportionment displays (API) – 2011a
- CMAQ for FRAPPE (EPA R8) – 2011a/b
- Met model performance (CIRA) – 2011a/b

Since April 2015

- SNMOS (State of NM) – 2011b CAMx
- CMAS Training (UNC-IE) – 2011b CMAQ inputs
- Project for USEPA (AECOM) – 2008b
- Background Ozone Analysis (EPA R8) – 2011 WRF
- Denver RAQC Ozone SIP (Denver Regional Air Quality Council / State of CO) – 2011a
- Ozone sensitivities in Denver to cultivation emissions (UNC)– 2008b
- BLM CO UFO oil and gas EA (BLM CO) - 2011 WRF
- Single Source AQRV Analysis (NPS) – 2008b
- Analysis of FRAPPE and DISCOVER-AQ (NCAR/CU) – 2011a
- Methane VOC Control Sensitivity Study (Clean Air Task Force) – 2008b Future
- Source Apportionment Modeling for Nitrogen in GYA (NPS/CIRA) – 2011a

Earlier

- 16 Projects (NEPA, Research, NPS, FWS AQRV analysis, etc.)

Summary of Computing and Data Storage Resources

Servers

- Views (Windows web server)
- Viking (Linux ftp file server to host modeling platform data and service modeling platform data requests)
- Vibe (Windows SQL database server to hosts monitoring data; ancillary web server)
- Vader (Windows SQL database server)
- Viper (Windows staging server)
- IWDW Team development machines

Online Storage Capacity

- 109Tb (Viking)

External Disk Capacity

- 100Tb of “shelf” storage for redundant backups and physical disk transfers

Future Allocations

- >100Tb on additional server for modeling platform data
- >100Tb of additional “shelf” and NAS storage

Immediate future - Modeling Platform Development Elements

2014 base case emissions, met domain expansion

- 2014 NEIv1 and “best available” quasi-natural emissions
- O&G comprehensive update north-south from AZ-NM to MT-ND basins
- Met modeling at 4km for same north-south area and east-west KS-CO to UT-NV

2014 Global Models’ evaluation and assessment

- Use as CONUS regional model boundary conditions
- PM, Ozone, other species
- Develop and document evaluation methods

2014 base case air quality modeling /evaluation

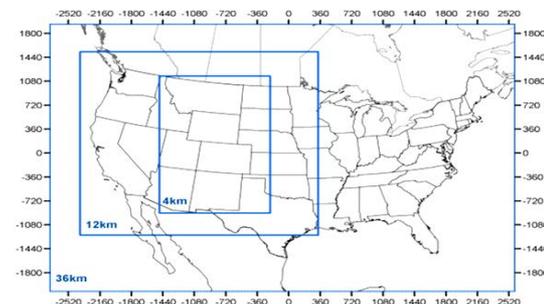
- Apply criteria used in earlier IWDW-WAQS evaluations
- Option for 2015/16 years – lighter base year modeling effort/evaluation

Future projection years

- Anthropogenic emissions – 2020/21, 2025, 2028, 2030
- Quasi-natural emissions – scenarios for biogenics, fire, ammonia, et cetera
- Option for modified future met based on climate change scenarios

Future years’ air quality modeling runs

- Evaluate with MATS and pending Regional Haze reasonable progress goals
- Serve as “No-Action” alternatives as inputs to NEPA studies



Modeling Domain

36km: 148 x 112 (-2736, -2088) to (2592, 1944)
 12km*: 227 x 230 (-2388, -1236) to (336, 1542)
 04km*: 317 x 515 (-1480, -904) to (-212, 1156)

* includes buffer cells

Acknowledgements

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- Gail Tonnesen and Rebecca Matichuk, EPA R8
- Mike George, NPS Intermountain Region
- Shawn McClure, Dustin Schmidt, and Rodger Ames, CIRA
- Ralph Morris and colleagues, Ramboll-Environ
- Zac Adelman and colleagues, UNC

