

## Appendix D. Western Regional Modeling Framework

### Background

As discussed in the subsections of Section III, the WRAP faces several key issues as it continues developing, refining, and analyzing regional data and analysis tools and applying photochemical modeling tools to address ozone and particulate transport and attainment issues for the member States. Evaluating the contributions of non-anthropogenic emissions, transported pollutants both intra- and inter-continental, and US anthropogenic emissions to modeled/monitored values will provide important tools for States and other WRAP members to address air quality planning. The characterization of these contributions is fundamental to understanding the unique drivers of background ozone and particulate concentrations in the West. It is the WRAP's desire in addressing these issues to not only advance the understanding of the issues, but to also build capacity within the member agencies and share our gains with EPA and other sister agencies.

While it has been suggested that EPA may provide regional haze modeling support to the RPOs in lieu of providing funding for additional RPO work, so it is highly important for the WRAP and other RPOs to stay engaged and continue collaboration with EPA while it continues to develop its modeling platforms. Many of the key goals of this Work Plan are similar to the challenges faced by EPA with the current development of 2011 and 2018 modeling platforms to be used for regulatory analysis. On June 1, 2014, the WESTAR Council submitted comments identifying member States' concerns with the 2011 and 2018 modeling platforms developed by EPA/OAQPS. This WRAP Work Plan addresses the areas of concern in the WESTAR letter, and is specifically intended to consider the inter-related transport and background concerns. Improved understanding of the contributions of boundary conditions, updated international emission inventories, oil & gas and fire emissions, and biogenic emissions in background ozone and PM concentrations and the role of the exceptional events rule in addressing contributions from these sources will further the understanding of the interplay of sources in future air quality planning across the West.

The intent of the Western Regional Modeling Framework is to focus emissions analysis, processing, and tracking efforts on regional aspects of air quality planning requirements of the Regional Haze Rule, the Ozone and PM<sub>2.5</sub> NAAQS, and emissions reduction/management initiatives of WRAP members. The emissions work of the Framework would leverage and act as a central storage mechanism for the studies and the extensive routine reporting efforts by WRAP member agencies, as well as related local, regional, and/or national activities such as management of greenhouse gasses from electrical generating units and the Oil & Gas sector, among others.

The intent of the Western Regional Modeling Framework is to focus and leverage regional air quality modeling efforts from the [3-State / Western Data Warehouse / Regional Modeling Center](#), [NW AIRQUEST – Northwest International Air Quality Environmental Science and Technology Consortium](#), and the [AIRPACT – Air quality forecasting for the Pacific Northwest](#); as well as other regional modeling initiatives of WRAP member agencies. In addition, participation in the Framework by WRAP member agencies will allow local, state, and other air quality modeling studies use Framework data and have their resulting individual results incorporated in the Framework to advance the quality of modeling results for the West. The air quality modeling activities would focus on the regional aspects of air quality planning requirements of the Regional Haze Rule, the Ozone and PM<sub>2.5</sub> NAAQS, and emissions reduction/management initiatives of WRAP members.

### Outline of Key Tasks

The immediate short-term needs for photochemical modeling are to address the Regional Haze Planning needs described in Section III.A and Appendix C and would be based on the best available data as described in Tasks 3 and 4, below. These modeling studies include:

- Task 1. Analyze and recommend in a series of White Papers for the WRAP Board: Implementation and Operational Approach for a Western Regional Modeling Framework, including leveraging opportunities and funding options, addressing existing western region modeling centers, EPA OAQPS activities, and identifying how to incorporate technical project results from WRAP Working Groups.
- [3-State / Western Data Warehouse / Regional Modeling Center](#)
  - [NW AIRQUEST – The Northwest International Air Quality Environmental Science and Technology Consortium](#)
  - [AIRPACT – Air quality forecasting for the Pacific Northwest](#)
  - Others to be determined
- WRAP staff or its contractors will prepare a white paper based on review the EPA 2011 and 2018 modeling platforms to identify areas of technical concern that are important to the WRAP membership for additional evaluation and collaboration. The review may result in additional tasks to be addressed by WRAP work plans. The information gained from this exercise will be shared with OAQPS to target areas for additional collaboration.
  - WRAP staff or its contractors will prepare a white paper providing an assessment of the application of various photochemical grid modeling methodologies and model configurations to western air quality issues. The paper will provide a catalog of western regional modeling studies that will be helpful in identifying successful methodologies to address a host of Western modeling challenges. The information gained from this exercise will be shared with OAQPS to target areas for additional collaboration.
  - WRAP staff or its contractors will prepare a white paper documenting the role of fire emissions in visibility impairment, how fire emissions are changing through time, the impact of fire emissions on regional haze natural conditions, and applying those inventories and methods to analyze those emissions in the Framework. The paper will provide a solid background of the role of fire in Western air quality issues and assist agencies in identifying areas for further work. The information gained from this exercise will be shared with OAQPS to target areas for additional collaboration.
  - WRAP staff or its contractors will prepare a white paper documenting the expected improvements in oil and gas emissions inventories and methods to analyze those emissions in the Framework.
- Task 2. Analyze and present a report for the WRAP Board: Ozone transport in the Western U.S.: State of Knowledge and Key Activities to Support Air Quality Planning.
- WRAP staff or its contractors will prepare a white paper documenting the current understanding of ozone transport based on literature review. This documentation will assist in identifying deficiencies in our understanding and areas requiring additional work or data to bolster the scientific community's knowledge base regarding ozone transport.

The information gained from this exercise will be shared with OAQPS to target areas for additional collaboration.

Task 3. Analyze and track emissions inventories and emissions trends by source sector and geographic region.

Air quality planning requires accurate estimates of present day emissions of air pollutants and reliable projections of future changes in emissions. EPA develops a triennial National Emissions Inventory (NEI) based on data provided by the states and tribes and using outputs from national emissions models and other national databases. The most recently available NEI is for 2011, and it is expected that EPA will release a first draft of the 2014 NEI at the end of 2016. The NEI includes emissions in a variety of spatial, temporal and pollutant speciation formats (e.g., county totals or gridded data; annual, monthly, daily or hourly emissions; and as unspiciated total VOC emissions). The NEI data must be processed and quality assured before it can be used in air quality modeling or to support other air planning activities. WRAP has historically performed the processing of the NEI to develop model ready emissions input files for the western states, and WRAP has also performed quality assurance and emissions updates for source sectors that were not well represented in the NEI. These activities have included development of emissions data for wildfires, biogenic sources, ammonia emissions, wind blow dust, and improvements to other anthropogenic source categories. WRAP has also traditionally developed projected estimates of emissions in future years. This activity includes tracking of emissions control measures implemented by states and tribe, national emissions control programs, and projections of growth in emissions as a result of population growth and economic development.

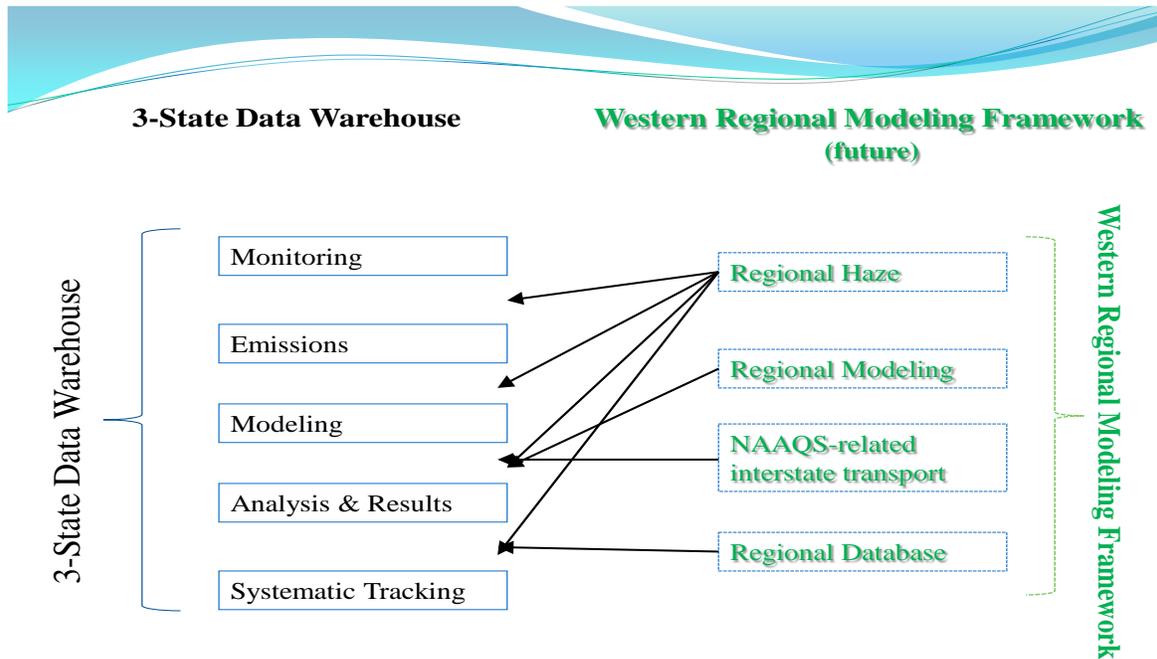
1. Development of modeling emissions inventory for a base case year, either 2011 or 2014.
2. Projection of emissions for future years including (1) a 2018 year that includes all emissions reductions committed to as part of the first regional haze planning period; and (2) a baseline 2028 year that includes all national emissions control programs and “on the books” emissions controls.
3. Development of additional 2028 emissions control scenarios that represent possible emissions reductions by source sector that can be used to achieve air quality planning goals for regional haze and ozone.
4. Development of improved web based tools for analysis and reporting of emissions and modeling data.

Task 4. Photochemical modeling

1. Base case model performance evaluation and diagnostic analysis for 2011 or 2014.
2. Model inter-comparison studies using CMAQ and CAMx, and using different global scale models.
3. Model source apportionment simulations to evaluate the sources that contribute to ozone formation.

4. Model projections for future emissions scenarios, including projected emissions reductions from national control measures and increases in emissions from population growth and development.
5. Analysis of the W126 secondary ozone standard, including base case modeling and future projections, and evaluation of control strategies for W126.
6. Analysis of ozone trends at rural and remote monitoring sites to characterize trends in background ozone.
7. Evaluation of model background ozone levels using diagnostic analysis source apportionment and sensitivity simulations.
8. Development of improved web based tools for analysis and reporting of emissions and modeling data.

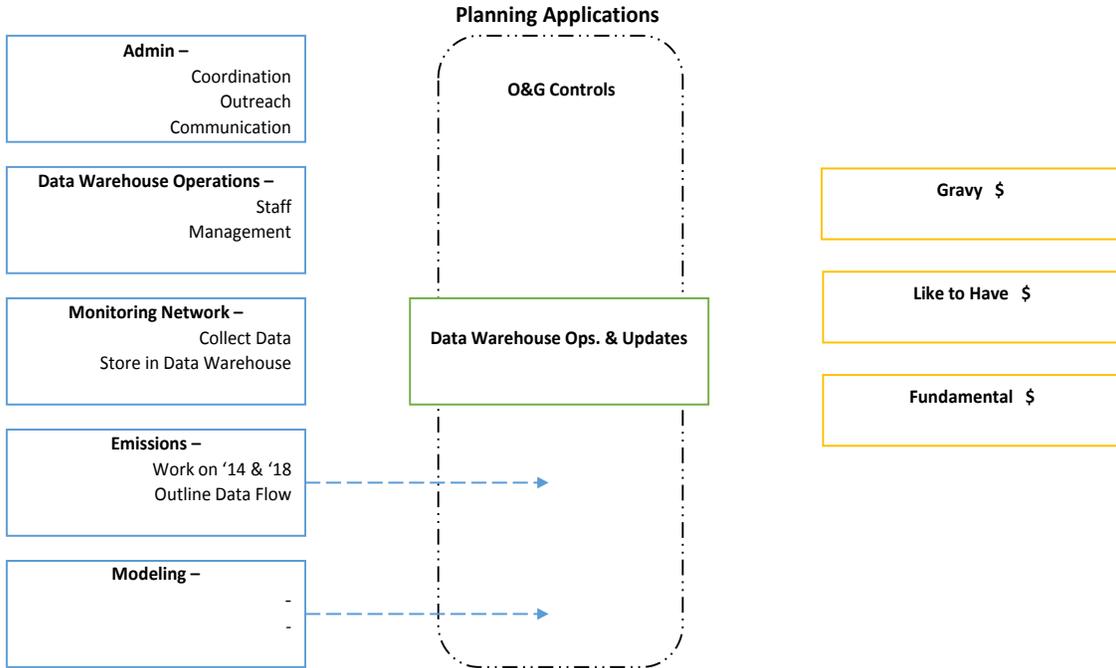
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2012-14    2015-17

WRAP  
2014-18

Tier



Summary Budget 2014-18

\$xx,xxx over the timeframe of the Work Plan is estimated to be needed and should be allocated to support the Western Modeling Framework activities.

Project	Funding Year									
	2014		2015		2016		2017		2018	
	Contract \$	Staff Support (% FTE)	Contract \$	Staff Support (% FTE)	Contract \$	Staff Support (% FTE)	Contract \$	Staff Support (% FTE)	Contract \$	Staff Support (% FTE)
White Paper for Western Regional Modeling Framework										
Western Ozone Transport Report										
Incremental additional analysis and tracking of emissions inventories and emissions trends by source sector and geographic region (beyond work already done by related leveraged projects)										
Incremental additional photochemical modeling studies for Regional Haze Planning and Ozone Transport by source sector and geographic region (beyond work already done by related leveraged projects)										
<b>Total</b>										

Deliverables and Timeline

1.

2. .

3. .

4. .

*Milestones and Deliverables*

1. *Initiate an ozone transport workgroup – date?*
2. *Develop an RFP for contractor support for ozone transport modeling – date?*
3. *Regional haze modeling*
4. *Ozone transport 2018 modeling results to be available in 2015?*