

## **Appendix E. Fire Working Group and Impacts of Natural-Uncontrollable Fire on Western Air Quality**

### Background

Natural and unplanned wildfires are increasing in the Western United States due to the build-up of natural fuels after years of public policy for restricting wildfire spread. With a better understanding of the role of natural fire in maintaining the health of natural landscapes, public policy is evolving to balance the need for natural fires with the need for protection of human infrastructure and public health. Additionally, climate change may result in altered weather patterns, shifts in the types and composition of natural landscape communities, and increased threats from adventitious biological pests on weakened and transitioning ecosystems. Periodic and sustained droughts, and pressure to expand human communities into the urban-wildland interface heighten the importance of understanding wildfire in the western United States. In recognition of the increasing contributions of wildfire smoke, in frequency and duration, to ambient air quality, the western states have formed cooperative tracking systems that are the technical basis for improved understanding of smoke from uncontrolled wildfires.

This regional interstate cooperation supports preparation of State Implementation Plans (SIPs) for Regional Haze and criteria pollutants. For this purpose, four activities are proposed in this Appendix: a standing Fire Working Group; two technical studies in the 201x-201x time period with subsequent further work planning from the results of those studies; and ongoing oversight of the WRAP Fire Emissions Tracking System (FETS) operations. These activities provide evidence for better planning on the regional scale, as well as a technical basis for national decisions for resource protection.

A standing WRAP Fire Working Group originally began as an outgrowth of discussions of the Grand Canyon Visibility Transport Commission, which observed that smoke from fires, planned or unplanned, could also be transported across political boundaries, and affect communities and natural visibility, sometimes hundreds of miles from the fire source (reference Background Section of this Work Plan). The initial Regional Haze Rule requirements for Clean Air Act §309 states included enhanced Smoke Management Programs, with methods for reducing emissions from fires. The Fire Working Group, comprised of \_\_\_\_\_ (name states, FLMs, etc.) designed a technical tool to track fires and quantify emissions in \_\_ (number) states. In recognition of the interstate transport of smoke from fires, some states developing Regional Haze SIPs under section 308 also participated. Currently, the Fire Working Group is an ad hoc group that convenes in-person and by conference call \_\_\_x\_\_\_ times a year to discuss the tracking system performance and to analyze the data. It is supported as a regular work assignment of the participating agencies.

### Proposed Activities and Deliverables

#### 1. Fire Working Group

The Fire Working Group proposes to continue operation for the purpose of recording and analyzing the data from planned and unplanned wildfires. The Working Group acts as a forum for interstate and interagency discussion of shared smoke management issues the identification of problems for which there are mutual benefits for finding resolutions.

Currently \_\_\_x\_\_\_ have Smoke Management Programs. The federal agencies have a highly

regarded web tool InciWeb (<http://inciweb.nwccg.gov/>) and several states have developed intrastate or interstate smoke emergency response plans (see Oregon <http://www.deq.state.or.us/AQ/burning/wildfires/index.htm>; California <http://www.arb.ca.gov/carpa/carpa.htm>; and OR-WA <http://www.nwccweb.us/information/firemap.aspx>) for the purpose of delivering real time smoke information to the affected communities. However, this real time data is not always archived. The Fire Working Group archives fire emissions and location data from both planned and unplanned fires in the western states in the Fire Emission Tracking System (FETS) so that it can be analyzed for air quality impact on a seasonal and an annual basis by comparing the temporal events with monitoring data. It is also used to coordinate planned burning to minimize air quality impacts from smoke. Maintaining the FETS is the primary concern of the Fire Emissions Working Group, to meet Regional Haze SIP commitments and to facilitate needed research and policy decisions.

The Fire Working Group has also identified several issues that warrant additional study. They are proposed as special work tasks in the next five years. They will need research funding. They feed into the process for achieving the national legislated commitment to achieve Natural Conditions for visibility.

Natural ecosystems in the western United States were maintained by unplanned (natural) wildfires, prior to the 19<sup>th</sup> century. By the 20<sup>th</sup> century, permanent human settlement patterns resulted in a federal policy to arrest wildfires to prevent them from burning out naturally. The result has been a dangerous accumulation of fuels that turn natural lightning strikes into catastrophic wildfire events. Part of re-adjusting to Natural Conditions has been a shift in public policy for fire management to controlled or prescribed burns on days when air quality can accommodate some smoke loading without public health impacts as a means of preventing catastrophic wildfires. Another shift in fire management policy is to control unplanned burns using larger perimeters, where damage to structures and existing human settlements is minimized. Both have smoke impacts on visibility which must be further calibrated and understood. Examining the monitoring and emission data for planned and unplanned fires will provide better technical data to evaluate the impact on visibility and health for these types of fires. These studies will inform future policies for smoke management for visibility and for health concerns.

## 2. Unplanned Wildfire Activity Analysis and Natural Conditions/Background Impact

Unplanned wildland fires contribute to visibility impacts in most Class I areas in the WRAP region and in many instances factor into the 20% worst days. Emissions from these wildfires are identified as natural (cite WRAP-FEJF document) and these events are highly variable temporally and spatially. Recent research indicates due to changing climate, wildfire seasons are lasting about 80 days longer than in past years (citation?). Thus, the extended fire season increases the number of days where unplanned fires could impact visibility in Class I areas and air quality across the region. Fire data from the past decade (citation?) suggest the number of wildfires may have decreased across the West, while the number of acres burned is on the rise. With fire seasons are increasing and the annual acres burned on the rise, impacts of smoke can mask progress in improving visibility of other contributing source sectors even more than is already the case. The need to better understand the wildfire smoke influence of unplanned fires on the 20% worst days and for

regional air quality more broadly needs to be addressed (see California Regional Haze 2014 Progress Report, Appendix B, <http://www.arb.ca.gov/planning/reghaze/reghaze.htm>).

Two approaches have been discussed by the Fire Working Group. Either Natural Conditions should be adjusted to reflect the natural haze caused by wildfires on Worst Days, or contributions to haze from wildfire smoke on Worst Days and to regional air quality would be removed from the Worst Days calculation to show progress to the default Natural Conditions made by reductions in controllable, anthropogenic sources. Currently, the default Worst Days deciview values for Natural Conditions may not fully reflect the intensity or frequency of unplanned wildfire smoke in the West.

### Proposed Activities and Deliverables

This task requires 1) review and assessment of emissions from wildfires on natural conditions for each Class I area, and 2) using models and IMPROVE data to identify and apportion wildfire contribution on 20% worst days. Days with natural fire impacts are included in the current method for calculating the 20% worst days at a Class I area. It has been suggested these events should not be included in the calculation of the 20% worst days, but instead excluded as exceptional events. At this time the Exceptional Event rule applied to the calculation of the Design Value for criteria pollutants does not cover wildfire impacts for the calculation of haze or visibility. Toward a better understanding of the impact of unplanned fires on visibility conditions, the main questions would seem to be using finding whether IMPROVE and fire activity data can identify days when smoke from unplanned fire impacts Class I monitors and identify days when planned fires impact Class I monitors.

Some differentiating factors may include long range transport, the percentage contribution of fire smoke emissions to OC versus OC from other sources, and differing ratios of OC to other species on wildfire smoke days. If removing the days when wildfire smoke impacts contributed to the 20% worst days, how different are the re-calculated 20% worst days. (The second task would be to evaluate planned fire (prescribed or Rx) smoke impacts to visibility at Class I areas and their contribution to the 20% worst days. This task feeds into answering the question: Have smoke management programs helped in reducing visibility impacts?)

### Activities

Natural fire impacts are factored into the 20% worst days at a Class I area. It has been suggested these events should not be included in the calculation in the 20% worst days, but instead looked at as exceptional events. At this time the exceptional event rule does not cover wildfire impacts on visibility. Toward a better understanding of the impact of unplanned fires on visibility conditions, the main questions would seem to be using IMPROVE and Fire activity data to: 1) identify days when smoke from unplanned fire impacts Class I monitors and, 2) identify days when planned fires impact Class I monitors. Long range transport, assess the contribution of fires emissions on the monitor--OC 50% smoke, 50% other sources. In removing the days of wildfire impacts contributed to the 20% worst days, re-calculate the 20% worst days. Evaluate RX impacts to visibility impacts at

Class I areas and their contribution to the 20% worst days. Have smoke management programs helped in reducing visibility impacts?

<http://www.wrapair.org/forums/fejf/documents/nbtt/FirePolicy.pdf>

The potential is high for significant visibility impacts from episodic wildfires under suppression, classified as “natural”, as demonstrated by recent wildfire seasons. Significant visibility impacts may be caused by an individual unplanned wildland fire event that can last for months at a time, and may be compounded when combined with impacts from other unplanned wildland fire events across the landscape.

The emissions and subsequent visibility effects of wildfire are highly variable both spatially and temporally. Wildfire activity can range dramatically from year to year in the same state, as demonstrated in Idaho where approximately 2.0 million acres were burned by wildfire in 2007 and less than 14 thousand acres were burned in 2004. Further support of this variability is documented in Section III.C of this Work Plan, which will dramatically affect local and regional air quality and visibility.

Depending on the frequency and magnitude of the unplanned wildland fire events, the calculated baseline, current and natural background visibility conditions may not represent an accurate portrayal of the visibility conditions at a given Federal Class I area in the WRAP region. Stakeholders have expressed concern that the visibility improvements resulting from emissions reduction programs for industrial, mobile, and other anthropogenic sources may be masked by visibility impacts from wildland fires under suppression. Concomitantly, the demonstration of reasonable progress may be dominated by visibility impacts to the natural background condition from these unplanned wildland fires.

“The contribution from fires can be substantial over short-term periods, but fires occur relatively infrequently and thus have a lower contribution to long-term averages...than sources for which emissions are more continuous.” Unplanned wildland fires events that occur relatively infrequently may have a lower contribution to long-term averages, such as baseline and current conditions. However, if unwanted wildfire events have a significant contribution to visibility impacts for three of the five years used to calculate the baseline conditions, the baseline conditions portrayed would be artificially high.

This also holds true if unwanted wildfire events occur at a greater frequency and magnitude during the five years utilized to establish current conditions, against which, states are required to demonstrate reasonable progress toward the 2064 natural conditions goal. Thus, the frequency and magnitude of unwanted wildfires has a potential to conceal visibility improvements from other source types, particularly for the 20 percent most-impaired days.

Based on the variability and the magnitude of wildfire emissions, it is recommended that with involvement of EPA, a workgroup be formed to study the effects from unwanted wildfire events on the establishment of baseline, current, and natural background visibility conditions, as well as on the demonstration of reasonable progress, as well as other air quality planning issues such as Exceptional Events for Ozone and Particulate Matter. The development of an approach for fires under suppression should be developed by the workgroup, to ensure that visibility improvements and other air quality improvements from

control of other source types are not masked by visibility impacts from unwanted wildfire events.

#### Methodologies (one or both?)

##### Modeling and IMPROVE:

- Leveraging off the work from DEASCO<sub>3</sub> and PMDETAIL combining modeling and ambient monitoring data
- Using the models to identify fires that may have contributed to visibility impacts, maybe even use back trajectories as a first cut, than assess the proportion of carbon was due to fire
- Use IMPROVE data to identify those days 20% worst days in which fire may have contributed to that day, and asses fires proportion of impact.

##### Natural Conditions Review:

- Revisit the work that established natural conditions
- Fire was considered, however, the analysis was done during the height of fire suppression actions
- Since then fire management policies have evolve to include acceptance of fire ecological role on the landscape. Thus, the number of fire has decreased, but the total annual acres burned have increased.
- This empirical approach may in turn revise natural conditions at some Class I areas

### 3. Planned Fires Analysis and Smoke Mgmt. Program Surveys

There are a broad range of smoke management programs in the United States. Some are voluntary and some are mandatory. Some were initiated because of National Ambient Air Quality Standards problems and some because of nuisance smoke concerns. Some programs have a permitting element while some simply require reporting. This diversity can result in varied effects on regulatory programs for compliance with air quality standards and regional haze goals, sometimes with conflicting impacts between states or tribes.

In order to start toward a better understanding of how the various programs might benefit efforts to attain air quality standards or to achieve reasonable progress for regional haze, it will be necessary to establish a baseline of information regarding state and tribal smoke management programs. A project to achieve that end is described below.

#### Activities

Akin to a project undertaken by the WRAP for baseline Regional Haze Rule planning a number of years ago, a survey of state smoke management programs should be taken across the country. This project will certainly have an element of updating relative to the previous survey, but should also reflect the changes in the planning, technical and regulatory landscape that have occurred in the intervening years and beyond. This survey could make queries like:

- Do you have a program to address smoke from prescribed burning in forests and rangeland and if so when was it created?
- Have you made changes recently, and if so what?
- From the checklist below identify elements that are part of your program (e.g. a permitting/request system, accomplishment reporting, meteorological requirements like ventilation, etc.)
- What elements of your program do you deem most effective?
- What air pollution concern(s) is your program aimed at?
- What technical tools like models or databases do you use in your program?
- Do you foresee modifications in the near future, and if so why?

So, the project will be to: develop a survey instrument based on interaction with WRAP membership in consideration of previous work; distribute the survey to state and tribal programs and follow up on it multiple times to ensure as much completeness as possible; analyze the survey responses and summarize them in a report; and vet through the WRAP Fire Working Group. The Fire Working Group will be tasked with ensuring that the report provides information that is appropriate to helping states and tribes understand the impact of fire programs on regulatory programs, as well as providing information that might allow these organizations to modify their programs to be more effective.

#### *Deliverables & Schedule*

The primary deliverables will be the aforementioned report along with a spreadsheet that contains the survey results.

This project would likely require nine months to a year to accomplish. The results would be most useful if they were available some time in 2015, so starting work early in 2015 would be desirable.

#### 4. FETS Mgmt. and Operations

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 Working Group meetings and accomplishing these projects.

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)
Fire Emissions Working Group										
Unplanned Wildfire Activity Analysis and Natural Conditions/Background Impact										
Planned Fires Analysis and Smoke Mgmt. Program Surveys			\$70K	0.25						
Fire Emissions Tracking System (FETS) Mgmt. and Operations										
<b>Total</b>										

Deliverables and Timeline

1. Conduct at least quarterly calls and annual in-person meetings of the Fire Emissions Workgroup to manage projects, coordinate among WRAP member agencies about fire emissions data collation and analysis, and address air quality analysis and planning activities.
2. Manage the operations of the Fire Emissions Tracking System.
3. Assess the need to conduct additional study projects on an annual basis for the Technical Steering Committee. Deliver work products and project results as directed by the TSC and WRAP Board.
4. Advise the TSC and WRAP Board on issues and development in the management and impacts of fire emissions.