



**Tahoe Area
Sierra Club
Group**



Sierra Forest Legacy
Protecting Sierra Nevada Forests and Communities



California-Nevada Tahoe Basin Fire Commission
Wildland Fuels Committee

12/13/07

Subject: Recommendations regarding Air Quality and Prescribed Fire

Dear Members of the Wildland Fuels Committee and other air quality subject experts:

I would like to express my appreciation for another opportunity to discuss with you and other subject matter experts air quality issues as they relate to efforts to protect ourselves from the impacts of catastrophic wildfires. At our last meeting on October 11, I presented a list of recommendations that could improve our ability to perform prescribed burns (to reduce excess fuels and restore forest health) while protecting humans and our environment from negative air pollution impacts. Other ideas were presented and discussed as well, and at the conclusion of the October 11 meeting, you asked us to return to the next meeting with refined, more specific recommendations for you to explore. This letter is intended to provide more refined solutions for you to consider in addition to those others will provide, and raise questions or attention to other solutions that are almost complete, but perhaps require some more time or resources before they can be fully utilized.

Solutions for implementing increased prescribed fire (hereafter “Rx burns”) will obviously not be based on finding ways around or relaxing air quality standards established to protect human health; rather, effective solutions will come from better management of our Rx burn activities. Further, we must find ways to remove excess biomass through means other than pile burning so that we can use our burn days to implement more restorative understory burning and continue to protect the health of the Basin’s populations and our environment. Proposed solutions are summarized below and discussed in greater detail in the attachment.

1. Improve our ability to forecast and track local/in-Basin weather conditions and smoke impacts and use these tools to better manage basin-wide Rx burns so burn days are used most effectively.
2. Improve our ability to monitor smoke impacts around the Basin.
3. Consider what options may be available to improve the ability to increase burning “in-season.”
4. Streamline permitting processes for small scale biomass facilities (alternatives to pile burning).
5. Learn from other areas and evaluate opportunities to share tools, efforts, etc.

I look forward to further discussing these and other ideas to help improve our ability to utilize prescribed fire more effectively. Thank you for your consideration.

Sincerely,

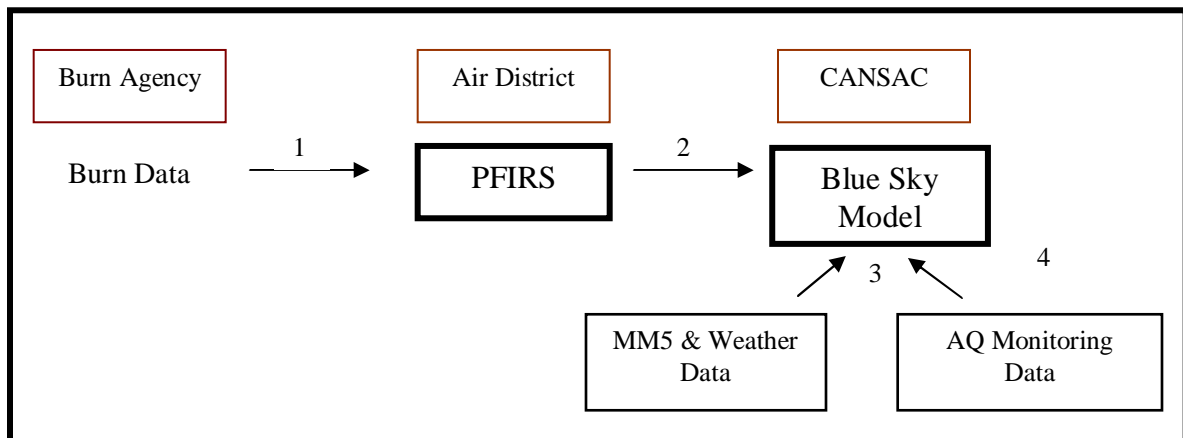
Jennifer Quashnick
Air Quality Representative for,
Sierra Forest Legacy and Tahoe Area Sierra Club

1. Improving our ability to forecast and track local/in-Basin weather conditions and smoke impacts and use these tools to better manage basin-wide Rx burns so burn days are used most effectively.

The Tahoe Fire Commission (TFC) can advance these abilities through including the following recommendations in the final report:

- a. Meteorologists with the California Air Resources Board (CARB) to work with local air districts to perform a historical comparison of burn day determinations versus actual weather conditions and fire behavior and determine where additional staff, equipment, regulatory changes, etc., may result in more in-Basin burn days.
- b. Evaluate the effectiveness of NV's modeling methods, compare to CA's methods, and determine whether any different NV methods would be applicable to CA given the different topography, human-health air quality standards and weather which generally causes smoke on the CA side to have a larger impact on the Basin than that generated on the NV side.
- c. Utilize the smoke management models that have been developed by multiple agencies and research institutions to better forecast potential smoke impacts and help guide overall Rx burn activity. Better smoke management will mean more Rx burns can be performed without exceeding health-based standards.

Below is a figure representing the modeling tools available to help better manage smoke. Descriptions follow.



1. Burn agency/entity inputs burn data into PFIRS (currently, burn agency provides data via hard copy to Air District).
2. PFIRS data is input into the Blue Sky Model – accounts for location, estimated emissions, time period, etc.
3. The Blue Sky Model uses MM5 model & meteorological data with smoke emissions data to predict where smoke from all fires in the area (in this case, the Tahoe Basin) will go and what the downwind concentrations will be in each area.
 - a. Model is calibrated through ambient AQ monitoring data. Portable PM monitors are needed in downwind areas as way to monitor concentrations and associated human health exposure; monitoring also helps further calibrate the model.
4. Information from PFIRS, Blue Sky and real-time meteorological and air quality data can be used to inform the 1pm calls between regulators and burners to evaluate if changes are needed.

Discussion:

The Prescribed Fire Information Reporting System (**PFIRS**) database was developed to take in all information from Title 17 Smoke Management Plans (e.g. fire size, estimated material, location, estimated emissions, etc.). Currently, such information is submitted to Air Districts via hard copy. It is difficult to determine the impacts of a burn from the information provided in this form. Therefore, air districts will generally err on the side of caution and perhaps deny Rx burns to assure that air standards are not violated when conditions are questionable or uncertain. With PFIRS, not only can burn agency personnel enter this information directly online, but the information feeds into another model (the Blue Sky Model) to allow an actual evaluation of impacts; this process will allow more burns to be approved on a given burn day.

The California And Nevada Smoke and Air Consortium (CANSAC) (working with the Desert Research Institute in Reno, NV) utilizes the **Blue Sky Model**, which uses data from two systems - the MM5 meteorological model and the PFIRS program – to estimate the expected smoke impacts from all planned fires in the Basin on a given day and therefore presents an important tool for planning Rx burn activities. Impacts include the expected location of the plume, where the smoke may end up and what the concentrations in those areas may be.

- Currently, burn decisions are based on an evaluation of the emission *levels* (within certain weather conditions). Because agencies can not estimate the downwind impacts of those emissions (which can vary for a variety of reasons), they will naturally be cautious in approving burns in order to protect human health.
- The Blue Sky Model instead allows for decision-making based on estimated impacts to specific downwind locations (e.g. communities), which is what we are concerned with (the emission levels in themselves do not tell us where smoke will go or how thick it will be downwind). If we can estimate the expected smoke impacts, we can plan Rx burns better. Experiences from other areas indicate that this smoke management process will allow more Rx burns on burn days (especially when combined with ambient air quality data, web cams, and other tools). For example, the model may show that because of weather conditions, the combined smoke from ~5 Rx burns on a given day will be diluted enough by the time it reaches a downwind community that it will be well below the air quality standards. Without these models, an analysis of the emission levels alone may indicate concern, and thus fewer burns are approved.
- The air regulators and burners generally participate in a 1pm call on burn days to evaluate conditions and determine whether any changes are needed. For example, if smoke is too heavy or expected to become heavier, one burner may agree to reduce their burn so another can continue as planned. With real-time tools to assess the smoke impacts (e.g. web cams, air monitors, etc.), those on these calls will have what they need to truly assess the situation. *This will likely reduce the number of burns that are put out or reduced after the 1pm call, just as it will allow for more burn approvals on a given day.*

The Tahoe Fire Commission (TFC) can help advance the completion and operation of these tools in the following ways:

- a. Recommend that CARB prioritize this in their staff work programs to make final completion a top priority.

PFIRS will eventually be connected to the Blue Sky Model, but the schedule for this process development has been slow and continues to be delayed as other work program priorities exist. If just one or two appropriate staff could fully focus on this project, it could likely be completed in a few months versus another year or longer.

- b. Recommend that the PFIRS model development and connection to the Blue Sky Model be reclassified as operational (from “research”) and be used first in the Tahoe Basin, as a type of “demonstration” project, where data can be used to calibrate it over time.

Currently, this program is still considered “research” and time is being spent performing tests to improve the model before it is operational. However, these adjustments to improve the process have taken a great deal of time and could go on for months to years, preventing application or “trial” uses on a large scale. Classifying this as “operational,” where it can be put into use sooner and then calibrated over time, will help improve conditions sooner and expedite “completion” of the model.

- c. Recommend that agencies seek additional funding to complete the Blue Sky Model (and any associated databases or models that require more funding to be connected with the Blue Sky Model).

The model is basically complete, however, it requires some hardware ‘upgrades’ and additional calibration before it can be operational. As this has been a lower priority for many agencies, the funding has not been available to address these needs.

- d. Recommend that this process be consistently used throughout the entire Basin; in other words, that the CA and NV air districts agree to use this process for Basin planning so that the entire Basin is assessed using these tools.

The Basin is one individual airshed, so it makes sense that air quality planning should be consistent throughout the Basin. Our air knows no state boundaries. Further, the models are created to address the cumulative impacts of multiple burns; therefore, if one district does not use this, the other districts will not be able to account for those emissions and thus, we will continue to see conservative (more restrictive) decisions made about burns. Years of effort and extensive resources from multiple agencies and research institutions have gone into creating these models and this process in order to specifically meet the needs of regulators and burners and to facilitate more effective Rx burning.

- e. Recommend that a “smoke management mitigation fee” be included in all fuels reduction/forest health projects to support air quality forecasting/emissions modeling activities (at a level which funds the amount not covered by existing state and local air district budgets).

The costs needed to operate these smoke management tools are not fully funded. The annual costs could be estimated, the amount not already covered determined, then based on that information, a proportional fee could be added to future projects to cover these smoke management costs. (It is expected that district costs will decrease on some level; where now, crews are “on hold” at \$2,000 – 3,000/day when a burn may not be permitted, they may not have to wait to do a burn so there are less days where these costs are incurred).

2. Improve our ability to monitor smoke impacts around the Basin.

Prescribed burning is regulated in order to make sure health-based air quality standards are not violated. Impacts to air quality are determined by monitoring. Therefore, monitoring is a necessary component of planning for prescribed burning and especially for maximizing opportunities to do Rx burn projects while not violating AQ standards. Further, monitoring provides ongoing calibration of models so that model performance can be checked and refined when necessary.

Unfortunately, the Basin's overall air quality network has been reduced over the past few years for a variety of reasons. CARB experienced budget cuts and had to focus resources where air quality was far less healthy. TRPA closed down their new South Lake Tahoe site not long after it was installed, and staff resources have apparently been shifted to focusing on the P7 Update. Luckily, members of the research community have been able to secure limited grant funding to add some additional AQ stations to the Basin. Overall, however, far more monitoring sites and equipment are needed (as is the funding to support them).

The TFC can assist by:

- a. Recommending that web cams be installed throughout the Basin so regulators and burners can assess how smoke is behaving and determine whether changes to a burn are needed.

For example, regulators and burners coordinate via a 1pm call on most burn days; they can check web cams to assess smoke conditions and plume behavior and determine how to proceed. If smoke conditions are too heavy, they may negotiate such that one burn is reduced so another can continue. Web cams have proven extremely helpful in many other forests. See <http://sierrafire.cr.usgs.gov/swfrs/> for a view of web cam utilization.

- b. Recommending that agencies find ways to expand air quality monitoring in the Tahoe Basin.

Monitoring needs are summarized below (details can be found in my 10/11/07 Letter to this Committee):

- i) Portable and stationary real-time monitors for PM mass (and some with chemical speciation);
- ii) Continuous sampling of particulate mass by size, with ex post facto composition as needed (to separate fine soil from smoke);
- iii) Expanded Basin-wide air quality monitoring network.

3. Consider what options may be available to improve the ability to increase burning "in-season."

There has been much discussion regarding a need for more burn days or burn opportunities in the Basin since the Angora Fire. However, for a variety of reasons, there are more burn days designated than used. This can be due to local air district regulations, other factors like a desire not to affect tourists or burn days where risk is increased by drier conditions. One question that has come up is whether there are

ways to better utilize burn day conditions during the summer months, or “in season.” My 10/11/07 letter discusses issues surrounding this concept in greater detail.

The TFC can help this investigation by recommending the following questions be investigated:

- How many burn opportunities are lost because of “protecting” tourists from Rx burn smoke?
- Can we instead better educate tourists regarding the need for Rx burns and not be limited by tourist periods?
- Historical weather data indicate the best weather conditions to carry smoke “up and out” occur in the summer months; however, this is also when conditions are drier. Are there possible “mitigations” for the drier conditions that would allow more in-season burning (e.g. increased on-site personnel, a “template” that allows for more small Rx burns during the summer months, etc.)?
- How many additional piles/acres burned could increased in-season burning translate into per year?

4. Streamlining permitting processes for small scale biomass facilities (providing alternatives to pile burns).

Small scale biomass facilities can help provide alternative methods to biomass removal and “save” burn days for the more restorative broadcast burning (which unfortunately, often goes undone since all resources are generally used for thinning and biomass removal).

Unfortunately, getting these facilities permitted is no easy accomplishment. In part, much of the small scale biomass technology, such as that which could be permitted in the Basin, is based on newer technology. Not all regulations have “caught up” to these facilities so their permit applications may often be forced through processes meant for other types of facilities, thus creating many questions and increasing the time and money it takes to obtain a permit (assuming one is eventually obtained); as a result, project proponents may become discouraged and give up on trying to install this technology. Additionally, manufacturers are not “used to” having to provide the emissions data that California requires (this may also be an issue in other states; we have experienced this process in California).

The TFC can help support this technology through recommending the following:

- a. Permitting agencies review their regulations in light of small scale biomass facilities (e.g. less than 5 MMbtu) and determine whether revised regulations specific to such facilities would help address permit applications, what other requirements must be met, etc.
- b. As long as human health is protected, regulations consider the overall net emission reductions (when biomass boiler emissions are compared to the emissions that would have been generated had that same material been pile

burned¹) when reviewing permit applications (as opposed to another type of stationary source where emissions can not exceed a given limit for any reason). For example, biomass boiler NOx emissions for “A” pounds burned in a 4.9 MMbtu unit over a 24 hour period may exceed stationary source requirements; however, when compared to pile burning, there is a 40% net reduction in NOx per “A” pounds burned in that same 24 hour period. *TRPA’s Chapter 91 was amended in 2003 to allow this consideration, although some additional questions remain.*

5. Learn from successful smoke management, monitoring, burn day activities, regulations, etc., that are being performed in other areas and evaluate opportunities to share tools, efforts, etc.

The Tahoe Basin is just one area dealing with problems faced by hundreds of mountain communities. Although other areas may have different environmental values to protect, the concepts remain the same, and the methods and tools used by others can assist activities in the Basin.

The TFC can recommend that Basin agencies (regulatory, burn agencies, forest management, etc.):

- Investigate how other local air districts deal with burn day determinations.
- Evaluate, for use in the Basin, the tools and methods used by others who successfully manage smoke to improve burn opportunities.
- Create relationships and opportunities to share information and resources statewide/throughout the western states.
- Evaluate how multi-state programs, such as the Fire Emissions Tracking System (FETS), may assist in smoke management in the Basin as well.

¹ To make sure material is not imported to the Basin since the goal is to reduce pile burning in the Basin, regulations should be like TRPA’s, which prohibit the import of material or use of material that would not have otherwise been pile burned.