DEVELOPMENT OF A CONCEPTUAL MODEL FOR LONG-TERM FIRE DATA SUPPORT

PREPARED FOR: Tom Moore, WESTAR

PREPARED BY: Matt Mavko, Air Sciences Inc.

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Background

Both natural, unplanned wildfires and long-standing practices of planned, prescribed fire are important air pollution sources in the western United States. For wildfire, the length of the fire season and the duration and intensity of individual fires are increasing due to the build-up of natural fuels after years of public policy for restricting wildfire spread and a warming climate. 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 through application of prescribed fire. Additionally, climate change is resulting in altered weather patterns, shifts in the types and composition of natural landscape communities, and increased threats from biological pests on weakened and transitioning ecosystems. Periodic and sustained drought and pressure to expand human communities into the wildland-urban interface heighten the importance of understanding wildfire in the western United States. In recognition of the increasing of wildfire smoke 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.

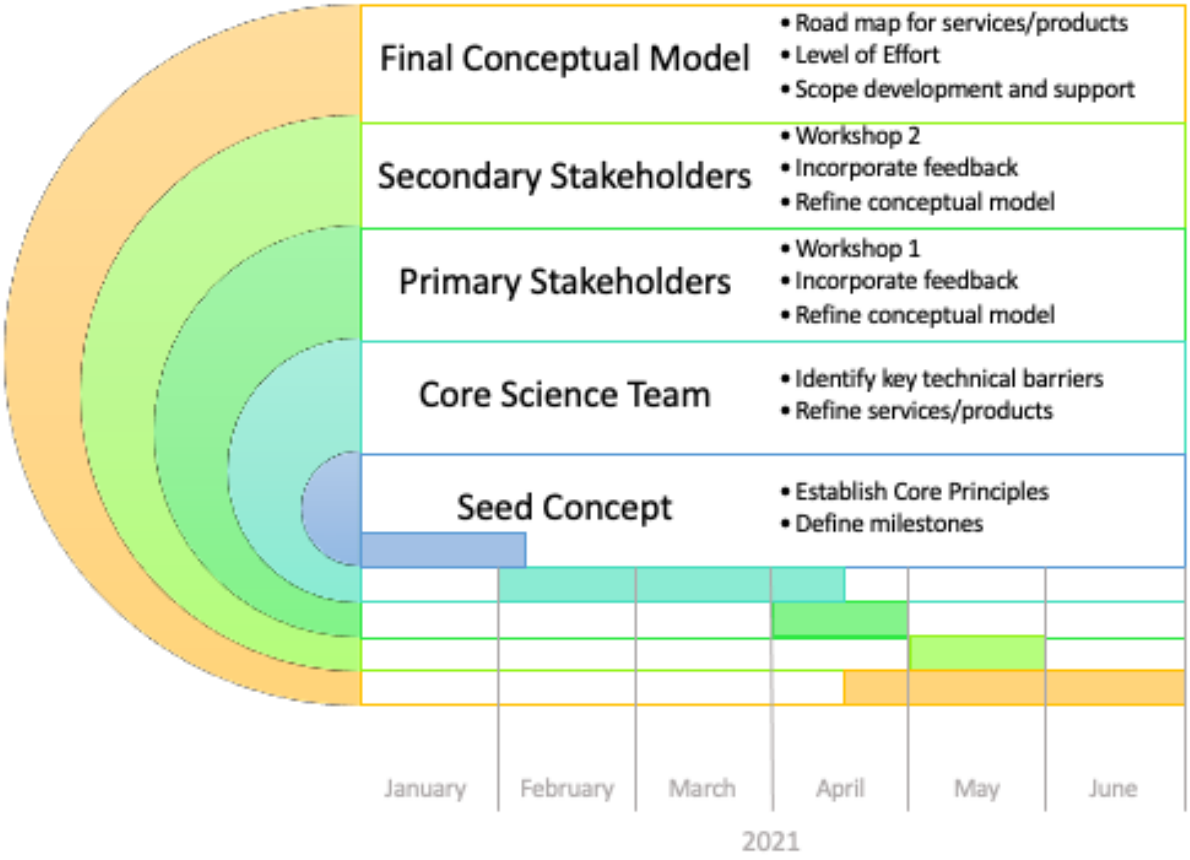
Based on the research literature predicting a longer fire season, increased fire severity, and a larger number of wildland fires in the future, the collaborative efforts of federal land managers (FLMs) and state, tribal, and local air agency jurisdictions will have an ever-growing stake in how fire emissions are addressed in both anticipating and responding to fire and smoke impacts. For all in this collaboration, recognition of the dynamics and increases in fire, verifiable and transparent decision-making, and data-driven implementation of air quality planning efforts is needed. Options available to address and plan for mitigation of fire's contribution to air pollution vary widely depending on many factors including location, fuel conditions, land management options, funding, proximity to urban areas, and many others.

The goal of this project is to establish technical standards and identify products and services needed for long-term availability of high-quality fire emissions data to support stakeholders with regard to NAA designation, "exceptional event" identification, background level definition, and fire emissions reduction strategy evaluation. This has broad implications for regulatory air quality, as it will meet an existing need for what is the largest single pollution source category in the United States.

Project Approach

Figure 1 illustrates the approach to the project over the next 6 months, building on an initial set of core principles and incrementally building to a final conceptual model, in the form of a workplan, that will guide the subsequent efforts.

Figure 1. Diagram of Project Approach



Core Principles

A set of core principles will guide the development of the conceptual model as well as engagement by members of the science team and other stakeholders. Draft principles are:

1. Recognition that fire emissions inventories currently used for regulatory and research application do not have a set of standards for quality and metadata in contrast to other major source sectors.
2. Recognition of a critical need for services and/or products that provide vetted, metadata-rich fire emissions datasets for a variety of modeling and analysis applications at defined levels of quality.
3. Recognition of the need for long-term support for fire emissions products or services to maintain consistency and continuity for stakeholders must address differing levels of expertise, programmatic approaches and needs by agency, and cultural needs.

Core Science Team

A core group of experts will initiate the development of the conceptual model by identifying the key products and services needed in line with the core principles, and the major technical barriers to implementation. An example of this discovery process is illustrated in Figure 2.

Figure 2. Example of building a conceptual model of a product following the core principles

Conceptual Model Workshops

Two workshops are planned that will support an iterative process of refinement of the work initiated by the Core Science Team. The Workshops will include "primary" stakeholders, defined as direct end-users of the proposed products and services, representing regulatory agencies and researchers. Workshops will also include "secondary" stakeholders that are upstream and downstream of the proposed products and services. These secondary stakeholders may include fire practitioners, fire behavior researchers, FLMs and air quality planners. The WRAP Fire & Smoke Work Group will provide oversight and feedback to this project and the FSWG webpage will be used to document discussions and work products.

The tentative format of each workshop will be to present the current state of progress on the draft conceptual model, followed by facilitated brainstorming and feedback sessions that will be assimilated into refinements of the conceptual model. We will track the outcomes and findings of each workshop throughout the conceptual model development process.

The coordination, meetings, and conceptual model development work will start in mid-December 2020 and run through June 2021.