



Developing an Impact Assessment of Local Air Quality as a Result of Biomass Burns



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Introduction

Developing an impact assessment of local air quality from slash pile burning can be important to communities and departments. This project will assess where smoke particulates travel and drop in the local area. Additionally, life cycle assessment methods will be utilized to calculate the impacts to human health. These impacts are to be considered avoided impacts when residual pile burning is removed and instead the slash piles are collected for bio-fuel creation.

Objectives

The objectives of the proposed project include:

- Spatially cataloging residual pile burn locations and the corresponding data for three years.
- Compile air pollution data in the corresponding slash pile burn areas and utilize GIS methods to overlay it with pile locations.
- Run a LCA local health impact assessment with the data collected.

The results of the analysis can inform forest management departments about the amount of smoke particulate that can reach communities. Additionally, the analysis will quantify the human health and environmental impacts associated with the burning of slash piles.

Project Plan Overview

The first part of the proposed project will include spatially cataloged slash pile locations and their respective volumes in the proposed Washington study locations in the Yakima area and nearby USFS forests.



Residual Slash Pile Example. Photo provided by Laurel James

Data collection will also include the pile broadcast burn dates for each of these sites. The data collection work will require visiting these locations and consulting with local foresters, district officials and tribal departments. The second part of the proposed project will include collection of the regional temporal air pollution data, for the burn seasons, and lay it over the GIS data with the geo-coded slash pile locations.



Residual Slash Pile Example. Photo provided by Laurel James

Proposed GIS Methods

The GIS methods include mapping out three years of selected slash pile burns throughout the region. The data (based on what is available from the department) will include: location of piles, date of burn, species of burning material, and amount of material to be burned

The proposed project will utilize a pollution and smoke modeling system produced by Brian Lamb and his associates (AIRPACT & CLEARSKY).

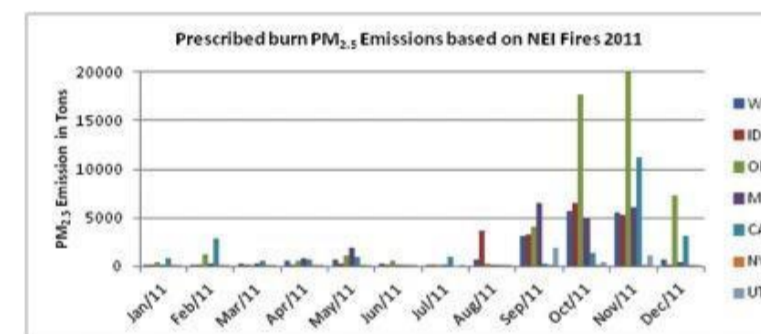


Figure 1. Monthly PM_{2.5} emissions by state for prescribed forest fires from the US EPA National Emission Inventory for 2011. Figure and caption courtesy of Brian Lamb.

Smoke plume perimeters will be mapped and particulates that fall in a given area such as within city limits will be calculated.

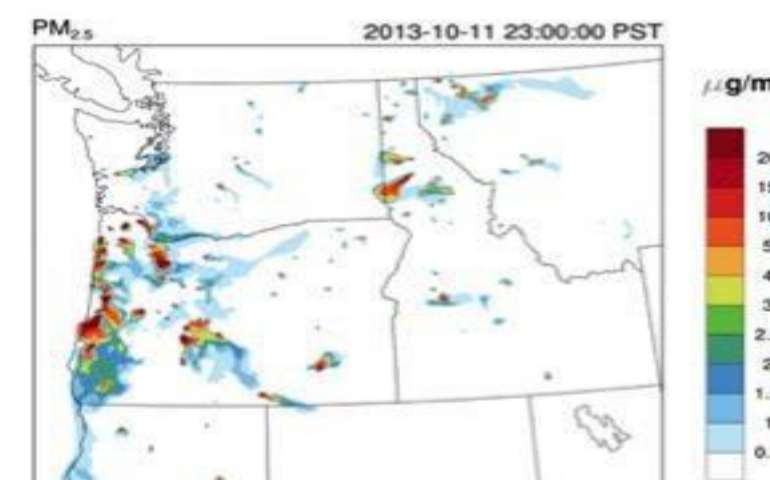


Figure 2. Differences in PM_{2.5} concentration between simulations with and without prescribed fires for a day in October, 2011. These results show significant PM_{2.5} levels in the local vicinity of prescribed fires. Figure and caption courtesy of Brian Lamb.

Proposed LCA Methods

The project will require utilization of life cycle assessment methods (LCA) and software. The LCA model will use the; calculated smoke particulate amounts to quantify the impacts of particulates on the local community

The results of the impacts on human health can potentially be correlated with respiratory related local hospital visits near the burn date.

Other important impact factors will be considered in the proposed project. For example, impacts on water sources (acidification, etc.)

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References

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