

WOOD SMOKE CURTAILMENT

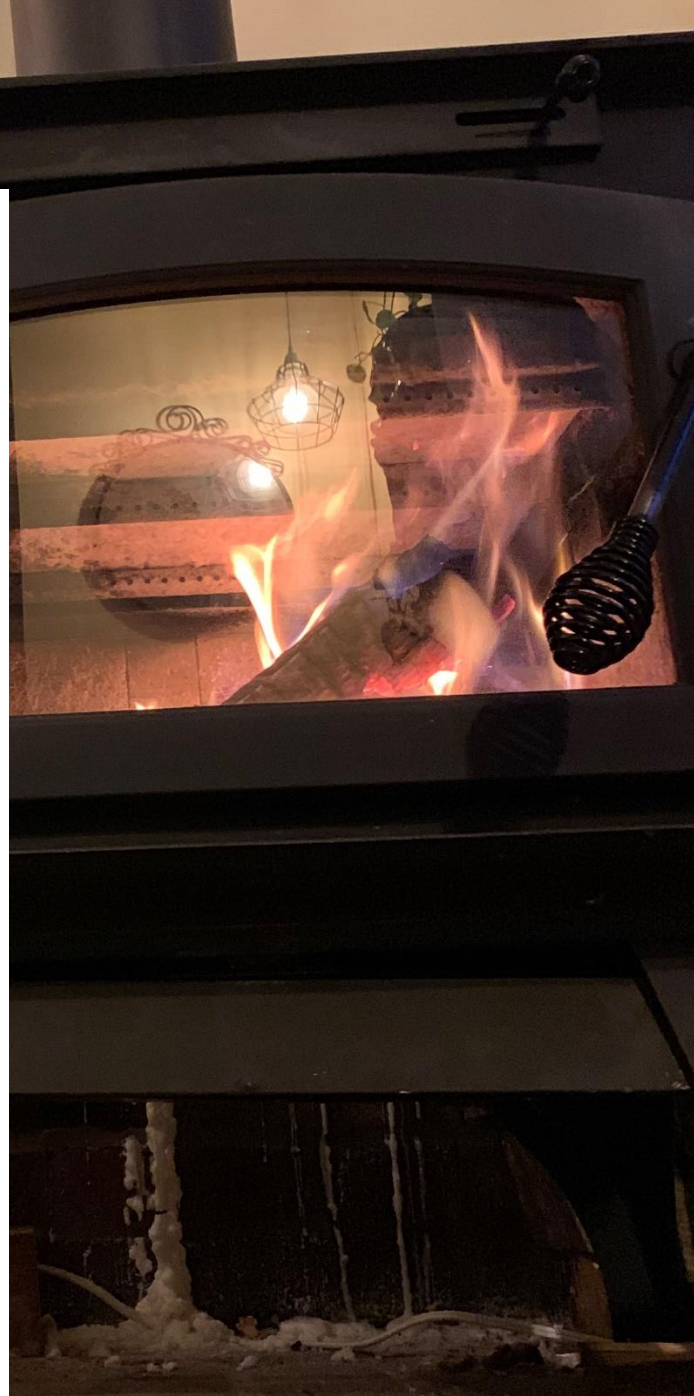
2018-2019

Season Review

A REPORT TO THE MULTNOMAH
COUNTY BOARD OF
COMMISSIONERS

COMPILED BY:

Healthy Homes and Communities Team
Multnomah County Environmental Health
Services



This report presents results from the first full season of the wood smoke curtailment ordinance from October 1st, 2018 through March 1st, 2019. The season was guided by a protocol document, drafted in September 2018, providing guidance for air quality forecasting, internal communications, and public notifications.

LIST OF ACRONYMS

EHS- Environmental Health Services
ESSENCE- Electronic Surveillance System for the Early Notification of Community-Based Epidemics
EPA- Environmental Protection Agency
NAAQS- National Ambient Air Quality Standards
NWS- National Weather Service
ODEQ- Oregon Department of Environmental Quality
PM- Particulate Matter
PM_{2.5}- Particulate Matter (diameter of 2.5 micrometers or less)
µg/m³- Micrograms per cubic meter

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BACKGROUND

Burning wood is one of the biggest sources of harmful air pollution in Multnomah County. The County made a significant step, in January 2018, by passing a winter wood smoke restriction ordinance. This new law was put in place to address the risk that winter wood burning may cause us to exceed federal air quality standards for small particulate pollution, while also protecting our communities.

Wood Smoke

Wood smoke happens when there is incomplete combustion of the burning of wood. Wood smoke is a complex mixture of fine particulate matter (PM), carbon monoxide, formaldehyde, nitrogen dioxide, and other harmful substances. Wood smoke is one of the largest sources of small particulate matter (PM_{2.5}) air pollution in Multnomah County's winter months.

Public Health Impacts of Particulate Pollution

When we experience weather conditions that prevent clean air from circulating through our communities, smoke concentrations can rise and make the air unhealthy to breathe. The fine particles contained in wood smoke are so small they can settle deep inside our lungs and even flow through our bloodstream, affecting other parts of our bodies. Health risks from exposure to wood smoke include heart disease, lung disease, respiratory distress, low birth weight, and increase cancer risk. There is a growing body of scientific literature suggests that it can be harmful even when there isn't enough to see or smell. In Multnomah County, residential wood smoke accounts for 11% of all area source air toxics excess cancer risk¹.

People with diseases that affect their lungs, older adults, children, and people in lower socioeconomic conditions are at greater risk from exposure to wood smoke emissions. [The Portland Air Toxics Solutions](#) (PATs) study found that modeled residential wood smoke pollution within the Portland Metro region is generally higher in census block groups with higher proportionality of Latino households, as opposed to all other race/ethnicity demographics evaluated². However, this is not just a Portland issue. A [study](#) published in March 2019 links PM_{2.5} exposure to human activities responsible for PM_{2.5} pollution. The study found that “on average, non-Hispanic whites experience a “pollution advantage”; estimated at ~17% less air pollution exposure than is caused by their consumption. They estimated that Blacks and Hispanics on average bear a “pollution burden” of 56% and 63% excess exposure, respectively, relative to the exposure caused by their consumption³.

In addition to affecting public health, high PM_{2.5} levels can put the County at risk of violating air quality standards set and enforced by the U.S. Environmental Protection Agency (EPA).

¹ Environmental Protection Agency (EPA), National Air Toxics Assessment (NATA), 2018.

² Oregon Department of Environmental Quality (DEQ), Portland Air Toxics Study (PATs), 2012

³ Tessum et al., <https://www.pnas.org/content/116/13/6001>, accessed 5/6/2019

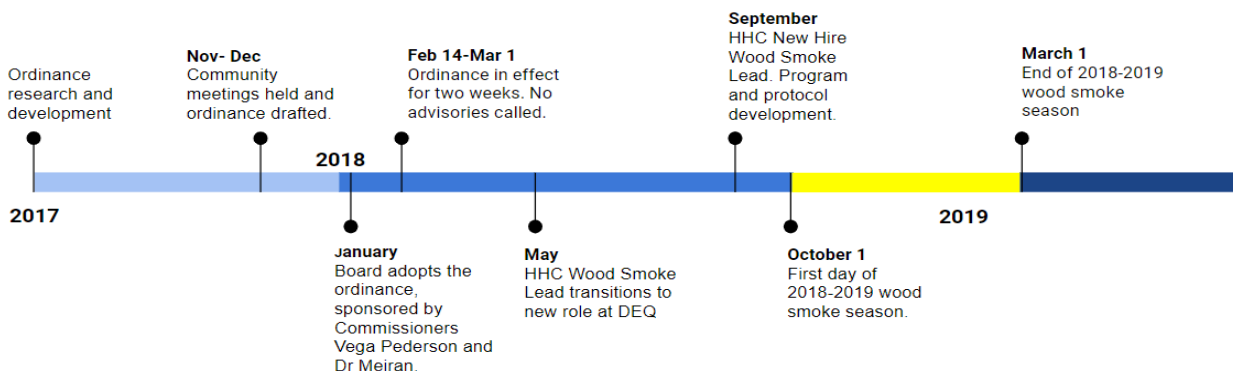
Regulatory Authorities and Wood Smoke

The Environmental Protection Agency sets air quality standards for six criteria pollutants, including PM_{2.5}, known to be of harm to public health and the environment, known as [National Ambient Air Quality Standards \(NAAQS\)](#). Currently, Multnomah County meets the federal PM_{2.5} standard.

The Oregon Department of Environmental Quality (DEQ) exercises its delegated authority from the EPA over wood smoke through Oregon Administrative Rules (OAR Chapter 340, division 262) referred to as the Heat Smart program. The Heat Smart program requires that non-EPA certified wood stoves must be removed upon a home's sale. DEQ also monitors five additional criteria pollutants (including ozone, lead, carbon monoxide, nitrogen dioxide, and sulfur dioxide) to ensure that limits aren't exceeded. If standards are not being met, this means our air is potentially unhealthy to breathe and the area is at risk of a "nonattainment" designation from EPA. A nonattainment designation can have significant impacts to a community, including restrictions economic activities, in order to come back into compliance with air quality standards. On days when the air quality is poor, DEQ issues public alerts, however DEQ advisories and warnings, do not include wood burning restrictions. While DEQ does not regulate wood burning from wood stoves, DEQ does regulate the combustion of illegal materials, such as scrap wood from construction sites, pallets, garbage, plastics and other materials.

Historically, burn restrictions have been one tool for reducing PM_{2.5} pollution. Multnomah County Environmental Health Services is responsible for implementing Ordinance 1253, known as the wood smoke curtailment, or restriction ordinance. On days when the County's air quality is forecast to be poor and a curtailment day is called, households and businesses may not burn wood unless a qualified exemption is met. Curtailment days may be called between October 1st and March 1st of each year. This is a mandatory program, however it only applies when air quality conditions are forecast to be unhealthy due to poor weather conditions such as air stagnation events. It is on these curtailment days that the Health Department has been granted the authority to restrict wood burning. The ordinance was signed in January 2018 (Figure 1) and written into Multnomah County Code Chapter 21.

Figure 1. Multnomah County Wood Smoke Curtailment Ordinance Timeline



Curtailments and Advisories

Advisories are implemented in 24 hour increments, issued by 11 am and implemented at noon the same day. Lifting of the advisory is evaluated for each 24 hour period (noon-noon). There are two types of advisories that restrict wood burning in Multnomah County during the winter months (see Figure 2).

A mandatory burning restriction, or a red day, uses the NAAQS for fine particles 24 hour average (short-term) concentration of $35 \mu\text{g}/\text{m}^3$. This level is considered unhealthy for sensitive groups. In an effort to caution people in time for them to reduce 24 hour exposure, a yellow day, or voluntary burn restriction may be called. For a yellow day, Multnomah County uses the NAAQS for fine particles annual average concentration of $12 \mu\text{g}/\text{m}^3$. This level has been identified as the level where air quality is acceptable, however sensitive groups should consider reducing exposure.

The ordinance exempts wood burning restrictions if wood burning;

- Is the sole source of heat,
- Is used for cooking,
- Is used in religious ceremonies,
- Because of economic need,
- In an emergency, or
- If a stove has a designated EPA emissions rating of 2.5 grams/hour or less.

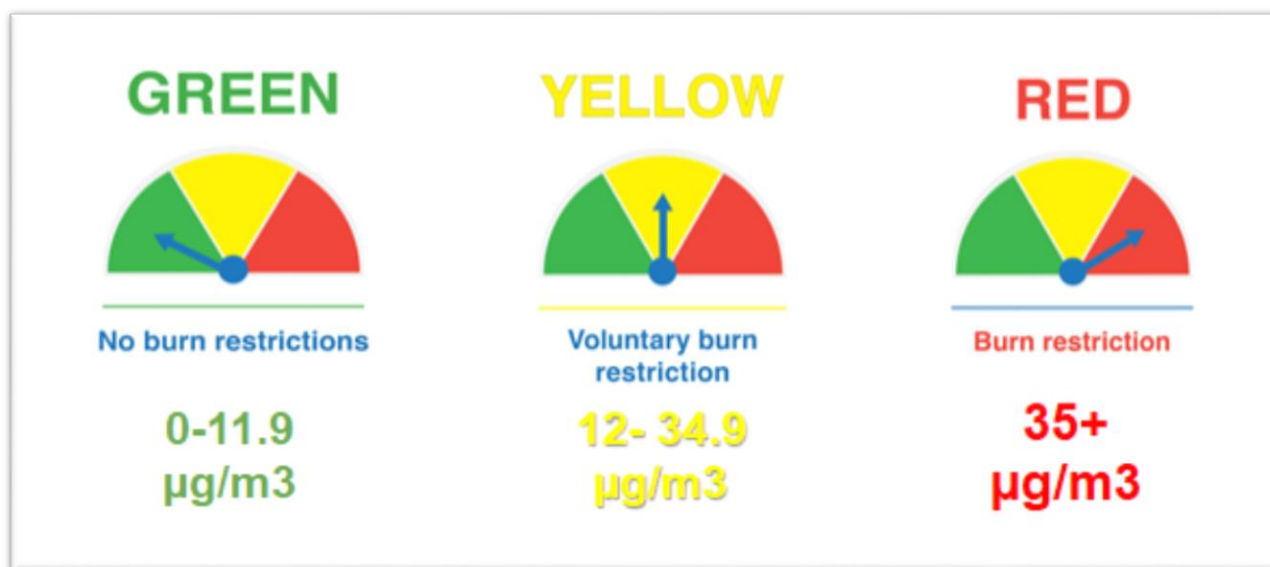


Figure 2. Multnomah County Wood Smoke Advisory Thresholds and Messages by Color

2018-2019 SEASON IN REVIEW

The ordinance's first full season began October 1, 2018 and went through March 1, 2019. In the weeks leading up to the season, staff prepared protocol and tracking documents along with other operational tools to implement the ordinance and report out on the five month season. Air Quality Program Specialists provided forecasts on a daily basis to predict County PM_{2.5} pollution levels. When air quality was predicted to be poor, a yellow or red day advisory was issued to restrict wood burning and alert sensitive individuals who may wish to lessen their exposure to wood smoke.

Advisories and Curtailments Summary

The 2018-2019 wood smoke curtailment season included 23 days of alerts (15% of season). There were 21 yellow days and 2 red days called (Figure 3).

Weather conditions were conducive to high PM 2.5 concentrations during the majority of the season as indicated by multi-day pollution episodes. The Weather Service classified this year as a weak El Nino year, which typically means warmer temperatures and drier days than normal. Across the season, there were a number of storms that did not produce a lot for our area and instead moved over towards California. However, patterns changed dramatically in February, when a cold front locked over the entire Pacific Northwest for about five weeks.

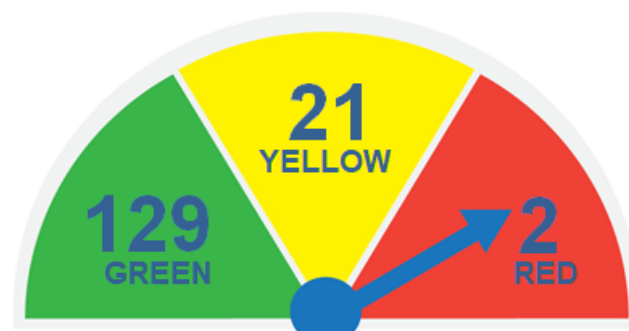


Figure 3. Number of green, yellow, and red days during the 2018-2019 Season.

The two red days occurred when a high pressure system persisted over the West Coast resulting in warm aloft temperatures, limiting the vertical mixing of pollutants. Closer to the surface, high pressure over Multnomah County resulted in calm-to-light winds, limiting the dispersion of pollutants. Based on information from DEQ, small fires and localized air pollution resulted in these red days. The National Weather Service also predicted some smoke from the large Camp Fire in Northern California could reach the metro area, however south east winds that would have brought California smoke were not strong. Multiple news outlets, state agencies, and local groups spread the word of the wood burning restrictions, allowing the red day advisory to reach Multnomah County community members.

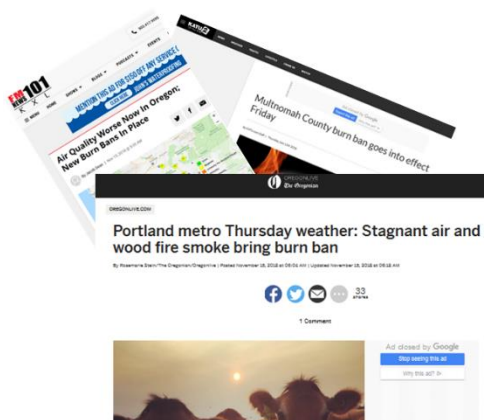


Figure 4. Examples of earned media during the two "red" days called in November 2018.

Penalties and Warnings Summary

This season, Multnomah County received a total of 54 wood smoke information requests and complaints from community members. A total of seven violation complaints were received during the two side by side red days. A violation complaint occurs when wood smoke is reported on a 'red' or no-burn day. No violation fees were issued and no exemptions were requested. One site visit was held at a residence receiving numerous and repetitive complaints.

Table 1. Seasonal Enforcement Statistics for the 2018-2019 season

Exemption Requests	0
Violations issued, first offense	7
Violations issued, second offense	0
Violations observed, third offense	0
Site Visit	1
Smoke calls/emails received on red days	3
Smoke calls/emails received on yellow days	19
Smoke calls/emails received on green days	32

Public Outreach and Communications Summary

Multnomah County has a population of 807,555⁴ people living in approximately 318,173⁵ households. The Census estimates that 3,496⁶ households in Multnomah County use wood burning as their primary source of heat, along with an unknown number of wood stoves and an unknown number of wood burning fireplaces, recreational fire pits and/or chimineas. As a result, several thousands of people are affected by the wood burning curtailment ordinance and public outreach is critical to its overall success.

During the 2018-2019 season, EHS used press releases and media contacts to raise awareness of the first yellow advisories of the season, as well as both red advisories. When advisories were issued, the County implemented the following communication plan:

- Curtailment notices are published on the county's [Wood Winter Wood Burning Restriction page](#) (English and Spanish).

⁴ U.S. Census Bureau, 2018 Estimates, <https://www.census.gov/quickfacts/multnomahcountyoregon>

⁵ U.S. Census Bureau, 2018 Estimates, <https://www.census.gov/quickfacts/multnomahcountyoregon>

⁶ U.S. Census Bureau, 2017 American Community Survey, 1 year Estimates (house heating fuel)

- People may sign up to receive email curtailment notices (English and Spanish)
- Curtailment notices are shared through social media, including Facebook and Twitter.
- Advisory updates are recorded on the complaints line at 503.988.0035
- Notices of mandatory wood burning restrictions are pushed out through Public Alerts.
- Red day advisories were shared with media and broadcast more broadly.

Web and print material was created during the season. Through the Internet, we sent emails to almost 350 *Wood Smoke Restrictions* subscribers and received thousands of unique visits to our website (see figure 5). The most views occurred during the season's two red days and a series of yellow days, which also coincide with the Department of Environmental Quality's air stagnation advisory announcements. Multnomah County's wood smoke curtailment ordinance was mentioned in their press releases.

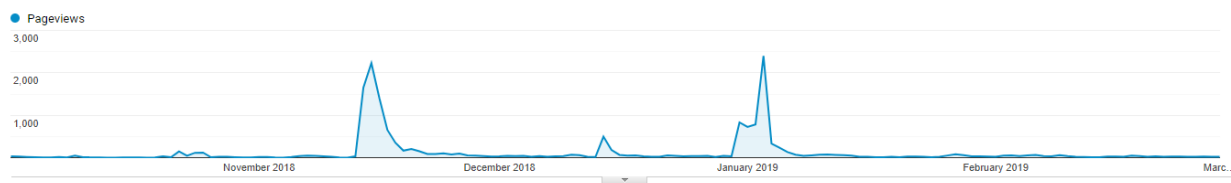


Figure 5. Seasonal web visits to multco.us/woodsmokestatus from October 1, 2018- March 1, 2019.

Educational mailers were also sent out, by request, and received by over one hundred households. We worked to get information out before October 1 by issuing a press release and doing several interviews for local media, including an on-camera interview with Commissioner Vega Peterson for MetroEast. We responded to numerous requests for information and complaints.

Through these efforts across the season, we estimate an approximate total reach of 10,000-15,000 people (this does not include earned media efforts).

End of Season Survey Summary

At the end of the season, staff conducted a web-based survey that was distributed to community members who voluntarily signed up for curtailment and advisory messages. The intention of the survey was to start to get an understanding of the program's impact. Participants of the survey were asked five questions. The survey received 54 responses. Results are included in the evaluation below. In summary, 64% of respondents indicated their wood burning behavior had changed as a result of the advisories.