



**Oregon**

Department  
of Agriculture

# Summary of the 2018 Field-Burning Season

As prepared by  
Natural Resources Program Area  
Smoke Management Program  
635 Capitol St. NE  
Salem, OR 97301  
503-986-4701  
[www.ODA.direct/Burning](http://www.ODA.direct/Burning)



In compliance with the Americans with Disabilities Act, this publication will be made available in alternate formats upon request.

# Summary of the 2018 Field-Burning Season

Prepared by  
The Oregon Department of Agriculture  
Natural Resources Program Area  
Smoke Management Program

## 1. Introduction

This summary is prepared annually by Oregon Department of Agriculture (ODA) Smoke Management Program staff to report the statistics for each field-burning season.

## 2. Weather Discussion: Prepared by the Oregon Department of Forestry Weather Office

Predicting weather patterns that will promote the lifting and evacuation of smoke out of the Willamette Valley and away from populated areas is vital to the efficient operation of the Smoke Management Program. There are usually only a few days each summer with “excellent” ventilation conditions, so days with “marginal-to-good” ventilation conditions must be efficiently utilized to keep overall smoke impacts to a minimum.

### June-July

Dry and relatively warm weather beginning in the middle of **June** (see Figures 1 and 2) allowed fields to be ready for burning by the time daily field-burning conference calls began on **July 9**. Sunny and hot weather conditions prohibited any burning until a weak influx of marine air on Friday, July 13, kicked off the 2018 field-burning season. Four fields totaling 199 acres were burned that afternoon with no registered smoke impacts. Burning was shut down at 3 p.m. because low humidity and rising temperatures were threatening to meet the State Fire Marshal Burn-Ban Criteria of 95 degrees Fahrenheit or above and relative humidity of 30 percent or below.

A stubborn upper-level ridge continued the hot and dry conditions into the following week, with valley temperatures near 100 degrees on July 15-16. A shift to onshore flow brought cooler marine air into the valley on the afternoon of July 17. Typically, that would have allowed for significant field burning. However, no burning was done because of aircraft operations over a wildfire in Silver Falls State Park, just east of Salem. Temperatures moderated for the duration of the week, but brisk and predominantly northerly winds prohibited the burning of any fields.

A strong upper-level ridge pushed maximum temperatures into the middle and upper 90s, with low humidity, the following Monday through Thursday. That continued to prohibit any field burning. Weak onshore flow cooled temperatures into the low 90s on Friday, July 27. That allowed for the burning of 389 acres with no reported smoke impacts.

The ridge strengthened that weekend, with Salem's temperature peaking at 99 degrees on Sunday, July 29. A cooling trend began on July 30, as the ridge began to shift eastward. However, skies turned hazy, as southerly flow aloft transported smoke from southwestern Oregon wildfires over the Willamette Valley. On Tuesday, July 31, the ridge had moved over Idaho. Winds aloft veered from the south to southwest, clearing the wildfire smoke from over northwestern Oregon. Increasing onshore flow capped high temperatures in the lower 90s and allowed for the burning of 2,256 acres with no smoke impacts recorded.

## **August**

An approaching weak upper-level trough maintained the southwesterly flow aloft and northwesterly transport winds on **Wednesday, August 1**. Morning marine clouds gave way to sunshine with temperatures cooling to near average (middle 80s). Favorable afternoon ventilation conditions allowed for the burning of 1,011 acres with one hour of light smoke impact in Lyons and Mill City. A deep marine layer brought a respite from the warm weather for the remainder of the week but also prohibited any burning.

A strong upper-level ridge began rebuilding over the region on the weekend of August 4-5 with temperatures climbing back into the 90s by early the following week. In addition, southerly flow aloft transported a layer of elevated smoke from wildfires over southwestern Oregon and northern California over the entire state. The combination of hazy skies, light winds, low humidity, and hot temperatures inhibited additional burning through August 9. On Friday, August 10, the upper-level ridge finally moved to the east, and a dry trough initiated a marine push with favorable early-afternoon ventilation conditions. Fire Marshal Burn-Ban Conditions were approached by 4 p.m., prompting an early end to burning. A total of 1,189 acres were burned with no smoke impacts.

After a cooler weekend, the upper-level ridge rebuilt over western Oregon early the following week. A surface thermal trough anchored over the Willamette Valley prohibited any burning through August 14. Temperatures climbed back into the 90s and would have been even hotter, if not for elevated smoke from Washington and British Columbia wildfires. A weak upper-level trough forced the surface thermal trough east of the Cascades from August 15-17, but the resultant onshore flow was not strong enough to allow for burning.

An amplifying offshore ridge drove a dry upper-level trough southward into Oregon early the following week. A deep layer of northeasterly winds transported substantial wildfire smoke from British Columbia and Washington over Oregon. The combination of offshore flow, hot temperatures, and degraded air quality prohibited burning through August 21. On Wednesday, August 22, a progression of the surface thermal trough into Central Oregon turned transport winds weakly onshore in the afternoon. However, with wildfire smoke compromising existing air quality, and elevated fire danger, no burning was done.

A strong marine push brought a blanket of low clouds into the Willamette Valley on August 23. Low clouds and residual wildfire smoke did not allow for enough surface heating to permit any burning. Salem's high temperature struggled to reach 70 degrees,

which was 23 degrees cooler than it was the previous day. Low clouds and wildfire smoke cleared enough the following day, Friday, August 24, to allow for the burning of some smaller fields. A total of 681 acres were burned with two hours of light smoke impact recorded in Lyons and one hour of light smoke impact in Mill City.

Some wildfire smoke moved southward into the area again on August 25, but the first fall-like upper-level trough of the season cleared the air and brought some showers to the northern half of the state on August 26. Higher elevations in the Silverton Hills picked up around one-tenth of an inch of rain, while Salem Municipal Airport recorded just a trace.

The trough pushed east of the region on Monday, August 27. Cool air aloft provided excellent mixing, and northerly transport winds were perfect for a 3-acre preparatory burn that required north-northeasterly winds to avoid smoke impacts. A thermal trough advanced up the coastline on August 28, with a dry and very warm offshore flow making for unfavorable burning conditions. An approaching upper-level trough forced the surface thermal trough east of the Cascades on Wednesday, August 29. Increasing onshore flow allowed for the most significant burning of the season, as 3,299 acres were burned with no smoke impacts recorded. Onshore flow continued on Thursday, August 30, and pressure gradients became favorable to keep smoke from down-mixing by mid-afternoon. A total of 304 acres were burned with no smoke impacts. A more stable northwesterly flow aloft did not allow for any burning on the final day of the month.

## **September**

The month began with a weak upper-level ridge bringing fair skies and near-average temperatures for Labor Day weekend. The ridge progressed east of the region by mid-week with increasing southwesterly flow aloft and through the transport layer, creating favorable burning conditions on Thursday, Sept. 6. A total of 1,691 acres were burned with one hour of light smoke impact recorded in Lyons. Similar burning conditions set up the next afternoon, Friday, Sept. 7, allowing for the burning of 985 acres with no smoke impacts recorded. A dry and stable westerly flow aloft cooled temperatures to near average that weekend.

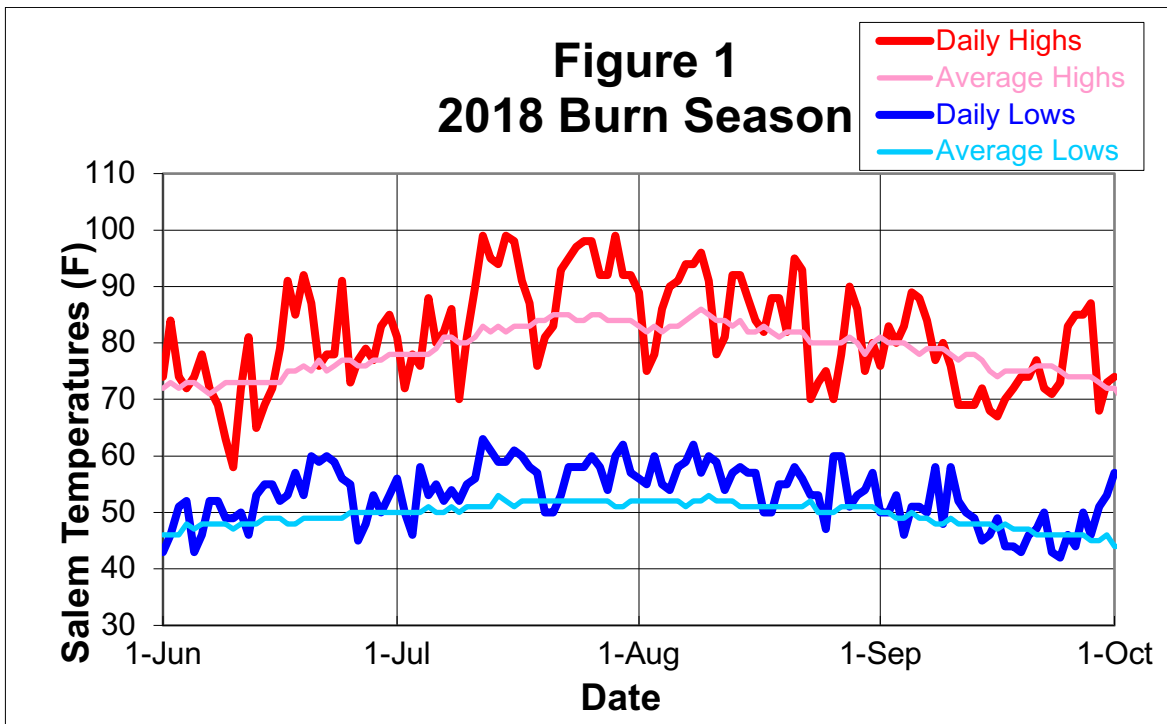
An approaching upper-level trough pushed a weak cold front across western Oregon on the morning of Monday, Sept. 10. Salem Municipal Airport recorded one-hundredth of an inch of rain, ending a record-long 90-day period without measurable rain. Any wet fields quickly dried out that afternoon with onshore flow and cool air aloft providing favorable burning conditions. A total of 1,233 acres were burned with two hours of light smoke impact recorded in Mill City. The next day, a strengthening upper-level trough brought widespread showers to northwestern Oregon for the first time since June 10. Precipitation totals in the northern Willamette Valley were as high as one-half inch but tapered off to near one-tenth of an inch around Salem. Scattered showers on Sept. 12 rendered the fields too wet for burning until Friday, Sept. 14, when southwesterly winds and good mixing allowed for the burning of 81 acres with no smoke impacts recorded.

An autumn-like weather system brought widespread showers to northwestern Oregon during the weekend of Sept. 15-16. Salem Municipal Airport received two-tenths of an

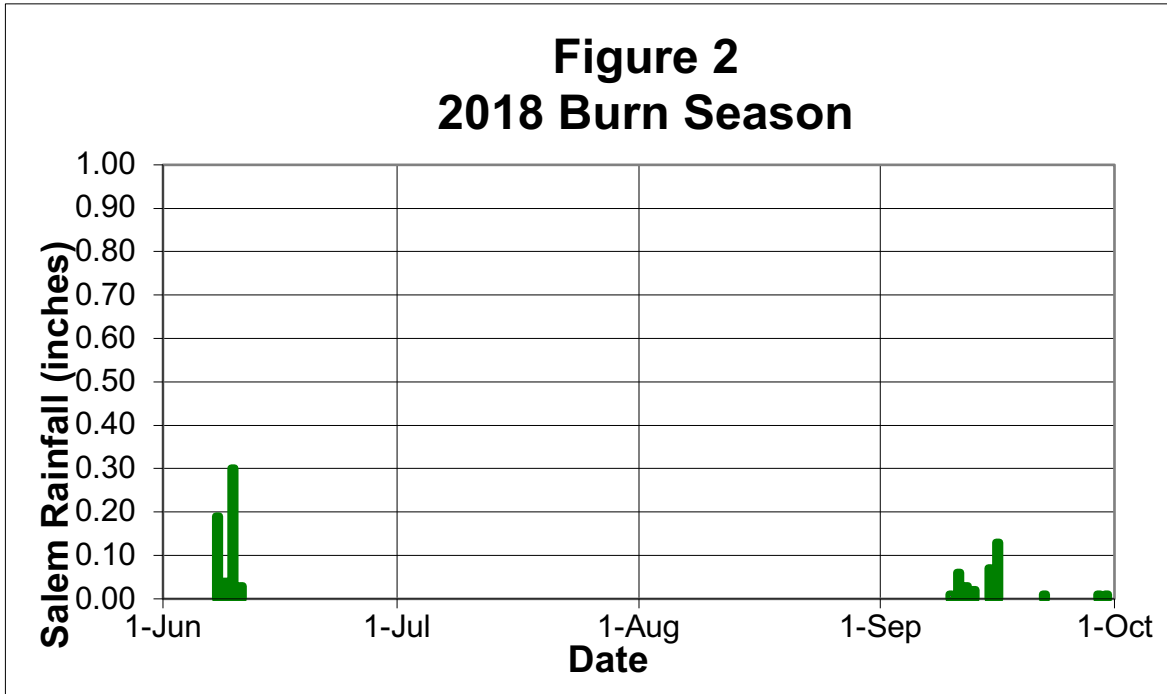
inch of rain, but up to a half-inch fell in the surrounding Cascade foothills. Fields remained too wet for burning until the afternoon of Tuesday, Sept. 18, when dry northerly winds and good mixing allowed for the burning of 93 acres with no smoke impacts. A weak weather system brought some clouds and turned transport winds northwesterly on Wednesday, Sept. 19 when all remaining fields were burned. A total of 373 acres were burned with no smoke impacts recorded.

A total of 13,787 acres were burned during the 2018 field-burning season.

**Figure 1**  
**Observed Temperatures at McNary Field (Salem Municipal Airport)**



**Figure 2**  
**Observed Precipitation at McNary Field (Salem Municipal Airport)**



### 3. Registered and Burned Acres

Open field-burning acreage registration begins in March and continues through April 1. Table 1 shows the breakdown of acres registered, the statutory limitation of each type, and the final allocation. The registration amounts show “on-time” registered acres. Registration totals can fluctuate slightly after “late registration” is conducted.

**Table 1**  
**Acres Registered On-time and Total Burned**

Type	Limitation (Maximum burnable acres)	Acres Registered (As of April 2, 2018)	Allocation	2018 Acres Burned
Identified Species and Steep Terrain	15,000	14,898	100%	13,787

#### Definitions

##### **Type: Open-Field Burning**

- **Identified Species:** Research has identified some species of grass seed that cannot be profitably produced without thermal sanitation. These identified species are Chewings Fescue, Creeping Red Fescue, and Highland Bentgrass.

- **Steep Terrain:** Fields located in the Willamette Valley where grass seed or cereal grain is grown; however, because of the steepness of the terrain, it is extremely difficult to apply alternatives to open field burning, and the perennial varieties of grass seed grown prevent erosion on steep hillsides.

#### 4. Enforcement

The 2018 field-burning season marked the 21st year that ODA has performed the enforcement function of the Smoke Management Program. This is stipulated under a Memorandum of Understanding with the Oregon Department of Environmental Quality, pursuant to Oregon Revised Statutes 468A.585.

There was one enforcement contact during the 2018 field-burning season. The enforcement action resulted in a Notice of Noncompliance.

#### 5. Smoke Impacts

It is the goal of the ODA Smoke Management Program, with the cooperation of the Willamette Valley grass seed and cereal grain growers, to reduce and/or eliminate smoke impacts in all populated areas. The combination of accurate weather prediction for open field burning, ODA field personnel observations, and grower experience all contribute to alleviate smoke impacts; however, smoke impacts still occur. Unexpected wind shifts, changes in mixing heights, transport wind speeds, and wind directions, along with inefficient lighting techniques, can all contribute to the occurrence of impacts.

The number of hours recorded for smoke impacts in 2018 in cities monitored are outlined in Table 2 (below).

*There were a total of 15 days when burning was conducted; 4 of the 15 days resulted in impacts during the 2018 season.*

**Table 2**  
**2018 Open Field Burning Impacts**

Date	Acres Burned	Impact Hours			Location
		Heavy	Moderate	Light	
August 1, 2018	1,011			1	Lyons
				1	Mill City
August 24, 2018	681			2	Lyons
				1	Mill City
Sept. 6, 2018	1,691			1	Lyons
Sept. 10, 2018	1,233			2	Mill City
<b>Totals</b>		<b>0</b>	<b>0</b>	<b>8</b>	



As defined in Oregon Administrative Rule (OAR) 603-077-0105, cumulative hours of smoke impact result in hourly nephelometer measurements that exceed  $1.8 \times 10^{-4}$  b-scat above the average prior three-hour background levels. For the purposes of this report, “heavy” hours of smoke impact are  $5.0 \times 10^{-4}$  b-scat or more above background (equivalent to visual range of 5 miles or less); “moderate” hours of smoke impact are  $1.8 \times 10^{-4}$  to  $5.0 \times 10^{-4}$  b-scat above background (equivalent to visual range of 12 miles or less); and “light” hours of smoke impact are  $1.0 \times 10^{-4}$  to  $1.8 \times 10^{-4}$  b-scat above the background. “Light” hours of smoke impact were not recorded before the 1999 season. The terms “light,” “moderate,” and “heavy” as used in relation to smoke impacts are not defined in OAR but are used by ODA to quantify the level of smoke impact on residents of the Willamette Valley. Nephelometers are located in Carus, Detroit, Eugene, Lyons, Mill City, Portland, Salem, Silverton, Springfield, and Sweet Home.

## 6. Complaints

A total of 89 Willamette Valley residents submitted complaints to the Smoke Management Program during the 2018 field-burning season. Table 3 (below) identifies the number of field-burning complaints originating from individual cities/areas.

**Table 3**  
**Complaints by City/Area**

Albany	1	Salem/Keizer	7
Detroit	0	Scio	5
Eugene/Springfield	0	Silverton	15
Idanha	4	Stayton	6
Lebanon	1	Sublimity	1
Lyons/Mehama	13	Unknown	9
Mill City/Gates	3	Other	24
Portland Metro	0		
		<b>Total</b>	89