

Oregon
Department
of Agriculture

SUMMARY OF THE 2012 FIELD-BURNING SEASON

**Oregon Department of Agriculture
Natural Resources Division
Smoke Management Program**



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**Prepared By
The Oregon Department of Agriculture
Natural Resources Division
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1. Introduction

This summary is prepared annually by the 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 or better” ventilation conditions must be efficiently utilized to keep overall smoke impacts to a minimum.

The spring and early summer of 2012 was cooler and wetter than normal across the Willamette Valley. However, an abrupt change to dry and warmer weather began on July 4 and persisted through September (See Figures 1 & 2). The Willamette Valley had a couple of days with drizzle or light showers, but the Salem Airport recorded a stretch of 68 consecutive days without measurable rain. Summer temperatures were generally not extreme; however, triple-digit heat made a one-day appearance on August 4, with the Salem Airport reaching 103°F.

Field burning officially began on July 24 with 8 acres of preparatory burning resulting in no smoke impacts. On July 25, when a light northwesterly sea breeze allowed for the burning of 146 acres, the result was one hour of light smoke impact in Lyons. A very weak trough brought light southwesterly transport winds July 26 and allowed the open burning of 133 acres. However, a 10-acre midday preparatory burn resulted in one hour of light smoke impact in Lyons. A deep marine layer prohibited any burning for the remainder of the week. Small preparatory burns were done on July 30 and 31, but a marine layer in the Willamette Valley did not make open burning possible.

August began with a weak westerly flow aloft and continued onshore flow across western Oregon. A persistent marine layer warmed enough to allow for limited afternoon open burning of 308 acres on August 1, with no smoke impacts. Northerly winds allowed for only small preparatory burns on August 2; with brisk northerly winds prohibiting any burning on August 3. After record heat over the weekend, the surface thermal trough shifted into eastern Oregon on Monday, August 6. Taking advantage of the switch to onshore flow, 729 acres were burned with no smoke impacts. A significant onshore flow developed on August 7, which provided very favorable smoke dispersal conditions, and 1,592 acres were burned resulting in one hour of light impact in Lyons.

A deep layer of marine air covered the Willamette Valley on Wednesday, August 8. Just 35 acres of preparatory burning resulted in two hours of light smoke impact in Lyons. Northerly winds did not allow for open burning on the August 9 and 10, but small preparatory acreage was burned without smoke impacts.

A strong upper-level ridge of high pressure brought a weeklong stretch of very warm weather to the Willamette Valley from August 11 through 17. The Salem Airport surpassed 95°F on five of those days peaking with a high of 97°F on August 16. During that period, only small preparatory burns on two different days were conducted with no smoke impacts. The strong ridge broke down over the weekend of August 18, with a weak southwesterly flow aloft developing. Weak onshore flow allowed for 437 acres of open burning on August 20, and 555 acres of open burning on August 21. There was one hour of light smoke impact in Lyons on August 21. Northerly winds prohibited any open burning on Wednesday, August 22; however, 42 acres of preparatory burning was completed without any smoke impacts.

A dry but autumn-like upper-level trough brought in the coolest weather in a month on Thursday, August 23. Forecast models indicated a strong push of marine to aid smoke evacuation. However, afternoon ventilation conditions proved to be only “marginal” resulting in smoke impacts. There were 2,470 acres burned, creating three hours of moderate and one hour of light smoke impacts in Lyons. All the smoke cleared from the region by 8 p.m. On Friday, August 24 the brisk northerly winds prohibited burning.

A weak cold front moved across northwestern Oregon late on Sunday, August 26 producing a few very light showers over the northern Willamette Valley. Dry weather quickly returned with southwesterly transport winds, and cool air aloft making for favorable smoke evacuation conditions on Monday, August 27, which allowed for 1,111 acres to be burned. On Tuesday, August 28 1,566 acres were burned with no smoke impacts registered. Transport winds turned northerly on August 29 and 30, and burning was not conducted. A dry upper-level trough turned transport winds onshore on Friday, August 31, but only 57 acres of preparatory burning was completed, due to concerns of smoke down-mixing. There were no smoke impacts registered.

In contrast to August, a dominant and broad upper-level ridge of high pressure made for generally unfavorable burning conditions during the entire month of September, forcing some growers to bale (instead of burn) their remaining fields. Labor Day weekend kicked off the month with cool onshore flow and slightly below normal temperatures. By Tuesday, September 4 a building ridge of high pressure pushed temperatures back above normal, and 72 acres were burned with no registered smoke impacts. No more burning was completed the remainder of the week due to persistent north to northeasterly winds and deteriorating mixing heights. On Friday, September 7 temperatures peaked with highs climbing into the mid 90's.

The upper-level ridge shifted eastward by Saturday, September 8 with a southerly flow aloft that spawned a few afternoon thunderstorms over the northern Willamette Valley, but rainfall was limited to trace amounts. The shift to onshore flow brought dramatic cooling, with high temperatures only climbing into the mid 70's on September 8 and low 70's on the September 9. Of great significance was the Pole Creek Wildfire, near Sisters, Oregon. Smoke from that fire would significantly impact air quality across northwestern Oregon for much of the month.

In the pre-dawn hours of Monday, September 10, a weak cold front brought the first measurable rain in over two months to the northern Willamette Valley. Most areas received a few hundredths to one-tenth of an inch of rain. The Salem Airport saw its first measurable rain since July 3 and high temperatures struggled to reach 70°F.

The flow aloft turned northwesterly on Tuesday, September 11 with a building upper-level ridge of high pressure clearing skies and warming temperatures a few degrees. Temperatures shot back into the upper 80's on Wednesday, September 12 as a thermal trough built northward along the coast and turned transport winds offshore. Smoke from the Pole Creek wildfire and other wildfires along the Cascades, was transported over northwestern Oregon turning skies hazy. No field burning was completed due to brisk north to northeasterly winds and poor air quality.

A thermal trough moved into the Willamette Valley on Thursday, September 13 with winds becoming light in the afternoon. Wildfire smoke was having a noticeable impact on air quality across all of northwest Oregon. No burning was conducted as hazy sunshine warmed valley temperatures into the low 90's. Increasing southerly flow aloft pushed the thermal trough to the crest of the Cascades on the afternoon of Friday, September 14. There was enough onshore flow to allow for the open burning of 272 acres with no registered smoke impacts.

Very weak onshore flow brought a few degrees of cooling over the weekend of September 15, along with improved air quality. A building thermal trough along the coast turned low-level winds back offshore on Monday, September 17. Valley high temperatures climbed back to near 90°F; once again, skies turned hazy across northwestern Oregon, in response to smoke from the Pole Creek Fire. A thermal trough moved over the Willamette Valley on the morning of Tuesday, September 18 before progressing eastward to near the Cascade crest in the afternoon. Onshore flow capped valley high temperatures in the mid 80's, but was too weak to clear wildfire smoke from the region. The thermal trough shifted into central Oregon on Wednesday, September 19, but the resultant onshore flow was still too weak to allow any burning.

A weak upper-level trough approached the coastline on Thursday, September 20 with southerly flow aloft over Oregon. Weak onshore flow began to improve air quality across northwestern Oregon. Valley high temperatures struggled to reach 70 degrees. A 64-acre test fire was conducted in the late afternoon, but warm air aloft made for low mixing heights and transport winds were too light to allow for additional burning. No smoke impacts were registered. The upper-level trough induced a "marine push" on the morning of Friday, September 21, which brought widespread drizzle and quite cool temperatures to northwest Oregon. Rainfall totals ranged from just a trace to a few hundredths of an inch. Fields were damp and valley temperatures only climbed into the low 60's.

The upper-level trough slowly progressed across Oregon on the weekend of the September 22. There were a few light showers on Saturday, but mostly sunny skies returned on Sunday. Valley temperatures warmed slightly but remained below normal. The upper-level trough finally pushed east of Oregon on Monday, September 24. Temperatures recovered back to near normal, but persistent northerly transport winds squelched any burning prospects. A broad upper-level ridge brought mostly sunny, dry, and warm weather back to the Willamette Valley for the remainder of the week. Air quality was better than during the previous week, but some wildfire smoke

remained over northwestern Oregon. Northerly winds did not allow for any burning through September 27. A weak cold front turned transport winds northwesterly on the afternoon of Friday, September 28. No burning was conducted, due to marginal mixing heights and existing wildfire smoke in the valley. The upper-level ridge quickly rebuilt over the region with north to northeast winds prohibiting any burning for the remainder of the month.

On Monday, October 1, sunny skies and offshore flow lifted valley temperatures into the mid 80's. Brisk north to northeast transport winds brought some improvement to valley air quality, but prohibited any burning. A dry cold front swept across northwest Oregon Monday night, causing valley high temperatures to cool about 10-15 degrees on Tuesday. Transport winds remained generally northerly, which did not allow for any burning.

Northwesterly flow aloft drove an unseasonably cold and dry air mass into eastern Oregon on Wednesday, October 3. Dry air poured westward, through the Columbia Gorge, over the Cascade passes, and into the Willamette Valley. This resulted in sunny skies and pleasant daytime temperatures, but also increased the haze from wildfire smoke. Brisk northeast winds and low humidity levels put the valley into State Fire Marshal Burn-Ban Conditions each afternoon for the duration of the first week of October.

A strong upper-level ridge of high pressure extended the dry and stable weather well into the second week of October. On Wednesday, October 10 the ridge began to weaken with light onshore flow allowing for 346 acres of open burning with no smoke impacts. An almost identical weather pattern the next afternoon permitted the open burning of the remaining 208 acres. The first in a series of fall storms dumped more than one-half inch of rain across the northern and central Willamette Valley on Friday, October 12. That finally cleared the persistent haze and wildfire smoke from the region, but also effectively ended the 2012 field-burning season.

Figure 1
2012 Burn Season Temperatures

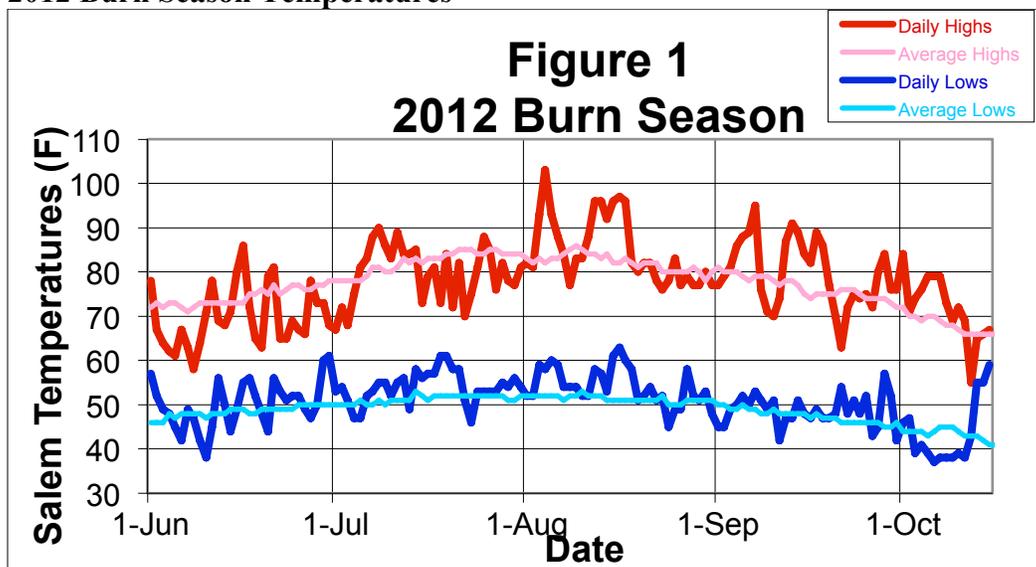
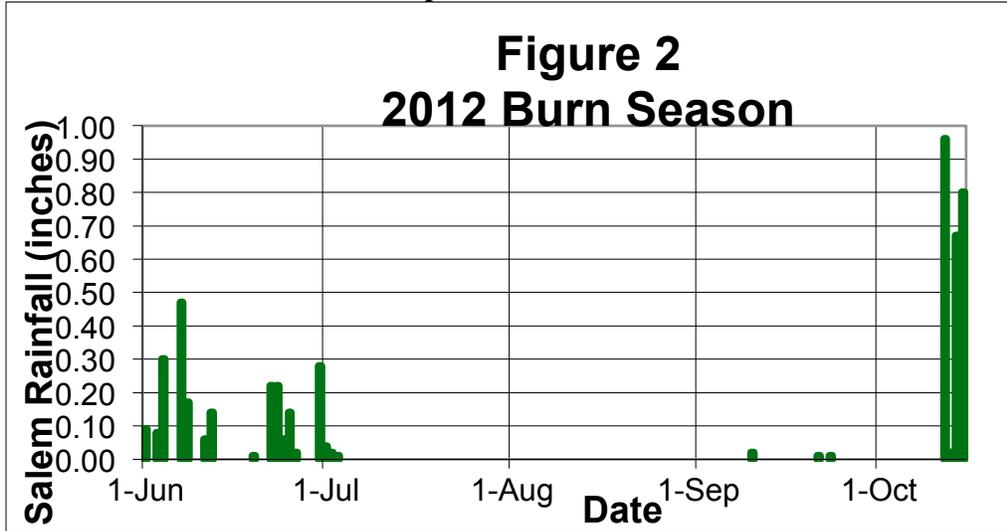


Figure 2
2012 Burn Season Precipitation



3. Registered and Burned Acres

Open field burning and propane flaming acreage registration begins in March and continues through April 1. Figure 3, shows the breakdown of acres registered, the statutory limitation of each type, and the final allocation of each type as imposed by the statutory limitation. Figures only show “on-time” registered acres. Registration totals can fluctuate slightly after “late-registration” is completed.

Figure 3
2012 Acres Registered and Burned

Type	Limitation (Maximum burnable acres)	Acres Registered (As of April 2, 2012)	Allocation	2012 Acres Burned
Identified Species & Steep Terrain	15,000	16,377	90%	10,249
Propane Flaming	500	200	100%	171
TOTAL ACRES BURNED				10,420

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.

Type: Propane Flaming

- The process of sanitizing (burning) fields planted in regular or identified species with a propane flamer: a mobile, fire-producing, sanitation device.

4. Enforcement

The 2012 field-burning season marked the fifteenth 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 were four enforcement contacts during the 2012 field-burning season. Three resulted in Letters of Warning and one resulted in a Notice of Non-compliance.

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 speed, and wind direction; along with inefficient lighting techniques, can all contribute to the occurrence of impacts.

The number of hours recorded for smoke impacts in cities monitored for smoke intrusions in 2012, are outlined in Figure 4.

Figure 4
2012 Open Field Burning Impacts*

Date	Acres Burned	Impact Hours			Location
		Heavy	Moderate	Light	
July 25	146			1	Lyons
July 26	133			1	Lyons
August 7	1,592			1	Lyons
August 8	35			2	Lyons
August 21	555			1	Lyons
August 23	2,470		3	1	Lyons

6. Complaints

Open field burning complaints received from Willamette Valley residents by the Smoke Management Program, totaled 83 for the 2012 field-burning season. Figure 5, identifies the number of field burning complaints originating from individual cities for the 2012 field-burning season.

Figure 5
2012 Open Field Burning Complaints by City

Albany	0	South Willamette	
Detroit	0	Valley	0
Eugene/Springfield	0	Salem/Keizer	7
Idanha	1	Scio	0
Lebanon	1	Silverton	10
Lyons/Mehama	20	Stayton	23
Mill City/Gates	13	Sublimity	4
Other	2	Unknown	2
Portland Metro	0	Total	83

*As defined in Oregon Administrative Rule (OAR) 603-077-0105, cumulative hours of smoke impact result in hourly nephelometer measurements that exceed 1.8×10^{-4} b-scat above the average prior 3-hour background levels. For the purposes of this report, “heavy” hours of smoke impact are 5.0×10^{-4} b-scat or more above background (equivalent to visual range of 5 miles or less); “moderate” hours of smoke impact are 1.8×10^{-4} to 5.0×10^{-4} b-scat above background (equivalent to visual range of 12 miles or less); and “light” hours of smoke impact are 1.0×10^{-4} to 1.8×10^{-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, Eugene, Lyons, Portland, Salem, Silverton, Springfield, and Sweet Home.