

# SUMMARY OF THE 2004 FIELD BURNING SEASON

Prepared By

The Oregon Department of Agriculture  
Natural Resources Division  
Smoke Management Program

## Introduction

This summary is prepared at the close of each burn season by the Smoke Management Program staff, to report the season's burn conditions and the amount of acreage registered and burned.

## Weather Discussion

From a weather perspective, the 2004 burn season can be categorized as "inconsistent."

The 2004 burn season was a challenging one from a weather standpoint. Unfavorable burning conditions in early and mid-summer and early fall rains created inconsistent burning opportunities for growers. The Oregon Department of Agriculture's (ODA) Smoke Management Program was able to take advantage of the burning opportunities presented in order to permit over 50,000 open field and propane acres burned.

This year 49,553 acres were open field burned. More than 61 percent of those acres was burned on just four days (See Figure 1). Significant open field burning (over 300 acres) occurred on a total of just 17 days during the season.

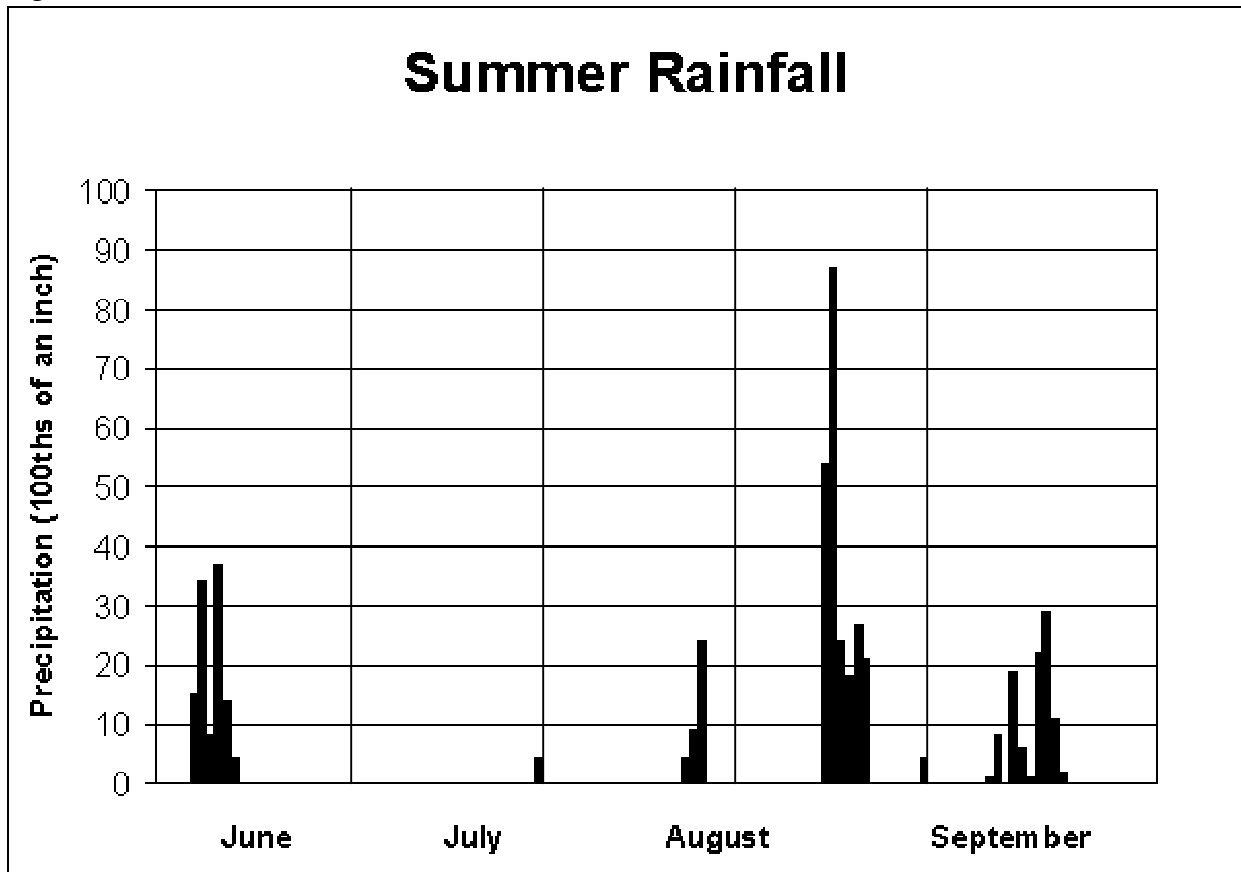
Figure 1

Monday Aug. 2	Wednesday Aug. 4	Monday Aug. 16	Saturday Aug. 21	<b>4 day Total</b>
10,252 acres	5,468	6,291 acres	8,495	<b>30,506 acres</b>

Historically, the field-burning season commences following the Fourth of July holiday. This burn season, weather conditions were unfavorable until July 13<sup>th</sup>. Additionally, the first day of burning over 5000 acres did not occur until August 2<sup>nd</sup>. Weather conditions again turned unfavorable in the second week of August as northerly winds and a low level inversion developed over the valley. An unusual weather situation developed during the second half of August. A deep upper level trough swept in from the northwest bringing heavy rain and much cooler temperatures. The rains continued for several days. Growers indicated that it was the worst August rain they had seen since 1968.

The rainfall graph (See Figure 2) shows the dramatic rainfall beginning on August 21<sup>st</sup>. Rain continued sporadically through the end of September, making it difficult to find field burning opportunities.

Figure 2



This bar graph shows rainfall for each day of the 2004 burn season. Rainfall in August, including heavy rainfall from the 21<sup>st</sup> through the 26<sup>th</sup>, was unusual and ended the field burning season for many growers.

### Weekend burning

ODA Smoke Management personnel were able to create a burn opportunity by recognizing an unusual weather situation. ODA identified a small window of opportunity to burn with minimal smoke impact during a weather transition, from an unfavorable north wind/low inversion pattern to the cold and wet weather pattern to come. That transition was to occur on a Saturday.

Weekend burning is in most cases prohibited under the State of Oregon Clean Air Act Implementation Plan (OAR 340-200-0040). If weekend burning is to occur it requires a coordinated effort. Spearheaded by ODA staff and area growers, the Saturday burn involved cooperation among many local and regional regulatory agencies. The Environmental Protection Agency (EPA), Oregon Department of Environmental Quality (DEQ), Oregon Department of Forestry, Lane Regional Air Pollution Authority, and local fire districts were all a part of this combined effort.

Over 8000 acres were burned on Saturday, August 21<sup>st</sup> with minimal smoke impact. If we had not taken advantage of this small window of opportunity, subsequent marginal weather the rest of the season may have seriously limited the number of acres burned in 2004.

## New Weather Equipment

For the 2004 burn season, the ODA Smoke Management Program installed and is utilizing new weather monitoring locations throughout the Willamette Valley and northern Oregon coast. Working in conjunction with the Natural Resource Division's Confined Animal Feeding Operations Program, and with funds from an EPA grant, the new weather monitoring equipment was used for the first time this year. This new equipment measures wind speed and direction, humidity, temperature and rainfall, and has become an important part of the smoke program's weather forecasting network. It allows ODA Smoke Management personnel to more accurately pinpoint weather changes in "real-time." This increased capability allowed ODA to better identify burning opportunities for growers and lessen smoke impacts on the general public. Additionally, the new weather stations have reduced operating costs. Previously, smoke management funds were used to finance mandated weather gathering equipment operated by DEQ. The net result is more weather information, at more locations, better forecasts, and less cost to the program.

## Registered Acres

Open field burning and propane flaming acreage pre-registration began on March 17 and continued through April 1. The chart below shows the breakdown of acres registered by type, limitation, allocation and available acres as of April 2, the day after pre-registration ended.

Type	Limitation	Acres Registered	Allocation	Acres Available
Regular	40,000	73,271	54%	527
Identified Species	22,000	16,974	100%	5,026
Steep Terrain	3,000	714	100%	2,286
Propane Flame	37,500	2,330	100%	35,170

## Definitions

### Type: Open Field Burning

- **Regular:** Perennial or annual grass seed, or cereal grain residue.
- **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:** Locations in the Willamette Valley where grass seed is grown, but because of the steepness of the terrain, it is extremely difficult to apply alternatives to open field burning.

### Propane Flaming

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

## Open Field Burning

In the 2004 burn season a total of 91,933 acres were pre-registered for open field burning compared to 78,491 acres in 2003. Registration included 74,245 acres of regular, 16,974 acres of identified species, and 714 acres of steep terrain. Regular registration exceeded the legislatively mandated limitation of 40,000 acres; therefore, the regular open field burning allocation rate for 2004 was 54%. The allocation rate for identified species and steep terrain for 2004 was 100%.

A total of 49,553 acres were open field burned during the 2004 burn season (34,457 regular limitation, 14,654 identified species, and 442 steep terrain). By comparison, a total of 50,437 acres were burned in 2003, 51,374 acres burned in 2002, 52,934 acres in 2001, and 50,801 acres in 2000.

During the 2004 burn season, burning was authorized on 63 days. Burning activity included 21 days with less than 300 acres burned, and 17 days of open field burning (days of over 300 acres burned). This compares to 22 open field burning days in 2003, and 14 open field burning days in 2002.

### 2004 Open Field Burn Crop

<b>Species</b>	<b>Burned</b>	<b>% of Total</b>
Annual Ryegrass	26,806	54.10%
Chewings Fescue	7,355	14.84%
Creeping Red Fescue	5,133	10.36%
Perennial Ryegrass	4,828	9.74%
Tall Fescue	1,410	2.85%
Highland Bentgrass	2,166	4.37%
Cereal Grain	1,163	2.35%
Orchardgrass	372	0.75%
Fine Fescue	320	0.65%
<b>TOTAL</b>	<b>49,553</b>	<b>100%</b>

## Propane Flaming

The maximum allowable acreage to be propane flamed is 37,500 acres (as set by the 1995 Legislature). In 2004, growers pre-registered 2,330 acres. At the end of the 2004 season 2,459 acres had been registered and 1,067 acres were propane flamed. This compares to 1,602 acres propane flamed in 2003, 1,582 acres in 2002, 1,627 acres in 2001, and 2,124 acres in 2000.

### 2004 Propane Flame Burn Crop

Species	Burned	% of Total
Creeping Red Fescue	59	5.53%
Perennial Ryegrass	538	50.42%
Tall Fescue	31	2.91%
Highland Bentgrass	106	9.93%
Cereal Grain	278	26.05%
Kentucky Bluegrass	55	5.15%
<b>TOTAL</b>	<b>1,067</b>	<b>99.99%</b>

## Stack Burning

Stack burning does not have an imposed acreage limitation, nor is registration required. Growers are obliged to secure a stack-burning permit containing the responsible party's name, location of the burn, and acreage represented by the accumulated residue prior to ignition. As of October 27, 2004, growers stack burned 1,667 acres. Previous years are as follows:

Year	Interim – October 27 <sup>th</sup>	Final – March 31 <sup>st</sup>
2004-2005	1,667	N/A
2003-2004	1,211	1,636
2002-2003	616	1018
2001-2002	691	1,309
2000-2001	921	1,050

### Total Annual Thermal Sanitation

<b>Burn Type</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>
Open Field Burning	49,553	50,437	51,374	52,934	50,801
Propane Flaming	1,067	1,602	1,582	1,627	2,124
Stack Burning	2,036*	1,636	1,018	1,309	1,050
<b>Total Sanitation</b>	<b>52,656</b>	<b>53,675</b>	<b>53,974</b>	<b>55,870</b>	<b>53,975</b>
Percent Change	-02%	-01%	-03%	+03%	-03%

\*Estimated Stack Burn Acreage (April 1, 2004 – March 31, 2005)

#### **Enforcement**

The 2004 burn season marked the eighth year that the department has performed the enforcement function of the Smoke Management Program (as stipulated under a Memorandum of Understanding with the Oregon Department of Environmental Quality, Pursuant to Oregon Revised Statutes 4868A.585).

There were 21 enforcement contacts during the 2004 season (as of December 31, 2004). This compares with two contacts during the 2003 season, 11 contacts in 2002, 10 contacts in 2001, and three contacts during the 2000 season.

Of the 21 enforcement contacts in 2004, two of the contacts investigated resulted in no violations. The remaining 19 enforcement contacts resulted in one civil penalty assessment, four notices of non-compliance, 13 written warnings, and one verbal warning.

#### **Smoke Impacts and Complaints**

It is the goal of the ODA Smoke Management Program, with the cooperation of the Willamette Valley growers, to eliminate or reduce smoke intrusions into populated areas. The combination of accurate weather prediction for burning, ODA field personnel observations, and grower experience all contribute to alleviate smoke impacts. However, smoke impacts still occur. Unexpected wind shifts, rapidly changing mixing heights, rapidly decreasing transport wind speeds and directions, and other meteorological factors affect the expected smoke behavior.

Smoke intrusions attributable to open field burning occurred on 10 days in 2004. Previous years totals included 9 days in 2003, 9 days in 2002, 21 days in 2001, and 8 days in 2000.

The number of hours of significant\* smoke impact in cities monitored for smoke in 2004 were Lyons (10 hours), Sweet Home (11 hours), and Carus (2 hours). Portland, Salem, Eugene, Springfield, Oregon City, and Corvallis recorded no days of smoke impact attributable to open field burning.

Open field burning complaints received from Willamette Valley residents by the Smoke Management Program totaled 475 for the 2004 season. That compares to 206 in 2003, 705 in 2002, 608 in 2001, and 477 in 2000.

ODA tracks the number of complaint calls by individuals to determine the amount of repeat callers. Information is recorded by ODA in order to prevent the results from being skewed by multiple calls by one individual. In addition to the numbers shown below, 28 anonymous calls were received.

\*\*Significant\*\* hours of smoke impact are defined as resulting in hourly nephelometer measurements exceeding  $1.8 \times 10^{-4}$  B scat above the prior 3-hour background.

#### **Breakdown of 2004 Open Field Burning Complaint Calls\***

<b>Calls Received</b>	<b>Number of Individuals</b>
<b>1</b>	<b>244</b>
<b>2</b>	<b>49</b>
<b>3</b>	<b>13</b>
<b>4</b>	<b>6</b>
<b>5</b>	<b>3</b>
<b>6</b>	<b>1</b>
<b>8</b>	<b>1</b>
<b>13</b>	<b>1</b>

\*Chart outlines the number of individuals and how many times they called. For example; 6 people called 4 times each for a total of 24 complaints.

## 2004 Comparative Annual Open Field Burning Data

	2004	2003	2002	2001	2000
Acres Registered*	91,933	83,695	79,679	79,756	76,561
Acres Burned	49,553	50,437	51,374	52,934	50,801
Most burned in one day	10,252	8,617	9,994	7,958	10,391
Burn days accounting for 75% of total acres	7	9	6	9	6
Weekend burn days allowed	1	0	0	0	0
<b>Number of Burn Days</b>					
300 – 1,000 acres	8	11	2	5	8
1,000 – 5,000 acres	5	8	8	10	6
5,000 – 10,000 acres	3	3	4	3	2
10,000 or greater	1	0	0	0	1
<b>Total Burn Days</b>	<b>17</b>	<b>22</b>	<b>14</b>	<b>18</b>	<b>17</b>
<b>Smoke Impact Hours</b> **total/heavy/mod. /light (# days)	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>
Portland	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Salem	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Corvallis	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Carus	1/0/1/1(1)	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Lyons	6/1/4/5(5)	4/0/4/10(6)	3/0/3/11(4)	11/0/11/56(17)	4/0/4/5(5)
Sweet Home	2/0/2/9(4)	2/0/2/2(3)	5/0/5/16(4)	2/0/2/5(3)	5/0/5/2(3)
Eugene	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Springfield	0/0/0/0	0/0/0/0	0/0/0/1(1)	0/0/0/0	0/0/0/0
Oregon City	0/0/0/0	0/0/0/0	0/0/0/0	2/0/2/2(1)	0/0/0/0
<b>Total</b>	<b>9/1/7/15(10)</b>	<b>6/0/6/12(9)</b>	<b>8/0/8/28(9)</b>	<b>15/0/15/63(21)</b>	<b>9/0/9/7(8)</b>
<b>Smoke Complaints</b> <b>Open Field Burning</b>					
Portland/Salem	35	14	4	31	33
Albany/Corvallis	13	15	10	11	18
Lebanon/Sweet Home	161	27	23	55	75
Eugene/Springfield	90	59	382	274	239
Other (North Valley)	45	22	83	112	47
Other (South Valley)	113	64	174	125	65
Unspecified Area	18	5	29	N/A	N/A
<b>Total Complaints</b>	<b>475</b>	<b>206</b>	<b>705</b>	<b>608</b>	<b>477</b>

\*All registered acres including late registration and transfers.

\*\*Total includes hourly nephelometer measurements exceeding  $1.8 \times 10^{-4}$  B-scat above prior 3-hour background; equivalent to visual range of 12 miles or less.

“Heavy” hours are  $5.0 \times 10^{-4}$  B-scat or more above background; equivalent to visual range of 5 miles or less. (One hour of heavy smoke impact is equal to two hours of moderate smoke impact).

“Moderate” hours of smoke impact are defined as resulting in hourly nephelometer measurements exceeding  $1.8 \times 10^{-4}$  B-scat above the prior 3-hour background; equivalent to visual range of 12 miles or less.

“Light” hours of smoke impact are defined as resulting in hourly nephelometer measurements exceeding  $1.0 \times 10^{-4}$  B-scat above the prior 3-hour background. “Light” hours of smoke impact were not recorded prior to the 1999 season.



## Open Field Burning Complaints and Wind Direction Correlation (over 300 acres)

Date	Location	Acres	Wind* Direction	F/P/S/G**	Smoke Impact Hours *** total/heavy/mod/light
7/13	Marion, Linn	502	SW	20/0/0/0	
7/14	Marion, Linn	1417	SW	10/0/0/0	Lyons 0/0/0/1
7/15	Marion, Linn	1169	SSW	80/0/0/0	Lyons 0/0/0/1
7/19	Marion, Linn	2236	SW	3/0/0/0	
7/20	Marion, Linn, Lane	2459	W	21/0/0/0	Lyons 5/1/3/1 Sweet Home 1/0/1/2
8/2	Marion, Linn, Lane, Benton	10252	WNW	68/0/0/0	Lyons 1/0/1/1 Sweet Home 1/0/1/2
8/3	Marion, Linn, Lane	880	NNW	28/0/0/0	
8/4	Marion, Linn, Clackamas	5468	NW	35/0/0/0	Sweet Home 0/0/0/3
8/16	Marion, Linn	6291	W	51/0/0/0	
8/17	Marion, Linn	651	NNW	25/0/0/0	
8/20	Benton, Linn, Lane, Marion	393	N	14/0/0/0	
8/21	Marion, Linn, Lane	8495	SW	32/0/0/0	Sweet Home 0/0/0/2
8/31	Marion, Linn	986	NW	2/0/0/0	
9/7	Marion, Linn, Benton	828	WSW	1/0/0/0	
9/8	Polk, Marion, Linn	3880	SW	21/0/0/0	
9/10	Marion, Linn	509	SW	9/0/0/0	Carus 1/0/1/1 Lyons 0/0/0/1
9/16	Linn	750	SW	0/0/0/0	

\* Documented from final pi-bal readings.

\*\*F/P/S/G are complaints pertaining to open field burning/propane flaming/stack burning/general air quality.

\*\*\*Total includes hourly nephelometer measurements exceeding  $1.8 \times 10^{-4}$  B-scat above prior 3-hour background; equivalent to visual range of 12 miles or less.

“Heavy” hours are  $5.0 \times 10^{-4}$  B-scat or more above background; equivalent to visual range 5 of miles or less. (One hour of heavy smoke impact is equal to two hours of moderate smoke impact).

“Moderate” hours of smoke impact are defined as resulting in hourly nephelometer measurements exceeding  $1.8 \times 10^{-4}$  B-scat above the 3-hour background; equivalent to visual range of 12 miles or less.

”Light” hours of smoke impact are defined as resulting in hourly nephelometer measurements exceeding  $1.0 \times 10^{-4}$  B-scat above the prior 3-hour background. “Light” hours of smoke impact were not recorded prior to the 1999 season.

