

SUMMARY OF THE 2005 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 Oregon Department of Agriculture (ODA), Smoke Management Program staff, to report the season's burn conditions and the amount of acreage registered and burned.

Weather Discussion

Weather for the 2005 burn season presented some unique challenges.

The winter was quite dry, but a wet spell in June (See Figure. 1) put growers behind schedule for harvesting. Consequently growers spent the month of July harvesting and not field burning. Only 1,759 acres were burned in July in 2005, in spite of some favorable burn days.

In August the Willamette Valley experienced a persistent north wind pattern that precluded widespread open-field burning. ODA was successful in utilizing slight and subtle variations in wind patterns to do limited burning in areas suited to those wind patterns. This is a difficult task, but without the periodic marine pushes or upper disturbances to give favorable burning opportunities this was the only option for much of the month of August. ODA also used "preparatory burning" as a tool to prepare larger fields for open field burning, and to completely burn small acreage fields in the north valley.

On August 16th, an upper trough and weak cold front moved through the Pacific Northwest in the early morning hours. Normally, this is a weather scenario that allows open field burning, however north winds prior to the system prevented burning ahead of the front. Surprisingly, on the day following this front, August 17th, winds were westerly and mixing heights were good, both indicators of good field burning opportunities. ODA permitted burning during the day after the front, anticipating the west winds would push the smoke into the unpopulated Cascade Mountains. A total of 8,435 acres were field burned on the 17th. Unfortunately, widespread subsidence acted as a barrier and prevented the smoke from moving eastward as anticipated. During the late afternoon and evening hours, smoke settled down in the Springfield/Eugene area, causing several hours of impacts.

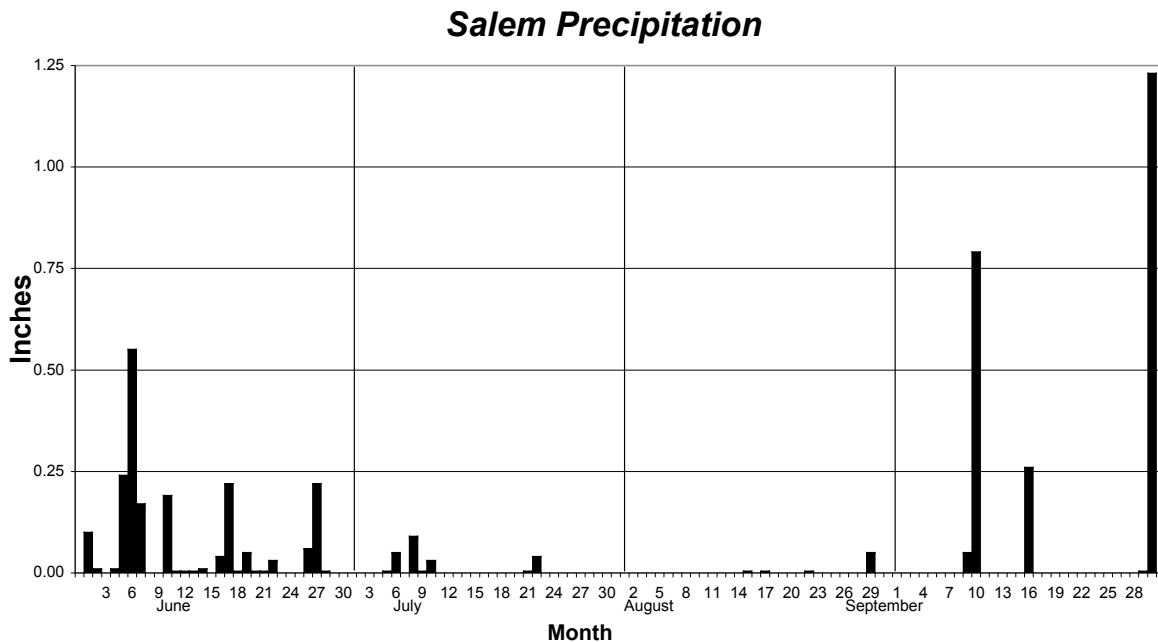
During this burn season, ODA refined the technique of burning on the west side of the valley on the short-lived northeasterly winds that are often present for a few hours in the morning. The portable pilot balloon (pi-bal) readings were a very valuable tool in assessing the viability of late morning field burning, on limited acreage, in Benton and western Lane counties.

In September, the north wind pattern evident in August became less persistent and there were several days in which field burning occurred. On September 14th, we field burned 9,311 acres ahead of a Pacific weather system that was producing showers and predominantly southwesterly winds. In the early afternoon, field burning was halted, as the southwesterly winds unexpectedly shifted to northerly, causing moderate and light impacts in Lyons, and light impacts in Eugene and Springfield.

Weather prediction and field burning is an inexact science. An illustration of this occurred on September 16th. A single 58-acre field was field burned in northwestern Lane County. The wind pattern at this location should not have created any impacts. Unfortunately, an unforeseen mid-afternoon downdraft associated with an incoming shower pushed smoke from this field burn into the Eugene/Springfield area. A nephelometer impact was registered in Springfield. To better improve our weather forecasting abilities and help prevent smoke impacts on the general public, ODA will be purchasing an additional theodolite for the 2006 field-burning season to allow pi-bals to be taken in additional parts of the Willamette Valley.

While classic weather patterns that would allow major open-field burning days did not occur this summer, ODA was able to identify marginal conditions and permit limited burning that ultimately allowed growers to burn nearly 50,000 acres – which has been the general historical average since 1998.

Figure 1



This bar graph shows rainfall for the 2005 burn season. Heavy rainfall in June prevented much field burning to be done in early July, as growers opted to harvest instead of field burning.

Four-Day Burn Percentage

During the 2005 field-burning season, 53% of all the acreage open field burned occurred over 4 days. This compares with 61% of all acreage burned over 4 days in 2004. The chart below outlines the 2005 figures.

Tues. 8/9/05	Wed 8/17/05	Fri. 8/26/05	Wed. 9/14/05	4 Day Total	Percent
4,466	8,435	3,768	9,311	25,980	53%

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
Regular	40,000	95,560	41%
Identified Species	22,000	17,806	100%
Steep Terrain	3,000	933	100%
Propane Flame	37,500	1,746	100%

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.

Type: 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 2005 field burn season, a total of 114,299 acres were pre-registered for open field burning compared to 91,933 in 2004. Registration included 95,560 acres of regular, 17,806 acres of identified species, and 933 acres of steep terrain. Regular registration exceeded the legislatively mandated limitation of 40,000 acres; therefore, the regular open field burning allocation rate for 2005 was 41%. The allocation rate for identified species and steep terrain for 2005 was 100%. A total of 49,225 acres were open field burned during the 2005 burn season (34,083 regular limitation, 14,376 identified species, and 766 steep terrain).

By comparison, a total of 49,553 acres were burned in 2004, 50,437 acres were burned in 2003, 51,374 acres burned in 2002, and 52,934 acres in 2001.

2005 Open Field Burning by Crop

Species	Burned (acres)	% Of Total
Annual Ryegrass	26,014	52.85%
Chewings Fescue	7,622	15.48%
Creeping Red Fescue	4,653	9.45%
Perennial Ryegrass	6,091	12.37%
Tall Fescue	1,215	2.47%
Highland Bentgrass	2,101	4.27%
Cereal Grain	699	1.42%
Orchardgrass	425	.86%
Fine Fescue	405	.82%
TOTAL	49,225	99.99%

Propane Flaming

The maximum allowable acreage to be propane flamed is 37,500 acres (as set by the 1995 Legislature). In 2005, growers registered 1,746 acres, with 1,631 acres propane flamed. This compares to 1,067 propane flamed in 2004, 1,602 acres in 2003, 1,582 acres in 2002, and 1,627 acres in 2001.

2005 Propane Flame Burn Crop

Species	Burned (acres)
Creeping Red Fescue	484
Perennial Ryegrass	399
Tall Fescue	64
Highland Bentgrass	77
Cereal Grain	30
Kentucky Bluegrass	135
Orchard Grass	180
Chewings Fescue	262
TOTAL	1,631

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 31, 2005, growers stack burned 1,366 acres. Previous years are as follows:

Year	Interim – October 31st	Final – March 31st
2005-2006	1,366	N/A
2004-2005	1,667	1,864
2003-2004	1,211	1,636
2002-2003	616	1018
2001-2002	691	1,309

Total Thermal Sanitation

The chart below shows the figures for total sanitation including stack-burning acreages.

Total Annual Thermal Sanitation

Burn Type	2005	2004	2003	2002	2001
Open Field Burning	49,225	49,553	50,437	51,374	52,934
Propane Flaming	1,631	1,067	1,602	1,582	1,627
Stack Burning*	1,750*	1,864	1,636	1,018	1,309
Total Sanitation	52,606	52,484	53,675	53,974	55,870

*Estimated Total Stack Burn Acreage (April 1, 2005 – March 31, 2006)

Enforcement

The 2005 burn season marked the ninth 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 17 enforcement contacts during the 2005 season (as of December 31, 2005). This compares with 21 enforcement contacts during the 2004 season, 2 contacts in 2003, 11 contacts in 2002, and 10 contacts in 2001.

Of the 17 enforcement contacts in 2005, fifteen contacts resulted in letters of warning, one contact resulted in a notice of non-compliance, and one contact resulted in a civil penalty assessment.

Smoke Impacts

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. In 2005, an excessive amount of smoke impacted populated areas. Unexpected wind shifts, rapidly changing mixing heights, rapidly decreasing transport wind speeds and directions, and other meteorological factors contributed to the impacts.

Smoke intrusions attributable to open field burning occurred on 15 days in 2005. Previous years totals included 10 days in 2004, 9 days in 2003, 9 days in 2002, and 21 days in 2001.

The number of hours of significant* smoke impact in cities monitored for smoke in 2005 are outlined below.

2005 Open Field Burning Impacts

Date	Acres Burned	Impacts Heavy	Impacts Moderate	Impacts Light	Location
August 9	4,466		2 hours	3 hours	Lyons
August 10	586		1 hour	1 hour	Lyons
August 15	1,593		1 hour		Lyons
August 16	1,464		1 hour		Lyons
August 17/18	8,435		2 hours	5 hours	Lyons
August 17	8,435		4 hours	1 hour	Springfield
August 17	8,435		1 hour		Eugene
August 26	3,768		1 hour		Lyons
Sept. 6	284			1 hour	Lyons
Sept. 7	569		1 hour		Lyons
Sept. 12/13	2,363			7 hours	Lyons
Sept. 14	9,311			1 hour	Eugene
Sept. 14	9,311			1 hour	Springfield
Sept. 14/15	9,311		5 hours	7 hours	Lyons
Sept. 16	1,700			1 hour	Springfield
Sept. 27	1,024			1 hour	Sweet Home
Sept. 27	1,024			1 hour	Lyons

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

“Heavy” hours are 5.0×10^{-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 1.8×10^{-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 1.0×10^{-4} B scat above the prior 3-hour background. “Light” hours of smoke impact were not recorded prior to the 1999 season.

Complaints

Open field burning complaints received from Willamette Valley residents by the Smoke Management Program totaled 1,106 during the 2005 field-burning season. This compares with 475 complaints received for the 2004 season, 206 in 2003, 705 in 2002, and 608 in 2001.

2005 Smoke Complaints by City – Open Field Burning

Albany	6	Salem/Keizer	50
Brownsville	8	Portland	0
Corvallis	25	Scio	8
Cottage Grove/Lorane	1	Silverton	12
Creswell	75	Springfield	148
Eugene	537	Stayton	46
Harrisburg	3	Sublimity	6
J. City/Monroe	15	Sweet Home	36
Lebanon	25	Veneta/Elmira	35
Lyons/Mehama	4	Other	3
Mill City/Gates	47	Unknown	16
		Total	1106

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. The breakdown of complaint calls received is outlined below.

Breakdown of 2005 Open Field Burning Complaint Calls*

Calls Received	Number of Individuals
1	879
2	61
3	19
4	3
5	1
7	1
9	1
15	1

*Chart outlines the number of individuals and how many times they called. For example; 3 people called 4 times each for a total of 12 complaints.

Comparative Information

2005 Comparative Annual Open Field Burning Data

n Season	2005	2004	2003	2002	2001
Acres Registered*	114,299	91,933	83,695	79,679	79,756
Acres Burned	49,225	49,553	50,437	51,374	52,934
Most burned in one day	9,311	10,252	8,617	9,994	7,958
Burn days accounting for 75% of total acres	10	7	9	6	9
Weekend burn days allowed	0	1	0	0	0
Number of Burn Days					
300 – 1,000 acres	15	8	11	2	5
1,000 – 5,000 acres	10	5	8	8	10
5,000 – 10,000 acres	2	3	3	4	3
10,000 or greater	0	1	0	0	0
Total Burn Days	27	17	22	14	18
Smoke Impact Hours total/heavy/mod./light (# days) **	2005	2004	2003	2002	2001
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	0/0/0/0	1/0/1/1(1)	0/0/0/0	0/0/0/0	0/0/0/0
Lyons	14/0/14/25(14)	5/1/4/5(5)	4/0/4/10(6)	3/0/3/11(4)	11/0/11/56(17)
Sweet Home	0/0/0/1(1)	2/0/2/9(4)	2/0/2/2(3)	5/0/5/16(4)	2/0/2/5(3)
Eugene	1/0/1/1(2)	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Springfield	4/0/4/3(3)	0/0/0/0	0/0/0/0	0/0/0/1(1)	0/0/0/0
Oregon City	0/0/0/0(0)	0/0/0/0	0/0/0/0	0/0/0/0	2/0/2/2(1)
Total (total days = 15 different days of smoke impact)	19/0/19/30(15)	8/1/7/15/(10)	6/0/6/12(9)	8/0/8/28(9)	15/0/15/63(21)

*All registered “open”, “identified species”, and “steep terrain” field-burning acres including late registration and transfers.

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

“Heavy” hours are 5.0×10^{-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 1.8×10^{-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 1.0×10^{-4} B-scat above the prior 3-hour background. “Light” hours of smoke impact were not recorded prior to the 1999 season.