

SUMMARY OF THE 2003 FIELD BURNING SEASON

Prepared By

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

Introduction

This summary is developed at the close of each field-burning season to report the season's conditions and the amount of acreage registered and burned.

Weather Summary

It was a good open-field burning year from a weather standpoint. The Oregon Department of Agriculture's (ODA) Smoke Management Program was able to take advantage of several different types of weather patterns to burn in a variety of topographical areas with minimum impacts. Early in the burn season, north winds were successfully used to burn near Cottage Grove and extreme south valley locations. These locations can be difficult to burn. Normal Willamette Valley summer weather patterns frequently create conditions that cause smoke intrusions into these areas. Another unusual weather pattern that presented itself in early August allowed the burning of another problematic field. North winds under a morning inversion, with easterly drainage winds from the Cascades in a narrow layer above the inversion, and southeasterly winds aloft provided a unique burn opportunity for a specific location in Benton County. Working in tandem, ODA field personnel and meteorological staff were able to recognize a unique burning opportunity for this specifically difficult area and fields were successfully sanitized with little or no impacts to the general public.

Through experience with weather prediction and wind behavioral patterns, ODA smoke management staff took advantage of several "marine pushes" that were spread evenly throughout the burn season. By identifying "marine pushes" and burning prior to their arrival in the valley, the smoke generated from field burning would reach heights of 5000 feet or more, and be carried away on strong transport winds with little or no impact to the general public. Additionally, growers were able to take advantage of several weather episodes that did not strictly qualify as "marine pushes", but provided enough westerly component to transport winds to avoid significant impact on any major population centers.

The ODA Smoke Management Program has continually worked to improve the weather forecasting and field burning opportunities in the field. During the 2003 field-burning season, the technique of "field pi-bals" (pilot balloon soundings of wind conditions aloft) was refined. The purpose of the field pi-bals, conducted at on-site field locations, is to identify wind conditions and field burning opportunities at specific locations at a specific time period. This provides growers and ODA managers insight as to how to best light the field and how the smoke will react to lessen the impacts on the general public on that particular day.

Another improvement has been the addition of new software, developed by ODA meteorological personnel, which provides rapid pi-bal analysis. This software creates a visual picture of prevailing transport wind speeds and levels (see fig. 1), that improves smoke management performance. The use of this software for pi-bal analysis has proven so successful, that it is being provided to other field burning programs throughout Oregon.

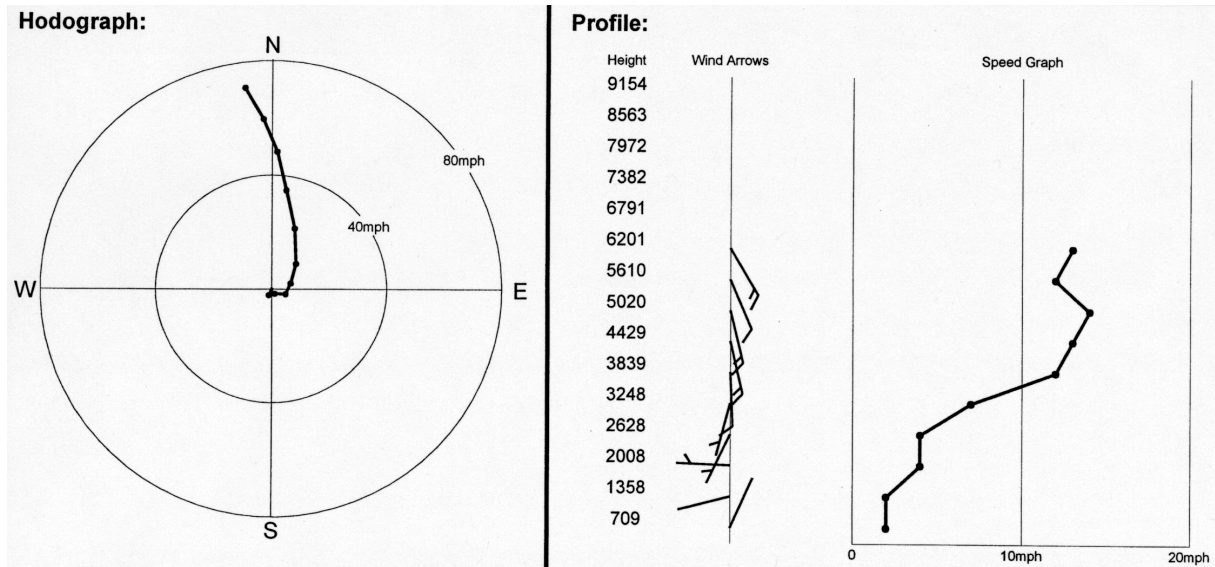


Fig. 1

Several regional forest fires and local fire safety bans affected the 2003 burn season. Most notably, the "B&B complex fire", which burned over 90,000 acres in the Cascade Mountain Range, created vast amounts of smoke impacts in the Willamette Valley. Over a period of four days in August, the ODA Smoke Management Program received 171 complaint calls regarding smoke. However, no field burning was conducted during these days as both ODA personnel and Willamette Valley growers felt it important to protect the air shed from additional smoke impacts. During the hottest weeks of summer, extreme fire safety conditions existed in the valley with many county fire-fighting personnel fighting the B&B complex fire. With the extremely dangerous conditions, and a potential lack of fire fighting personnel to extinguish a possible valley wildfire, local fire districts placed a burn ban on all field burning several times during the field-burning season.

Registered Acres

Open field burning and propane flaming acreage pre-registration began on March 17 and continued through April 1. The chart on page 3 shows the breakdown of acres registered by type, limitation, allocation and available acres as of April 2, the day after pre-registration ended.

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.

Type	Limitation	Acres Registered	Allocation	Acres Available
Regular	40,000	60,648	66%	52
Identified Species	22,000	17,139	100%	4,861
Steep Terrain	3,000	704	100%	2,296
Propane Flame	37,500	1,145	100%	36,355

Open Field Burning

In the 2003 burn season a total of 78,491 acres were pre-registered for open field burning compared to 79,679 acres in 2002. Registration included 60,648 acres of regular open field burning, 17,139 acres of identified species, and 704 acres of steep terrain. Regular registration exceeded the legislatively mandated limitation of 40,000 acres, therefore, the regular open field burning allocation rate for 2003 was 66%. The allocation rate for identified species and steep terrain for 2003 was 100%.

A total of 50,437 acres were open field burned during the 2003 burn season (35,345 regular limitation, 14,703 identified species, and 389 steep terrain). By comparison, a total of 51,274 acres were burned in 2002, 52,934 acres in 2001, and 50,801 acres in 2000.

During the 2003 burn season, 40 days were authorized as preparatory burning days and 22 days of open field burning were authorized (days in which more than 300 acres were burned). This compares to 14 open field burning days in 2002, 18 days in 2001, and 17 days in 2000. During the 22 authorized open field burning days, an average of 2,182 acres were burned, with August 21, 2003 being the largest day with 8,617 acres being burned.

2003 Open Field Burn Crop

Species	Burned	% of Total
Annual Ryegrass	25,089	49.74%
Chewings Fescue	7,097	14.07%
Creeping Red Fescue	5,517	10.94%
Perennial Ryegrass	3,634	7.21%
Tall Fescue	1,056	2.09%
Highland Bentgrass	2,089	4.14%
Cereal Grain	5,517	10.94%
Orchardgrass	174	0.34%
Fine Fescue	264	0.52%
TOTAL	50,437	99.99%

Propane Flaming

The maximum allowable acreage to be propane flamed is 37,500 acres (as set by the 1995 Legislature). In 2003, growers pre-registered 1,145 acres, at the end of the season 2,598 acres had been registered to be propane flamed. 1,602 (4.3% of the limitation) acres were burned. This compares to 2,606 registered acres (6.9%) and 1,582 (4.2%) burned acres in 2002, 2,965 acres (7.9%) registered acres and 1,627 acres (4.3%) burned in 2001, 2,875 acres (7.6%) registered and 2,124 acres (5.6%) burned in 2000, and 3,575 acres (9.5%) registered acres and 1,939 acres (5.1%) burned in 1999.

2003 Propane Flame Burn Crop

Species	Burned	% of Total
Creeping Red Fescue	46	2.87%
Perennial Ryegrass	906	56.55%
Tall Fescue	177	11.05%
Highland Bentgrass	147	9.18%
Colonial Bentgrass	29	1.81%
Cereal Grain	102	6.37%
Orchardgrass	118	7.36%
Kentucky Bluegrass	77	4.81%
TOTAL	1602	100%

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, 2003, growers stack burned 1,211 acres. Previous years are as follows:

Year	Interim – October 27 th	Final – March 31 st
2003-2004	1,211	N/A
2002-2003	616	1018
2001-2002	691	1,309
2000-2001	921	1,050
1999-2000	3,120	3,825

Total Annual Thermal Sanitation

Burn Type	2003	2002	2001	2000	1999
Open Field Burning	50,437	51,374	52,934	50,801	49,999
Propane Flaming	1,602	1,582	1,627	2,124	1,939
Stack Burning	1,409*	1,018	1,309	1,050	3,825
Total Sanitation	53,448	53,974	55,870	53,975	55,763
Percent Change	-01%	-03%	+03%	-03%	+01%

*Estimated Stack Burn Acreage (April 1, 2003 – March 31, 2004)

Enforcement

The 2003 burn season marked the seventh 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 two enforcement contacts during the 2003 season, resulting in warnings. This compares with 11 contacts during the 2002 season, resulting in 13 violations, 10 contacts during the 2001 season, resulting in 14 violations, three contacts during the 2000 season, resulting in 5 violations, and 4 contacts during the 1999 season, resulting in 4 violations. After evaluating the factors involved in each case during the 2003 season, two letters of informal warning were issued.

Smoke Impacts and Complaints

It is the goal of the 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 8 days in 2003. Previous years totals included 9 days in 2002, 21 days in 2001, 8 days in 2000, and 6 days each in 1999 and 1998.

The number of hours of significant* smoke impact in cities monitored for smoke in 2003 were Lyons (4 hours) and Sweet Home (2 hours). Light** smoke impact was noted in Lyons for a total of 10 hours while Sweet Home recorded 2 hours. Portland, Salem, Eugene, 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 206 for the 2003 season. That compares to 705 in 2002, 608 in 2001, 477 in 2000, and 249 in 1999.

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, 36 anonymous calls were received.

Breakdown of Open Field Burning Complaint Calls

Calls Received	Number of Individuals
1	146
2	17
3	1
4	3
6	2
10	1

*"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.

**"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.

2003 Comparative Annual Open Field Burning Data

	2003	2002	2001	2000	1999
Acres Registered*	83,695	79,679	79,756	76,561	75,382
Acres Burned	50,437	51,374	52,934	50,801	49,999
Most burned in one day	8,617	9,994	7,958	10,391	7,217
Burn days accounting for 75% of total acres	9	6	9	6	9
Weekend burn days allowed	0	0/30	0/28	0/26	0/24
Number of Burn Days					
300 – 1,000 acres	11	2	5	8	7
1,000 – 5,000 acres	8	8	10	6	9
5,000 – 10,000 acres	3	4	3	2	3
10,000 or greater	0	0	0	1	0
Total Burn Days	22	14	18	17	19
Smoke Impact Hours					
**total/heavy/mod. /light (# days)	2003	2002	2001	2000	1999
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
Lyons	4/0/4/10(6)	3/0/3/11(4)	11/0/11/56(17)	4/0/4/5(5)	5/0/5/0(3)
Sweet Home	2/0/2/2(3)	5/0/5/16(4)	2/0/2/5(3)	5/0/5/2(3)	3/1/2/0(1)
Eugene	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/2(1)
Springfield	0/0/0/0	0/0/0/1(1)	0/0/0/0	0/0/0/0	0/0/0/2(1)
Oregon City	0/0/0/0	0/0/0/0	2/0/2/2(1)	0/0/0/0	0/0/0/0
Total	6/0/6/12(9)	8/0/8/28(9)	15/0/15/63(21)	9/0/9/7(8)	8/1/7/4(6)
Smoke Complaints					
Open Field Burning					
Portland/Salem	14	4	31	33	3
Albany/Corvallis	15	10	11	18	4
Lebanon/Sweet Home	27	23	55	75	45
Eugene/Springfield	59	382	274	239	144
Other (North Valley)	22	83	112	47	18
Other (South Valley)	64	174	125	65	35
Unspecified Area	5	29	N/A	N/A	N/A
Total Complaints	206	705	608	477	249

*All registered 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.

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
7/10	Marion, Linn, Lane	607	SW	3/0/0/0	Lyons 0/0/0/1
7/14	Marion, Linn	530	WNW	3/0/0/0	
7/15	Marion, Linn, Lane	1914	W	17/0/0/0	
7/25	Marion, Linn	824	NW	3/0/0/0	
8/4	Marion, Linn	2429	WNW	10/0/0/0	
8/5	Marion, Linn	688	NW	1/0/0/0	
8/6	Marion, Linn, Lane	6138	WSW	17/0/0/0	Lyons 2/0/2/2, Sweet Home 1/0/1/0
8/7	Marion, Linn	3595	SW	12/0/0/0	
8/11	Marion, Linn	6823	W	5/0/0/0	
8/12	Marion, Benton, Linn, Lane	1143	N	2/0/0/0	
8/14	Benton, Linn	872	N	2/0/0/0	
8/15	Marion, Linn, Lane	2664	W	11/0/0/0	Lyons 1/0/1/1
8/20	Marion, Benton, Linn	955	NNE	22/0/0/0	
8/21	Marion, Linn	8617	WSW	21/0/0/0	Sweet Home 0/0/0/2
8/25	Clackamas, Marion, Linn	2568	W	7/0/0/0	
9/5	Yamhill, Marion, Linn	1575	NW	20/0/0/0	Lyons 0/0/0/2
9/8	Lane, Linn	568	WSW	0/0/0/0	
9/15	Marion, Linn	3316	WNW	3/0/0/0	Lyons 1/0/1/3
9/18	Marion, Linn	555	WSW	0/0/0/0	Lyons 0/0/0/1
9/25	Marion, Benton, Linn	1130	N	0/0/0/1	Sweet Home 1/0/1/0

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

**Total includes hourly nephelometer measurements exceeding 1.8×10^{-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 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 1.8×10^{-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 1.0×10^{-4} B-scat above the prior 3-hour background. “Light” hours of smoke impact were not recorded prior to the 1999 season.