

Appendix C: Fire Regimes, Condition Classes, Fuel Models, Fire Statistics

Fire Regimes²¹

Fire regimes, characterized by type, frequency, predictability, extent, magnitude, synergism and timing of fires, describe the general fire environment of a given area. There are six regime definitions, as displayed below.

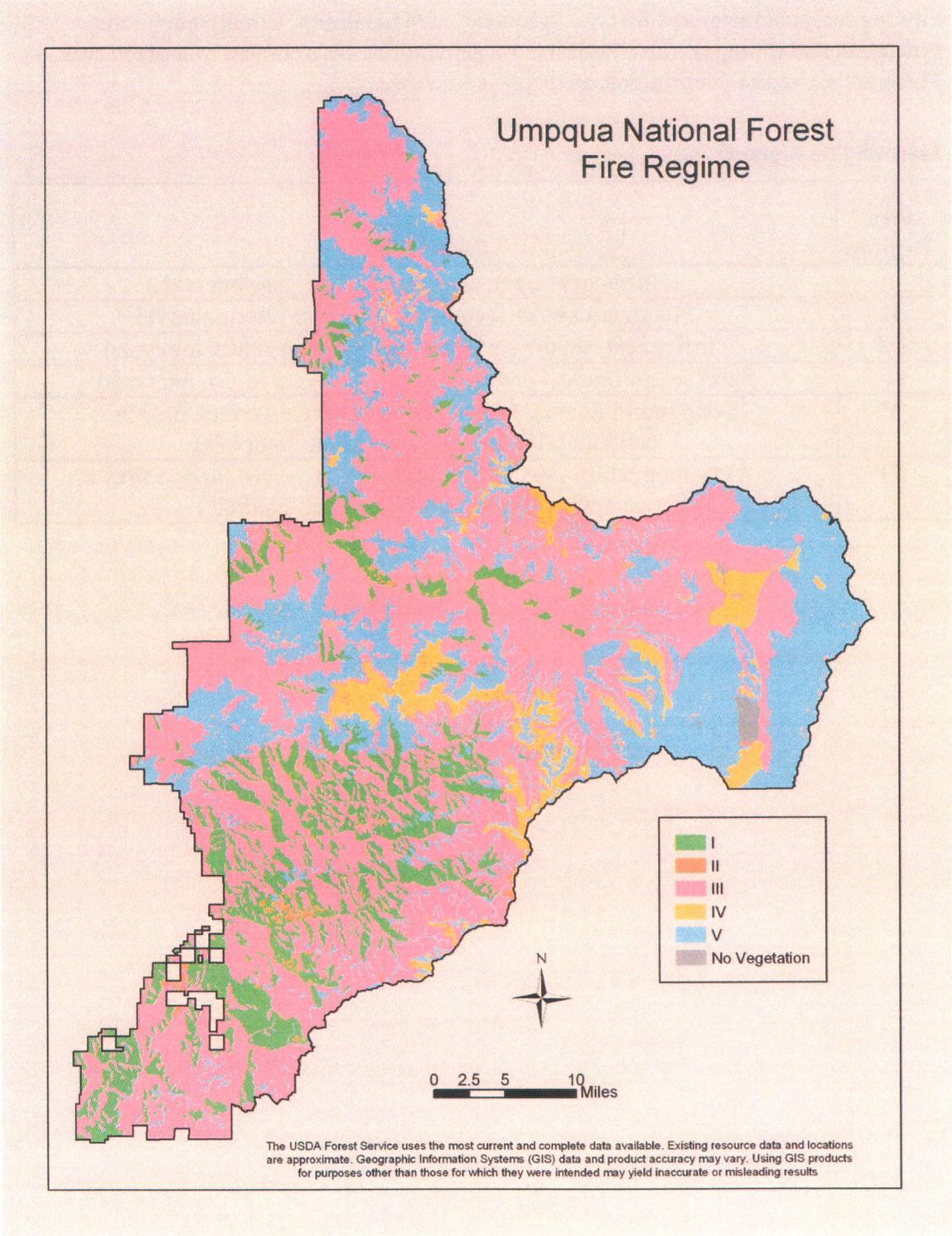
Table 10: Fire Regimes²²

Fire Regime	Description
I	Infrequent light surface fire (>25 year intervals)
II	Frequent light surface fires (1-25 year return intervals)
III	Infrequent, severe surface fires (>25 year return intervals)
IV	Short return interval crown fires (25-100 year return intervals)
V	Long return interval crown fires and severe surface fires in combination (100-300 year return intervals)
VI	Very long return interval crown fires and severe surface fires in combination (>300 year return intervals)

²¹ Agee, James K. 1993. Fire Ecology of Pacific Northwest Forests. Covelo, CA. Island Press

²² Umpqua National Forest. 2003. Watershed Restoration Business Plan.

Figure 5: Fire Regime Map



Condition Class

A condition class describes the degree to which an area has departed from its historical fire regime. The alteration of key ecosystem components (such as species composition, structural stage, stand age and canopy closure) occurred over time in a number of ways that include fire exclusion, fire suppression, timber harvesting, grazing, the introduction and establishment of exotic plant species, insects and disease processes.

Condition classes for the Central Coast Range and Cascades Fire Planning Unit are in the development stages; they will be incorporated into this Fire Management Plan upon completion.

Table 11: Condition Class

Condition Class	Attributes	Example Management Options
One	<ul style="list-style-type: none">➤ Fire regimes are within or near an historical range.➤ The risk of losing key ecosystem components is low.➤ Fire frequencies have departed from historical frequencies (either increased or decreased) by no more than one return interval.➤ Vegetation attributes (species composition and structure) are intact and functioning within an historical range.	Where appropriate, these areas can be maintained within the historical fire regime by treatments such as prescribed fire.

Condition Class	Attributes	Example Management Options
Two	<ul style="list-style-type: none"> ➤ Fire regimes have been moderately altered from their historical range. ➤ The risk of losing key ecosystem components has increased to moderate. ➤ Fire frequencies have departed (either increased or decreased) from historical frequencies by more than one return interval. This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity or landscape patterns. ➤ Vegetation attributes have been moderately altered from their historic ranges. 	<p>Where appropriate, these areas may need moderate levels of treatments to be restored to the historical fire regime. Treatments may include prescribed fire, and manual or mechanical treatments,</p>
Three	<ul style="list-style-type: none"> ➤ Fire regimes have been significantly altered from their historical range. ➤ The risk of losing key ecosystem components is high. ➤ Fire frequencies have departed (either increased or decreased) by multiple return intervals. This change results in dramatic changes to one or more of the following: fire size, frequency, intensity, severity or landscape patterns. ➤ Vegetation attributes have been significantly altered from their historic ranges. 	<p>Where appropriate, these areas need high levels of restoration treatments such as hand or mechanical treatments. These treatments may be necessary before prescribed fire is used to restore the historical fire regime.</p>

Fuel Models

Table 12: NFDRS and Fire Behavior Fuel Model Relationships

NFDRS FUEL MODELS	FIRE BEHAVIOR FUEL MODELS														
	1	2	3	4	5	6	7	8	9	10	11	12	13		
A Western Annuals	X														GRASS
L Western Perennials	X														
S Tundra	X					3rd			2nd						
C Open Pine w/Grass		X							2nd						
T Sagebrush w/Grass		X			3rd	2nd					X				
N Sawgrass			X												
B Mature Brush (6 Ft)				X											SHRUB
O High Pocosin				X											
F Inter. Brush					2nd	X									
Q Alaskan Black Spruce						X	2nd								
D Southern Rough						2nd	X								TIMBER
H Short Needle Closed Normal Dead								X							
R Hardwood Litter (Summer)								X							
U Western Long Needle Pine									X						
P Southern Long Needle Pine									X						
E Hardwood Litter (Fall)									X						
G Short Needle Closed Heavy Dead										X					SLASH
K Light Slash											X				
J Medium Slash												X			
I Heavy Slash													X		
	GRASS			SHRUB			TIMBER			SLASH					

Summary of FPU Fire Statistics

The information presented below presents a summary of fire statistics for the FPU.

Table 13: Forest Service and BLM Fire Occurrence Statistics (1990-2003)

	Umpqua National Forest	Roseburg BLM
No. Fires Started on or Burned Into	1,198	209
Acres Burned	108,774.2	1305.6
Avg. No. Fires / Year	86 (69 lightning fires)	15 (10 lightning fires)
Avg. No. Acres / Year	7,769.6 (6,455 acres from lightning)	93.3 (16.9 acres from lightning)
Fires > 100 Ac.	26 (22 started by lightning)	3 (0 started by lightning)
Fires > 10,000 Ac.	4 (3 started by lightning)	0 (0 started by lightning)
Peak of Season	August 13 th	
67% of Fires Occur	July 1 - August 31 st	
98% of Fires Occur	May 5th - October 30	April 4th - November 10
Earliest Fire	January 3, 1992	February 2, 1994
Latest Fire	December 12, 2000	December 18, 2002
Largest Fire	July 12, 2002 – Boulder Creek (48,079.6 ac.)	October 26, 1993 – Spurline (365.5 ac.)
Most Fires in 1 Day	July 23, 1994 – 69 fires	July 27, 1998 - 17 fires
	Umpqua National Forest	Roseburg BLM
Most Significant Fire Event	July 12 – Sept. 11, 2002 (94 fires for 88,153 ac.)	October 26, 1993 (2 fires for 373.5 ac.)
No. Days 7+ Fire Starts	41	5
Fires >100ac on 7+ Fire Start Days	22 (85% of large fires occurred on multi-fire days)	0
Most Fires in One Year	1994 – 149 fires for 30.9 acres	1994 – 36 fires for 23.4 acres
Most Acres in One Year	2002 – 88,168 acres from 102 fires	1993 – 450.4 acres from 15 fires
Least Fires and Acres in One Year	1997 – 1.6 acres from 14 fires	1997 – 1.6 acres from 4 fires

Table 14: Forest Service and BLM Statistical Fire Causes

Statistical Cause	Umpqua Fires	Umpqua Acres	Roseburg BLM Fires	Roseburg BLM Acres
Lightning	965 (80.6%)	90,362.8 (83.1%)	134 (64.1%)	235.9 (18.1%)
Equipment	10 (.8%)	54 (0.1%)	12 (5.7%)	7.1 (.5%)
Smoking	28 (2.3%)	4.4 (0.0%)	9 (4.3%)	2.3 (0.2%)
Campfire	94 (7.8%)	187.0 (0.2%)	26 (12.4%)	860.1 (65.9%)
Debris Burn	7 (.6%)	47.4 (0.0%)	3 (1.4%)	2.5 (.2%)
Railroad	0 (0%)	0 (0%)	17 (8.1%)	104.2 (8.0%)
Arson	40 (3.3%)	263.1 (0.2%)	0 (0%)	0 (0%)
Children	4 (0.3%)	.4 (0.0%)	0 (0%)	0 (0%)
Other	50 (4.2%)	17,855.1 (16.4%)	8 (3.8%)	93.5 (7.2%)
Total	1,198	108,774.2	209	1,305.6

Table 15: Summary Forest Service and BLM Statistics by Fire Size Class

Size Class	Umpqua Fires	Umpqua Acres	Roseburg BLM Fires	Roseburg BLM Acres
A (0.1-0.25 ac.)	897 (74.9%)	101.8 (0.1%)	137 (65.6%)	10.7 (0.8%)
B (0.25-9 ac.)	239 (19.9%)	312.6 (0.3%)	56 (26.8%)	118.2 (9.1%)
C (10-99 ac.)	36 (3.0%)	1,271.4 (1.2%)	13 (6.2%)	498.2 (38.2%)
D (100-299 ac.)	11 (0.9%)	1,680.4 (1.5%)	2 (1.0%)	313.0 (24.0%)
E (300-999 ac.)	6 (0.5%)	3,020.4 (2.8%)	1 (0.5%)	365.5 (28.0%)
F (1000-4999 acres)	5 (0.4%)	10,286.6 (9.5%)	0 (0%)	0 (0%)
G (5000+ ac.)	4 (0.3%)	92,101.0 (84.7%)	0 (0%)	0 (0%)
Totals	1,198	108,774.2	209	1305.6

Table 16: Summary Forest Service and BLM Statistics by Total Acres Burned

Ranking	Year	Umpqua Acres	Umpqua Fires	Roseburg BLM Acres	Roseburg BLM Fires
1	2002	88168.0	102	450.4	15
2	1996	18199.2	111	280.7	31
3	2003	1298.3	38	249.5	13
4	1998	398.4	140	172.5	18
5	2001	286.5	129	83.5	6
6	1999	156.5	54	23.4	36
7	1990	85.5	98	14.6	21

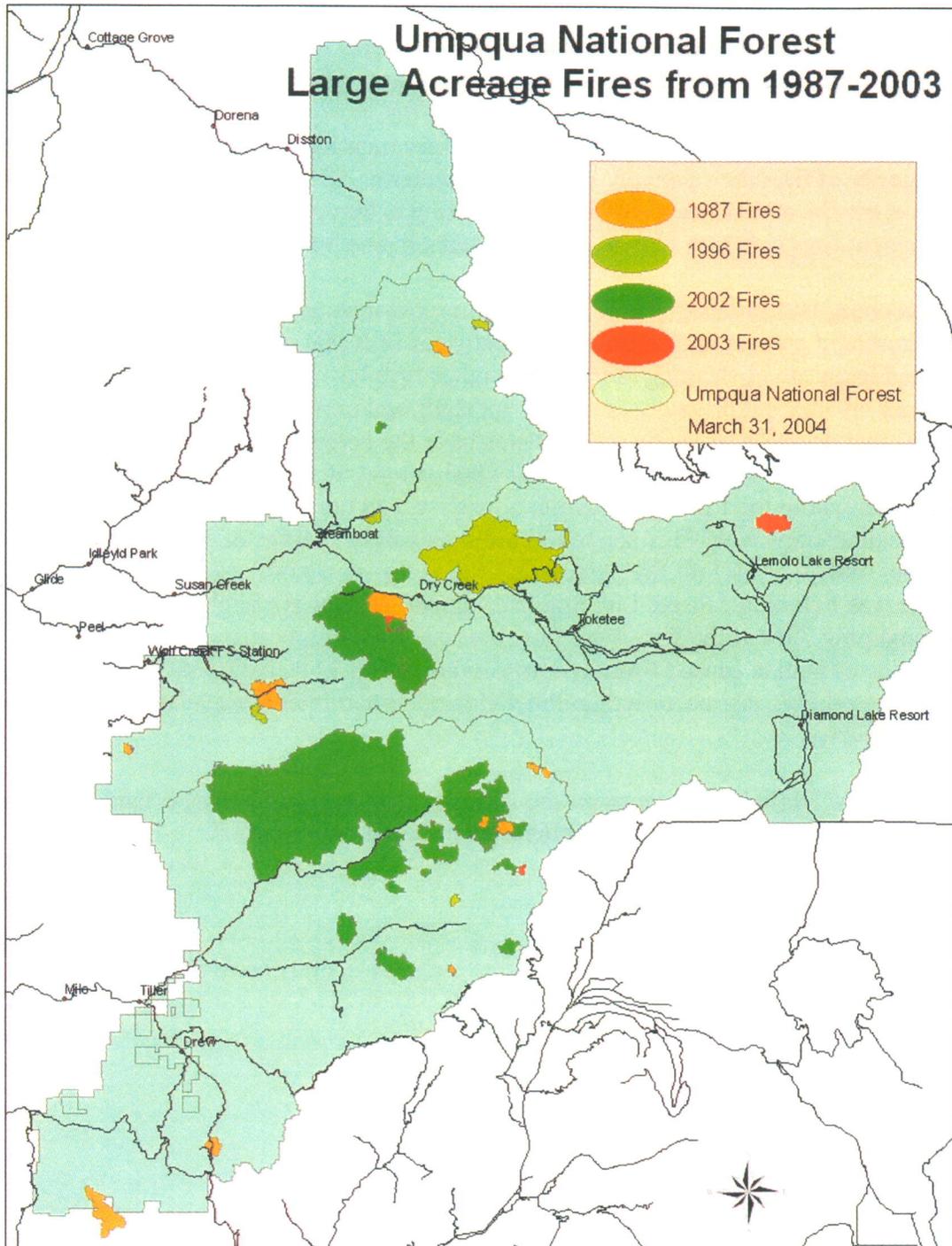
Table 17: Summary of Number Fires by Forest Service and BLM Unit

Year	Cottage Grove	Tiller	Diamond Lake	North Umpqua	Umpqua Total	Roseburg BLM Total
1990	0	24	59	15	98	13
1991	1	40	34	20	95	11
1992	7	41	52	22	122	18
1993	1	21	39	4	65	15
1994	3	39	68	39	149	36
1995	3	8	18	16	45	10
1996	8	21	31	51	111	21
1997	1	2	8	3	14	4
1998	3	52	46	39	140	21
1999	0	27	25	2	54	8
2000	3	8	21	4	36	4
2001	7	42	45	35	129	11
2002	2	48	22	30	102	31
2003	3	9	23	3	38	6
Total	42	382	491	283	1198	209

Table 18: Summary of Number Acres by Forest Service and BLM Unit

Year	Cottage Grove	Tiller	Diamond Lake	North Umpqua	Umpqua Total	Roseburg BLM Total
1990	0	19.2	9.0	57.3	85.5	249.5
1991	.1	10.8	7.2	13.1	31.2	3.5
1992	6.0	8.4	14.8	2.9	32.1	172.5
1993	.3	22.7	16.5	20.3	59.8	450.4
1994	.3	13.4	10.0	7.2	30.9	23.4
1995	.3	.9	12.6	2.8	16.6	1.7
1996	20.7	344.1	16,363.8	1,470.6	18,199.2	14.6
1997	.1	.2	1.0	.3	1.6	1.6
1998	.3	273.6	7.6	116.9	398.4	13.1
1999	0	152.5	3.8	.2	156.5	5.4
2000	.3	2.9	4.9	1.5	9.6	2.4
2001	4.2	82.5	14.3	185.5	286.5	3.3
2002	.2	68,898.7	2.9	19,266.2	88,168.0	280.7
2003	.3	2.5	1,295.2	.3	1,298.3	83.5
Total	33.1	69,832.4	17,763.6	21,145.1	108,774.2	1,305.6

Figure 6: Umpqua National Forest Large Fires Map (1987-2003)



Fire History Analysis for Roseburg BLM Managed Lands (1990-2003)

During the period of 1990-2003 the Roseburg District averaged 15 fires per year, burning an average of 93 acres annually. Approximately 66 % of these fires were Size Class A incidents (less than 0.25 acres in size), 27 % were Size Class B incidents (0.25-9 acres in size), and 6 % were Size Class C incidents (10 – 99 acres in size). Only 1.5% (3 fires) exceeded 100 acres in size. These were all human caused fires, the largest of which burned 365 acres. On average, lightning accounts for approximately 64% of the annual number of fires while a variety of human causes account for the remaining 36%. While the majority of fires are relatively insignificant in terms of size and fire intensity, stand replacement fire events occasionally occur. During extreme weather conditions, stand replacement fires can burn several thousand acres in one burning period.

The Roseburg BLM managed lands are intermingled with privately owned forest lands in a checkerboard ownership pattern. The statistics of fires that have occurred on the BLM managed lands are misleading in that many other fires have occurred within the District boundary on adjacent privately owned forest lands and in rural residential areas. Many of the fires that occur on privately owned lands have the potential to spread onto BLM managed lands. During the period of 1990-2003, a total of 1,338 fires occurred on all ownerships within the Roseburg District boundary, and burned a total of 5,147 acres. The annual average is 96 fires per year, burning a yearly average of 368 acres. Of the total fires, only 0.6% (eight fires) exceeded 100 acres; seven of these were human caused and one was lightning caused. Lightning accounted for approximately 27% of all fires. The remaining 73% of the fires were from a variety of human causes. The higher percentage of human caused fires, as compared to the BLM statistics, is due to the many human caused fires that occur within the Wildland Urban Interface (WUI) and along major highways.

Tables 19 and 20 (below) summarize the 209 fires that occurred on BLM lands, and the 1326 fires that occurred on all ownerships during this 14-year period.

Table 19: Fire Occurrence Statistics – Douglas Forest Protection and Roseburg BLM (1990-2003)

	Douglas Forest Protection	Roseburg BLM
No. Fires Started on or Burned Into	1,338	209
Acres Burned	5157.68	1305.6
Avg. No. Fires / Year	96 (26 lightning fires)	15 (10 lightning fires)
Avg. No. Acres / Year	368.4 (53 acres from lightning)	93.3 (16.9 acres from lightning)
Fires > 100 Ac.	8 (1 started by lightning)	3 (0 started by lightning)
Fires > 10,000 Ac.	0	0
Peak of Season	August 13 th	
67% of Fires Occur	July 1 - August 31 st	
98% of Fires Occur	May 5th - October 30	April 4th - November 10
Earliest Fire	February 2, 1994	February 2, 1994
Latest Fire	December 18, 2002	December 18, 2002
Largest Fire	October 26, 1993 (Spurline - 365.5 ac.)	October 26, 1993 (Spurline - 365.5 ac.)
Most Fires in 1 Day	July 12, 2002– 50 fires	July 27, 1998 - 17 fires
Most Significant Fire Event	October 26, 1993 (2 fires for 373.5 ac.)	October 26, 1993 (2 fires for 373.5 ac.)
No. Days 7+ Fire Starts	13	5
Fires >100ac on 7+ Fire Start Days	0	0
Most Fires in One Year	1994 – 142 fires, 342.55 acres	1994 – 36 fires, 23.4 acres
Most Acres in One Year	1996 – 670.71 acres, 138 fires	1993 – 450.4 acres, 15 fires
Least Fires and Acres in One Year	1997 – 43.19 acres, 44 fires	1997 – 1.6 acres, 4 fires

Table 20: Statistical Fire Causes Douglas Forest Protection and Roseburg BLM

Statistical Cause	DFPA Fires	DFPA Acres	Roseburg BLM Fires	Roseburg BLM Acres
Lightning	364 (27%)	745.89 (14%)	134 (64.1%)	235.9 (18.1%)
Equipment	108 (8%)	538.53 (10%)	12 (5.7%)	7.1 (.5%)
Smoking	254 (19%)	696.12 (14%)	9 (4.3%)	2.3 (0.2%)
Campfire	53 (4%)	229.52 (4%)	26 (12.4%)	860.1 (65.9%)
Debris Burn	96 (7%)	273.77 (5%)	3 (1.4%)	2.5 (.2%)
Railroad	168 (13%)	1432.75 (28%)	17 (8.1%)	104.2 (8.0%)
Arson	39 (3%)	469.19 (9%)	0 (0%)	0 (0%)
Children	72 (5%)	231.09 (4%)	0 (0%)	0 (0%)
Other	184 (14%)	530.8 (10%)	8 (3.8%)	93.5 (7.2%)
Total	1,338	5147.66	209	1,305.6