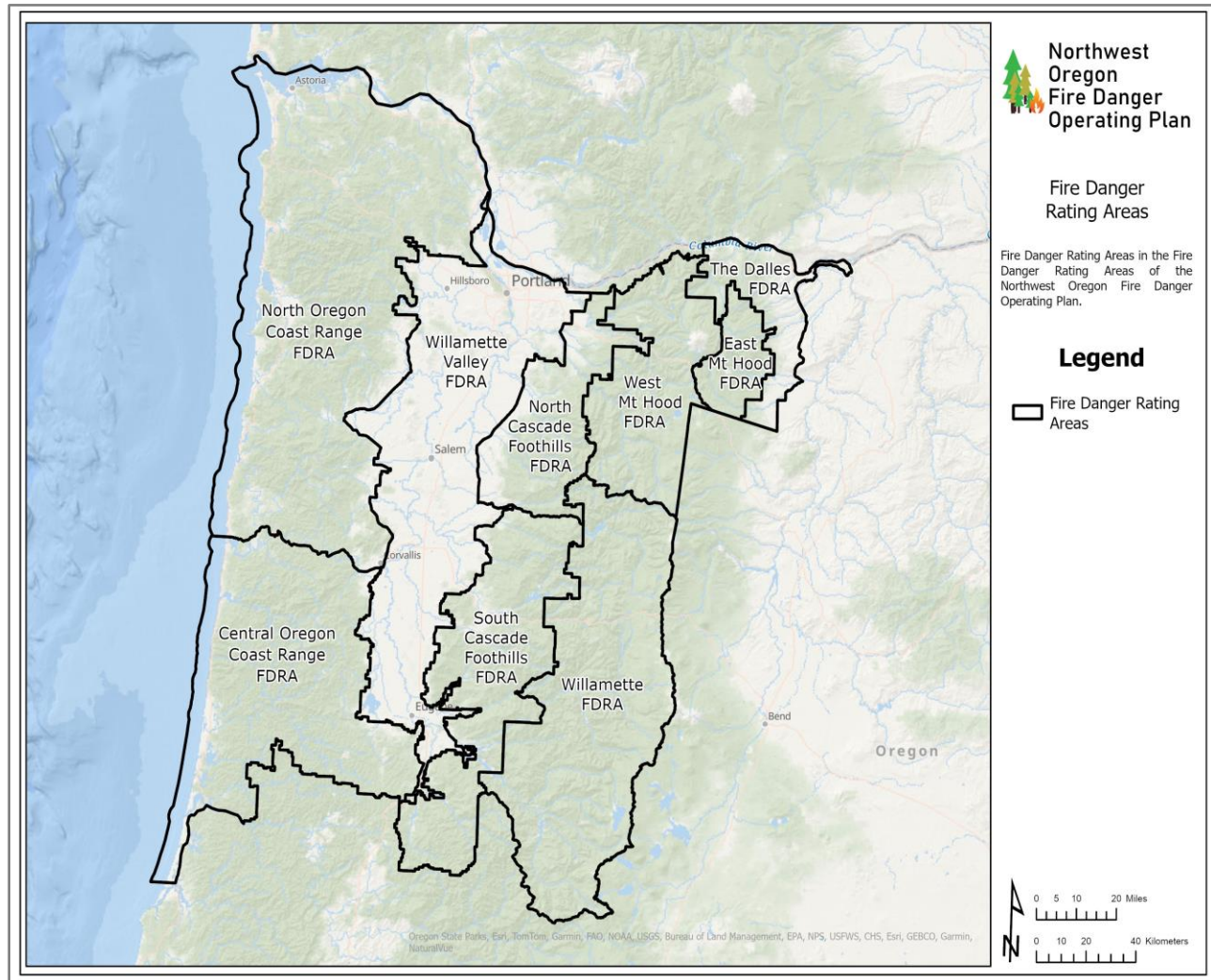


# Northwest Oregon

## Interagency Fire Danger Operating Plan



Columbia River Gorge National Scenic Area  
 Mount Hood, Siuslaw, and Willamette National Forests  
 Northwest Oregon District BLM  
 Oregon Department of Forestry Central Oregon - The Dalles Unit  
 United States Fish and Wildlife Service

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## 1.0 Introduction

### 1.1 Purpose

The public, industry, and our own agency personnel expect the interagency wildland fire management agencies to implement appropriate and timely decisions which ultimately result in safe, efficient, and effective wildland fire management actions.

This fire danger operating plan (FDOP) is intended to establish and document interagency planning and response levels based upon an assessment of vegetation, climate, topography and an analysis of historical weather and fire data. The plan provides a science-based tool for incorporating a measure of risk associated with decisions which have the potential to affect the safe and the effective control of wildland fire.

Interagency policy and guidance regarding the development of Fire Danger Operating Plans can be found in the Interagency Standards for Fire & Aviation Operations ([Red Book](#)).

### 1.2 Operating Plan Objectives

- Provide a tool for agency administrators, fire managers, dispatchers, agency cooperators, and firefighters to correlate fire danger ratings with appropriate fire business decisions.
- Develop fire danger rating areas based upon similar climate, vegetation, and topography. (Chapter 2.1)
- Document an interagency fire weather monitoring network consisting of remote automatic weather stations. (Chapter 2.3)
- Define the fire problem and determine the most appropriate fire danger-based decision tool to mitigate the problem. (Chapter 3.0)
- Document the most effective methods for fire managers to communicate potential fire danger to cooperating agencies, industry, and the public. (Chapter 3.3)
- Determine relevant decision points for fire management actions based upon an analysis of historical fire weather and fire occurrence data. (Chapter 4.0)

### 1.3 Application

The FDOP guides the application of the national fire danger rating system (NFDRS) using decision points and management actions associated with system outputs. Decision points were developed as a result of analysis for this FDOP and documented herein. The mitigating fire management actions taken at each decision point are developed by and maintained at each unit participating in this plan.

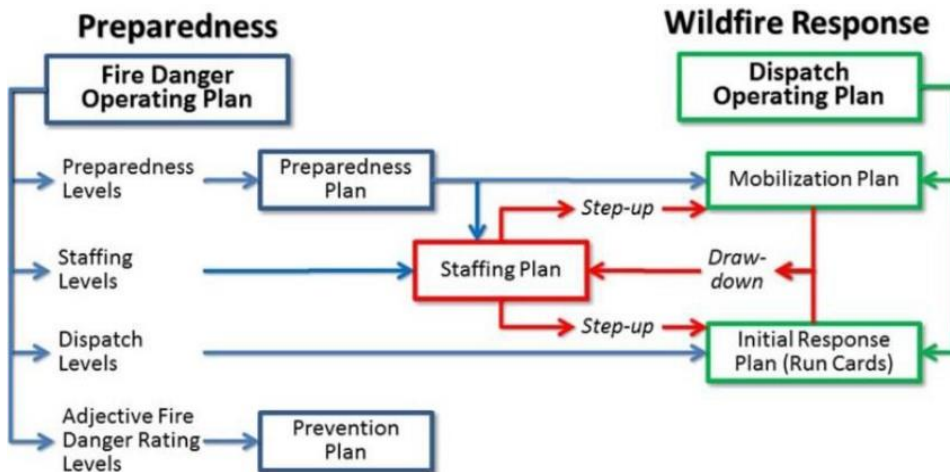


Figure 1. Relationship between Fire Danger Operating Plan and other documents.

### 1.3.1 Preparedness Plan

The preparedness plan describes actions to ensure sufficient unit resource capability to respond to unplanned ignitions for longer periods, several days to weeks. It combines decision points with mid- to long-term events. Examples include drought, the peak of burn season, or local fire activity and resource availability. Units should document specific preparedness level procedures, including calculation methodology and frequency in the unit preparedness plan itself.

The associated decisions and planned actions are located with the individual unit preparedness plans.

#### 1.3.1.1 Preparedness Level

The preparedness level is a five-tier (1-5) fire danger rating decision tool that is based on NFDRS outputs and other mid- to long-term indicators. Preparedness levels are established to assist fire managers with weekly or monthly planning decisions.

### 1.3.2 Staffing Plan

The staffing plan describes action to ensure sufficient unit resource capability to respond to unplanned ignitions during short periods, one to several burn periods. It combines decision points with short-term events. Examples include forecasted lighting, fire weather watches/warnings, or other pre-planned events such as Fourth of July. Interagency staffing level decision points and calculation are identified and documented in this FDOP; the associated decisions and planned actions are located with the individual unit.

#### 1.3.2.1 Staffing Level

Staffing levels form the basis for decisions regarding the degree of readiness of initial attack (IA) and support resources. They are expressed as numeric values where 1 represents the low end of the fire danger continuum and 5 (4 in the case of The Dalles FDRA) the high end. Staffing level is intended to provide fire managers with day-to-day decision support regarding staffing of suppression resources such as employee overtime associated with

working people beyond their normal schedules and extended staffing resources, types of resources and minimum number of resources.

The process for determining local staffing levels is not always the same as staffing level calculated directly from WIMS (Weather Information Management System). WIMS calculates staffing level on climatological breakpoints. Currently, individual dispatch centers will calculate their respective staffing levels, with an expectation of coordination with adjacent or overlapping centers.

### **1.3.3 Response Plan/Mobilization Plan**

Initial response plans, also referred to as run cards or response plans, specify the fire management response to an unplanned ignition within a defined geographic area. Initial response is based on fire danger, fire management objectives, and resource availability. The initial response plan and planned actions are located within the individual unit response plan.

#### **1.3.3.1 Response Levels**

Response levels are established to assist fire managers with decisions regarding the most appropriate *response* to an initial fire report until a qualified Incident Commander arrives at the incident.

Response Levels are a direct function of staffing levels. The number and type of suppression resources dispatched to a reported fire is developed by local units and located within the individual dispatch centers.

### **1.3.4 Prevention/Restriction Plan**

Prevention/restriction plans document the wildland fire problems and outline efforts regarding fire restrictions and closures. An interagency analysis of the fire problem and associated target group are identified and documented in this FDOP; the associated decisions and planned actions are located with the individual unit.

### **1.3.5 Adjective Level**

In 1974, the USFS and BLM established five standard adjective fire danger rating levels (Low, Moderate, High, Very High, Extreme) and descriptions for public information and signing. Fire danger is expressed using the national adjective descriptions and color codes. The Oregon Department of Forestry uses four rating levels (Low, Moderate, High, and Extreme) to convey fire danger to the public.

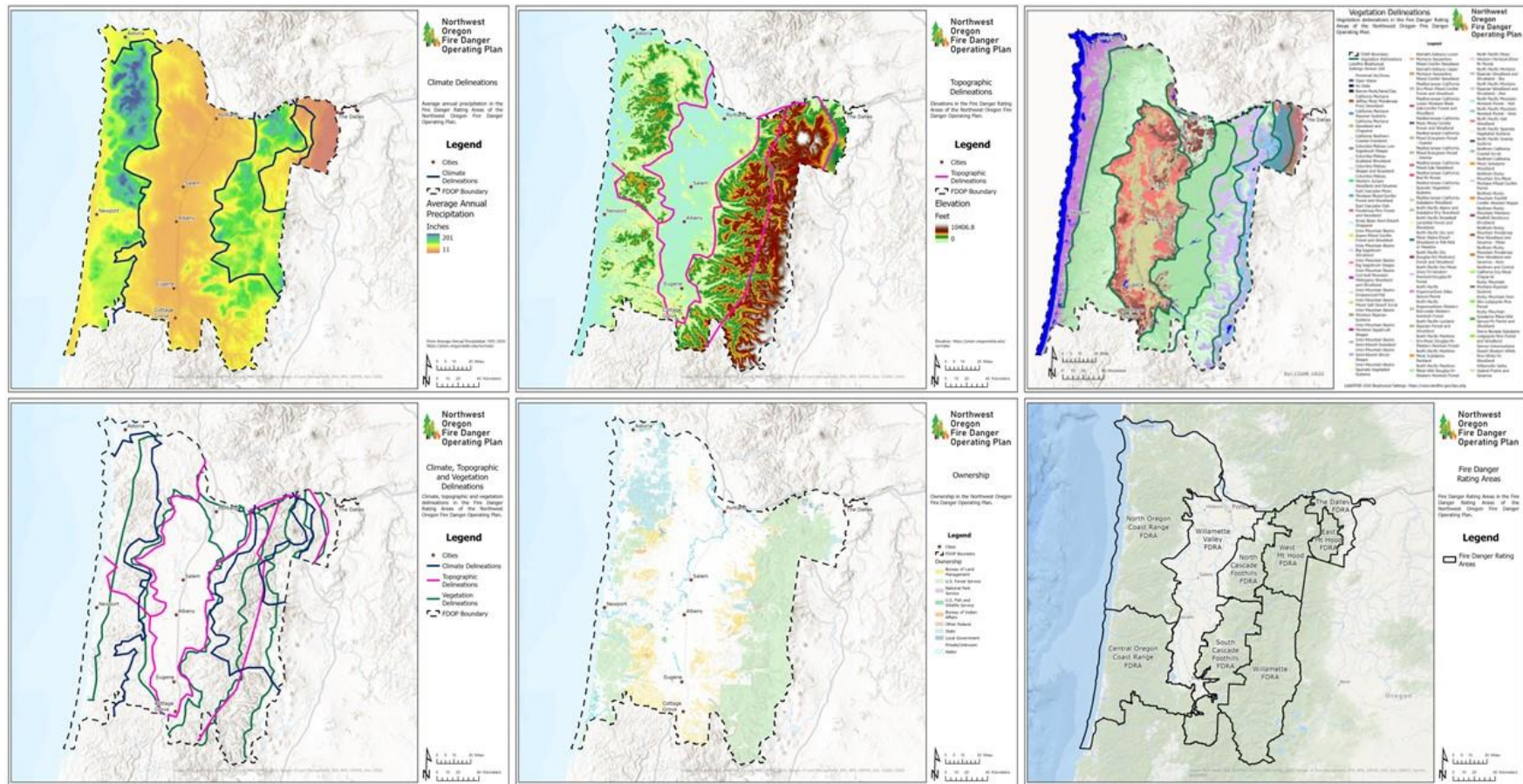
## **2.0 Fire Danger Planning Area Inventory and Analysis**

### **2.1 Fire Danger Rating Areas**

A fire danger rating area (FDRA) is defined as a large geographic area that is relatively homogenous with respect to climate, vegetation, and topography. Because of these similarities it can be assumed that fire danger within an FDRA is relatively uniform.



FDRAs are developed through spatial delineation of climate, vegetation, and topography (Figure 2). After these environmental factors are considered independently, they are interpolated to form draft FDRAs. Where possible, final FDRAs were formed by edge matching the draft FDRAs to existing administrative boundaries and fire weather zones (Figure 3).



**Figure 2. Top row from left to right: individual delineations for climate, topography, and vegetation. Second row, climate, topography, and vegetation delineations grouped together, ownership and final FDRAs for the Northwest Oregon Fire Danger Operating Plan. See Appendix for larger maps.**

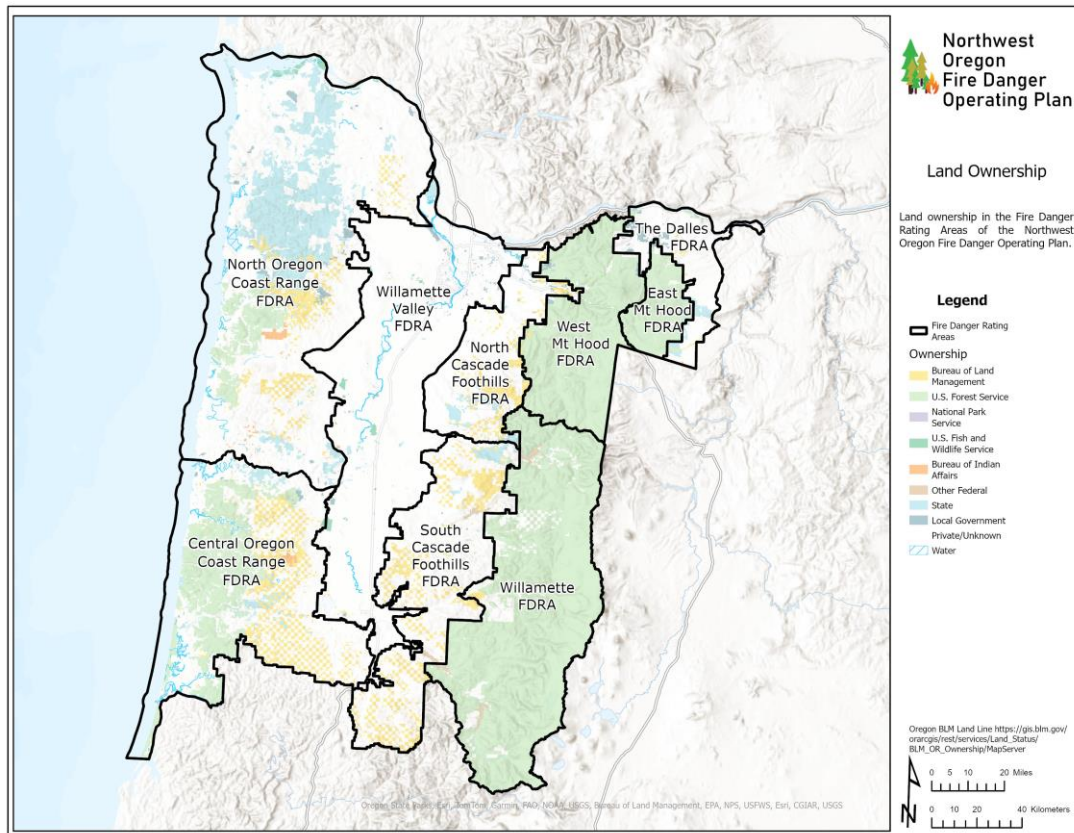


**Table 1. LANDFIRE elevation (median, feet), LANDFIRE slope (median, percent), PRISM annual precipitation (median, inches), and LANDFIRE FBFM 40 (majority) for FDRA.**

FDRA	Elevation	Slope	Precipitation	FBFM 40
<b>Central Oregon Coast Range</b>	669	26	73	185
<b>East Mt Hood</b>	3,487	18	39	165
<b>North Cascade Foothills</b>	1,299	15	67	185
<b>North Oregon Coast Range</b>	738	19	80	161
<b>South Cascade Foothills</b>	1,647	23	65	185
<b>The Dalles</b>	1,830	14	19	102
<b>West Mt Hood</b>	3,399	27	84	185
<b>Willamette</b>	3,595	30	81	185
<b>Willamette Valley</b>	265	2	43	102

## 2.2 Administrative Units

This document supports consistent application of fire danger decisions applied across multiple agencies jurisdictional boundaries. Wildland fire management and suppression responsibilities within the FDOP area are shared among federal, state, and local cooperators. Participants in this plan will communicate and coordinate fire danger with one another.



**Figure 3. Land management and ownership within the Northwest Oregon Fire Danger Operating Plan area.**

**Table 2. Percent ownership within the FDOP totaling at least one percent (BLM Oregon/Washington LLI).**

Ownership	Percent Area
USFS	28%
PV	26%
PVI	20%
PVN	11%
BLM	6%
STF	5%

**Table 3. Percent ownership by Fire Danger Rating Area, top three totaling at least one percent (BLM Oregon/Washington LLI).**

FDRA	Ownership	Percent Area
Central Oregon Coast Range	USFS	30%
Central Oregon Coast Range	PVI	23%
Central Oregon Coast Range	PV	21%
East Mt Hood	USFS	93%
East Mt Hood	PV	3%
East Mt Hood	ST	3%
North Cascade Foothills	PVN	45%
North Cascade Foothills	PVI	31%
North Cascade Foothills	BLM	15%
North Oregon Coast Range	PVI	38%
North Oregon Coast Range	PV	29%
North Oregon Coast Range	STF	18%
South Cascade Foothills	PVI	46%
South Cascade Foothills	PV	26%
South Cascade Foothills	BLM	19%
The Dalles	PV	85%
The Dalles	ST	5%
The Dalles	LG	5%
West Mt Hood	USFS	96%
West Mt Hood	PV	1%
West Mt Hood	LG	1%
Willamette	USFS	91%
Willamette	PV	4%
Willamette	PVI	3%
Willamette Valley	PV	56%
Willamette Valley	PVN	37%
Willamette Valley	PVU	2%



FDRA	NWS ID	RAWS	Agency	Unit	Installed Date
North Oregon Coast Range	351711	CHANDLER	S&PF	DEPT OF FORESTRY	2021-09-13
North Oregon Coast Range	351710	ROCKHOUSE 1	S&PF	DEPT OF FORESTRY	2004-07-30
North Oregon Coast Range	350215	CEDAR	USFS	SIUSLAW NF	2003-06-06
North Oregon Coast Range	350505	RYE MOUNTAIN	BLM	SALEM	1983-07-19
North Oregon Coast Range	350208	TILLAMOOK	S&PF	DEPT OF FORESTRY	2004-07-30
North Oregon Coast Range	350216	SOUTH FORK	S&PF	DEPT OF FORESTRY	2004-07-30
North Oregon Coast Range	350309	COLUMBIA CO FAIRGROUNDS	S&PF	DEPT OF FORESTRY	2023-05-23
North Oregon Coast Range	350113	TIDEWATER	S&PF	DEPT OF FORESTRY	2010-10-09
North Oregon Coast Range	350308	MILLER	S&PF	DEPT OF FORESTRY	2004-07-30
South Cascade Foothills	352562	GREEN MOUNTAIN	S&PF	DEPT OF FORESTRY	2004-07-30
South Cascade Foothills	352552	TROUT CREEK	BLM	EUGENE	1986-04-23
South Cascade Foothills	352553	BRUSH CREEK	BLM	EUGENE	1989-05-17
South Cascade Foothills	352024	YELLOWSTONE MTN.	BLM	SALEM	1986-04-22
South Cascade Foothills	352025	JORDAN	S&PF	DEPT OF FORESTRY	2004-07-30
The Dalles	350812	MIDDLE MTN	S&PF	DEPT OF FORESTRY	2004-07-30
The Dalles	350919	WASCO BUTTE	S&PF	DEPT OF FORESTRY	2004-07-30
West Mt Hood	350718	RED BOX	USFS	MT. HOOD NF	2001-07-25
West Mt Hood	350726	WANDERERS PEAK	USFS	MT. HOOD NF	1985-06-01
West Mt Hood	350604	LOG CREEK	USFS	MT. HOOD NF	2000-06-04
Willamette	352558	EMIGRANT	USFS	WILLAMETTE NF	1990-09-20
Willamette	352557	FIELDS	USFS	WILLAMETTE NF	1986-07-22
Willamette	352554	PEBBLE	USFS	WILLAMETTE NF	1991-05-03
Willamette	351909	BOULDER CREEK	USFS	WILLAMETTE NF	2000-10-05
Willamette Valley	352561	WILLOW CREEK	BLM	EUGENE	2005-06-07

### 2.3.2 Weather Data

Weather data was obtained from FAMWeb Data Warehouse (FDW), Program for Climate, Ecosystem and Fire Applications (CEFA) Desert Research Institute, Western Region Climate Center (WRCC) and Fire Environment Mapping System (FEMS). WIMS data is available from 2014 and CEFA from 2000. CEFA data was prepended and used to fill gaps in the WIMS data.

**Table 5. PRISM annual precipitation (inches), LANDFIRE elevation (feet) and LANDFIRE slope (percent) for Active, Permanent, Fire RAWS (WXx).**

FDRA	NWS ID	RAWS	Elevation	Slope	Precipitation
Central Oregon Coast Range	351604	CANNIBAL MOUNTAIN	1,941	11.6	84.5
Central Oregon Coast Range	351811	WILKINSON RIDGE	1,273	21.1	71.1
Central Oregon Coast Range	351813	CORVALLIS	307	2.8	44.3

FDRA	NWS ID	RAWS	Elevation	Slope	Precipitation
Central Oregon Coast Range	351814	GELLATLY	899	9.5	63.3
Central Oregon Coast Range	352545	GOODWIN PEAK	1,652	52.5	88.8
Central Oregon Coast Range	352547	VILLAGE CREEK	1,487	16.5	61.2
Central Oregon Coast Range	352550	HIGH POINT	1,915	8.6	60.5
East Mt Hood	350912	POLLYWOG	3,362	8.1	37.2
East Mt Hood	350913	WAMIC MILL	3,292	10.6	29.2
North Cascade Foothills	350727	HORSE CREEK	3,372	10.3	88.2
North Cascade Foothills	350728	EAGLE CREEK	737	2.7	55.6
North Oregon Coast Range	350113	TIDEWATER	2,042	19.9	143.4
North Oregon Coast Range	350208	TILLAMOOK	62	0.8	85.9
North Oregon Coast Range	350215	CEDAR	2,157	37.7	142.5
North Oregon Coast Range	350216	SOUTH FORK	2,286	32.0	119.5
North Oregon Coast Range	350308	MILLER	1,095	7.8	71.5
North Oregon Coast Range	350309	COLUMBIA CO FAIRGROUNDS	254	3.0	47.1
North Oregon Coast Range	350505	RYE MOUNTAIN	1,956	9.4	88.6
North Oregon Coast Range	351710	ROCKHOUSE 1	1,909	47.0	97.7
North Oregon Coast Range	351711	CHANDLER	1,673	23.5	122.7
South Cascade Foothills	352024	YELLOWSTONE MTN.	3,119	10.0	99.3
South Cascade Foothills	352025	JORDAN	752	3.0	54.2
South Cascade Foothills	352552	TROUT CREEK	2,270	19.0	85.6
South Cascade Foothills	352553	BRUSH CREEK	2,107	13.0	70.8
South Cascade Foothills	352562	GREEN MOUNTAIN	3,047	9.1	52.8
The Dalles	350812	MIDDLE MTN	2,588	21.6	37.0
The Dalles	350919	WASCO BUTTE	2,336	1.3	27.0
West Mt Hood	350604	LOG CREEK	2,854	18.2	123.2
West Mt Hood	350718	RED BOX	3,345	6.2	66.5
West Mt Hood	350726	WANDERERS PEAK	4,274	28.6	99.8
Willamette	351909	BOULDER CREEK	3,543	2.6	78.8
Willamette	352554	PEBBLE	3,457	8.2	88.3
Willamette	352557	FIELDS	3,354	12.2	58.4
Willamette	352558	EMIGRANT	3,773	52.9	65.3
Willamette Valley	352561	WILLOW CREEK	451	2.6	41.9

Table 6. Weather stations selected to produce NFDRS output based on the analysis in chapter 4.0 (WX data).

FDRA	RAWS	NWS ID	Agency	Unit	Installed Date
Central Oregon	CANNIBAL	351604	USFS	SIUSLAW NF	2004-03-29

FDRA	RAWS	NWS ID	Agency	Unit	Installed Date
<b>Coast Range</b>	MOUNTAIN				
<b>Central Oregon Coast Range</b>	GOODWIN PEAK	352545	USFS	SIUSLAW NF	2005-07-07
<b>Central Oregon Coast Range</b>	VILLAGE CREEK	352547	BLM	EUGENE	1984-04-17
<b>Central Oregon Coast Range</b>	HIGH POINT	352550	BLM	EUGENE	1983-07-20
<b>East Mt Hood</b>	POLLYWOG	350912	USFS	MT. HOOD NF	1981-03-23
<b>East Mt Hood</b>	WAMIC MILL	350913	USFS	MT. HOOD NF	2013-05-02
<b>North Cascade Foothills</b>	HORSE CREEK	350727	BLM	SALEM	1984-08-24
<b>North Cascade Foothills</b>	EAGLE CREEK	350728	S&PF	DEPT OF FORESTRY	2004-07-30
<b>North Oregon Coast Range</b>	TIDEWATER	350113	S&PF	DEPT OF FORESTRY	2010-10-09
<b>North Oregon Coast Range</b>	CEDAR	350215	USFS	SIUSLAW NF	2003-06-06
<b>North Oregon Coast Range</b>	SOUTH FORK	350216	S&PF	DEPT OF FORESTRY	2004-07-30
<b>North Oregon Coast Range</b>	RYE MOUNTAIN	350505	BLM	SALEM	1983-07-19
<b>South Cascade Foothills</b>	YELLOWSTONE MTN.	352024	BLM	SALEM	1986-04-22
<b>South Cascade Foothills</b>	TROUT CREEK	352552	BLM	EUGENE	1986-04-23
<b>South Cascade Foothills</b>	BRUSH CREEK	352553	BLM	EUGENE	1989-05-17
<b>South Cascade Foothills</b>	GREEN MOUNTAIN	352562	S&PF	DEPT OF FORESTRY	2004-07-30
<b>The Dalles</b>	MIDDLE MTN	350812	S&PF	DEPT OF FORESTRY	2004-07-30
<b>The Dalles</b>	WASCO BUTTE	350919	S&PF	DEPT OF FORESTRY	2004-07-30
<b>West Mt Hood</b>	RED BOX	350718	USFS	MT. HOOD NF	2001-07-25
<b>West Mt Hood</b>	WANDERERS PEAK	350726	USFS	MT. HOOD NF	1985-06-01
<b>Willamette</b>	BOULDER CREEK	351909	USFS	WILLAMETTE NF	2000-10-05
<b>Willamette</b>	PEBBLE	352554	USFS	WILLAMETTE NF	1991-05-03
<b>Willamette</b>	FIELDS	352557	USFS	WILLAMETTE NF	1986-07-22
<b>Willamette Valley</b>	WILLOW CREEK	352561	BLM	EUGENE	2005-06-07
<b>Willamette Valley</b>	CORVALLIS (Finley)	351813	FWS	WILLIAM L FINLEY NWR	2002-06-20

### 3.0 Fire Danger Problem Analysis

To apply a fire danger system which will assist managers with fire management decisions, ignition problems need to be identified, quantified, framed, and associated with a specific target group to determine the most appropriate fire danger-based decision tool to mitigate the given issue.



### 3.1 Fires

#### 3.1.1 Fire Occurrence Data

Fire occurrence data was sourced from the Spatial wildfire occurrence data for the United States, 1992-2020 (Short 2022). This data was merged with data from Interagency Fire Occurrence Reporting Modules (InFORM) for the years 2021-2023.

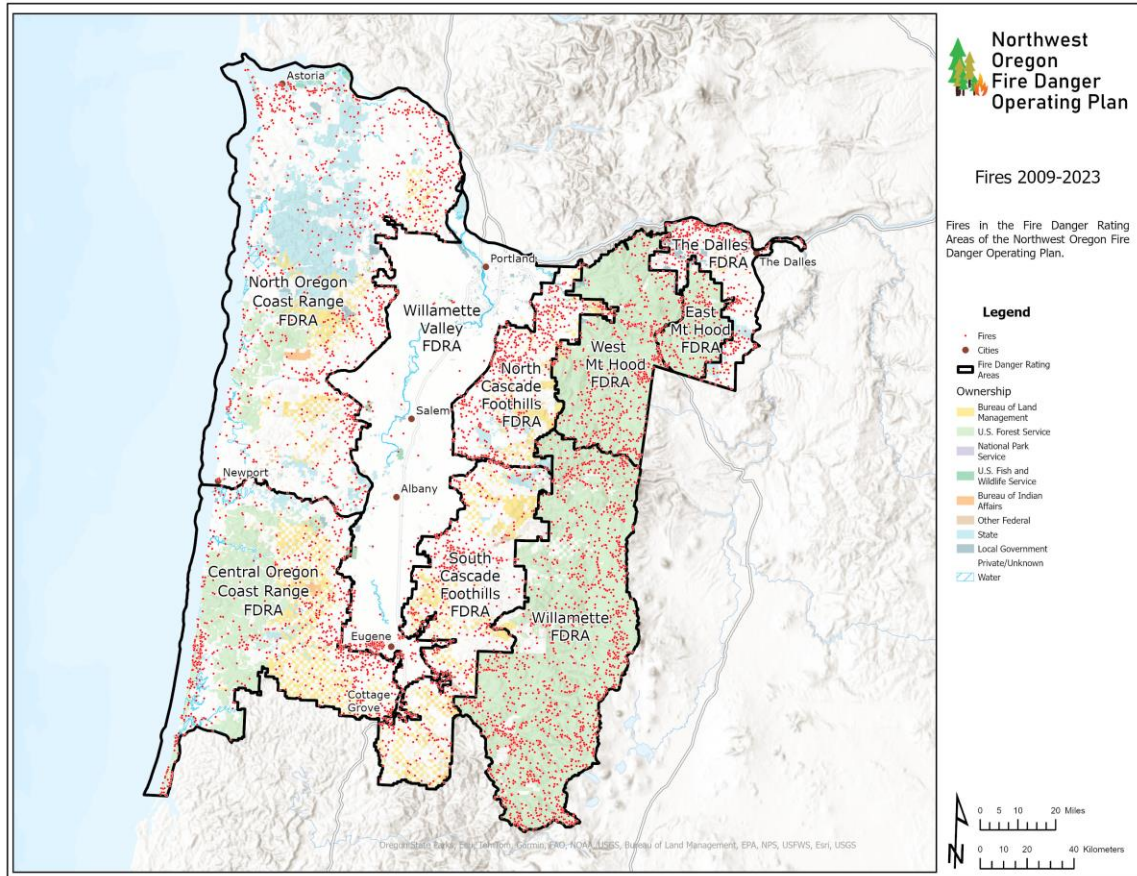
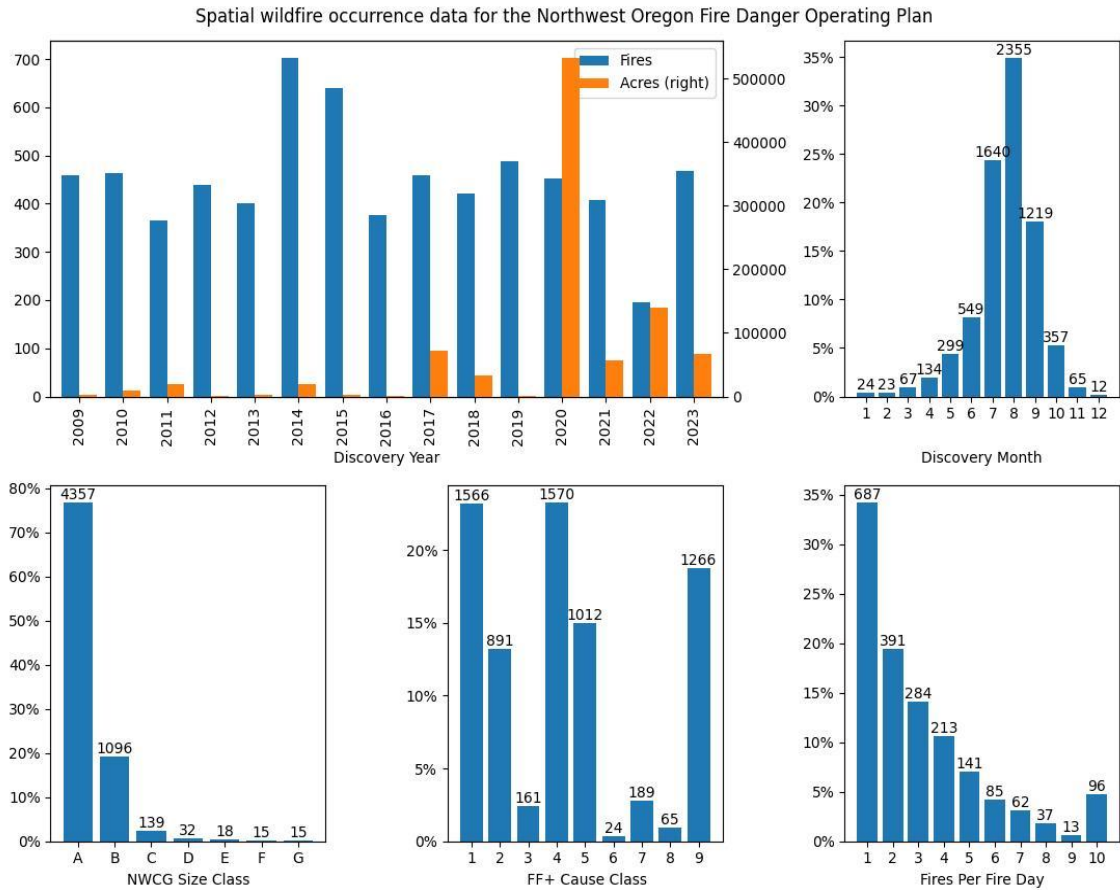


Figure 5. Fires in the Northwest Oregon Fire Danger Operating Plan Area (2009-2023).



**Figure 4. Fire occurrence summary graph data for the Northwest Oregon Fire Danger Operating Plan area.**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres C - 10 to 99.9 acres D - 100 to 299 acres E - 300 to 999 acres F - 1000 to 4999 acres G - >= 5000 acres.

**Cause Classes:** 1 - Lightning 2 - Equipment Use 3 - Smoking 4 - Campfire 5 - Debris Burning 6 - Railroad 7 - Arson 8 - Children 9 - Miscellaneous

### 3.2 Identification/Definition of the Fire Problems

**Table 7. NWCG fire cause class for the Northwest Oregon Fire Danger Operating Plan area.**

NWCG General Cause	Count	Percent
Recreation and ceremony	1570	23%
Natural	1566	23%
Missing data/not specified/undetermined	1034	15%
Debris and open burning	1012	15%
Equipment and vehicle use	820	12%
Arson/incendiarism	189	3%
Smoking	161	2%
Other causes	156	2%
Power generation/transmission/distribution	71	1%
Misuse of fire by a minor	65	1%
Fireworks	62	1%
Railroad operations and maintenance	24	0%
Firearms and explosives use	14	0%

### 3.3 Target Group/Tool Association

**Table 8. Leading NWCG fire cause classes excluding "Missing data/not specified/undetermined" and "Other Causes" within the FDOP area.**

NWCG General Cause	Target Group	Degree of Control	Index/Component	Management Tool
Recreation and ceremony	Public	Low	BI/ERC	PL (Restriction Plan) & Adj (Prevention Plan)
Natural	Agency	High	BI/ERC	SL/RL (Staffing Plan/Mob Guide)
Debris and open burning	Public	Low	BI/ERC	Other (Restriction Plan)
Equipment and vehicle use	Public/Industry	Low/Moderate	ERC/IFPL	Adj (Prevention Plan) & IFPL
Arson/incendiarism	Agency	High	BI/ERC	SL/RL/LEI (Staffing Plan/Mob Guide)

### 3.4 Fire Problems by FDRA

**Table 9. Top 5 NWCG fire cause class excluding "Missing data/not specified/undetermined" for all FDRAs.**

FDRA	NWCG General Cause	Count
Central Oregon Coast Range	Recreation and ceremony	194
Central Oregon Coast Range	Equipment and vehicle use	172
Central Oregon Coast Range	Debris and open burning	147
Central Oregon Coast Range	Natural	70
Central Oregon Coast Range	Arson/incendiarism	31
East Mt Hood	Recreation and ceremony	127
East Mt Hood	Natural	52
East Mt Hood	Arson/incendiarism	21
East Mt Hood	Smoking	12
East Mt Hood	Equipment and vehicle use	11
North Cascade Foothills	Debris and open burning	223
North Cascade Foothills	Recreation and ceremony	96
North Cascade Foothills	Equipment and vehicle use	77
North Cascade Foothills	Other causes	22
North Cascade Foothills	Natural	19
North Oregon Coast Range	Debris and open burning	311
North Oregon Coast Range	Recreation and ceremony	244
North Oregon Coast Range	Equipment and vehicle use	224
North Oregon Coast Range	Natural	54
North Oregon Coast Range	Smoking	41
South Cascade Foothills	Debris and open burning	140
South Cascade Foothills	Equipment and vehicle use	139
South Cascade Foothills	Recreation and ceremony	97
South Cascade Foothills	Natural	88
South Cascade Foothills	Arson/incendiarism	23
The Dalles	Debris and open burning	84
The Dalles	Equipment and vehicle use	54
The Dalles	Natural	41
The Dalles	Recreation and ceremony	36
The Dalles	Smoking	21
West Mt Hood	Recreation and ceremony	450
West Mt Hood	Natural	176
West Mt Hood	Arson/incendiarism	27
West Mt Hood	Equipment and vehicle use	23
West Mt Hood	Debris and open burning	22
Willamette	Natural	1058
Willamette	Recreation and ceremony	301
Willamette	Equipment and vehicle use	54

FDRA	NWCG General Cause	Count
Willamette	Debris and open burning	37
Willamette	Arson/incendiarism	26
Willamette Valley	Equipment and vehicle use	66
Willamette Valley	Debris and open burning	44
Willamette Valley	Recreation and ceremony	25
Willamette Valley	Arson/incendiarism	15
Willamette Valley	Other causes	15

## 4.0 Fire Danger Decision Point Analysis

The FDOP will be used to support fire management decisions made at specific decision points. When conditions, or a combination of events and conditions, signal that it is time to do something different a decision point has been reached. Decision points are typically based upon either climatological breakpoints or fire business thresholds.

### 4.1 Methods

FireFamilyPlus was used to establish fire business thresholds and a statistical analysis of fire occurrence and historical weather was completed for each FDRA (Table 12). Each FDRA has an assigned Special Interest Group (SIG) of local weather stations for the purposes of calculating the daily fire danger indices.

If neither fire business metric were acceptable, due to a lack of fire and/or weather data, climatology was used.

### 4.2 Climatological Breakpoints

Climatological breakpoints are points on the cumulative distribution curve of a fire danger index. For example, the value at the 90th percentile ERC is the climatological breakpoint at which 10 percent of the ERC values are greater in value.

When using climatology, it is important to identify the analysis period used to determine the percentile values. The percentile values for the analysis period will be different from the percentile values for the fire season.

**This FDOP uses percentile values for the entire analysis period.** This enables comparisons between FDRAs of differing fuel models or indexes.

**Table 10. Agency ERC breakpoints (historical USDI and USDA, respectively).**

FDRA	80	85	90	97
Central Oregon Coast Range	33.9	40.1	47.9	63.1
East Mt Hood	88.8	99.1	110.4	128.5
North Cascade Foothills	27.0	30.3	33.7	41.5
North Oregon Coast Range	36.7	42.6	50.0	65.9
South Cascade Foothills	28.5	31.9	35.8	44.0
The Dalles	35.4	39.0	43.1	51.5
West Mt Hood	59.5	68.7	78.9	102.3
Willamette	27.2	30.5	33.6	40.7
Willamette Valley	26.8	29.4	32.2	36.7

**Table 11. Agency BI breakpoints (historical USDI and USDA, respectively).**

FDRA	80	85	90	97
<b>Central Oregon Coast Range</b>	51.2	60.6	70.0	88.2
<b>East Mt Hood</b>	52.2	56.1	61.2	71.1
<b>North Cascade Foothills</b>	17.4	18.8	20.4	23.6
<b>North Oregon Coast Range</b>	65.1	74.8	86.9	112.1
<b>South Cascade Foothills</b>	19.8	21.4	23.2	26.9
<b>The Dalles</b>	23.3	24.8	26.7	30.2
<b>West Mt Hood</b>	41.3	45.3	50.5	62.4
<b>Willamette</b>	17.6	19.0	20.6	23.6
<b>Willamette Valley</b>	18.2	19.5	20.9	23.8

### 4.3 Fire Business Thresholds

Fire business thresholds, unlike decision points based on climatological percentiles, make a direct relationship between NFDRS output and historic fire business. Thresholds based on fire business are determined through analysis of historic weather and fire occurrence data and set such that each decision point represents a meaningful increase in fire activity.

### 4.4 Decision Points

This FDOP uses a combination of climatological breakpoints and fire business thresholds.

**Table 12. Selected stations, fuel model, and decision point values. See table 6 for additional information about selected weather stations.**

FDRA	Stations	Fuel Model	Method	ERC Values	ERC Percentiles	BI Values	BI Percentiles
<b>Willamette</b>	Boulder Creek, Pebble, Fields	Y	FF+ Fires	9, 20, 32, 41	52, 70, 87, 97	7, 14, 19, 23	54, 69, 85, 96
<b>North Oregon Coast Range</b>	Tidewater, Cedar, South Fork, Rye Mountain	X	FF+ Fires	14, 32, 50, 72	57, 75, 90, 99	21, 47, 67, 101	53, 70, 81, 94
<b>Central Oregon Coast Range</b>	Cannibal Mountain, Goodwin Peak, Village Creek, High Point	X	FF+ Fires	11, 27, 45, 65	53, 73, 88, 97	20, 41, 65, 91	55, 74, 87, 98
<b>Willamette Valley</b>	Corvallis (Finely), Willow Creek	Y	FF+ Fires	12, 23, 31, 39	53, 73, 88, 98	Not Applicable	Not Applicable
<b>North Cascade Foothills</b>	Horse Creek, Eagle Creek	Y	FF+ Fires	8, 18, 31, 45	46, 66, 86, 99	Not Applicable	Not Applicable
<b>South Cascade Foothills</b>	Yellowstone, Trout Creek, Brush Creek, Green Mountain	Y	FF+ Fires	16, 28, 37, 46	63, 79, 91, 98	Not Applicable	Not Applicable
<b>East Mt Hood</b>	Pollywog, Wamic Mill	Z	FF+ Fires	50, 75, 113, 130	58, 73, 91, 97	Not Applicable	Not Applicable
<b>West Mt Hood</b>	Red Box, Wanderers Peak	Z	FF+ Fires	33, 59, 85, 104	64, 80, 92, 97	Not Applicable	Not Applicable
<b>The Dalles</b>	Middle Mountain, Wasco Butte	Y	FF+ Fires	26, 35, 44	64, 79, 91	Not Applicable	Not Applicable

## 4.5 Final Results by FDRA

### 4.5.1 Central Oregon Coast Range FDRA

**General Location:** The Central Oregon Coast FDRA is to the west of the Willamette Valley and runs in a north south orientation along the edge of the operating plan boundary, bordered by the Pacific Ocean. This area includes the part of the Oregon Coast Mountain Range

**Vegetation:** Timber and Shrubs.

**Climate:** Most of the annual precipitation occurs during the winter and spring months with less rainfall during the summers, although the maritime air from the Pacific Ocean has a strong influence on weather patterns in these rating areas. The median precipitation for the Central Oregon Coast Range FDRA is 73 but can range between 40 and 200 inches.

**Topography:** The Coast Range begins just east of the Pacific Ocean and increases in elevation to about 500 to 3000 feet before descending down into the Willamette Valley.

#### Fire Occurrence

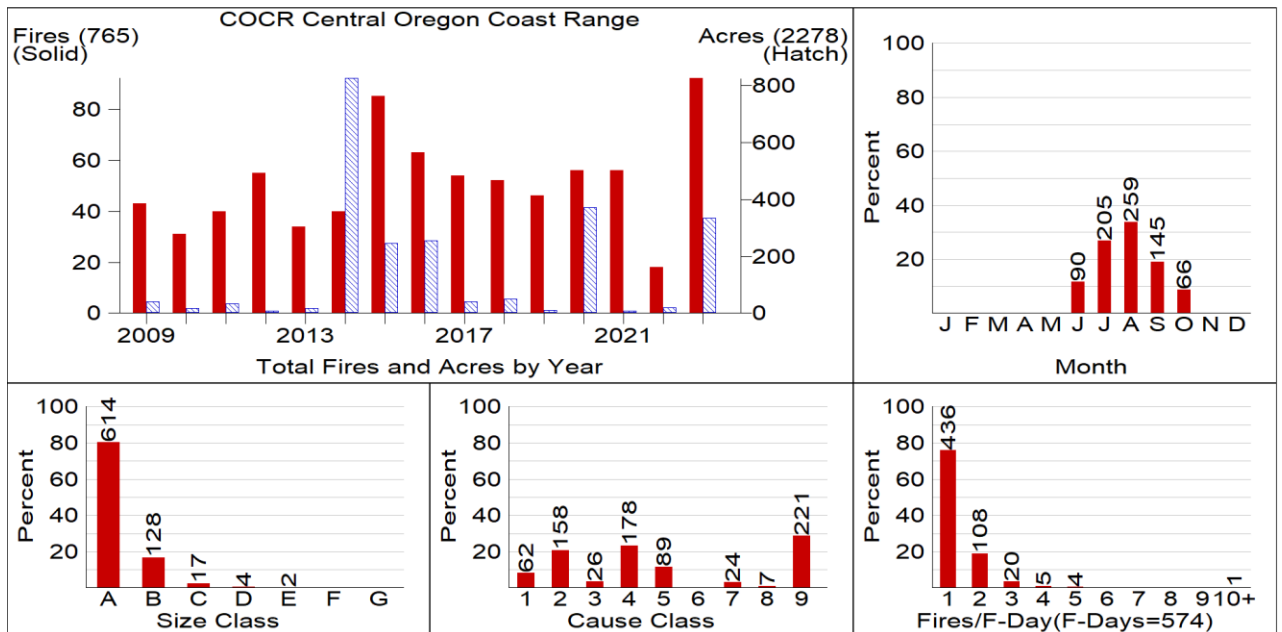


Figure 7. Fire occurrence summary graph data for the Central Oregon Coast Range FDRA

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous



**Table 13. The season, large fire, and multiple fire day as defined in the fire problem analysis for the Central Coast Range FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
June 1st – Oct 31st	2 acres	3 fires	2295	574	52	30

**Table 14. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the Central Oregon Coast Range FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NFDRS Index	Class	Range
	2009-2023		X	ERC	1	0-10
					2	11-26
					3	27-44
Cannibal		1			4	45-64
Goodwin		1			5	> 65
Village Creek		1		BI	1	0-20
High Point		1			2	21-41
					3	42-65
					4	66-91
					5	> 91

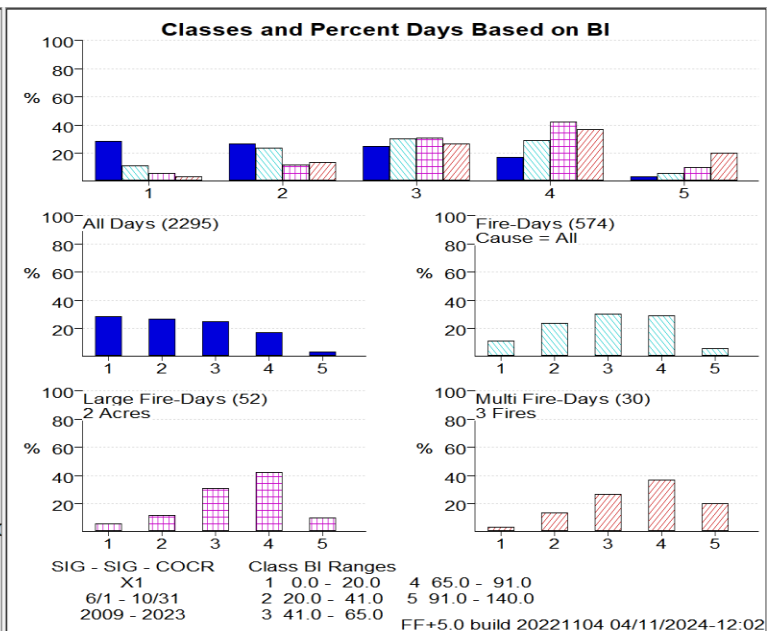
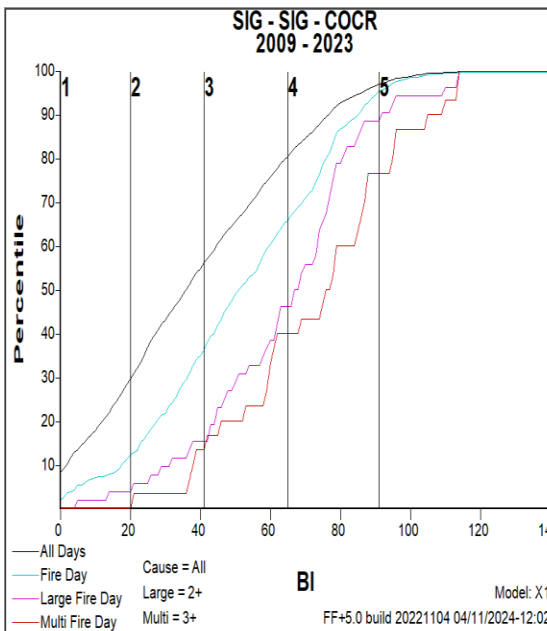
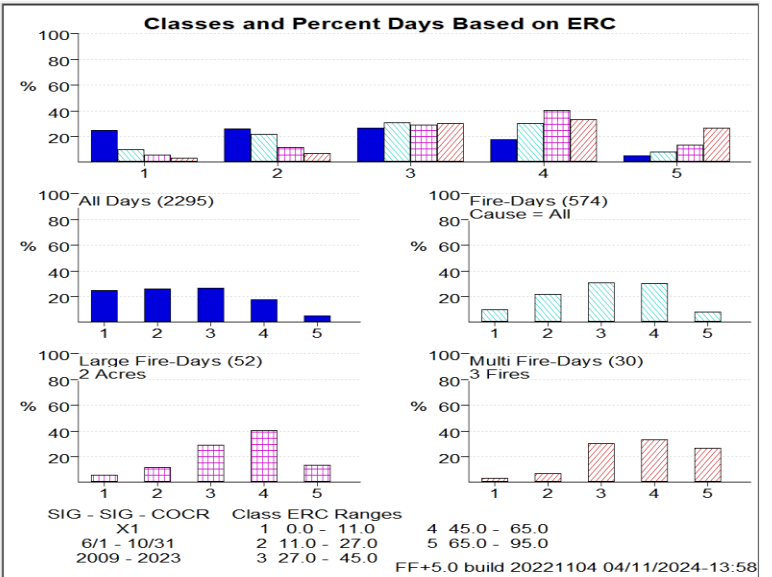
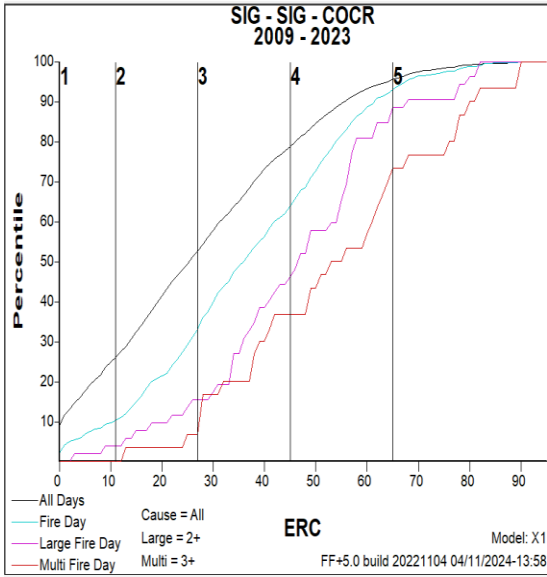


Figure 8. ERC and BI breakpoints for the Central Oregon Coast Range FDRA.

**Table 15. Correlation values for the Central Oregon Coast Range FDRA for Burning Index (BI) and Energy Release Component (ERC).**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R <sup>2</sup>	FD Chi <sup>2</sup>	FD P-Val	FD P-Range	LFD Acres	LFD R <sup>2</sup>	LFD Chi <sup>2</sup>	LFD P-Val	LFD P-Range	MFD Fires	MFD R <sup>2</sup>	MFD Chi <sup>2</sup>	MFD P-Val	MFD P-Range
COCR	2009-2023	6/1 - 10/31	ERC	X1	All	0.90	17.78	0.0229	0.12-0.68	2	0.90	4.28	0.8305	0.01-0.18	3	0.89	4.06	0.8517	0.00-0.19
COCR	2009-2023	6/1 - 10/31	BI	X1	All	0.94	11.47	0.1766	0.11-0.76	2	0.91	3.81	0.8738	0.00-0.27	3	0.84	6.60	0.5808	0.00-0.30
COCR	2009-2023	6/1 - 10/31	ERC	Y1	All	0.87	25.84	0.0011	0.08-0.69	2	0.65	16.50	0.0358	0.00-0.16	3	0.77	8.94	0.3475	0.00-0.17
COCR	2009-2023	6/1 - 10/31	BI	Y1	All	0.96	7.18	0.5174	0.07-0.64	2	0.66	13.49	0.0961	0.00-0.17	3	0.90	3.95	0.8613	0.00-0.22
Cannibal, Goodwin	2009-2023	6/1 - 10/31	BI	X2	All	0.87	17.83	0.0225	0.14-0.81	2	0.65	13.01	0.1115	0.01-0.34	3	0.87	3.52	0.8973	0.00-0.42

## 4.5.2 East Mt Hood FDRA

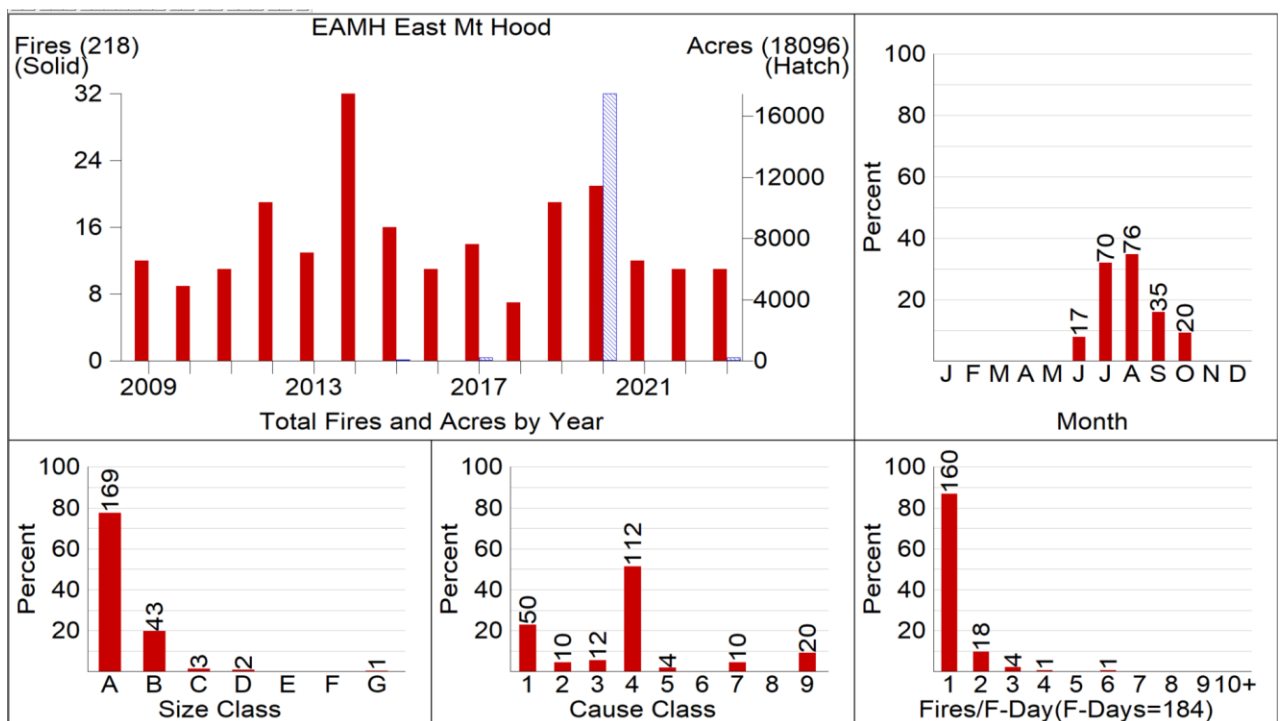
**General Location:** This area includes the lower eastern slopes of Mt Hood east of Highways 35 and 26 on the Mt Hood National Forest.

**Vegetation:** This area is a transition zone with upper elevations hosting moist and dry site grand and Douglas fir with some ponderosa and lodge pole pine. The lower slopes host dry site ponderosa and oak stands with an understory of brush.

**Climate:** The annual precipitation range is between 16 and 100 inches with a median of 39 inches per year. The driest months are typically July and August with some years receiving minimal precipitation during this period. It is not uncommon for dry weather to persist in the area beginning in June into October.

**Topography:** Terrain is heavily bisected by drainages that run generally from the east to the west towards the Columbia and Deschutes rivers. Drainages can be extremely steep. Elevations range from 1700 feet to 6300 feet with a median elevation of 3,487 feet.

### Fire Occurrence



**Figure 9. Fire occurrence summary graph data for the East Mt Hood FDRA**

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

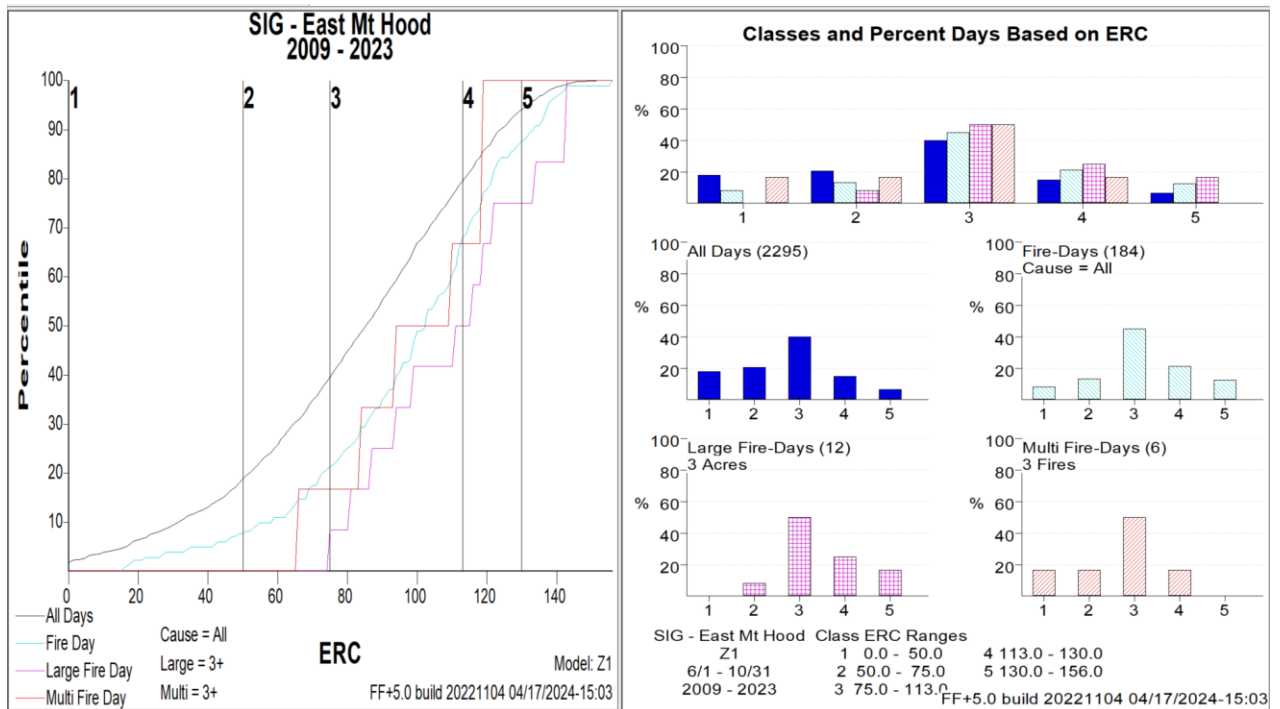
**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 16. The season, large fire, and multiple fire day as defined in the fire problem analysis for the East Mt Hood FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
June 1st – Oct 31st	3 acres	3 fires	2295	184	12	6

**Table 17. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the East Mt Hood FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NDFRS Index	Class	Range
Wamic Mill	2009-2023	1	Z	ERC	1	0-50
					2	51-75
		3			76-113	
Pollywog	1	4			114-130	
		5			>130	



**Figure 10. ERC breakpoints for the East Mt Hood FDRA.**

**Table 18. Correlation values for the East Mt Hood FDRA.**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R <sup>2</sup>	FD Chi <sup>2</sup>	FD P-Val	FD P-Range	LFD Acres	LFD R <sup>2</sup>	LFD Chi <sup>2</sup>	LFD P-Val	LFD P-Range	MFD Fires	MFD R <sup>2</sup>	MFD Chi <sup>2</sup>	MFD P-Val	MFD P-Range
East Mt Hood	2009 - 2023	6/1 - 10/31	BI	Z1	All	0.72	10.66	0.2215	0.02 - 0.22	3	0.06	17.28	0.0157	0.02 - 0.12	3	0.32	3.86	0.277	0.01 - 0.16
East Mt Hood	2009 - 2023	6/1 - 10/31	ERC	Z1	All	0.92	3.33	0.9119	0.02 - 0.20	3	0.08	6.6	0.5801	0.03 - 0.11	3	0.22	1.41	0.7031	0.01 - 0.12
East Mt Hood	2009 - 2023	6/1 - 10/31	FM1	Z1	All	0.46	18.91	0.0085	0.02 - 0.12	3	0.15	2.93	0.7106	0.01 - 0.09	3	0.93	0.15	0.9274	0.02 - 0.22
East Mt Hood	2009 - 2023	6/1 - 10/31	FM10	Z1	All	0.82	5.02	0.7551	0.01 - 0.14	3	0.08	3.59	0.6096	0.02 - 0.10	3	0.39	0.78	0.8532	0.01 - 0.27
East Mt Hood	2009 - 2023	6/1 - 10/31	FM100	Z1	All	0.72	14.56	0.0684	0.01 - 0.17	3	0.17	5.23	0.388	0.02 - 0.11	3	0.02	0.35	0.8415	0.03 - 0.03
East Mt Hood	2009 - 2023	6/1 - 10/31	FM1000	Z1	All	0.9	6.31	0.6128	0.01 - 0.19	3	0.02	7.87	0.1635	0.05 - 0.08	3	0.2	4.81	0.0904	0.01 - 0.07



### 4.5.3 North Cascade Foothills FDRA

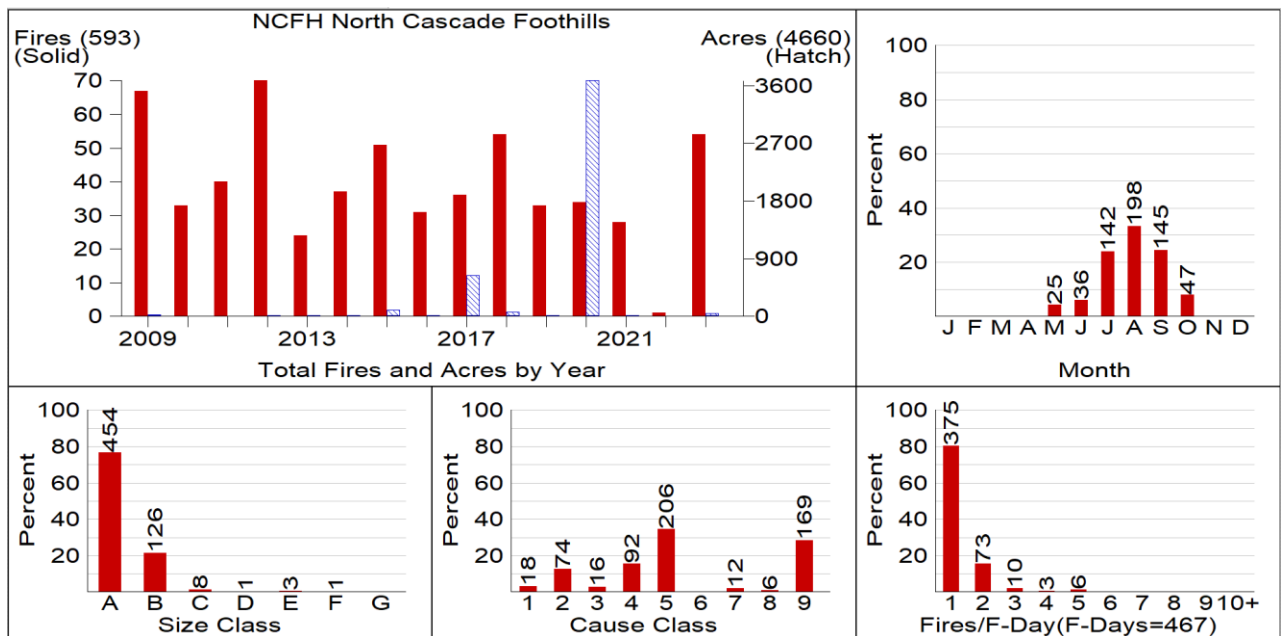
**General Location:** The Cascade foothills lie between the Willamette Valley to the east and the Cascade Mountains to the west. They run north to the Columbia River Gorge and to the southern part of the Willamette Valley. This area is further broken into two separate rating areas, the North Cascade Foothill and South Cascade Foothill FDRAs.

**Vegetation:** Timber, Grass, and Shrubs.

**Climate:** Similarly to the Cascade Mountains, most of the annual precipitation occurs during the winter and spring months, with little rainfall during the summer. As elevation increases there is a corresponding increase in precipitation. Median precipitation for the North Cascade Foothill FDRA is 67.

**Topography:** The Cascade foothills begin just east of the Willamette Valley at around 500 feet and increase in elevation to about 2000 feet where they transition into the Cascade mountains.

#### Fire Occurrence



**Figure 11. Fire occurrence summary graph data for North Cascade Foothill FDRA**

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

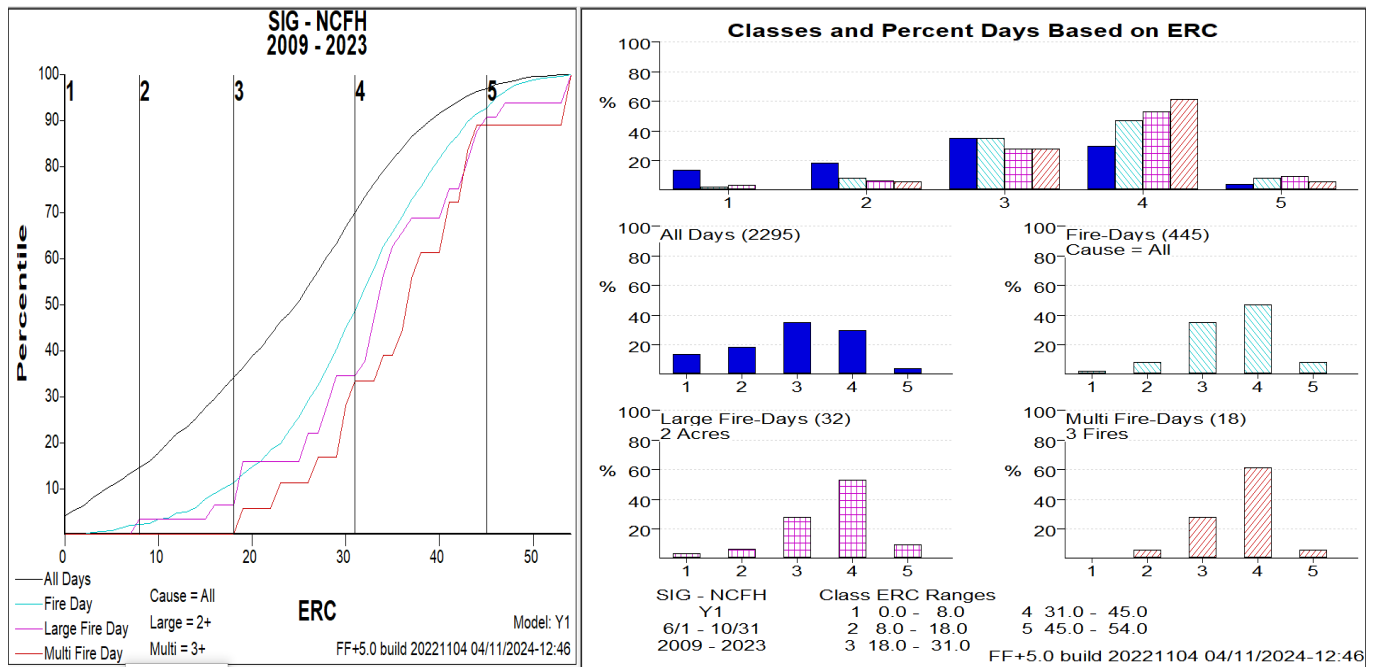
**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 19. The season, large fire, and multiple fire day as defined in the fire problem analysis for the North Cascade Foothills FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
May 1st – Oct 31st	2 acres	3 fires	2760	467	38	19

**Table 20. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the North Cascade Foothills FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NFDRS Index	Class	Range
Horse Creek	2009-2023	1	Y	ERC	1	0-8
2					9-18	
3		19-31				
4		32-45				
5		46-54				
Eagle Creek		1				



**Figure 12. ERC breakpoints for the North Cascade Foothills FDRA.**

**Table 21. Correlation values for the North Cascade Foothills FDRA for Energy Release Component (ERC).**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD Acres	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD Fires	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
NCFH	2009-2023	5/1 - 10/31	ERC	Y1	All	0.94	16.82	0.0321	0.03-0.63	2	0.55	14.49	0.0698	0.00-0.08	3	0.76	4.96	0.7615	0.00 - 0.06
NCFH	2009-2023	5/1 - 10/31	BI	Y1	All	0.93	18.92	0.0153	0.02-0.81	2	0.66	13.62	0.0923	0.00-0.22	3	0.71	5.29	0.7265	0.00-0.23
NCFH	2009-2023	5/1 - 10/31	ERC	X1	All	0.91	21.69	0.0055	0.06-0.63	2	0.85	4.87	0.7714	0.00-0.10	3	0.62	8.67	0.3713	0.00-0.06
NCFH	2009-2023	5/1 - 10/31	BI	X1	All	0.91	21.43	0.0061	0.05-0.83	2	0.89	3.30	0.9141	0.00-0.26	3	0.68	6.93	0.5442	0.00-0.22
NCFH	2009-2023	5/1 - 10/31	ERC	Z1	All	0.97	8.72	0.03668	0.03-0.66	2	0.64	10.80	0.2135	0.00-0.09	3	0.68	6.88	0.5493	0.00-0.07
NCFH	2009-2023	5/1 - 10/31	BI	Z1	All	0.96	10.46	0.2344	0.03-0.91	2	0.77	7.57	0.4766	0.00-0.34	3	0.60	7.66	0.4677	0.00-0.35

### 4.5.4 North Oregon Coast Range FDRA

**General Location:** The North Oregon Coast FDRA is to the west of the Willamette Valley and runs in a north south orientation in the northwest corner of the operating plan boundary, bordered by the Pacific Ocean. This area includes the part of the Oregon Coast Mountain Range

**Vegetation:** Timber and Shrubs.

**Climate:** Most of the annual precipitation occurs during the winter and spring months with less rainfall during the summers, although the maritime air from the Pacific Ocean has a strong influence on weather patterns in these rating areas. The median precipitation for the North Oregon Coast Range FDRA is 80 but can range between 40 and 200 inches.

**Topography:** The Coast Range begins just east of the Pacific Ocean and increases in elevation to about 500 to 3000 feet before descending down into the Willamette Valley.

#### Fire Occurrence

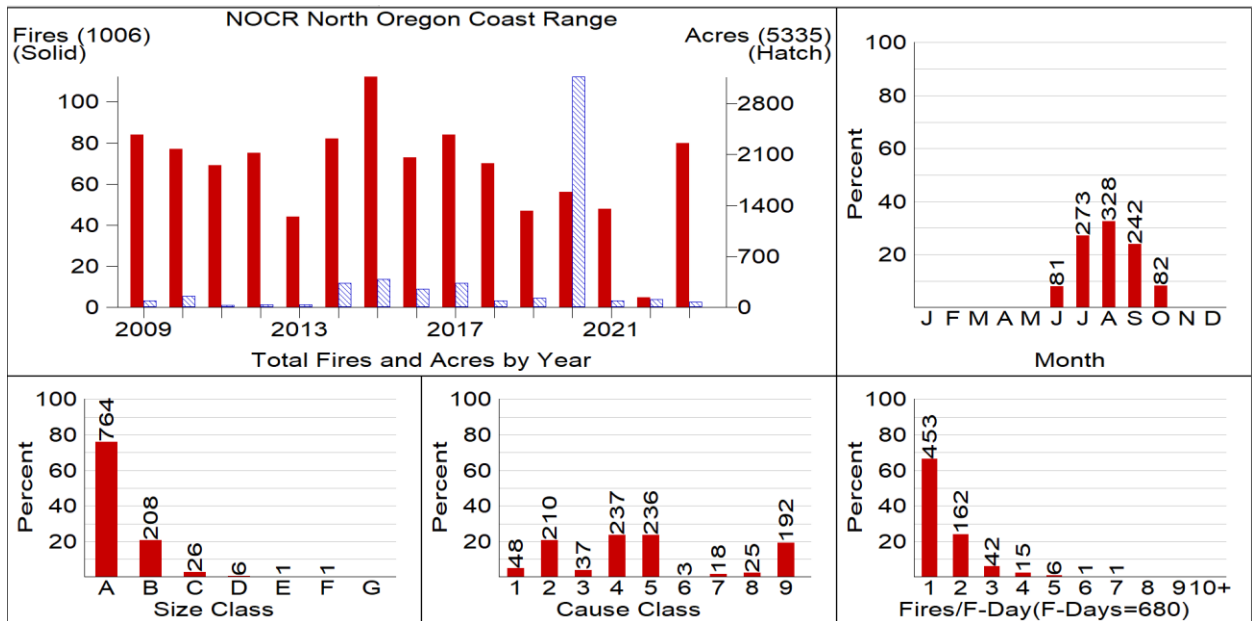


Figure 13. Fire occurrence summary graph data for North Oregon Coast Range FDRA.

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 22. The season, large fire, and multiple fire day as defined in the fire problem analysis for the North Oregon Coast Range FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
June 1st – Oct 31st	2 acres	3 fires	2295	680	77	65

**Table 23. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the North Oregon Coast Range FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NFDRS Index	Class	Range	
	2009-2023		X	ERC	1	0-14	
					2	15-32	
					3	33-50	
Tidewater		1			4	51-72	
Cedar		1			5	> 72	
					BI	1	0-21
South Fork		1		2		22-47	
Rye Mountain		1		3		48-67	
				4		68-101	
				5		> 101	

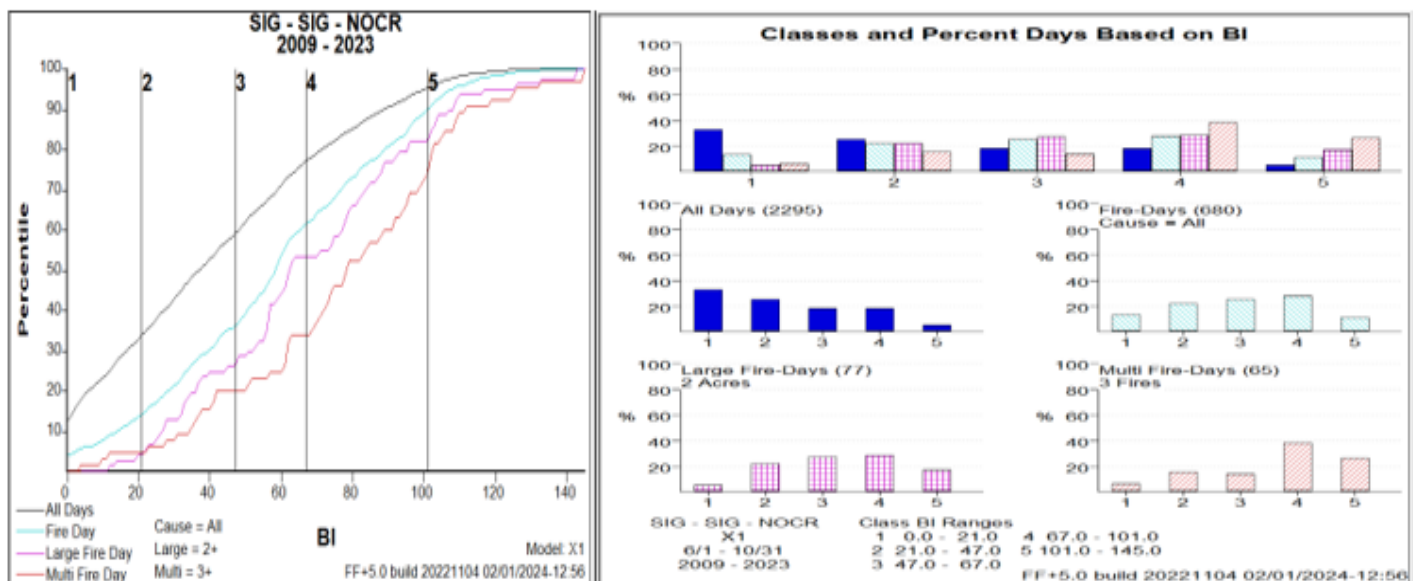
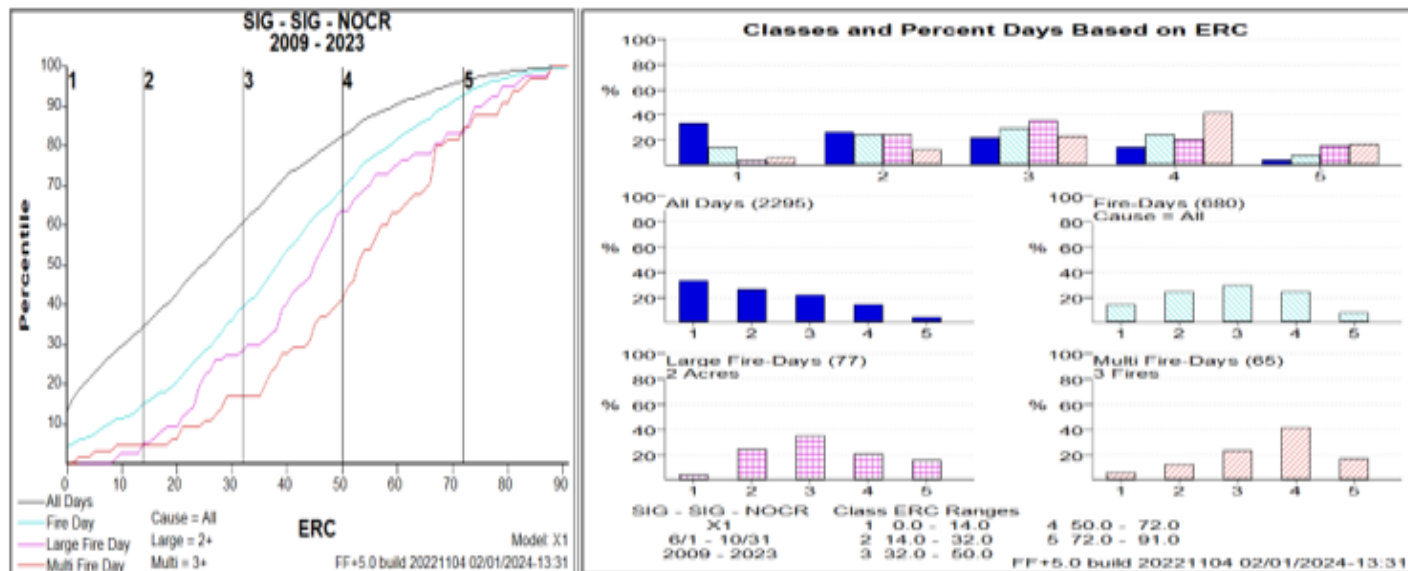


Figure 14. ERC and BI breakpoints for the North Oregon Coast Range FDRA.



**Table 24. Correlation values for the North Oregon Coast Range FDRA for Energy Release Component (ERC) and Burning Index (BI).**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R <sup>2</sup>	FD Chi <sup>2</sup>	FD P-Val	FD P-Range	LFD Acres	LFD R <sup>2</sup>	LFD Chi <sup>2</sup>	LFD P-Val	LFD P-Range	MFD Fires	MFD R <sup>2</sup>	MFD Chi <sup>2</sup>	MFD P-Val	MFD P-Range
NOCR	2009-2023	6/1 - 10/31	ERC	X1	All	0.93	19.0	0.0149	0.03-0.63	2	0.67	17.3	0.0267	0.00-0.08	3	0.92	4.6	0.7953	0.00 - 0.06
NOCR	2009-2023	6/1 - 10/31	BI	X1	All	0.93	19.8	0.0112	0.02-0.81	2	0.67	15.00	0.0587	0.00-0.22	3	0.92	4.6	0.7265	0.00-0.23
NOCR	2009-2023	6/1 - 10/31	ERC	Y1	All	0.94	22.68	0.0038	0.08-0.82	2	0.74	13.30	0.1019	0.00-0.18	3	0.91	5.66	0.6856	0.00-0.23
NOCR	2009-2023	6/1 - 10/31	BI	Y1	All	0.98	6.06	0.6407	0.07-0.75	2	0.83	10.90	0.2076	0.00-0.19	3	0.87	9.27	0.3202	0.00-0.24
NOCR	2009-2023	6/1 - 10/31	ERC	Z1	All	0.96	15.51	0.0499	0.09-0.80	2	0.79	11.16	0.1929	0.01-0.20	3	0.91	6.76	0.5630	0.00-0.27
NOCR	2009-2023	6/1 - 10/31	BI	Z1	All	0.98	5.52	0.7009	0.08-0.82	2	0.80	11.99	0.1514	0.00-0.28	3	0.88	7.78	0.4554	0.00-0.37

### 4.5.5 South Cascade Foothills FDRA

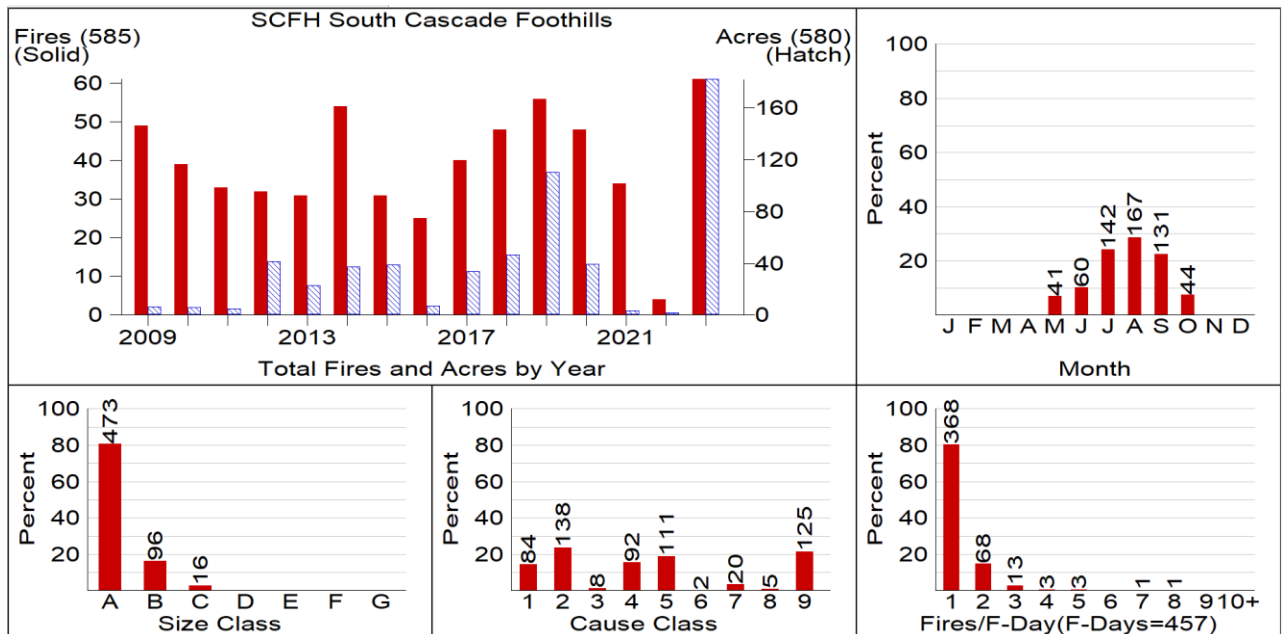
**General Location:** The Cascade foothills lie between the Willamette Valley to the east and the Cascade Mountains to the west. They run north to the Columbia River Gorge and to the southern part of the Willamette Valley. This area is further broken into two separate rating areas, the North Cascade Foothill and South Cascade Foothill FDRAs.

**Vegetation:** Timber, Grass, and Shrubs.

**Climate:** Similarly to the Cascade Mountains, most of the annual precipitation occurs during the winter and spring months, with little rainfall during the summer. As elevation increases there is a corresponding increase in precipitation. Median precipitation for the South Cascade Foothill FDRA is 65.

**Topography:** The Cascade foothills begin just east of the Willamette Valley at around 500 feet and increase in elevation to about 2000 feet where they transition into the Cascade mountains.

#### Fire Occurrence



**Figure 15. Fire occurrence summary graph data for the South Cascade Foothill FDRA.**

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

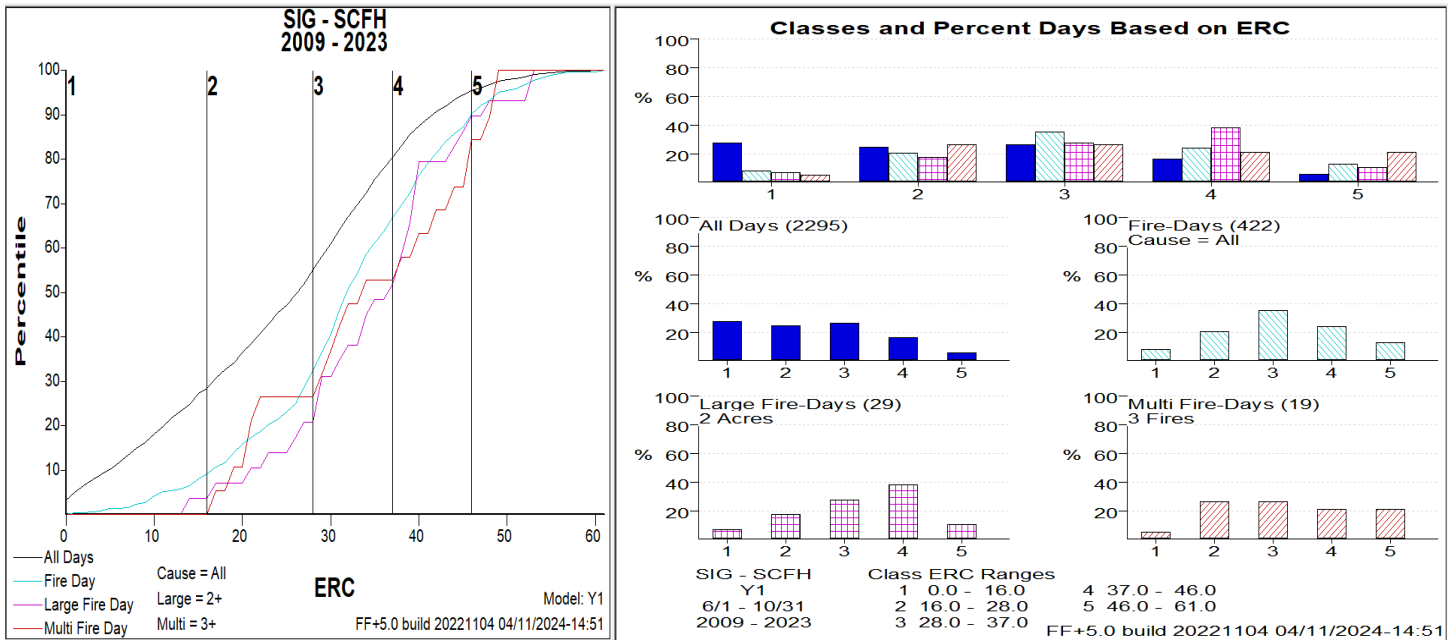
**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 25. The season, large fire, and multiple fire day as defined in the fire problem analysis for the South Cascade Foothill FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
May 1st – Oct 31st	2 acres	3 fires	2760	457	32	21

**Table 26. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the South Cascade Foothills FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NDFRS Index	Class	Range
Yellowstone	2009-2023	1	Y	ERC	1	0-16
Trout Creek		1			2	17-28
Brush Creek		1			3	29-37
Green Mountain		1			4	38-46
					5	> 46



**Figure 16. ERC breakpoints for the South Cascade Foothills FDRA.**

**Table 27. Correlation values for the South Cascade Foothills FDRA for Energy Release Component (ERC).**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD Acres	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD Fires	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
SOCF	2009-2023	5/1 - 10/31	ERC	Y1	All	0.88	28.10	0.0005	0.04-0.60	2	0.72	6.95	0.5422	0.00-0.07	3	0.46	11.94	0.1537	0.00 - 0.04
SOCF	2009-2023	5/1 - 10/31	BI	Z1	All	0.88	26.06	0.0010	0.05-0.59	2	0.71	7.39	0.4950	0.00-0.09	3	0.67	5.16	0.7409	0.00-0.04
SOCF	2009-2023	5/1 - 10/31	ERC	X1	All	0.92	15.24	0.0546	0.07-0.52	2	0.76	6.70	0.5692	0.00-0.09	3	0.57	7.00	0.5361	0.00-0.05

### 4.5.6 The Dalles FDRA

**General Location:** This area includes the lower eastern slopes of Mt Hood from Warm Springs Confederated Tribe lands to the Columbia River Gorge and east to the mouth of the Deschutes River.

**Vegetation:** Timber with understory in upper elevations and drainages; including the breaks of the Columbia River. Vegetation transitions to areas of grass-shrub then finally grass at lower elevations.

**Climate:** The annual precipitation range is between 11 and 84 inches with median of 19 inches per year. The driest months are typically July and August with some years receiving minimal precipitation during this period. It is not uncommon for dry weather to persist in the area from May through October.

**Topography:** Terrain is heavily bisected by drainages that run generally from the east to the west towards the Columbia and Deschutes rivers. Drainages can be extremely steep, particularly along the breaks of the Columbia River. Elevations ranges from 4000 feet near the boundary with the East Mt Hood FDRA to 75' along the Columbia River with a median elevation of 1830 feet.

#### Fire Occurrence

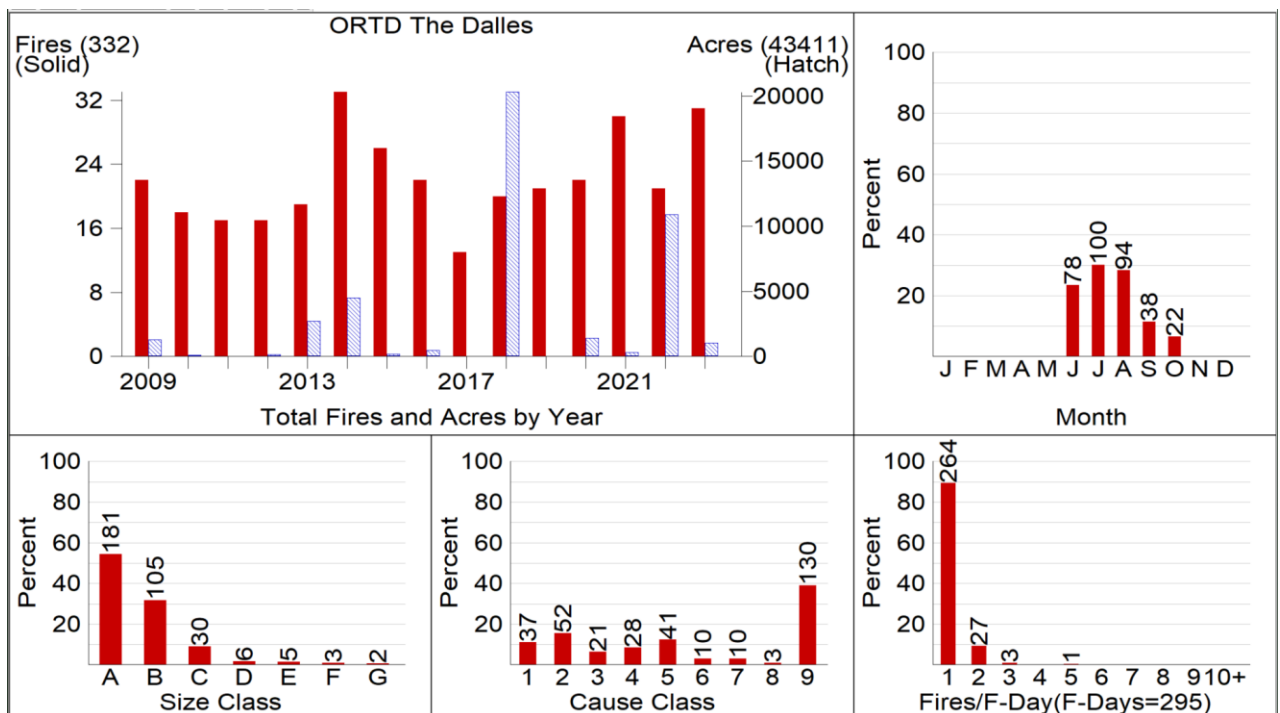


Figure 17. Fire occurrence summary graph data for The Dalles FDRA.

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

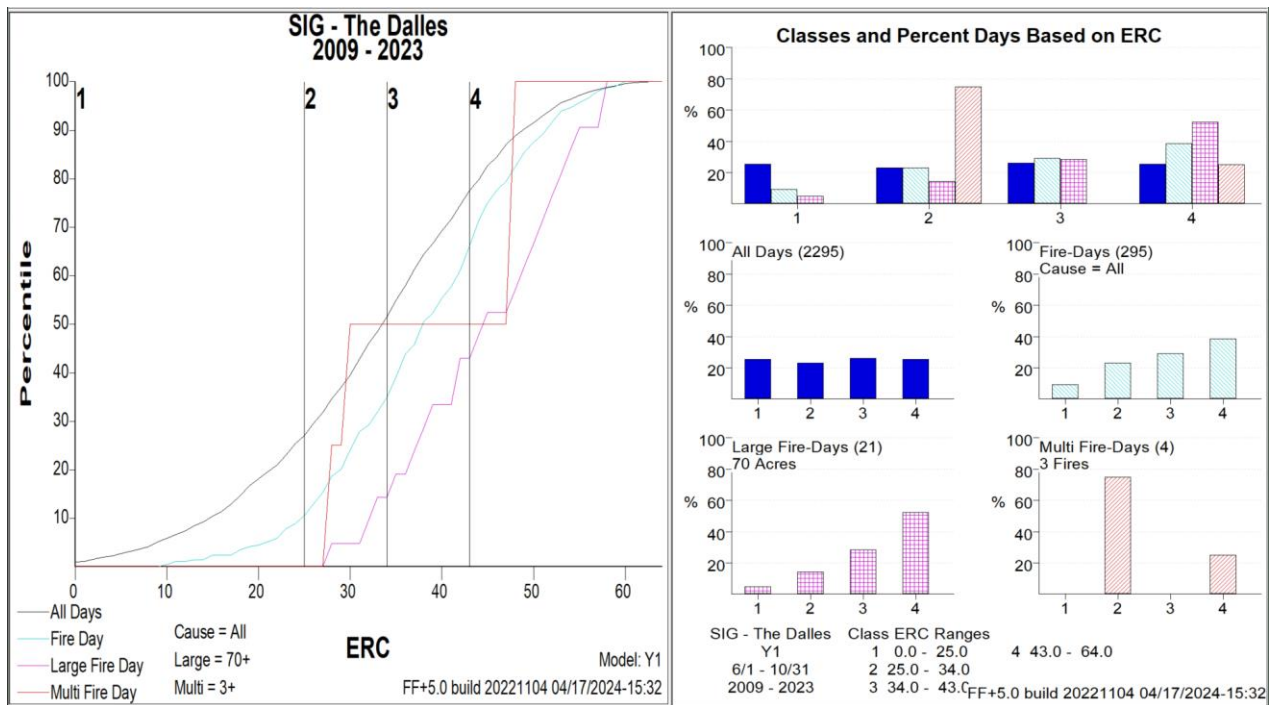
**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 28. The season, large fire, and multiple fire day as defined in the fire problem analysis for The Dalles FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
June 1st – Oct 31st	70 acres	3 fires	2295	295	21	4

**Table 29. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for The Dalles FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NFDRS Index	Class	Range
Middle Mountain	2009-2023	.29	Y	ERC	1	0-50
					2	26-34
Wasco Butte		.71			3	35-43
					4	>43



**Figure 18. ERC breakpoints for The Dalles FDRA.**

**Table 30. Correlation values for The Dalles FDRA.**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD Acres	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD Fires	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
The Dalles	2009 - 2023	6/1 - 10/31	BI	Y1	All	0.76	16.55	0.0352	0.03 - 0.34	70	0.54	4.95	0.7628	0.00 - 0.35	3	0.91	0.09	0.7647	0.00 - 0.07
The Dalles	2009 - 2023	6/1 - 10/31	ERC	Y1	All	0.77	16.03	0.0419	0.04 - 0.30	70	0.61	3.28	0.9158	0.01 - 0.18	3	0.4	1.8	0.1803	0.00 - 0.06
The Dalles	2009 - 2023	6/1 - 10/31	FM1	Y1	All	0.79	12.13	0.1454	0.01 - 0.23	70	0.11	3.35	0.7635	0.01 - 0.11	3	0.25	1.42	0.2331	0.01 - 0.05
The Dalles	2009 - 2023	6/1 - 10/31	FM10	Y1	All	0.75	14.31	0.0739	0.02 - 0.24	70	0.02	7.44	0.385	0.02 - 0.11	3	0.55	3.57	0.059	0.00 - 0.16
The Dalles	2009 - 2023	6/1 - 10/31	FM100	Y1	All	0.81	12.8	0.119	0.02 - 0.27	70	0.28	8.55	0.2869	0.01 - 0.14	3	0.51	2.52	0.1128	0.00 - 0.09
The Dalles	2009 - 2023	6/1 - 10/31	FM100	Y1	All	0.86	9.84	0.2768	0.02 - 0.27	70	0.72	1.82	0.8731	0.01 - 0.18	3	0	0.7	0.403	0.01 - 0.01



### 4.5.7 West Mt Hood FDRA

**General Location:** The Cascade mountains rise to the east of the Willamette Valley and run in a north south orientation along the Cascade Crest, the edge of the operating plan boundary to the west. This area is further broken into two separate rating areas.

**Vegetation:** Timber, Grass, and Shrubs.

**Climate:** Most of the precipitation occurs during the winter and spring months, with limited rainfall during the summer. The range of average annual precipitation is between 38 inches in the lower lying areas and 154 inches in the upper elevation areas and Bull Run. The median average annual precipitation is 84 inches.

**Topography:** Elevations generally range between 2000 and 10400 feet. The lowest areas along drainages are as low as 600 feet. The median elevation across the area is 3399 feet.

#### Fire Occurrence

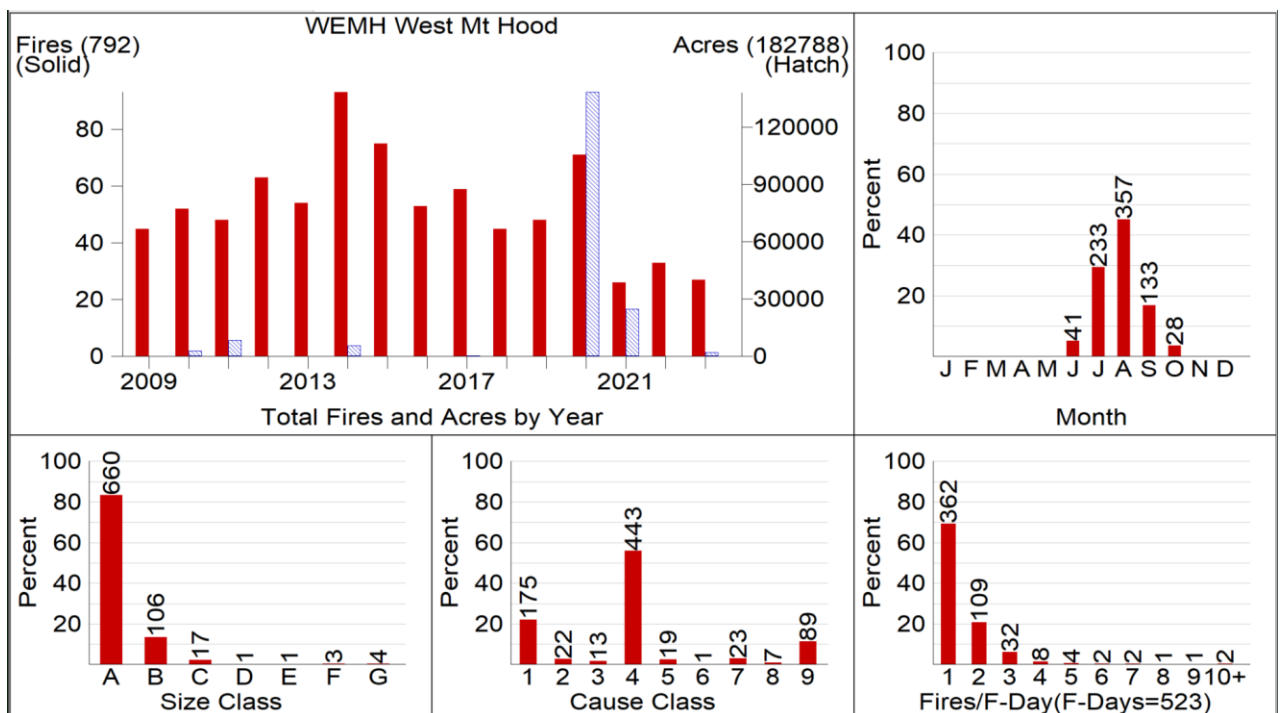


Figure 19. Fire occurrence summary graph data for West Mt Hood FDRA.

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

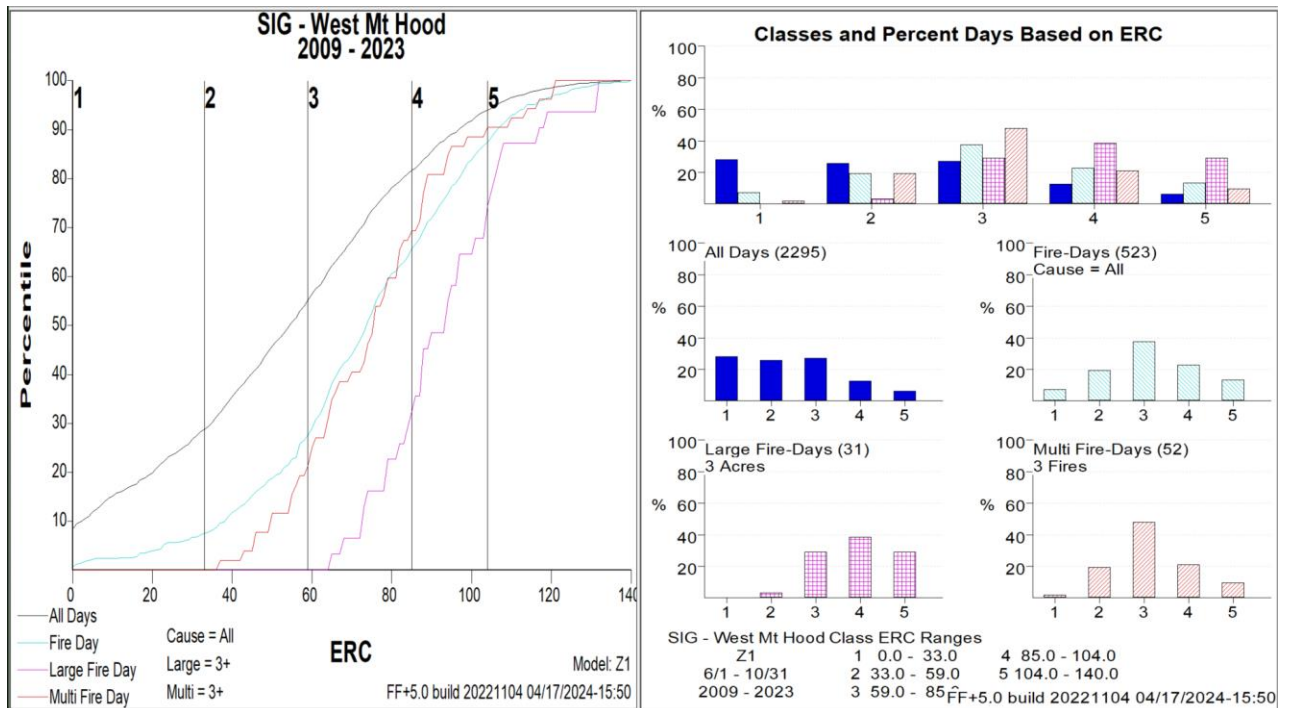
**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 31. The season, large fire, and multiple fire day as defined in the fire problem analysis for West Mt Hood FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
June 1st – Oct 31st	3 acres	3 fires	2295	523	31	52

**Table 32. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for West Mt Hood FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NDFRS Index	Class	Range
Red Box	2009-2023	1	Z	ERC	1	0-33
					2	34-59
Wanderers Peak		1			3	60-85
					4	86-104
					5	> 104



**Figure 20. ERC breakpoints for West Mt Hood FDRA.**

**Table 33. Correlation values for West Mt Hood FDRA.**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD Acres	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD Fires	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
West Mt Hood	2009 - 2023	6/1 - 10/31	BI	Z1	All	0.95	11.88	0.1565	0.05 - 0.76	3	0.65	7.86	0.4471	0.00 - 0.39	3	0	7.88	0.4448	0.10 - 0.10
West Mt Hood	2009 - 2023	6/1 - 10/31	ERC	Z1	All	0.94	15.83	0.0449	0.06 - 0.70	3	0.55	9.72	0.2852	0.01 - 0.26	3	0	12.85	0.1172	0.09 - 0.11
West Mt Hood	2009 - 2023	6/1 - 10/31	FM1	Z1	All	0.94	11.45	0.1773	0.03 - 0.42	3	0.78	3.96	0.6822	0.00 - 0.16	3	0.03	10.08	0.1839	0.08 - 0.10
West Mt Hood	2009 - 2023	6/1 - 10/31	FM10	Z1	All	0.96	6.91	0.5469	0.03 - 0.47	3	0.56	10.28	0.2457	0.00 - 0.17	3	0.02	11.07	0.198	0.09 - 0.11
West Mt Hood	2009 - 2023	6/1 - 10/31	FM100	Z1	All	0.93	13.73	0.0892	0.02 - 0.59	3	0.46	8.82	0.3574	0.00 - 0.16	3	0	5.15	0.741	0.08 - 0.11
West Mt Hood	2009 - 2023	6/1 - 10/31	FM1000	Z1	All	0.9	25.89	0.0011	0.01 - 0.64	3	0.32	12.9	0.0446	0.00 - 0.17	3	0.35	5.53	0.4782	0.03 - 0.17

### 4.5.8 Willamette FDRA

**General Location:** The Cascade mountains rise to the east of the Willamette Valley and run in a north south orientation along the Cascade Crest, the edge of the operating plan boundary to the west. It is bordered by the Mount Hood National Forest to the north and the Umpqua National Forest to the south.

**Vegetation:** Timber, Grass, and Shrubs.

**Climate:** Most of the annual precipitation occurs during the winter and spring months, with little rainfall during the summer. As elevation increases there is a corresponding increase in precipitation with a median precipitation between 81 and 84 inches. Generally, annual precipitation also increases in a northerly direction, with Westfir in the southern end of the rating area receiving approximately 58 inches per year and 79 inches in Detroit.

**Topography:** The Cascade Mountains begin at around 2000 feet and increase in elevation to about 10,000 feet along the crest before they descend into the eastern slopes of the range.

#### Fire Occurrence

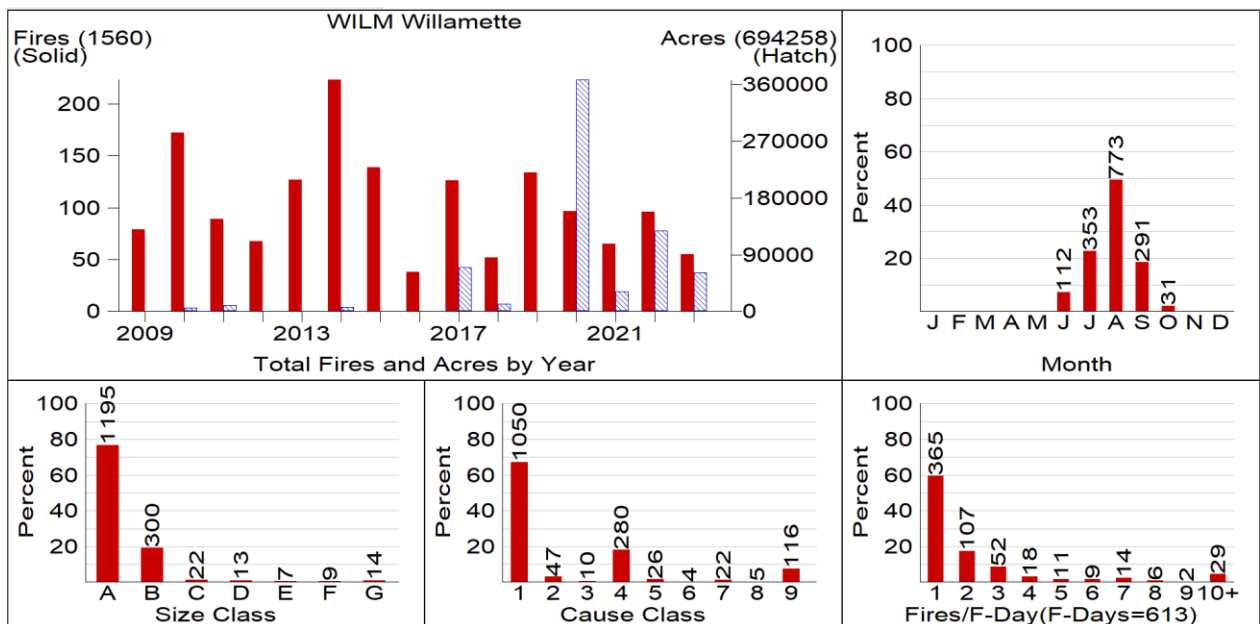


Figure 21. Fire occurrence summary graph data for the Willamette FDRA.

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 34. The season, large fire, and multiple fire day as defined in the fire problem analysis for the Willamette FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
June 1st – Oct 31st	2 acres	3 fires	2295	613	96	141

**Table 35. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the Willamette FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NFDRS Index	Class	Range
	2009-2023		Y	ERC	1	0-9
					2	10-20
					3	21-32
Boulder Creek		1			4	33-41
Pebble		1			5	> 41
Fields		1		BI	1	0-7
					2	8-14
					3	15-19
					4	20-23
			5	> 23		

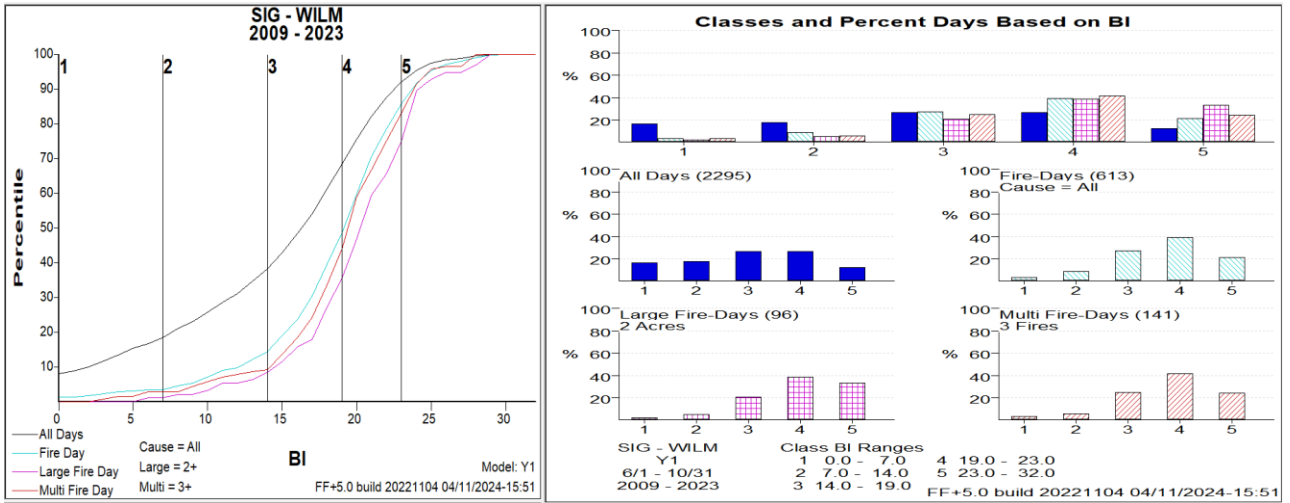
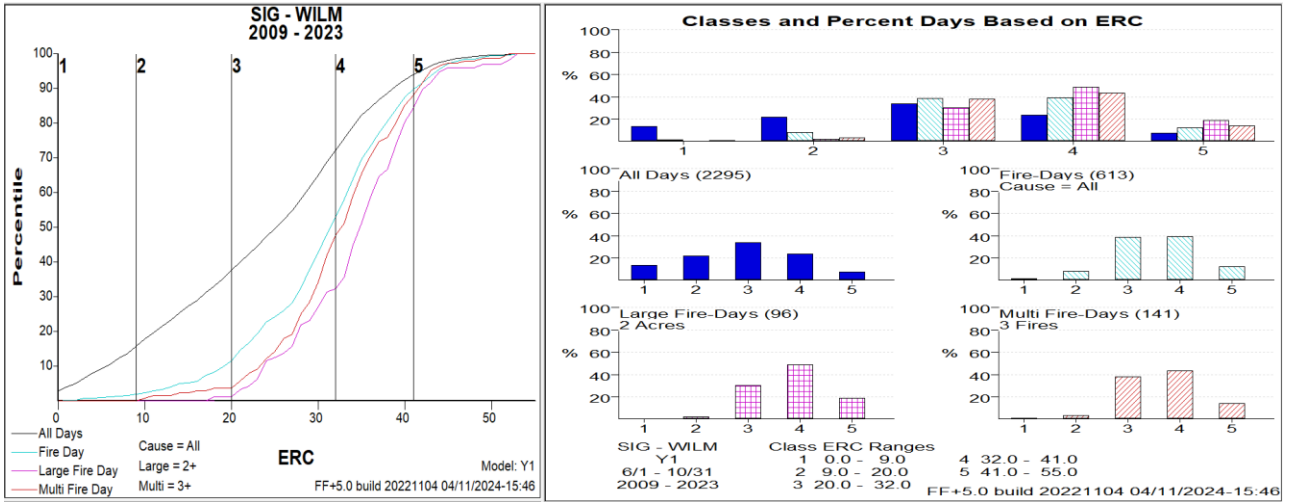


Figure 22. ERC and BI breakpoints for the Willamette FDRA.

**Table 36. Correlation values for the Willamette FDRA for Energy Release Component (ERC) and Burning Index (BI).**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R <sup>2</sup>	FD Chi <sup>2</sup>	FD P-Val	FD P-Range	LFD Acres	LFD R <sup>2</sup>	LFD Chi <sup>2</sup>	LFD P-Val	LFD P-Range	MFD Fires	MFD R <sup>2</sup>	MFD Chi <sup>2</sup>	MFD P-Val	MFD P-Range
WILM	2009-2023	6/1 - 10/31	ERC	Y1	All	0.91	29.2	0.0003	0.05-0.76	2	0.84	11.74	0.1633	0.00-0.32	3	0.82	16.36	0.0375	0.01-0.31
WILM	2009-2023	6/1 - 10/31	BI	Y1	All	0.97	7.26	0.5089	0.04-0.72	2	0.95	3.15	0.9247	0.00-0.26	3	0.89	7.82	0.4509	0.01-0.26
WILM	2009-2023	6/1 - 10/31	ERC	X1	All	0.91	21.41	0.0061	0.09-0.65	2	0.91	4.02	0.8549	0.01-0.21	3	0.81	13.37	0.0996	0.02-0.21
WILM	2009-2023	6/1 - 10/31	BI	X1	All	0.99	3.25	0.9179	0.07-0.76	2	0.90	6.65	0.5753	0.00-0.30	3	0.86	10.03	0.2631	0.01-0.30
WILM	2009-2023	6/1 - 10/31	ERC	Z1	All	0.86	37.26	0.0000	0.07-0.73	2	0.85	9.34	0.3146	0.01-0.27	3	0.81	12.93	0.1141	0.02-0.25
WILM	2009-2023	6/1 - 10/31	BI	Z1	All	0.96	10.08	0.2597	0.06-0.78	2	0.86	8.07	0.4265	0.01-0.31	3	0.89	6.14	0.6311	0.01-0.28



### 4.5.9 Willamette Valley FDRA

**General Location:** The Willamette Valley runs in a north south orientation bordered by the Coast Range to the west and the Cascades to the east. The majority of this FDRA is under the protection of county and local fire departments that are not signatories to this plan.

**Vegetation:** Grass, Shrubs, and Timber.

**Climate:** Similar to the other FDRAs in this plan, most of the annual precipitation occurs during the winter and spring months with less rainfall during the summer. The lowest elevations in the Valley see correspondingly lower precipitation amounts compared to the foothills, with locations such as Eugene receiving a median of 46 inches per year. The FDRA has a range between 38 and 66 inches per year with a median of 43 inches per year.

**Topography:** Elevation in the Willamette Valley ranges from nearly sea level along the Columbia River to approximately 500 feet where it begins to transition in the coast range and cascade foothills.

#### Fire Occurrence

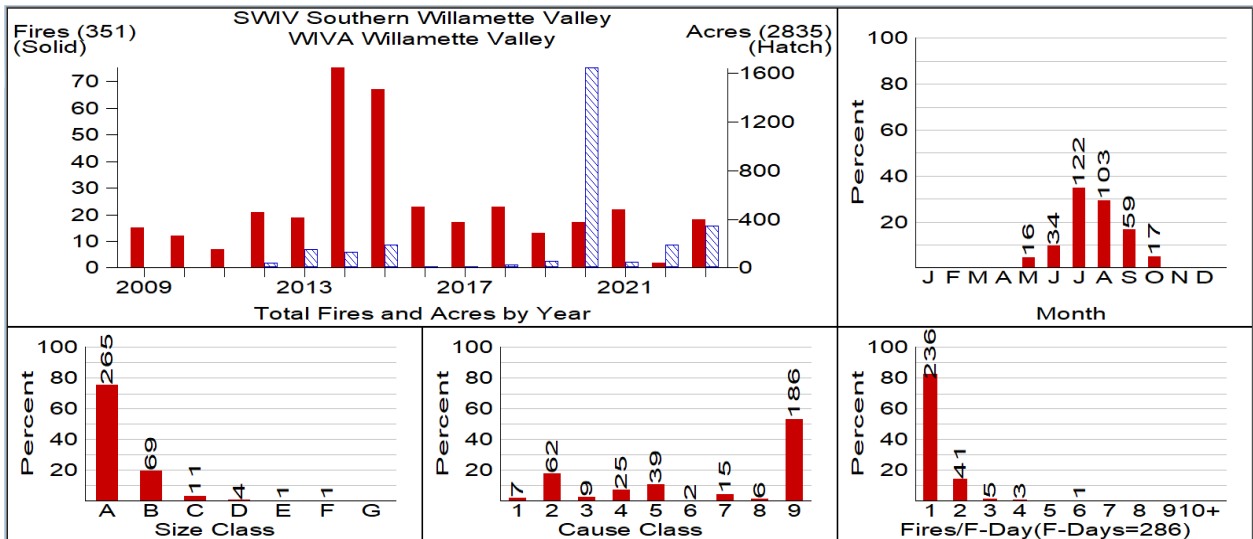


Figure 23. Fire occurrence summary graph data for the Willamette Valley FDRA.

**Fire size class and cause definitions:**

**Size Classes:** A - <= 0.25 acres, B - 0.26 to 9.9 acres, C - 10 to 99.9 acres, D - 100 to 299 acres, E - 300 to 999 acres, F - 1000 to 4999 acres, G - >= 5000 acres.

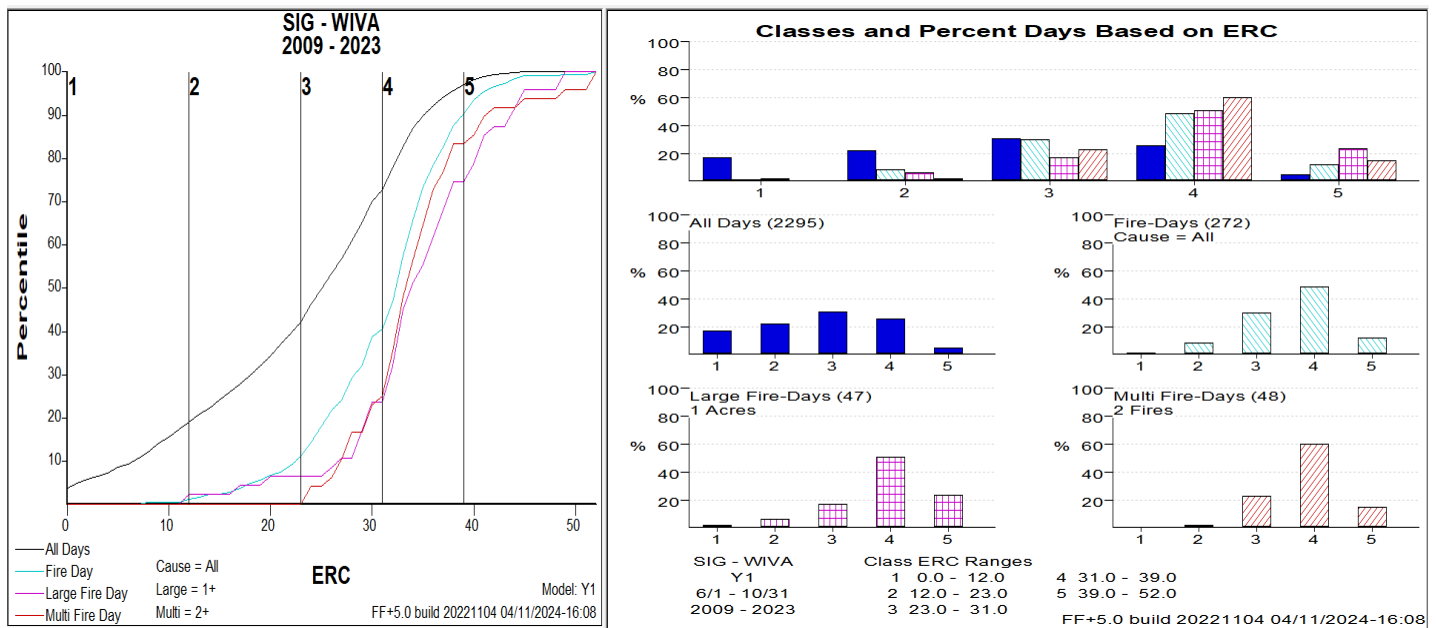
**Cause Classes:** 1 - Lightning, 2 - Equipment Use, 3 - Smoking, 4 - Campfire, 5 - Debris Burning, 6 - Railroad, 7 - Arson, 8 - Children, 9 - Miscellaneous

**Table 37. The season, large fire, and multiple fire day as defined in the fire problem analysis for the Willamette Valley FDRA, as well as, the number of qualifying weather days, fire days, large fire days, and multiple fire days used in the correlation analysis.**

Season	Large Fire	Multiple Fire Day	Number of fire Weather days	Number of Fire Days	Number of Large Fires	Number of Multiple Fire Days
May 1st – Oct 31st	1 acre	2 fires	2760	286	49	50

**Table 38. SIG stations, analysis years, NDFRS Fuel model with analysis breakpoints for the Willamette Valley FDRA.**

SIG/ RAWS	Data Years Used	Weighting Factor	Fuel Model	NDFRS Index	Class	Range
Corvalis (Finley)	2009-2023	1	Z	ERC	1	0-12
2					13-23	
3		24-31				
4		32-39				
5		> 39				
Willow Creek		1				



**Figure 24. ERC breakpoints for the Willamette Valley FDRA.**

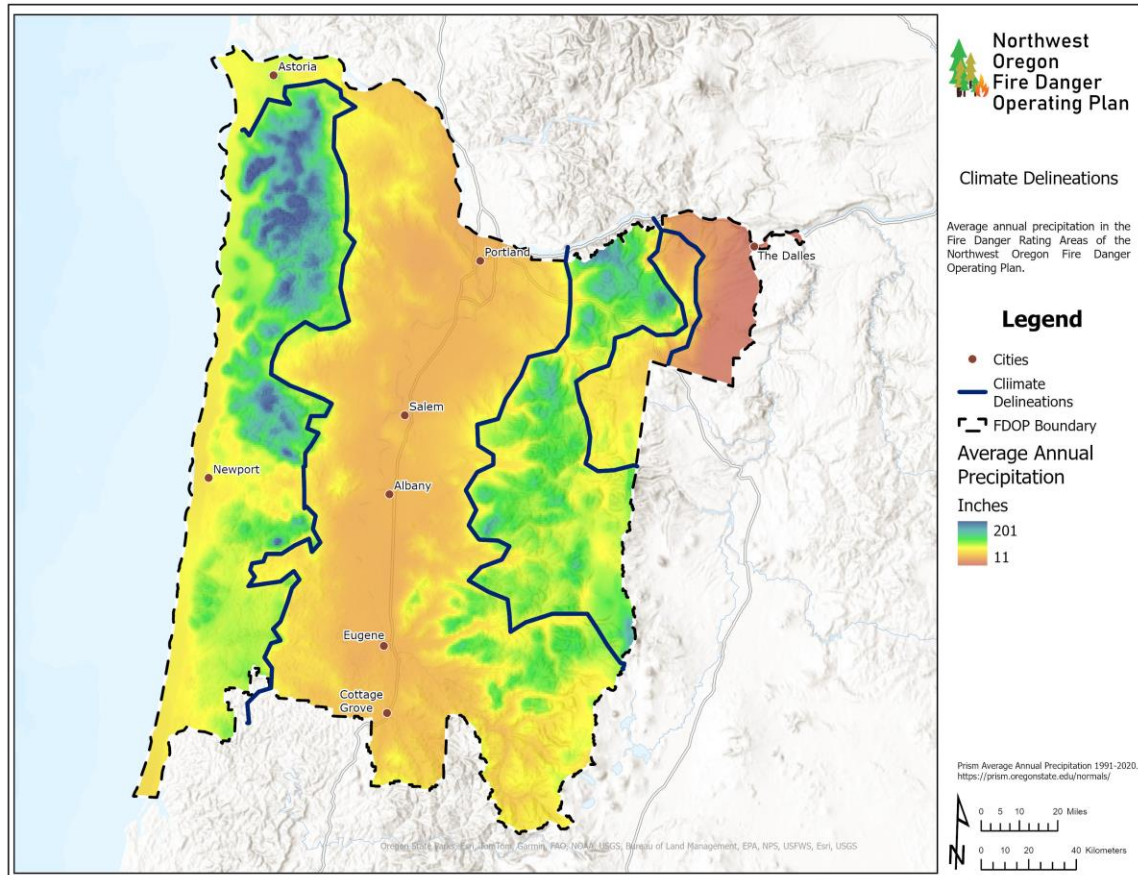
**Table 39. Correlation values for the Willamette Valley FDRA for Energy Release Component (ERC) and Burning Index (BI).**

SIG/Station	Years	Annual Filter	Variable	Model	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD Acres	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD Fires	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
WIVA	2009-2023	5/1 - 10/31	ERC	Y1	All	0.97	7.64	0.4696	0.00-0.71	1	0.86	8.13	0.4209	0.00-0.40	2	0.87	7.42	0.4919	0.00 - 0.37
WIVA	2009-2023	5/1 - 10/31	BI	Y1	All	0.93	15.31	0.0535	0.02-0.50	1	0.83	10.15	0.2544	0.00-0.35	2	0.90	5.29	0.7263	0.00 - 0.30
WIVA	2009-2023	5/1 - 10/31	ERC	X1	All	0.91	23.72	0.0026	0.02-0.51	1	0.88	10.36	0.2405	0.00-0.21	2	0.90	6.57	0.5834	0.00-0.17
WIVA	2009-2023	5/1 - 10/31	BI	X1	All	0.93	15.31	0.0535	0.02-0.50	1	0.77	18.00	0.0212	0.00-0.20	2	0.81	12.31	0.1378	0.00-0.17

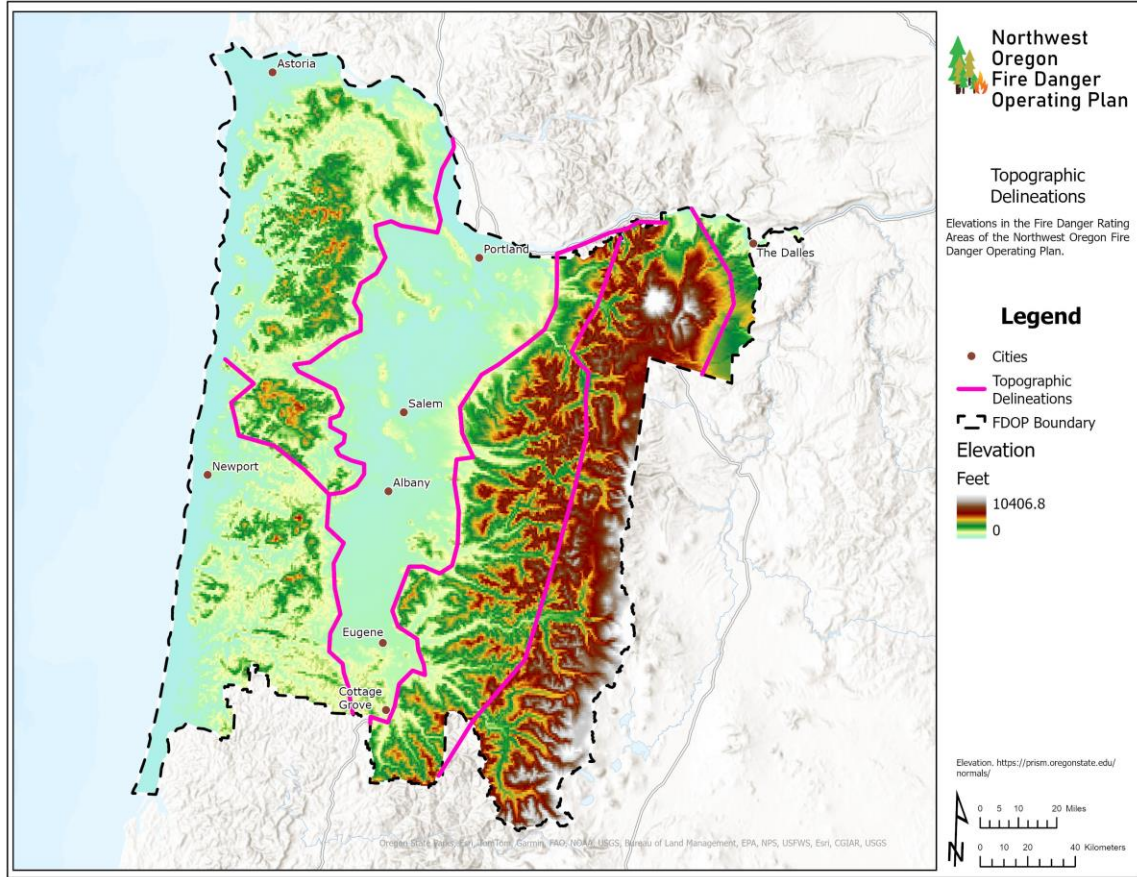
## Appendices

### A.1.0 FDRA Delineation Maps

Climate, topographic, and vegetation data used for FDRA delineations.

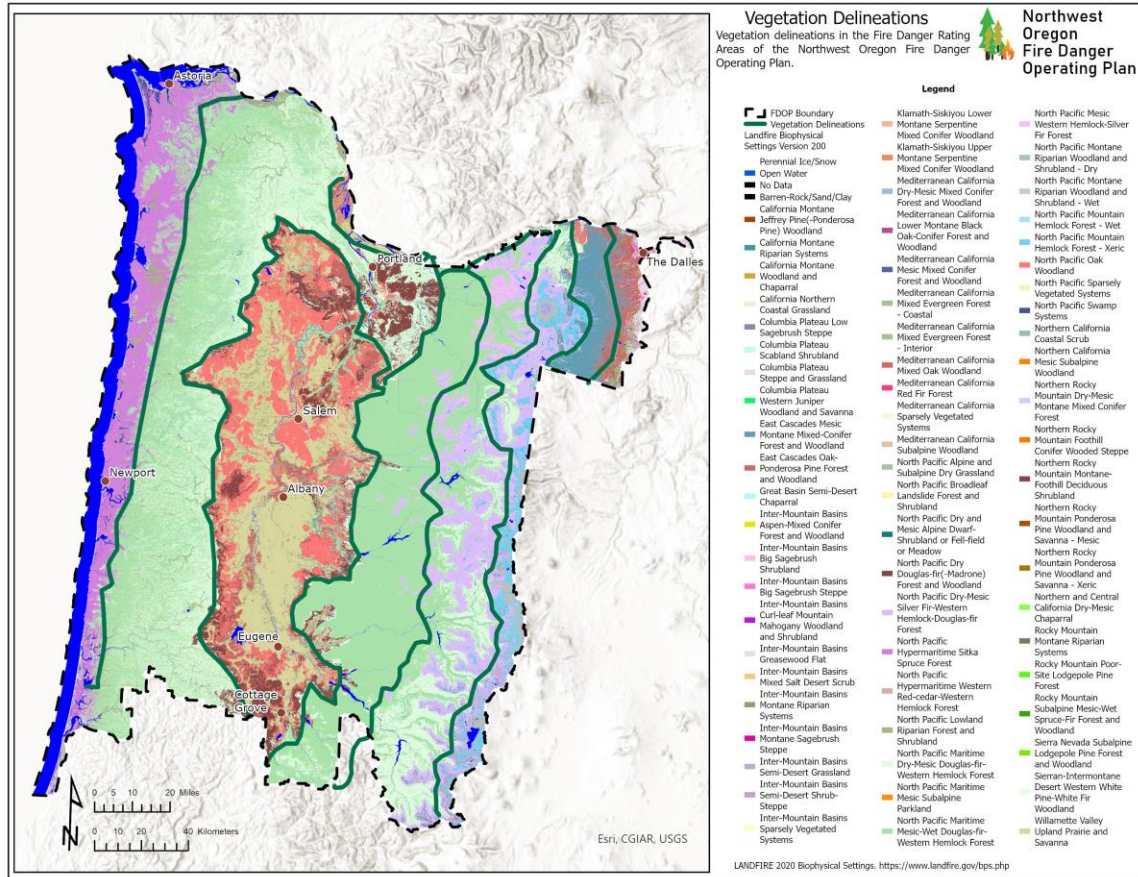


**Figure 25. Climate delineations showing average annual precipitation in the Northwest Oregon Fire Danger Operating Plan area.**

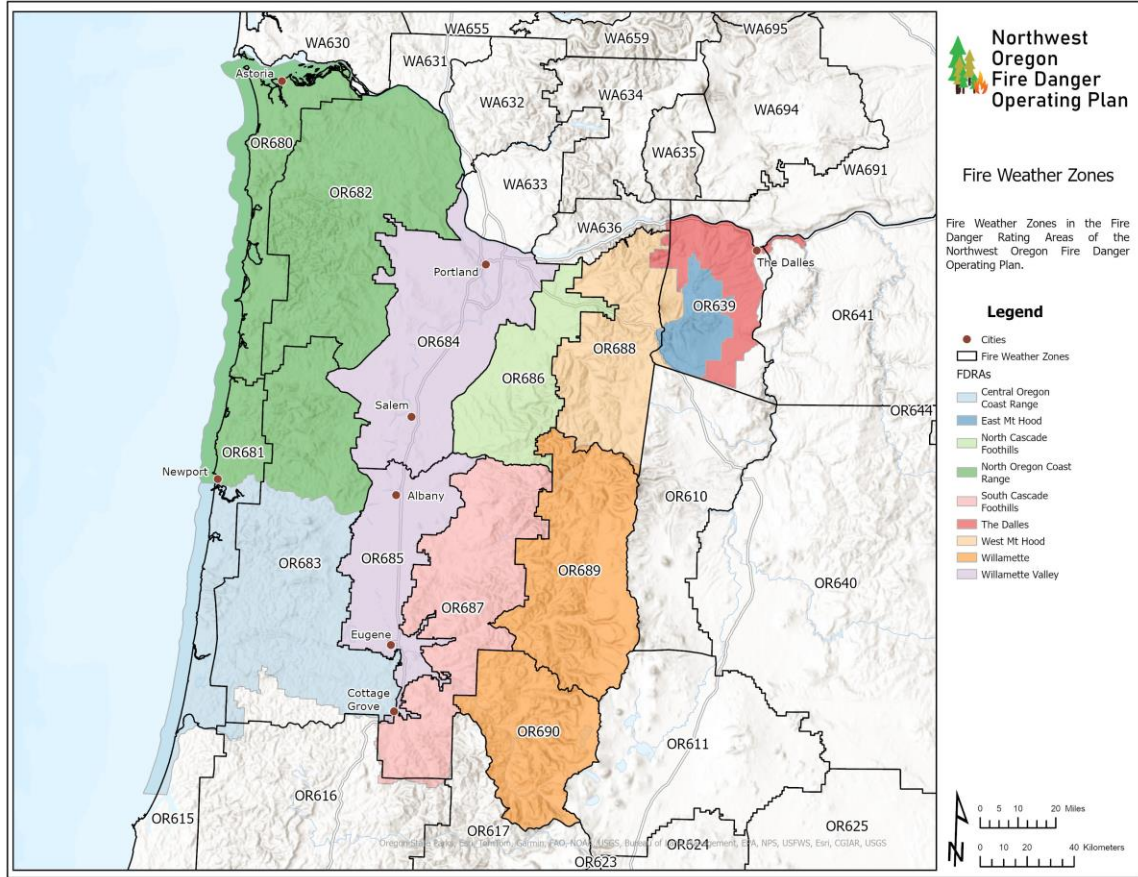


**Figure 26. Topographic delineations showing elevations in the Northwest Oregon Fire Danger Plan Area.**





**Figure 27. Vegetation delineations showing vegetation in the Northwest Oregon Fire Danger Operating Plan Area.**



**Figure 28. Fire weather zones in the Northwest Oregon Fire Danger Operating Plan Area.**



## A.2.0 Additional Fire Occurrence Information

**Table 40. FDRA fire occurrence size percentiles (final size, acres).**

FDRA	50	90	97
Central Oregon Coast Range	0.1	1.3	11.6
East Mt Hood	0.1	0.8	8.6
North Cascade Foothills	0.1	1.5	8.0
North Oregon Coast Range	0.1	1.9	17.0
South Cascade Foothills	0.1	1.0	7.5
The Dalles	0.2	14.8	177.6
West Mt Hood	0.1	0.5	11.6
Willamette	0.1	1.5	50.4

**Table 1. FDRA fire discovery start and end dates by percentile fire size.**

FDRA	Size	Percentile	Min	Max
Central Oregon Coast Range	1.3	90	March 19	October 30
Central Oregon Coast Range	11.6	97	April 02	September 26
Central Oregon Coast Range	53.4	99	April 02	September 05
East Mt Hood	0.8	90	May 24	November 19
East Mt Hood	8.7	97	May 24	October 03
East Mt Hood	150.5	99	August 18	September 03
North Cascade Foothills	1.5	90	January 23	October 30
North Cascade Foothills	8.0	97	January 23	October 30
North Cascade Foothills	162.3	99	January 23	October 30
North Oregon Coast Range	1.9	90	January 23	December 09
North Oregon Coast Range	17.0	97	January 23	December 09
North Oregon Coast Range	93.5	99	January 23	November 11
South Cascade Foothills	1.0	90	January 24	November 02
South Cascade Foothills	7.5	97	January 24	October 19
South Cascade Foothills	19.3	99	January 24	July 24
The Dalles	14.8	90	May 09	November 11
The Dalles	177.6	97	May 09	November 04
The Dalles	1233.4	99	August 01	August 28
West Mt Hood	0.5	90	June 24	November 01
West Mt Hood	11.6	97	June 24	November 01
West Mt Hood	99.7	99	July 04	September 13
Willamette	1.5	90	April 08	October 29
Willamette	50.4	97	July 13	October 10
Willamette	3400.0	99	July 23	September 08
Willamette Valley	1.9	90	February 06	October 01
Willamette Valley	22.0	97	July 26	October 01
Willamette Valley	129.2	99	August 12	September 08

## References

PRISM Climate Group Average Annual Precipitation, Oregon State University,  
<https://prism.oregonstate.edu>, data created 30 Aug 2022, accessed 21 Mar 2024

LANDFIRE: LANDFIRE Biophysical Setting layer. (2022, Sept 28 - last update). U.S. Department of Interior, Geological Survey, and U.S. Department of Agriculture. [Online]. Available: <http://landfire.cr.usgs.gov/viewer/> [2014, Mar 22].

PRISM Climate Group Digital Elevation Model, Oregon State University,  
<https://prism.oregonstate.edu>, data created Unknown, accessed 21 Mar 2024

Short, Karen C. 2022. Spatial wildfire occurrence data for the United States, 1992-2020 [FPA\_FOD\_20221014]. 6th Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2013-0009.6>