Western Washington

Interagency Fire Danger Operating Plan - 2021

Version: 06/29/2021

This plan is compatible with NFDRS 2016 and intended to be fully implemented for 2021.

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Western Washington

Interagency Fire Danger Operating Plan

Approved by:

Signatories to this plan include the following agencies.

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Washington State Department of Natural Resources, South Puget Region
Washington State Department of Natural Resources, Pacific Cascades Region
Washington State Department of Natural Resources, Olympic Region
National Park Service, Olympic National Park
National Park Service, North Cascades National Park
National Park Service, Mount Rainer National Park
National Park Service, San Juan Island National Historical Park
US Forest Service, Olympic National Forest
US Forest Service, Mount Baker-Snoqualmie National Forest
US Forest Service, Gifford Pinchot National Forest
US Fish and Wildlife Service, Western Washington Zone
Bureau of Land Management, Spokane District
Bureau of Indian Affairs, Northwest Region

For simplicity's sake, each agency will be responsible for maintaining a signed hardcopy on file.

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Contents

Executive Summary

The intent of the 2021 Western Washington Fire Danger Operating Plan (WWFDOP) is to fully implement the NFDRS 2016 models to determine fire danger levels for the 2021 fire season and next few years to come. In 2020, this plan was tested to allow agency administrators, dispatch centers, and fire managers in Western Washington the opportunity to compare the 2016 NFDRS models side by side with the original NFDRS system used in the past. The comparisons and input from the field were used to revise and update this plan. This plan allows agencies to meet the mandate to transition to NFDRS 2016 for the 2021 fire season.

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 document a decision-making process for agency administrators, fire management personnel, communication center personnel, and agency co-operators by establishing interagency planning and response levels based upon an assessment of vegetation, climate, and topography utilizing the national fire danger rating system (NFDRS).

This plan provides science-based rationale to support decisions which have the potential to significantly compromise safety and control of wildland fires. This is achieved using the best available scientific methods and an analysis of historical weather and fire data.

Figure 1: Preparedness Plan Relationship

1.1.1 Preparedness Plan

Interagency policy and guidance require numerous unit plans and guides to meet preparedness objectives. Some of these plans and guides are inter-related or provide the basis for other plans/guides, as shown in Figure 1.

This FDOP guides the application of information from decision support tools (such as NFDRS) at the local level. This FDOP is supplemental to any Fire Management Plan that may exist within the individual units; it documents the establishment and management of a fire weather station network and describes how fire danger ratings will be applied to local unit fire management decisions. The actual implementation of the fire business thresholds is described in the

following supplemental action plans. The decision points are identified and documented in the Fire Danger Operating Plan.

1.1.1.1 Preparedness Plan

Preparedness plans provide management direction given identified levels of burning conditions, fire activity, and resource commitment. Preparedness levels (1 to 5) are determined by incremental measures of fire danger, fire activity, and resource commitment. The preparedness levels are identified and documented in this FDOP; the associated decisions and planned actions are located with the individual agency-unit.

1.1.1.2 Staffing Plan

The staffing plan describes daily resource availability/capability to respond to unplanned ignitions. Mitigating actions are designed to enhance the unit's fire management capability during short periods or other pre-identified events, where normal staffing cannot meet initial attack, prevention, or detection needs. The decision points are identified and documented in this FDOP; the associated decisions and planned actions are located with the individual agency-unit.

1.1.1.3 Prevention Plan – Fire Danger Components

Prevention plans document the wildland fire problems identified by a prevention analysis. This analysis will not only examine human-caused fires, but also the risks, hazards, and values for the planning unit. Components of the plan include mitigation (actions initiated to reduce impacts of wildland fire to communities), prevention (of unwanted human-caused fires), education (facilitating and promoting awareness and understanding of wildland fire), enforcement (actions necessary to establish and carry out regulations, restrictions, and closures), and administration of the prevention program. The analysis of fire problems and associated target groups are documented in this Fire Danger Operating Plan; the associated decisions and planned actions are in located with the individual agency and/or units.

1.1.1.4 Public Fire Restriction Plan

A restriction plan is a document that outlines agency coordination efforts regarding fire restrictions and closures. An interagency approach for initiating restrictions or closures helps provide consistency among the land management partners, while defining the restriction boundaries so they are easily distinguishable to the public. Based on the fire danger, managers may impose fire restrictions or emergency closures to public lands. Decision points when restrictions and/or closures should be considered are identified and documented in this FDOP; the associated decisions and planned actions are located with the individual agency-unit.

1.1.2 Wildfire Response

1.1.2.1 Initial Response Plan

Initial response plans, also referred to as run cards or pre-planned response plans, specify the fire management response (e.g. number and type of suppression assets to dispatch) within a defined geographic area to an unplanned ignition based on fire weather, fuel conditions, fire management objectives, and resource availability. Response levels are identified and documented in the Fire Danger Operating Plan. The number and type of suppression resources dispatched to a reported fire is developed by local agency units and located within the individual dispatch centers.

1.1.2.2 Local Mobilization Plan

The mobilization plan identifies standard procedures, which guide the operations of multi-agency logistical support activity throughout the coordination system. The mobilization plan is intended to facilitate interagency dispatch coordination, ensuring the timeliest and most cost-effective incident support services available are provided. Communication between units, GACCs, state, regional offices and other cooperative agencies are addressed. The mobilization plan is updated annually and distributed to fire managers and posted on the local dispatch office website and/or distribution list.

1.2 Policy and Guidance

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). Agency specific direction can be found in:

U.S. Forest Service – Manual 5120 - Fire Management - Preparedness
Bureau of Land Management – Manual 9211 - 1 - Fire Planning Handbook
National Park Service - National Park Service – Manual 18, Chapter 5 – Preparedness
Fish and Wildlife Service – Fire Management Handbook, Chapter 10 - Preparedness
Bureau of Indian Affairs – Wildland Fire and Aviation Program Management Operations Guide

1.3 Operating Plan Objectives

1. Provide a tool for agency administrators, fire managers, dispatchers, agency co-operators, and firefighters to correlate fire danger ratings with appropriate fire business decisions in fire danger planning area.
2. Delineate fire danger rating areas (FDRAs) with similar climate, vegetation, and topography.
3. Establish an interagency fire weather-monitoring network consisting of remote automated weather stations (RAWS) which comply with NFDRS weather station standards (PMS 426-3).
4. Define climatological breakpoints and fire business decision thresholds using the Weather Information Management System (WIMS), National Fire Danger Rating System

(NFDRS), and Fire Family Plus software to analyse and summarize an integrated database of historical fire weather and fire occurrence data. Identify seasonal risk analysis criteria and establish general fire severity thresholds.

5. Define roles and responsibilities to make fire preparedness decisions, manage weather information, and brief fire suppression personnel regarding current and potential fire danger.
6. Improve communication methods for fire managers to communicate potential fire danger to cooperating agencies, industry, and the public.
7. Provide guidance to interagency personnel outlining specific daily actions and considerations at each preparedness level.
8. Identify the development and distribution of fire danger pocket cards to all personnel involved with fire suppression within the fire danger planning area.
9. Provide a framework that units may use to evaluate their implementation of the plan and identify program needs.

2.0 Fire Danger Planning Area Inventory and Analysis

2.1 Administrative Units

This document supports the consistent and effective application of fire danger decisions applied across multiple jurisdictional boundaries within Western Washington. Wildland fire management and suppression responsibilities are shared among Federal, State, and local co-operators.

Figure 2: Overview Map

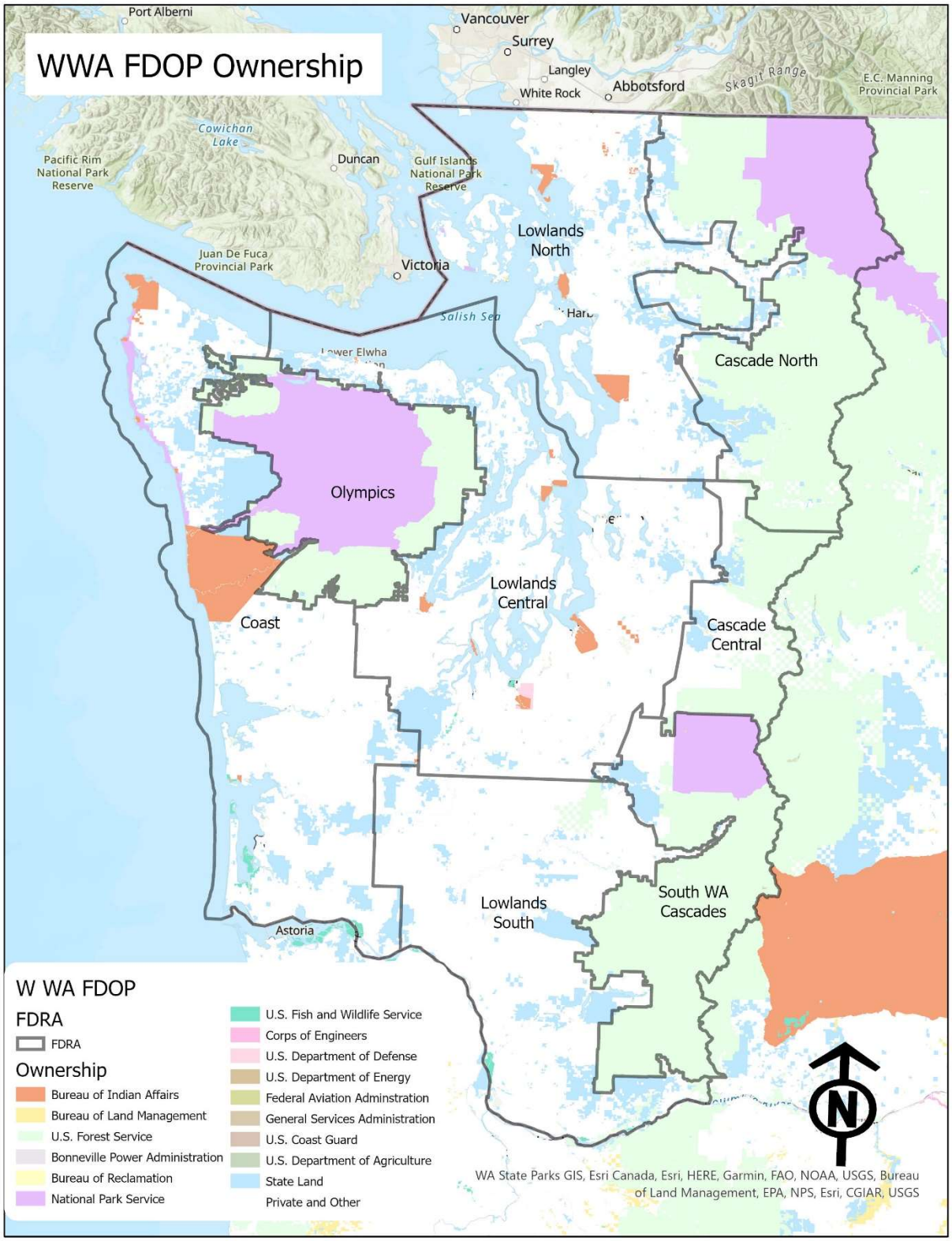


Table 1: Ownership Table

Agency	Approx. Acreage
WA-DNR	**1,528,958**
USFS	**3,606,335**
BLM	**3,045**
NPS	**1,677,676**
FWS	**24,048**
BIA	**322,386**
OTHER STATE LANDS	**107,146**
PRIVATE	**8,280,541**
DOD	**8,308**

2.2 Weather Stations

All RAWS used in this plan to produce NFDR outputs comply with the National Wildfire Coordinating Group (NWCG) weather station standards and guidelines (PMS 426-3). Each RAWS receives, at a minimum, one annual on-site maintenance visit by either the local user or contracted personnel to ensure sensors are within calibration standards and to verify site and station conditions.

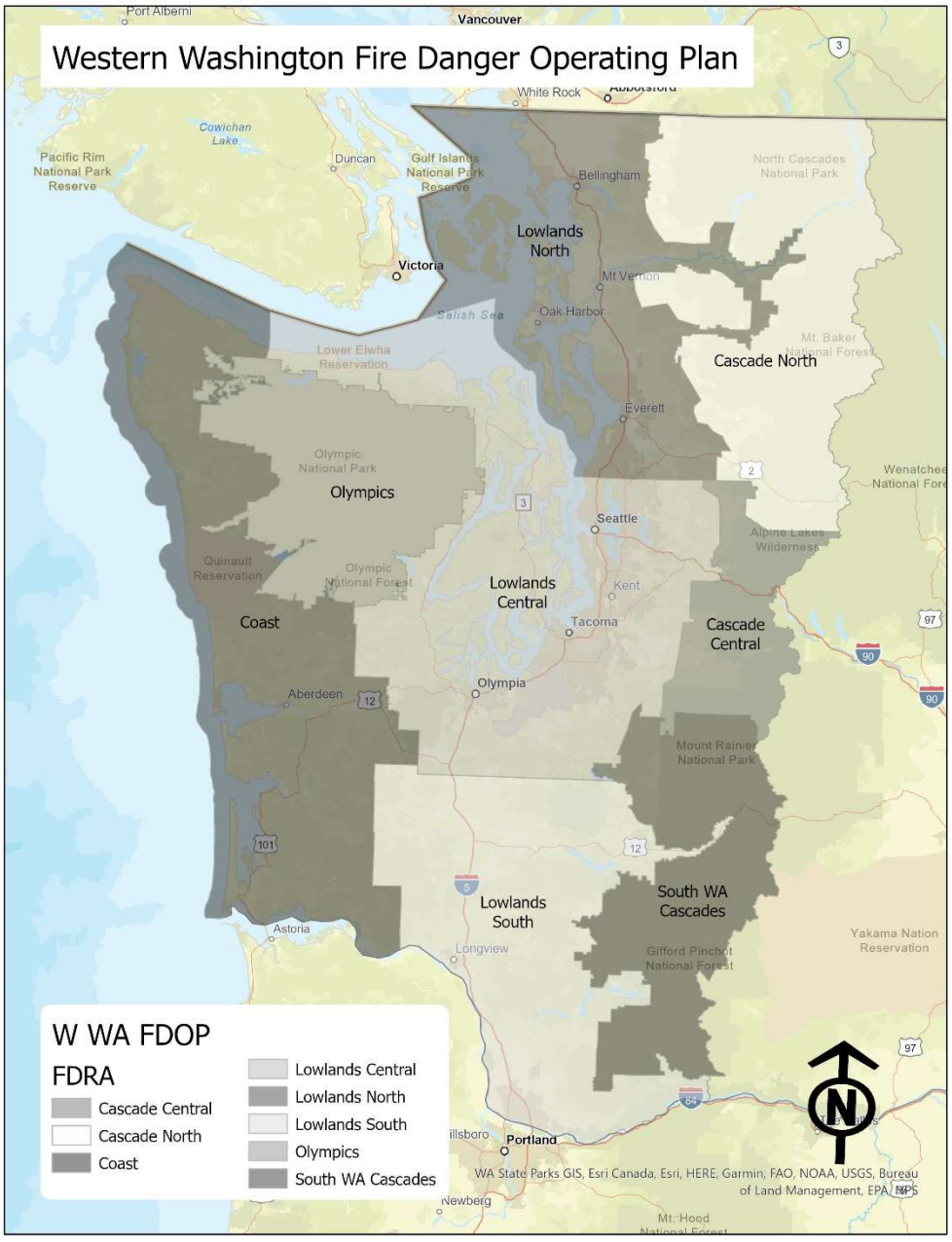
2.3 Fire Danger Rating Areas

A fire danger rating area (FDRA) is defined as a large geographic area relatively homogenous with respect to climate, vegetation, and topography. Because of these similarities, it can be assumed that the fire danger within a FDRA is relatively uniform. FDRA were delineated based upon an analysis of these three factors: climate, vegetation, and topography. Delineations are depicted in Appendix C with specific analysis of each area in Appendix B.

After these environmental factors were considered, the draft FDRAs were edge-matched to existing administrative boundaries. Primarily local fire district boundaries where available and a combination of major roads/river/ridges and administrative boundaries (mostly legal lines) elsewhere.

Communications center response area boundaries, although typically aggregated to form FDRAs, were not used. Some response areas such as local fire district boundaries were not split by FDRAs to avoid additional workload and confusion for operational personnel. The final FDRA delineation is depicted below and described below in section 2.3.1. FDRAs will be continuously evaluated and may be adjusted over time.

Figure 3: Proposed FDRA boundaries



2.3.1 FDRA Descriptions

The following descriptions describe the general areas within each FDRA. More detailed information can be obtained at the Western Region Climate Center state climate narratives, https://wrcc.dri.edu/Climate/narrative_wa.php.

2.3.1.1 *Olympics FDRA*

General Location: This area includes the Olympic Mountains on the Olympic Peninsula.

Vegetation: Primarily Timber with understory.

Climate: Annual precipitation ranges from 70 to 100 inches over the lower western slopes of the Olympics to 150 inches or more along the windward slopes of the mountains. A significant rain shadow causes a dramatic decrease in precipitation on the east side of the Olympics with as little as 15-18 inches rain in some areas.

Topography: Terrain is extremely steep and rugged in the Olympics. Elevation varies from approximately 1,000 feet in the lower river valleys to 7500' in the higher peaks of the Olympics.

2.3.1.2 North, Central, and South Lowlands FDRAs

After the 2020 test run of the W. WA FDOP that had one large Lowland FDRA, it was recommended that it be divided into three FDRAs for 2021 to better communicate subtle differences in the Puget Sound lowlands. They are divided into North, Central, and South Lowland FDRAs. They can all be characterized by the general description below.

General Location: The Puget Sound Lowlands extending from the Columbia River to the Canadian border. The I-5 corridor bisects the FDRAs with 30-40 miles extending on either side. The Northern Lowland FDRA it includes northern portions of the lowlands including the San Juan Islands. The Central Lowlands includes an area from just north of Seattle to about 30 miles south of Olympia. It also includes the lower elevations of the northern Olympic Peninsula. The Southern Lowland FDRA is all else down to the Columbia river.

Vegetation: Timber, Grass and Brush.

Climate: This is the warmest, driest, and most densely populated region of western Washington. In the rain shadow of the Olympics from Port Angeles to Mt Vernon, and including the San Juan Islands, the annual precipitation ranges from 18 to 30 inches. Average summertime highs range from 65° F near the water, to 75° F inland. For the rest of the Lowlands FDRA from Mt Vernon and Quilcene, south to the Columbia River, annual precipitation ranges from 32 to 45 inches of precipitation with average summertime highs from 73° to 78° F.

Topography: The majority of these FDRAs is made up of gently rolling terrain below 800ft MSL, with a few mountainous sections along the Cascade foothills that reach up to 3,800ft MSL.

2.3.1.3 Coast FDRA

General Location: This area includes the coastal plains and the western slope of the Coastal Range from the Columbia River to the Strait of Juan de Fuca. It extends from the coastline to approximately 40 miles inland at its furthest extent.

Vegetation: Timber with some grass fuel types found in coastal prairies and areas of dune grasses, generally following the natural range of Sitka Spruce.

Climate: The area receives the full force of storms moving inland from over the Pacific Ocean. The "rainforest" area along the southwestern and western slopes of the Olympic Mountains receives the heaviest precipitation in the continental United States. Annual precipitation ranges from 70 to 100 inches over the Coastal Plains to 150 inches or more along the windward slopes of the mountains. A morning marine layer with mist or drizzle is common during the spring and summer.

Topography: Elevation ranges from sea level to 2000' at the highest points.

2.3.1.4 North, Central and Southern Cascades FDRAs

Like the Lowlands, it was recommended that the one large Cascades FDRA used in 2020 be be divided into three FDRAs for 2021 to better communicate and identify changes observed from north to south. They are divided into North, Central, and South Lowland FDRAs. The map in figure 3 showed the boundary delineations for the three Cascade FDRAs. They can all be characterized by the general description below, with subtle changes in weather and lightning patterns and fire occurrence.

General Location: These FDRA areas include the western slope of the Cascade Range from an elevation of approximately 1,000 feet to the crest of the Cascades and extending from the Columbia River to the Canadian Border. The breaking point between the FDRAs are

Vegetation: Timber.

Climate: The annual precipitation ranges from 60 to 100 inches or more. Indications are that the heaviest precipitation probably occurs along the slopes of east-west mountain valleys which become narrower as the elevation increases along the windward slopes of the Cascades. Annual precipitation in some of the wetter areas has reached 140 inches in one out of ten years.

Topography: The Cascades range has extremely steep, rugged terrain. Elevation ranges from approximately 1000" in the foothills to over 7000'.

3.0 Fire Danger Problem Analysis

In order 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 Fire Occurrence

In general, ten years of fire occurrence data were used for the analysis in this FDOP although this may vary by FDRA. Data was obtained from the spatial wildfire occurrence data for the United States dataset. Fires are considered without regard to agency affiliation. Fire occurrence charts by FDRA can be found in Appendix B.

Due to the low occurrence of large fires in the Olympics and Northern Cascades along with the low correlation between fire discovery date and large fire growth events, the fire data were modified to facilitate the fire occurrence analysis. The methodology included taking a long duration, large fire event (mainly for the Olympics and North Cascades) and defining large fire growth days or active fire behaviour periods during the life of the incident. Each of these dates was recorded separately to "correct" the data to represent each time the fire exhibited active fire behavior and/or large fire growth. The justification for this adjustment is that many of the fires are managed using a monitor or confinement strategy and can remain on the landscape for long periods of time without having significant activity. By defining the large fire growth days there can be a better analysis for the indices that best correlate to the "active" fire periods.

3.2 Identification/Definition of the Fire Problem(s)

The ability to regulate, educate, or change behaviour within a user group will be based upon the interface method and how quickly they can react to the action taken. Consequently, the most appropriate decision tool would depend upon the sensitivity of the target group to the implementation of the action. In addition, each action will result in positive and/or negative impacts to a user group.

In selecting a component and/or index, several factors must be considered:

Affected Target Group: The group of people commonly associated with the problem (e.g., agency, industry, or public).

Agency: Employees of the federal, state, and local governments involved in the cooperative effort to suppress wildland fires. This includes Federal, State, and County land management employees, along with volunteer fire departments who share a similar protection mission to manage wildland fires.

Industry: Employees affiliated with organizations which utilize natural resources and/or obtain permits or leases to conduct commercial activities on federal, state, or private lands. These entities or activities could include ranchers, wilderness camps, railroads, mines, timber harvesting, filming, building construction, oil and gas, electric generation, guiding services, etc.

Public: Individuals who use public lands for non-commercial purposes such as off-highway vehicle use, camping, hiking, hunting, fishing, skiing, firewood gathering, agriculture, mountain biking, general travel, and recreation. This group also includes those living within the wildland urban interface.

Problem Definition: This is the problem specific to the area of concern and includes ignition causes. The problem is framed to focus on the wildland fire management issue associated with a specific target group.

Degree of Control: This is a general description of how much control the fire management agencies have over the target group (High to Low). This is a measure of how quickly the affected target group can respond to changing fire danger levels.

Communication: Various methods of communication are utilized to influence an affected target group to change their behavior. Depending upon the specific target group, communication may include face-to-face verbal conversations, radio, telephone, email, newspaper, television, signing/posting, text messages, etc.

Component/Index: Sensitivity of the NFDRS outputs should be commensurate with the ability to react (or communicate) to the target group.

Management Action: The actions or applications are pre-defined and taken at breakpoints determined through an analysis of fire danger indices and fire occurrence. Collectively the decision points represent levels of fire danger applied as a communication mechanism to specific target groups. The intent is to minimize the risk of a fire ignition problem by controlling or influencing a specific target group (Agency, Public, and Industry).

Figure 4: Fire Summary for Western Washington FDOP

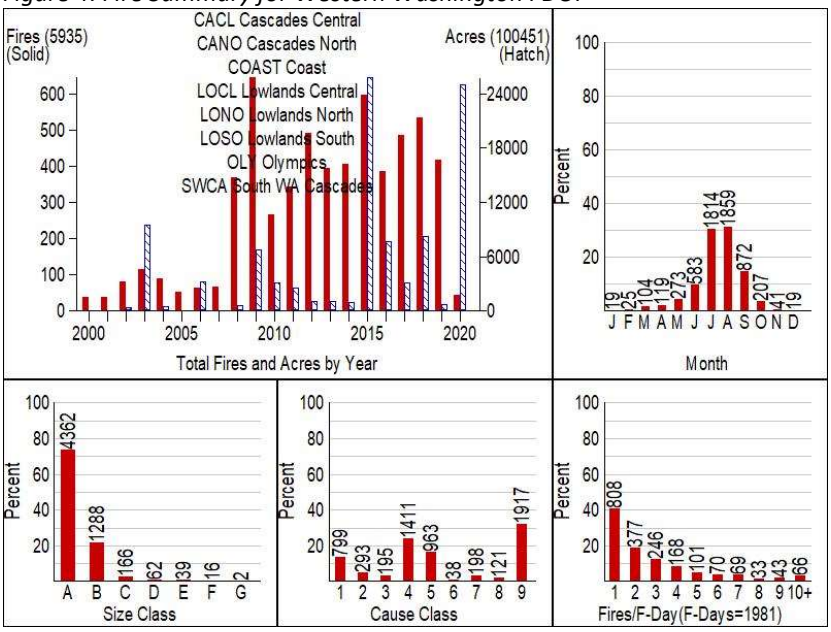


Table 2: Identification and definition of the fire problem in Western Washington.

TARGET GROUP		IGNITIONS CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	PROBLEM
General	*Specific*	*General*	*Specific*			
Agency	Agency suppression resources and fire managers	1 - Lightning	Lightning	High	Dispatch centers communicate fire weather (LAL) and fire danger (SL and PL)	Fires which exceed the units capability to manage due to growth on the discovery day
Agency	Agency suppression resources and fire managers	1 - Lightning	Abundant Lightning	High	Dispatch centers communicates fire weather (LAL) and fire danger (SL and PL)	Fires which exceed the units ability to manage because the number of ignitions exceeds initial attack capability and/or fires escape initial attack on subsequent days
Public	Public using overnight developed recreation sites	4 - Campfire	Unattended (and escaped) campfires	High	PIO/Prevention Radio, media broadcast, news release and internet. Smokey Arm, adj. signs and prevention patrols	Campfires in developed recreation areas that escape and become large fires or tie up agency resources allowing other fires to grow and escape initial attack
Public	Public using agency lands for day use or undeveloped overnight use	4 - Campfire	Unattended (and escaped) campfires	Low	PIO/Prevention Radio, media broadcast, news release and internet. Smokey Arm, adj. signs and prevention patrols	Campfires in undeveloped or day use recreation sites that escape and become large fires or tie up agency resources allowing other fires to grow and escape initial attack
Industry	Woods workers and Industrial forest users operating on public lands	2 - Equipment	Any ignition associated with the target group from chainsaws to yarding	Moderate	Dispatch centers communicate IFPL for agency personnel, state posts on internet for public	Ignitions which become large fires resulting from industrial forest operations (equipment and smoking)

Public	Private Landowners	5 - Debris Burning	Escaped debris burns	Low	Burn restrictions posted on the dispatch website, Radio, media broadcast, news release and internet	Escaped debris burns which become large fires or tie up agency resources

4.0 Fire Danger Threshold/Decision Analysis

Decision points can be based upon either:

- Climatological Breakpoints, or
- Fire Business Thresholds.

The FDOP will be used to support fire management decisions made at specific decision points. A decision point is a point along the range of possible output values where a decision shifts from one choice to another. 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 identified for selected indices and levels within each FDRA.

4.1 Climatological Breakpoints

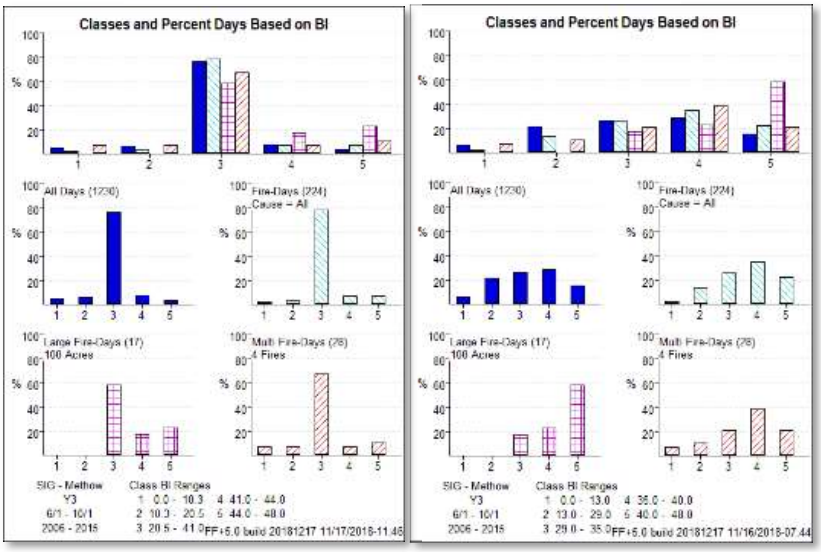
Climatological breakpoints are points on the cumulative distribution curve of a fire danger indices computed from climatology (weather). For example, the value at the 90th percentile ERC is the climatological breakpoint at which only 10 percent of the ERC values are greater in value. Climatological percentiles were originally developed for budgetary decisions by federal agencies, *without regard for associated fire occurrence*, and are predetermined by agency directive, as exemplified below:

BLM: 80th and 95th percentiles
FWS, NPS, USFS: 90th and 97th percentiles

When using climatology, it is important to identify the period of record used to determine the agency percentiles. The percentile values for the calendar year will be different from the percentile values for the fire season.

Where possible the decision thresholds identified in this FDOP are based upon the statistical correlation of historical fire occurrence and weather data and, therefore, do not utilize climatological percentiles for decision points. Note the fire business charts to the right showing climatological breakpoints on the left and fire business thresholds on the right. Increased preparedness actions taken at levels 4/5 have little potential to affect outcomes using traditional climatological breakpoints

Figure 5: Climatological Breakpoints Example



since most of the fire problems occur at level 3.

4.2 Weather Station Analysis

Remote Automated Weather Stations (RAWS) in different geographical locations with common sensitivity to NFDRS model inputs can be grouped together to form a special interest group (SIG). Refer to the Appendix B for details regarding the weather station analysis. The stations and SIGs below were chosen based on location, station and data quality, and the statistical correlation to the fire problem in section 4.3 below.

Many stations at the higher elevations suffer outages in the winter due to snow loading or are difficult to repair timely because of access issues. This has created significant gaps in the data for many stations and limited the number of stations available for analysis. When data gaps can be filled, SIGS and FDRA's should be re-analyzed to ensure the validity of the data. The impacts of having corrected manual observations without the remaining 23 hours of data provides a case where the data counts appear complete, but the other 23 hours of missing data is causing a misrepresentation of the indices.

4.2.1 NFDR Stations and Special Interest Groups (SIGS)

Table 3: FDRA RAWS stations list

FDRA	Station	Station Name	Owner	WIMS Ann Prec
Coast	450130	Ellis Mt	WA-DNR	106
	450306	Minot LO	WA-DNR	100
	450312	Humptulips	WA-OLF	160
	450407	Huckleberry	WA-DNR	120
North Lowlands	451415	Sumas	WA-DNR	45
	451509	Finney		
	451613	Gold Mt	WA-MBF	
Central Lowlands	450207	Quilcene	WA-OLF	45
	451207	Castle Rock	WA-DNR	45
	451507	Sedro Woolley	WA-DNR	47
	451702	Enumclaw	WA-DNR	49
	451103	Chehalis	WA-DNR	46
South Lowlands	451103	Chehalis	WA-DNR	46
	451207	Castle Rock		45
Olympic	450117	Cougar	WA-OLF	50
	450121	Tom Creek	WA-OLF	100
	450124	Hurricane	WA-OLP	74
	450911	Jefferson	WA-OLF	90

North Cascade	451504	Marblemount	WA-NPS	
	451509	Finney		
	451613	Gold Hill	WA-MBF	70
Central Cascade	451611	Johnson		
	451718	Green Water	WA-DNR	
	451721	Fire Academy	WA-MBF	
South WA Cascades	451115	HAGER	WA-GPF	50
	541919	ORRCR	WA-GPF	66
	451924	DRYCR	WA-GPF	70

4.3 Fire Business Analysis

A statistical correlation of fire occurrence with fire danger indices, weather stations, and fuel models was used in conjunction with the fire problem analysis table in Section 3.2 above to determine the best combination for predicting the fire problem in each FDRA.

All 5 NFDR fuel models were given a cursory examination however the use of GSI for NFDR in this area needs further consideration and adjustment at this time as live fuels are not curing during the fire season under current vapor pressure deficit settings. Fuel model Y contains no live fuels and often had better statistical results than others, perhaps in part to the mentioned GSI issue. Statistical results of chosen combinations are included in the FDRA information sheets in Appendix B.

4.4 Parameters Used to Calculate Fire Danger

Large fires, multiple fire days, and herb type were determined through analysis and participant input. KBDI and precipitation are both required to run NFDR 2016. KBDI, used to adjust for drought fuels, was left at the default of 100. Annual precipitation from the PRISM dataset, shown in the previous table, was used instead of a GIS precipitation analysis, this may or may not be desirable with NFDR 2016 and should be further explored.

Table 4:

FDRA (s)	Station ID	Name	Analysis Years	Analysis Time of Year	NFDRS Fuel Model	Slope Class	Avg Precip	Initial KBDI	Max SC	Herb Annual	Station Weight
North, Central, and South Cascades	451115	Hager	2010-2019	June 15-Sept 30	Y	3	50	100	5	N	1
	451509	Finney	2010-2019	June 15-Sept 30	Y	3	90	100	5	N	1
	451718	Greenwater	2010-2019	June 15-Sept 30	Y	4	140	100	5	N	1
	451721	Fire Academy	2010-2019	June 15-Sept 30	Y	3	64	100	5	N	1
	451924	Dry Creek	2010-2019	June 15-Sept 30	Y	3	70	100	5	N	1
Coast	450130	Ellis Mt	2008-2019	June 1 - Oct 1	Y	3	106	100	5	N	1
	450306	Minot LO	2008-2019	June 1 - Oct 1	Y	2	100	100	5	N	1
	450312	Humptulips	2008-2019	June 1 - Oct 1	Y	4	160	100	5	N	1
	450407	Huckleberry	2008-2019	June 1 - Oct 1	Y	4	120	100	5	N	1
North, Central, and South Lowlands	450207	Quilcene	2008-2019	May 1 – Sept 30	Y	3	45	100	5	N	1
	451207	Castle Rock	2008-2019	May 1 – Sept 30	Y	2	45	100	5	N	1
	451507	Sedro Woolley	2008-2019	May 1 – Sept 30	Y	2	47	100	5	N	1
	451702	Enumclaw	2008-2019	May 1 – Sept 30	Y	2	49	100	5	N	1
	451103	Chehalis	2008-2019	May 1 – Sept 30	Y	2	46	100	5	N	1
Olympic	450117	Cougar	2008-2019	June 15-Sept 30	Y	4	50	100	5	N	1
	450121	Tom Creek	2008-2019	June 15-Sept 30	Y	4	100	100	5	N	1
	450124	Hurricane	2008-2019	June 15-Sept 30	Y	4	74	100	5	N	1
	450911	Jefferson	2008-2019	June 15-Sept 30	Y	4	90	100	5	N	1
South Washington Cascades	451115	Hager	2006-2020	June 15-Sept 30	Z	3	50	100	19	N	1
	451919	Orr Creek	2006-2020	June 15-Sept 30	Z	3	66	100	19	N	1
	451924	Dry Creek	2006-2020	June 15-Sept 30	Z	3	70	100	19	N	1

4.5 Decision Points

Using Fire Family Plus software (5.0), NFDRS decision points have been identified where changes in fire business should occur, as illustrated in the chart below. Threshold charts for all FDRAs are included in the Appendix B. Energy release component 10HR fuel moisture and burning index were carried forward from the analysis for use in this plan as the basis for setting fire danger levels. Decision points based on fire business analysis are available in Appendix B within each FDRA's Information Sheet.

Figure 6: Example of Decision breakpoints

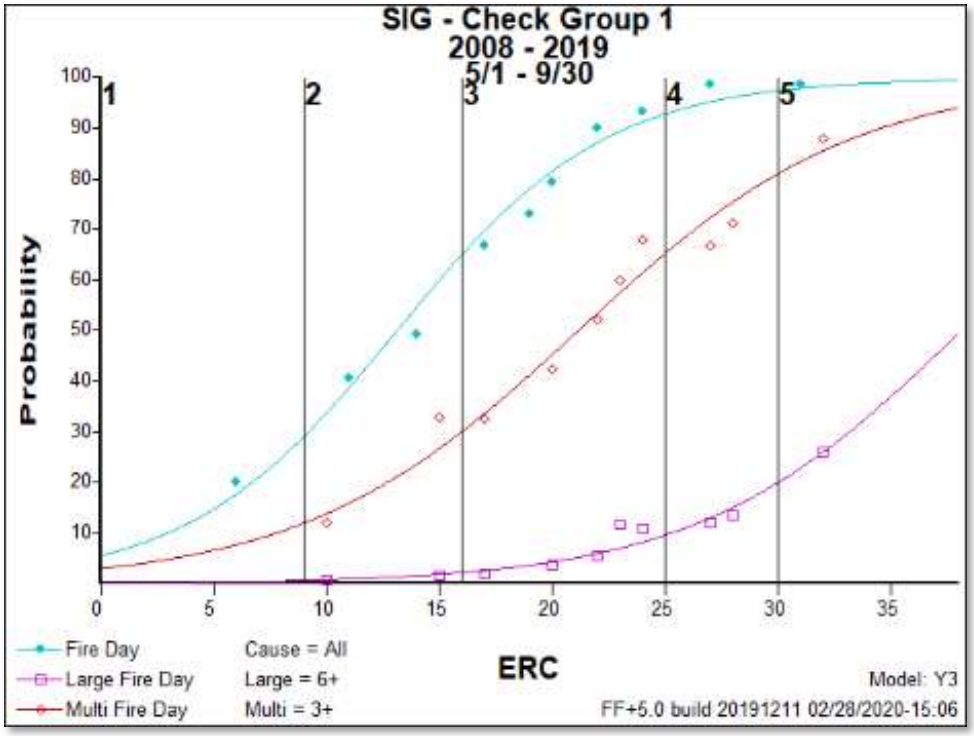


Table 5: Fire Business Decision Summary Table

TARGET GROUP	DECISION POINTS	INDEX	FUEL MODEL	SUBORDINATE PLAN USED TO MODIFY TARGET GROUP BEHAVIOR
Agency	5	ERC	Y	Staffing Plan
Agency	3	10HR, Burning Index, ERC	Y	Response Plan
Agency	5	ERC	Y	Preparedness Plan
Public	5	ERC	Y	Prevention Plan (Adjective Rating)
Public	TBD by Unit	ERC	Y	Prevention Plan or Public Use Restriction Plan
Industry	4	IFPL	Y	Industry/Public Use Restriction Plan

5.0 Fire Danger Rating Level Decisions

The NFDRS utilizes the WIMS processor to manipulate weather and forecast data stored in the National Interagency Fire Management Integrated Database (NIFMID) to produce fire danger ratings for corresponding weather stations. The NFDRS outputs from the WIMS processor can be used to determine various levels of fire danger rating to address the fire problems identified previously in the Fire Problem Analysis Chart. The system is designed to model worst-case fire danger scenario. The NFDRS, along with other decision support tools, will be utilized to produce levels (thresholds) of fire business to address local fire problems by targeting public, industrial, or agency groups.

The NFDRS will be utilized to produce outputs to assist fire managers with six sets of decisions.

For the 2021 fire season Response levels, Staffing Levels, and Preparedness Levels will be calculated by individual dispatch centers, with an expectation of coordination with adjacent or overlapping centers. The Adjective Rating level will be discussed with a representative from all units on a weekly phone call during fire season at a minimum.

- **Response Levels** will be used as a decision tool for dispatchers to assign initial attack resources to a fire reported in a specific dispatch zone.
- **Staffing Levels** will be used for appropriate day-to-day suppression resource staffing.
- **Preparedness Levels** will assist fire managers with more long-term (or seasonal) decisions with respect to fire danger.
- **Adjective Rating Level** will be used to communicate fire danger to the public.
- **Industrial Fire Precaution Level** will be used to curtail preventable industrial ignitions.
- **Public Use Restriction Level** will be used to curtail public ignitions.

5.1 Response (or Dispatch) Level

Calculation and Communication will be managed at the local level with an expectation of coordination between centers

Response (or dispatch) levels are pre-planned actions which identify the number and type of resources (engines, crews, aircraft, etc.) initially dispatched to a reported wildland fire based upon fire danger criteria. Dispatch 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 level in this plan is a direct function of staffing level.

5.2 Staffing Level

Calculation and Communication will be managed at the local level with an expectation of coordination between centers

STAFFING LEVEL	RESPONSE LEVEL
1	1
2	
3	
4	2
5	3

The staffing level forms the basis for decisions regarding the degree of readiness of initial attack (IA) and support resources. Staffing Levels are expressed as numeric values where 1 represents the low end of the fire danger continuum and 5 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 of shared resources such as air tankers, helicopters, hotshot crews and other large fire support resources.

The process for determining local staffing levels is not the same as staffing level calculated directly from WIMS. WIMS calculates staffing level on climatological breakpoints; For 2020 Individual Dispatch Centers will calculate their respective staffing levels, with an expectation of coordination with adjacent or overlapping centers. Dispatch centers will calculate staffing level based on decision points identified in their own staffing plans and unit fire staff will check correlation with this plan and use that as a communication tool between units. This graph is to be utilized as an example and a starting point for further discussion and refinement.

STAFFING INPUT VALUE	1 □	2 □		3 □		4 □		5 □	
RED FLAG WARNING, FIRE WEATHER WATCH, IA ACTIVITY?	↓	No □	Yes □	No □	Yes □	No □	Yes □	No □	Yes □
STAFFING OUTPUT VALUE	I	II		III		IV		V	

The primary input is the forecast or observed staffing level based on the decision points defined in this plan. The secondary input is specific to the respective dispatch area, and may include inputs such as red flag warnings, fire weather watches or warnings, public use triggers like holidays, offshore flow, thermal trough in place, predicted lightning etc. These secondary inputs may increase or decrease the staffing level from the primary input.

5.3 Preparedness Level

Calculation and Communication will be managed at the local level with an expectation of coordination between centers

The preparedness level is a five-tier (1-5) fire danger rating decision tool that is based on NFDRS output(s) (energy release component, Y) and other mid- to long-term indicators of fire business such as fine fuel loading or drought. Preparedness levels are established to assist fire managers with weekly or monthly planning decisions.

The preparedness level worksheet below is presented as an example. Units should document specific preparedness level procedures, including calculation frequency, in unit preparedness plans.

Variable	Response	Factor
Staffing Level	Staffing Level 1-5	1-5
IA Commitment	Yes	Add .25
	No	Subtract .25
Extended Attack	Yes	Add .25
	No	Subtract .25
7 Day Fire Potential PSAs- NW01, NW02	Yes	Add .25
	No	Subtract 0
GACC PL	Increasing	Add .25
	Holding Steady	0
	Decreasing	Subtract .25

The preparedness input value should be an average, or weighted average, of the forecast preparedness level and trend pertinent to the unit. For example, Northwest DNR may choose to use the average of the Cascades and Lowland fire danger rating area current/forecast trend value as the input since these cover most of their response area of concern.

5.4 Adjective Fire Danger Rating Level

Informed by Staffing level value calculated, published, and broadcast twice daily by the communications centers. Actual value set weekly during fire season based on discussion with agency or unit representatives.

In 1974, the USFS, BLM and state forestry organizations established five standard adjective fire danger rating levels descriptions for public information and signing. For this purpose, only, fire danger is expressed using the national adjective descriptions and colour codes.

Although NFDRS processors (e.g., WIMS) automatically calculate the adjective rating based on climatology, units participating in this plan will use FDRA preparedness level (ERC-Y) thresholds/breakpoints defined in this plan as the basis for discussions with cooperators for setting FDRA adjective rating level.

ERC Breakpoint	Adjective Rating
1	Low
2	Moderate
3	High
4	Very High
5	Extreme

5.5 Public Use Restrictions

Set by the unit, ideally informed by adjective rating or unit calculated preparedness value.

Public use restrictions are implemented and set by the individual agencies participating in this plan. Currently there is not a coordinated interagency set of restrictions/levels (or actions) used by participants in this plan.

Ideally units will set public use restrictions based on, or informed by, adjective rating (less risk tolerant) or unit calculated preparedness level (more risk tolerant). Number of levels, actions, and basis for decision making will be defined in unit prevention plans or public use restrictions plans.

5.6 Industrial Fire Precaution Level

DNR, U.S. Forest Service, Bureau of Land management and Bureau of Indian Affairs all use the same four-level industrial regulation system. This system, which helps prevent wildfires by regulating work in the woods, is known as the Industrial Fire Precaution Level (IFPL) system. More information on IFPL in Washington can be found on the Washington Department of Natural Resources page here.

IFPL for Fuel Model Y Proposed Splits

		IC															
	ERC/IC	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80
ERC	0-5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	6-10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	11-15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	16-20	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
	21-25	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
	26-30	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
	31-35	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3
	36-40	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3
	41-45	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3
	46-50	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3
	51-55	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4
	56-60	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4
	61-65	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4
	66-70	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4
	71-75	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4
	76-80	1	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4

Figure 7: IFPL Lookup Table

The model above is being tested as a replacement for the 1978 precaution value for determining IFPL. The model uses ERC-Y and IC-Y index values for the IFPL zone SIG. Development is ongoing and any future iterations will be incorporated in this document as they are developed and approved. The publicly posted IFPL value will be determined through regular fire danger coordination that includes the respective land management agencies with jurisdiction for each IFPL zone.

6.0 Fire Danger Operating Procedures

6.1 Roles and Responsibilities

6.1.1 Agency Administrators

Agency Administrators will use this plan to coordinate with fire management officers on fire business related decisions.

6.1.2 Fire Program Managers

Fire program managers (FMOs) will use this FDOP and NFDRS outputs as a tool to coordinate and to make informed fire business decisions. The fire program manager is ultimately responsible for ensuring this plan is maintained, utilized, and communicated.

Fire program managers will ensure that their stations are maintained to NFDRS standards.

6.1.3 Fire Danger Technical Group

Each participating agency will be responsible for providing an NFDRS technical specialist to participate in the maintenance, review, and update of this plan. These individuals are listed in front of the table of contents.

Members of the Fire Danger Technical Group will monitor NFDRS to ensure validity, coordinate/communicate any problems identified, review plan implementation, coordinate plan revisions, present the plan, and be available for NFDRS technical consultation. The technical group will coordinate with fire managers from their unit for updates and additions to the plan. The technical group will coordinate annually to review plan implementation, decide if revisions are necessary, and accomplish revisions.

6.1.4 Fire Weather Station Owners/Managers

The station owners will ensure appropriate editing of the RAWS catalogues to match this plan and maintain *current* primary and secondary contacts for stations. Station owners will maintain stations in accordance with NWCG PMS 426-3 and ensure a timely response when notified of an unexpected need for repair.

6.1.5 Communication Center

The dispatch centers will ensure that the daily NFDRS indices are retrieved and that the daily staffing and preparedness levels are calculated, communicated, and made available during fire season, April 1st through October or season end, and as requested by participants in this plan due to extenuating factors.

The dispatch centers will monitor RAWS daily for unusual readings that may suggest an issue needing attention and contact the station owners to arrange resolution and notify agency fire program managers (FMO).

The dispatch centers will give WIMS the proper seasonal care and inputs required to run NFDR 2016, including setting snow flags and starting KBDI. Dispatch centers will be responsible for the RAWS stations under their jurisdiction. For example, PSICC will monitor and maintain inputs for Stations owned by the Mt Baker Snoqualmie NF and North Cascades National Park within the North and Central Cascade FDRA. Columbia Cascade will monitor stations and inputs for

stations on the Gifford Pinchot NF and Mt Rainier NP for the South WA Cascades FDRA, and DNR dispatch centers will do the same for all DNR owned stations.

6.1.6 Duty Officers

A duty officer from each agency will be identified to the appropriate dispatch center throughout the fire season. It is the duty officer role to interpret and modify the daily staffing and preparedness levels (if warranted) by extenuating factors not addressed by this plan to make fire business decisions.

6.1.7 National Weather Service

Weather forecasts and products for the area are provided by the National Weather Service, Seattle and Portland offices. The annual Northwest Fire Weather Operating Plan contains contact information and product listing (including NFDRS point and trend forecast products) and can be found on the Northwest Coordination Center Website.

6.2 Daily Schedule

The intent is to provide web based NFDRS products from which dispatchers and managers can quickly and easily obtain the needed information to calculate and communicate fire danger levels. This information has previously been hosted externally and communication centers should be prepared to obtain the outputs from WIMS and using the tables and worksheets in this plan. **The daily indices are available at W. WA FDOP FDRA Daily NFDRS Map.**

Dispatch centers will use the current day's forecasted indices for the morning fire weather broadcast. Those will be in effect until the afternoon fire weather broadcast that will communicate the observed indices for the day.

Morning and afternoon broadcasts **will** include the observed and predicted ERC, when available, as well as predicted Staffing Level.

6.3 Critical Fire Danger

Critical fire danger events such as thermal pressure troughs, offshore flow/east winds, and dry cold front winds will be typically captured by National Weather Service meteorologists in red flag warnings or fire weather watches. Warm, dry, unstable conditions can exacerbate fire danger conditions in Western Washington and cause active fire behavior during times when fuels are not critically dry. The moss and lichen component within timber fuels contributes greatly to this effect.

Poor nighttime humidity recoveries below approximately 60 percent combined with more than 14 days without wetting rain and temperatures above 72 degrees is generally a threshold for increased fire activity. Effects of prolonged periods of poor humidity recovery on heavy fuels can persist for one to two days after onshore flow returns.

For more information see the publication Critical Weather Patterns of the United States as well as other weather conditions can be found on the NWCC website here. Information on past large fire growth days can be found in the Appendix F.

6.4 Season Ending Event

The NWCC conducted a season ending event analysis by predictive services area which can be found on their fire analysis page. Experience has shown locally that season ending analysis conducted in the traditional manner for individual fires or by FDRA come within a week or so either side of the NWCC analysis. A season ending analysis will also be available on the RMA Dashboard site that is under develop in 2021.

6.5 Fire Danger Pocket Cards/Seasonal Risk Analysis

The fire danger pocket card is a tool which can aid fire suppression personnel to interpret NFDRS outputs and understand local fire danger thresholds for a local area. Pocket cards can relate current NFDRS outputs with the historical average and worst-case values in a specific geographic location. Visiting resources can use the pocket card to familiarize themselves with local fire danger conditions. The pocket cards meet NWCG guidelines and are posted on the NWCG website. Seasonal risk analysis (pocket cards with updated daily values) will be linked on the dispatch center websites. For 2020, pocket cards will reflect the original NFDRS model, not the NFDRS 2016 model.

6.6 Weather Station Maintenance

Each agency is responsible for the annual maintenance and calibration of their RAWS used in this plan. Specifics regarding NWCG weather station standards and guidelines can be found in PMS 426-3 here.

Appendices

Appendix A: Primary Distribution List

This list indicates key personnel associated with this plan at this time.

Washington State Department of Natural Resources
DNR Northwest Region Dispatch and Fire Managers
DNR Olympic Region Dispatch and Fire Managers
DNR South Puget Sound Region Dispatch and Fire Managers
DNR Pacific Cascade Region Dispatch and Fire Managers
Coordination Centers
Puget Sound Interagency Coordination Center
Columbia Cascade Interagency Coordination Center
National Park Service
North Cascades National Park FMO
Olympic National Park (Olympic Interagecy FMO)
Mt. Rainier National Park (Covered by GP FMO)
Forest Service
Mount Baker Snoqualmie National Forest FMO
Olympic National Forest (Olympic Interagecy FMO)
Gifford Pinchot National Forest FMO

Appendix B: Fire Danger Rating Area Analysis – Western Washington FDOP
B-1: North Cascades FDRA Analysis

B-2: Central Cascades FDRA Analysis

B-3: South Washington Cascades FDRA Analysis

General Location: This area includes the western slope of the Cascade Range from approximately 1000 feet in elevation to 14,000 feet, just north of the Columbia River to the northern boundary of Mt Rainier National Park.

Vegetation: Primarily Timber with understory.

Climate: Annual precipitation ranges from 50 inches at lower elevation to 240 inches at the highest elevations. The direst months are typically July and August with some years receiving minimal precipitation during this period. Severe years can exhibit continued dry weather through September.

Topography: Terrain is extremely steep and rugged. Elevation varies from approximately 1000 feet in the lower river valleys and foothills to 14000' at Mount Rainer. Burnable vegetation is generally confined to elevations less than 6000 feet.

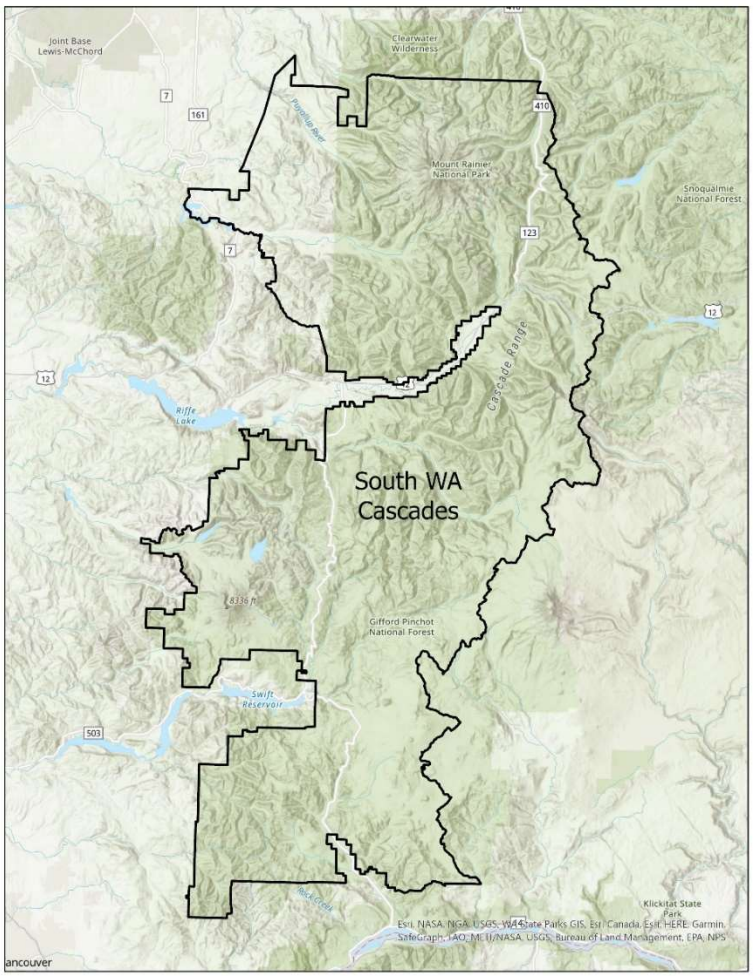
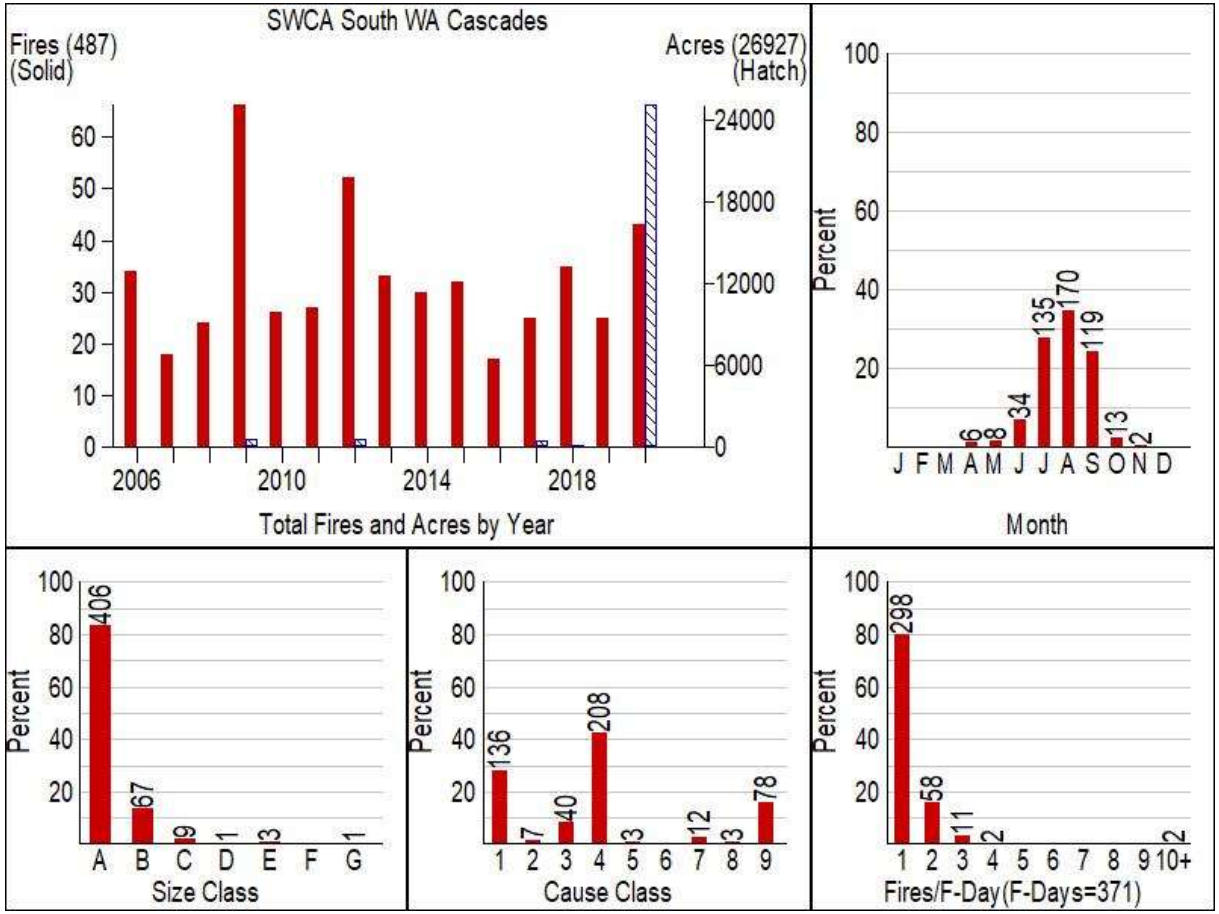


Figure B4.1: Overview map of Cascades FDRA.



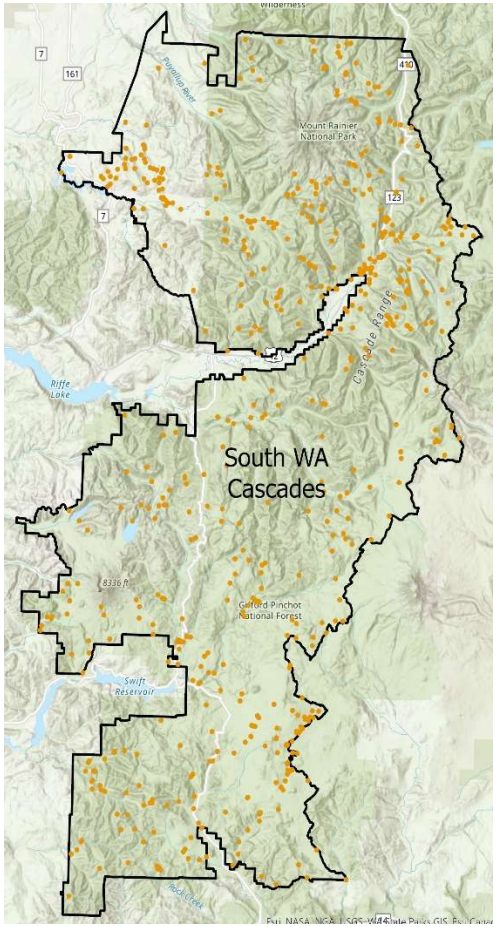


Figure B4.2: Fire Summary Graph for analysis months and years for South WA Cascades FDRA *Figure B4.3: Map of fires used for South WA Cascades analysis*

Table B4.1: Select fire summary graph data for South WA Cascades FDRA.

Fire Cause Classes		Fires By Month Lightning vs Human			Fire Size Percentiles	
1	Lightning	Month	Lightning	Human	Percentile	Acres
2	Equipment	April	1	5	100	24995
3	Smoking	May	2	6	99	36

4	Campfire	June	9	25	98	15
5	Debris	July	57	78	97	7
6	Railroad	August	38	132	96	4.6
7	Arson	Sept	29	90	95	2
8	Children	Oct	0	13	90	.5
9	Misc	Nov	0	2	80	.2

Season and Size determination

Table B4.2: Season, large fire size in acres, and multiple fire day used in analysis for South WA Cascades FDRA.

Season	Large Fire	Multiple Fire Day
June 15th-Sept 30th	3 acres	3 fires

Fire Danger Decision Analysis

Table B4.3: The season, large fire, and multiple fire day as defined in the fire problem analysis for South WA Cascades FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis for South WA Cascades FDRA.

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 15th-Sept 30th	3 acres	3 fires	1620	331	21	15

SIG Catalog

Table B4.4: Final SIG station parameters as determined through correlation analysis for South WA Cascades FDRA.

Station ID	Name	Analysis Years	Analysis Time of Year	NFDRS Fuel Model	Slope Class	Avg Precip	Max SC	Herb Annual	Station Weight
451115	Hager	2006-2020	June 15th-Sept 30th	Z	3	70	19	N	1
451919	Orr Creek	2006-2020	June 15th-Sept 30th	Z	3	66	19	N	1
451924	Dry Creek	2006-2020	June 15th-Sept 30th	Z	3	99	19	N	1

Correlation Analysis Table

Table B4.5: Correlation values for South WA Cascades 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
451115	2007 - 2020	6/15 - 9/30	BI	X3P3	All	0.83	19.09	0.0144	0.09 - 0.54	3 (C)	0.79	5.19	0.7369	0.00 - 0.37	3 (C)	0.03	6.04	0.6433	0.03 - 0.06
451919	2007 - 2020	6/15 - 9/30	BI	X3P3	All	0.92	7.38	0.4959	0.04 - 0.88	3 (C)	0.6	7.75	0.4584	0.00 - 0.87	3 (C)	0	7.21	0.5138	0.03 - 0.09
451921	2007 - 2020	6/15 - 9/30	BI	X3P3	All	0.88	11.55	0.1726	0.10 - 0.62	3 (C)	0.77	5.33	0.7219	0.00 - 0.56	3 (C)	0.01	19.35	0.0131	0.04 - 0.06
451924	2007 - 2020	6/15 - 9/30	BI	X3P3	All	0.94	7.74	0.4595	0.04 - 0.62	3 (C)	0.64	8.99	0.3433	0.00 - 0.31	3 (C)	0.04	6.31	0.6126	0.02 - 0.08
451115	2007 - 2020	6/15 - 9/30	BI	Y3P3	All	0.97	3.25	0.9177	0.03 - 0.56	3 (C)	0.76	8.46	0.3901	0.00 - 0.47	3 (C)	0.32	3	0.8088	0.01 - 0.11
451919	2007 - 2020	6/15 - 9/30	BI	Y3P3	All	0.92	7.81	0.4519	0.03 - 0.58	3 (C)	0.73	5.94	0.6542	0.00 - 0.63	3 (C)	0.23	7.5	0.3787	0.00 - 0.14
451921	2007 - 2020	6/15 - 9/30	BI	Y3P3	All	0.9	8.74	0.3643	0.07 - 0.53	3 (C)	0.72	8.29	0.406	0.00 - 0.43	3 (C)	0.07	7.5	0.4839	0.02 - 0.08
451924	2007 - 2020	6/15 - 9/30	BI	Y3P3	All	0.95	5.19	0.7368	0.02 - 0.58	3 (C)	0.75	6.22	0.6221	0.00 - 0.32	3 (C)	0.06	13.48	0.0612	0.01 - 0.09
451115	2007 - 2020	6/15 - 9/30	BI	Z3P3	All	0.93	6.13	0.6322	0.05 - 0.63	3 (C)	0.81	6.49	0.5927	0.00 - 0.47	3 (C)	0.17	6.94	0.5434	0.01 - 0.10
451919	2007 - 2020	6/15 - 9/30	BI	Z3P3	All	0.95	4.37	0.822	0.04 - 0.84	3 (C)	0.68	7.06	0.5305	0.00 - 0.90	3 (C)	0.05	11.25	0.1879	0.01 - 0.24
451921	2007 - 2020	6/15 - 9/30	BI	Z3P3	All	0.95	3.86	0.8697	0.09 - 0.56	3 (C)	0.9	1.95	0.9825	0.00 - 0.48	3 (C)	0.02	8.94	0.3477	0.02 - 0.09
451924	2007 - 2020	6/15 - 9/30	BI	Z3P3	All	0.97	3.16	0.9239	0.03 - 0.61	3 (C)	0.68	7.18	0.517	0.00 - 0.31	3 (C)	0.04	13.27	0.1029	0.01 - 0.09
451115	2007 - 2020	6/15 - 9/30	ERC	X3P3	All	0.9	8.56	0.381	0.10 - 0.54	3 (C)	0.7	7.87	0.4461	0.00 - 0.38	3 (C)	0.09	4.37	0.8227	0.03 - 0.07
451919	2007 - 2020	6/15 - 9/30	ERC	X3P3	All	0.97	2.61	0.9565	0.05 - 0.47	3 (C)	0.76	5.17	0.7391	0.00 - 0.30	3 (C)	0.01	10.78	0.2144	0.02 - 0.05

451921	2007 - 2020	6/15 - 9/30	ERC	X3P3	All	0.92	6.69	0.5708	0.11 - 0.52	3 (C)	0.74	7.22	0.5133	0.00 - 0.34	3 (C)	0.04	10.99	0.2021	0.04 - 0.06
451924	2007 - 2020	6/15 - 9/30	ERC	X3P3	All	0.86	18.73	0.0164	0.05 - 0.51	3 (C)	0.81	4.12	0.8457	0.00 - 0.28	3 (C)	0.03	7.75	0.4586	0.02 - 0.06
451115	2007 - 2020	6/15 - 9/30	ERC	Y3P3	All	0.93	6.76	0.5625	0.04 - 0.69	3 (C)	0.77	6.17	0.6278	0.00 - 0.53	3 (C)	0.42	3.12	0.9264	0.01 - 0.13
451919	2007 - 2020	6/15 - 9/30	ERC	Y3P3	All	0.89	10.51	0.2313	0.03 - 0.62	3 (C)	0.66	8.83	0.3572	0.00 - 0.53	3 (C)	0.13	13.87	0.0853	0.00 - 0.16
451921	2007 - 2020	6/15 - 9/30	ERC	Y3P3	All	0.94	6.86	0.5513	0.06 - 0.65	3 (C)	0.74	7.71	0.4622	0.00 - 0.50	3 (C)	0.23	5.1	0.7472	0.02 - 0.11
451924	2007 - 2020	6/15 - 9/30	ERC	Y3P3	All	0.98	2.78	0.9475	0.04 - 0.63	3 (C)	0.78	4.15	0.8436	0.00 - 0.35	3 (C)	0.21	7.3	0.5051	0.01 - 0.09
451115	2007 - 2020	6/15 - 9/30	ERC	Z3P3	All	0.9	8.81	0.3588	0.06 - 0.66	3 (C)	0.83	3.64	0.8882	0.00 - 0.47	3 (C)	0.14	12.27	0.1397	0.01 - 0.12
451919	2007 - 2020	6/15 - 9/30	ERC	Z3P3	All	0.94	5.38	0.7158	0.05 - 0.61	3 (C)	0.74	6.34	0.6093	0.00 - 0.47	3 (C)	0.06	10.24	0.2488	0.01 - 0.12
451921	2007 - 2020	6/15 - 9/30	ERC	Z3P3	All	0.89	10.28	0.2462	0.09 - 0.58	3 (C)	0.76	5.65	0.6868	0.00 - 0.44	3 (C)	0.08	10.39	0.2389	0.02 - 0.09
451924	2007 - 2020	6/15 - 9/30	ERC	Z3P3	All	0.91	10.34	0.2418	0.05 - 0.60	3 (C)	0.81	4.54	0.8052	0.00 - 0.35	3 (C)	0.16	6.12	0.6339	0.02 - 0.08
SIG - SWCA	2006 - 2020	6/15 - 9/30	ERC	Z3	All	0.88	15.31	0.0535	0.05 - 0.61	3 (C)	0.77	6.71	0.568	0.00 - 0.44	3 (C)	0.23	11.11	0.1955	0.01 - 0.14

Decision Points

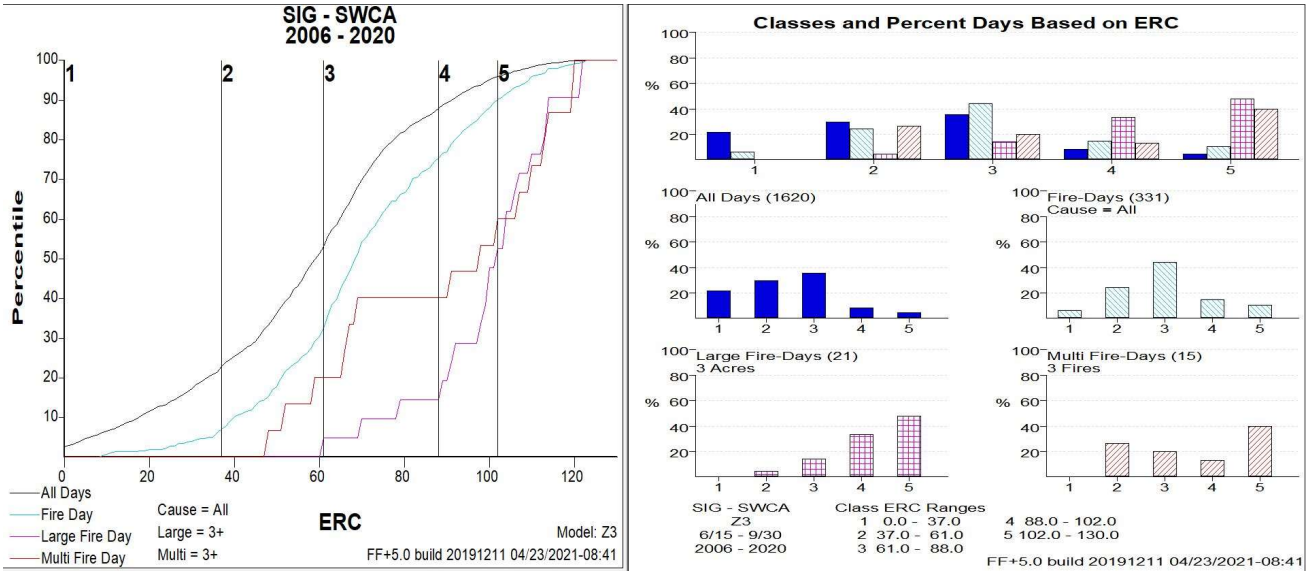


Figure B4.4: ERC-Z Breakpoints for South WA Cascades FDRA

Table B4.6: For each ERC bin as Class. Number of weather days or All Days (AD) expressed as the number of days in the analysis period and proportion of the analysis period. Number of fire days (FD) is the proportion of fire days, and proportion of all days within the given class with a fire day. Number of large fire days (LFD) is the proportion of fire days with a large fire, and the proportion of all days within the given class with a large fire. Number of days with multiple fires (MFD) is the proportion of multiple fire days, and the proportion of all days within the given class with multiple fire days.

Class	ERC Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		#AD	%AD	#FD	%FD	%AD	#LFD	%LFD	%FD	%AD	#MFD	%MFD	%FD	%AD
1	0-36	348	21	21	6	6	0	0	0	0	0	0	0	0
2	37-60	483	30	80	24	17	1	5	1	0	4	27	5	1
3	61-87	578	36	146	44	25	3	14	2	1	3	20	2	1
4	88-101	138	9	49	15	36	7	33	14	5	2	13	4	1
5	102-129	73	5	35	11	48	10	48	29	14	6	40	17	8

Table B4.7: Staffing level and adjective rating by ERC-Z range for South WA Cascades FDRA.

Staffing Level and Adjective Rating for *South WA* Cascades FDRA					
Cascades ERC-Z	0-36	37-60	61-87	88-101	102+
Staffing Level	1	2	3	4	5
Adjective Rating	Low	Moderate	High	Very High	Extreme

Future and Continued Needs

Snow flags will continue to be needed with the transition to NFDRS 2016. The current status of snow flags is lacking with some stations reporting no snow flags for several years. At a minimum these need to be identified for each station for winter 2019 and maintained for all season into the future.

Station downtime is a critical factor in determining NFDRS outputs. NFDRS 2016 now uses all 24 hours of observations to calculate fuel moistures. With this, the ability to modify the daily 1300 weather observations to control NFDRS outputs is lost. Therefore, station downtime must be avoided to the fullest extent possible.

Some CEFA data for this FDRA has errors. FDRA should be re-analyzed once corrected data is acquired.

B-4: North Lowlands FDRA Analysis

Description

General Location: The Lowlands North FDRA extend from the Canadian border to approximately the King Snohomish county line, and to the Cascade foothills. It includes the San Juan Islands, and Whidby Island.
Vegetation: Timber Grass and Brush.
Climate: In the rain shadow of the Olympics, from Port Angeles to Mt Vernon, and including the San Juan Islands the annual precipitation ranges from 18 to 30 inches. Average summertime highs range from 65° F near the water, to 75° F inland.
Topography: The majority of the FDRA is made up of gently rolling terrain below 800ft MSL, with a few mountainous sections along the Cascade foothills that reach up to 3,800ft MSL.

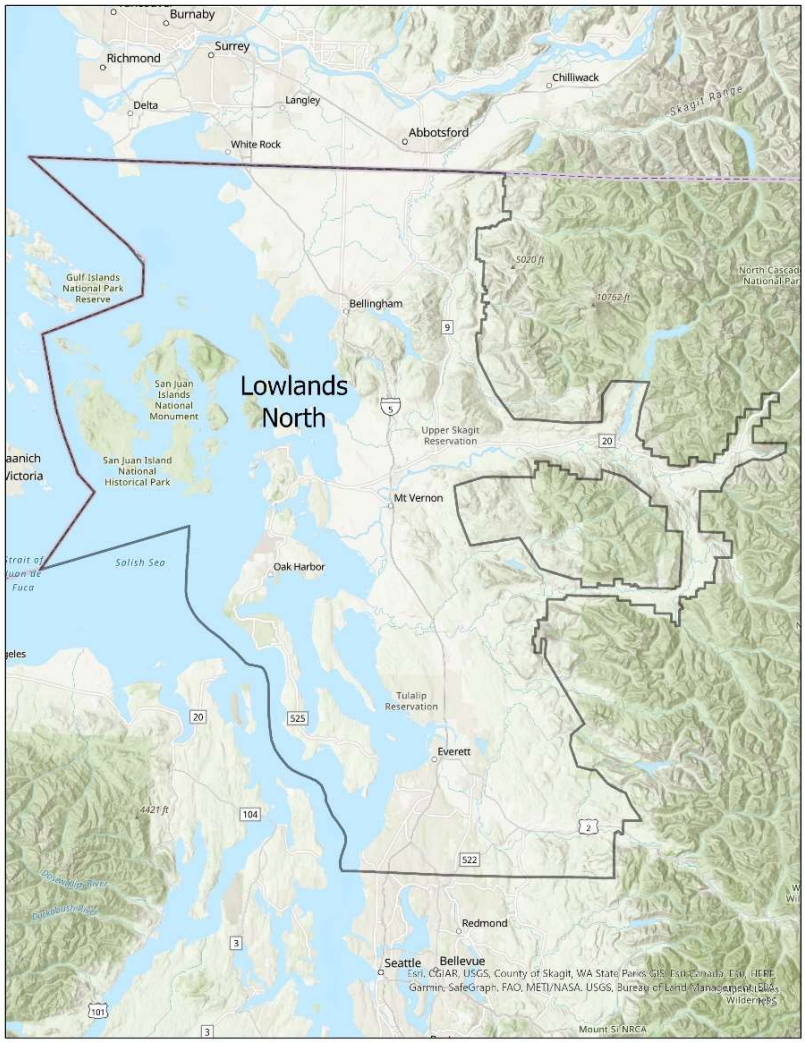


Figure 1. Overview map of Lowlands North FDRA.

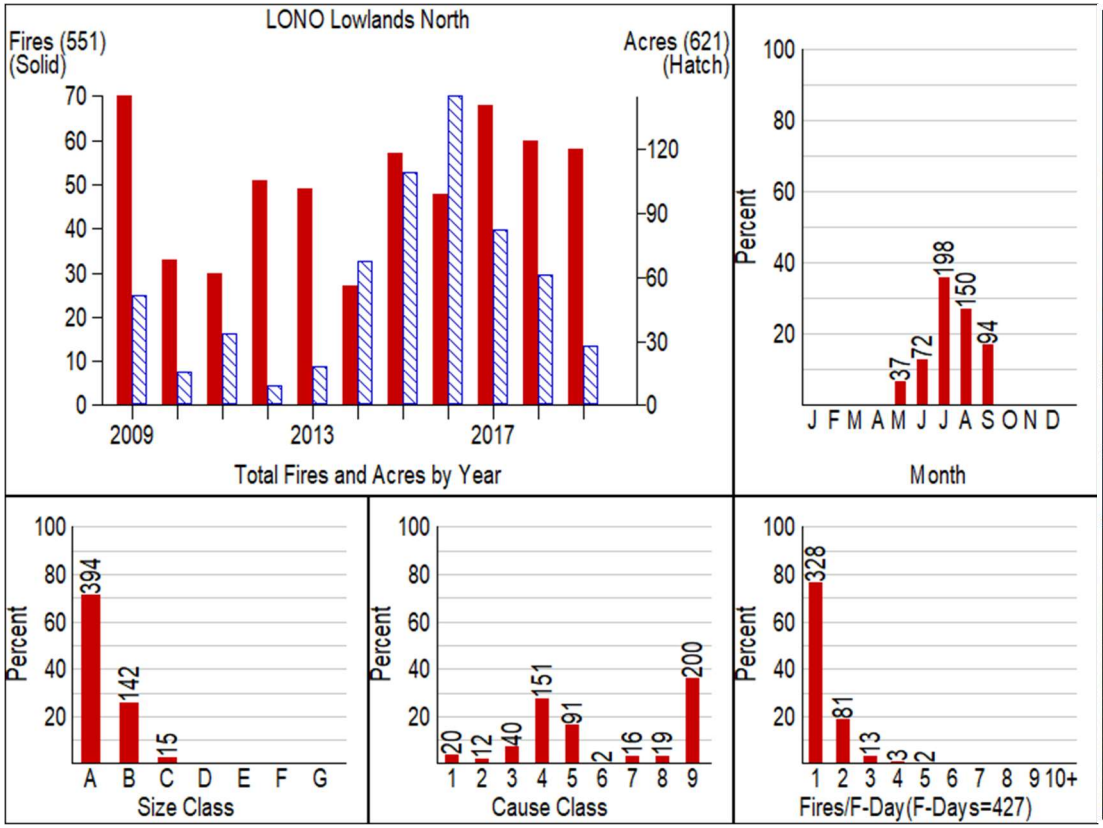


Figure 2. Fire Summary Graph for analysis months and years for Lowlands North FDRA

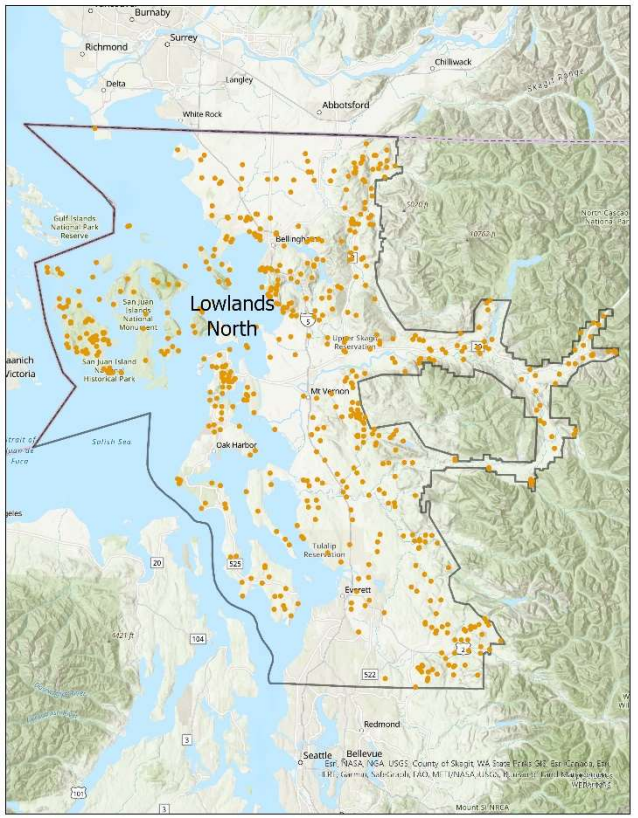


Figure 3. Map of fires used for Lowlands North analysis

Table 1. Select fire summary graph data for Lowlands North FDRA.

Fire Cause Classes		Fires By Month Lightning vs Human			Fire Size Percentiles	
1	Lightning	Month	Lightning	Human	Percentile	Acres

2	Equipment				100	60.0
3	Smoking	May	0	37	99	18.5
4	Campfire	June	0	72	98	11.0
5	Debris	July	9	189	97	8.0
6	Railroad	August	3	147	95	5.0
7	Arson	Sept	8	86	90	1.5
8	Children				80	0.5
9	Misc				70	0.3

Season and Size Determination

Table 2. Season, large fire size in acres, and multiple fire day used in analysis for Lowlands North FDRA.

Season	Large Fire	Multiple Fire Day
May 1st – Sept 30th	5	2

Table 3. Fire problem analysis table for Lowlands North FDRA.

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
Public	Overnight campers.	4 - Campfire	Unattended (and escaped) Campfires around developed recreation sites and dispersed camp sites.	Low	Communicated by Dispatch Center daily to agency personnel and through prevention messaging and public use restrictions	FDRA experiences high number of statistcal unattended campfires in developed and dispersed sites. Maintain and update fire danger website(s), coordinate traditional and social media releases, increase fire prevention patrols with elevated preparedness and response levels.
Industry	Permit burns	5 - Debris Burning	Escaped permitted debris burns	High	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	*SPECIFIC*	*GENERAL*	*SPECIFIC*			
					change. Personal communications with active permit burners, and website maintenance.	conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Public	Rule, Permit Burns, illegal burning	5 - Debris Burning	Escaped debris burns	Low	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels change. Personal communications with active permit burners, and website maintenance.	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Industry	Spark emitting equipment operations	9 - Miscellaneous	Ignitions caused by equipment use including: timber harvest, firewood cutting, right of way maintenance, and	High	Website, IFPL phone line, media releases, and IFPL/restriction coordination calls	Determine and post the IFPL levels to the website and phone line. Communicate changes in the IFPL level to communications staff for potential media release, and conduct tool

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
			other engineering operations.			inspections on active operations.
Public	General public	9 - Miscellaneous	Smoking fires, vehicle caused fires, powerline fires, other undetermined human caused ignitions	Very Low	Accurately maintain website, phone systems and sign plans. Traditional and social media releases for best practices.	Emphasize origin protection to Incident commanders and fire investigator training to increase success of fire cause determinations.

Fire Danger Decision Analysis

Table 4. The season, large fire, and multiple fire day as defined in the fire problem analysis for Lowlands FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis for Lowlands North FDRA.

Season	Large Fire	Multi Fire Day	Number of Weather Days	Number of Fire Days	Number of Large Fire Days	Number of Multi Fire Days
May 1-Sept 30	5 acres	2 or more fires	1658	427	30	99

Sig Catalogue

Table 5. Final SIG station parameters as determined through correlation analysis for Lowlands North FDRA.

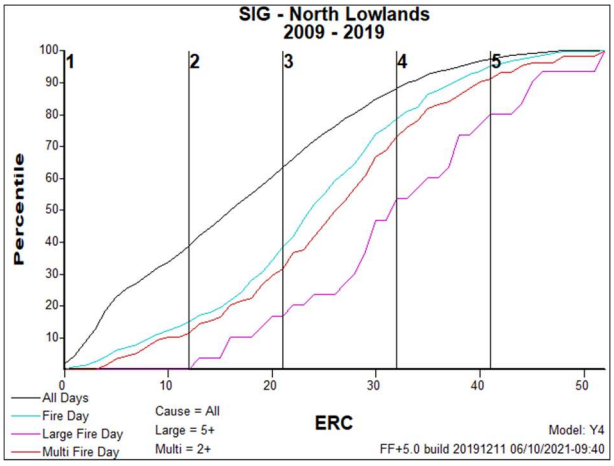
Station ID	Name	Analysis Years	Season	NFDRS Fuel Model	Slope Class	Average Precip	Max SC	Station Weight
451415	Sumas	2009-2019	May 1 – Sept 30	Y	4	90	5	1
451509	Finney	2009-2019	May 1 – Sept 30	Y	3	90	5	1
451613	Gold Mt	2009-2019	May 1 – Sept 30	Y	3	47	5	1

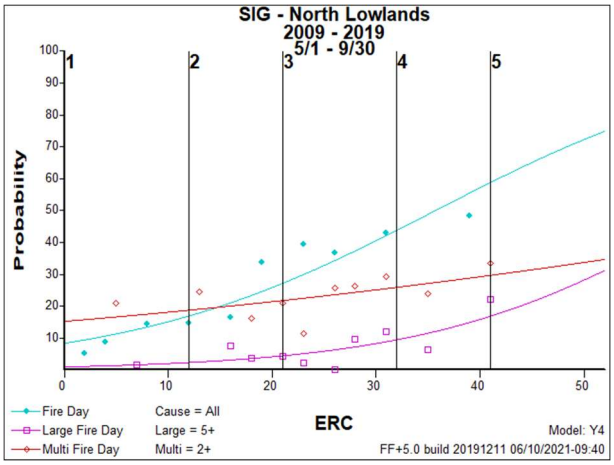
Correlation Analysis Table

Table 6. Correlation values for Lowlands North FDRA.

FDRA	SIG/Station#	Years	Annual Filter	Variab	Mode	Green	Free	FD Typ	FD R^	FD Chi	FD P-V	FD P-Rang	LFI	LFD R^	LFD Chi	LFD P-V	LFD P-Rang	MF	MFD R^	MFD Chi	MFD P-V	MFD P-Rang
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	BI	Y4	1-Jun	31-Dec	All	0.91	16.38	0.0372	0.10 - 0.66	5	0.87	4.02	0.8556	0.00 - 0.19	2	0.92	4.91	0.7674	0.02 - 0.24
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	DSR		1-Jun	31-Dec	All	0.58	76.49	0	0.20 - 0.94	5	0.71	15.64	0.0479	0.01 - 0.55	2	0.67	18.76	0.0162	0.04 - 0.62
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	ERC	Y4	1-Jun	31-Dec	All	0.87	27.57	0.0006	0.09 - 0.76	5	0.8	7.79	0.4542	0.00 - 0.24	2	0.86	7.69	0.464	0.02 - 0.31
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	FM1	Y4	1-Jun	31-Dec	All	0.97	4.35	0.8239	0.07 - 0.49	5	0.74	11.86	0.1574	0.00 - 0.09	2	0.97	1.61	0.9907	0.01 - 0.14
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	FM10	Y4	1-Jun	31-Dec	All	0.94	8.81	0.3587	0.05 - 0.55	5	0.76	10.83	0.2116	0.00 - 0.11	2	0.75	16.22	0.0393	0.01 - 0.18
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	IC	Y4	1-Jun	31-Dec	All	0.71	45.35	0	0.17 - 0.73	5	0.68	16.59	0.0346	0.01 - 0.23	2	0.62	19.27	0.0135	0.04 - 0.28
LONO	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	KBDI	Y4	1-Jun	31-Dec	All	0.77	38.16	0	0.11 - 0.55	5	0.49	11.75	0.1627	0.01 - 0.05	2	0.69	15.64	0.0479	0.02 - 0.16
	SIG - North Lowlan	2009 - 2019	5/1 - 9/30	SC	Y4	1-Jun	31-Dec	All	0.98	2.96	0.7055	0.10 - 0.58	5	0.98	0.58	0.8999	0.00 - 0.13	2	0.95	2.71	0.7447	0.02 - 0.19

Decision Points





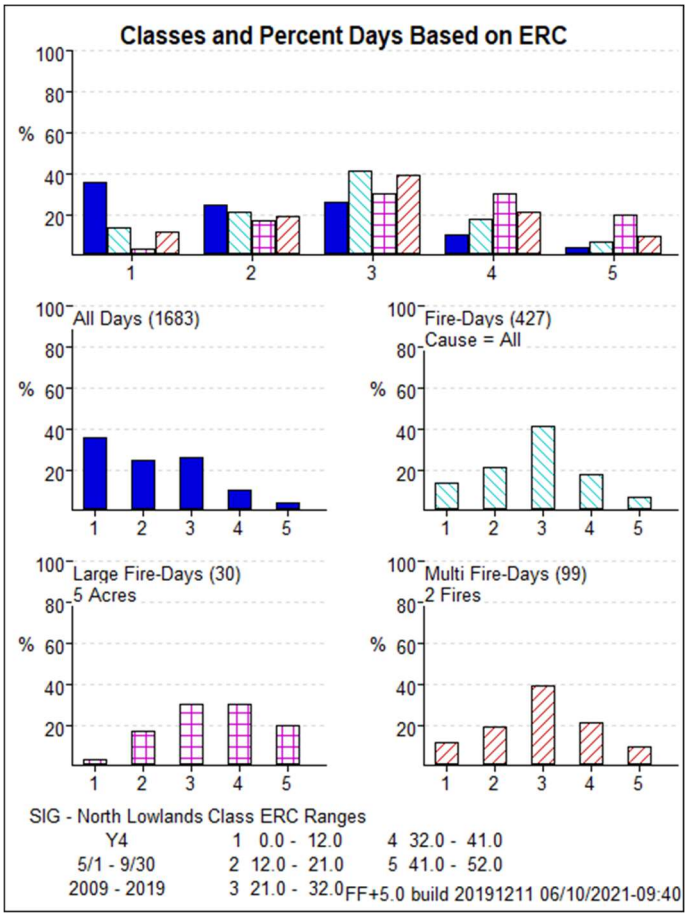


Figure 4. ERC-Y Breakpoints for Lowlands North FDRA

Table 7. For each ERC bin as Class. Number of weather days or All Days (AD) expressed as the number of days in the analysis period and proportion of the analysis period. Number of fire days (FD) is the proportion of fire days, and proportion of all days within the given class with a fire day. Number of large fire days (LFD) is the proportion of fire days with a large fire, and the proportion of all days within the given class with a large fire. Number of days with multiple fires (MFD) is the proportion of multiple fire days, and the proportion of all days within the given class with multiple fire days.

Class	ERC Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		# AD	%AD	#FD	%FD	%AD	#LFD	%LFD	%FD	%AD	#MFD	%MFD	%FD	%AD
1	0-12	603	36	57	13	9	1	3	2	0	11	11	19	2
2	12-21	412	24	90	21	22	5	17	6	1	19	19	21	5
3	21-32	436	26	177	41	41	9	30	5	2	39	39	22	9
4	32-41	173	10	76	18	44	9	30	12	5	21	21	28	12
5	41+	59	4	27	6	46	6	20	22	10	9	9	33	15

Table 8. Staffing level response leveland adjective rating by ERC-Y range for Lowlands.

Staffing Level and Adjective Rating for Lowlands FDRA					
LONO ERC-Y	0-12	12-21	21-32	32-41	41+
Staffing/Response Level	1	2	3	4	5
Adjective Rating	Low		Moderate	High/Very High	Extreme

B-5: Central Lowlands FDRA Analysis

Description

General Location: The Lowlands Central FDRA extends from the Southern Thurston county in the south to approximately the King Snohomish county line in the north, and between the Olympic and the Cascade foothills. It includes the Kitsap Peninsula and the lower elevations of the eastern half of the Olympic Peninsula.
Vegetation: Timber Grass and Brush, Douglas Fir/Hemlock forests with Oak prairie in some locations.
Climate: This is the most densely populated region of western Washington. In the rain shadow of the Olympics the annual precipitation ranges from 32 to 45 inches. Average summertime highs range from 65° F near the water, to 75° F inland.
Topography: The majority of the FDRA is made up of gently rolling terrain below 800ft MSL, with a few mountainous sections along the Cascade foothills that reach up to 3,800ft MSL.

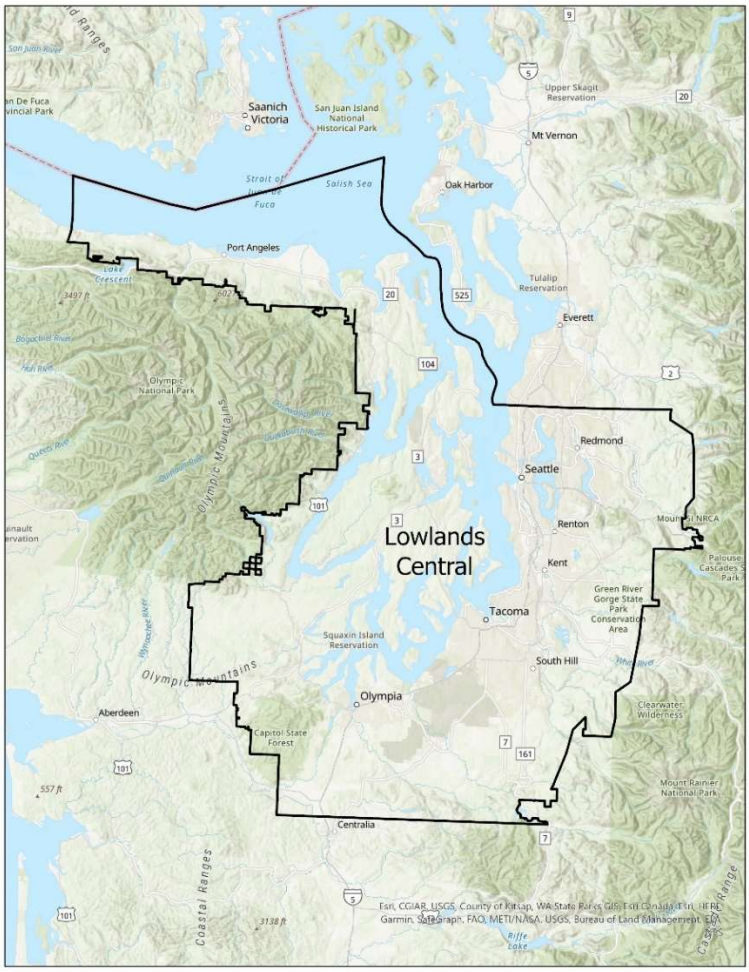


Figure 1. Overview map of Lowlands Central FDRA.

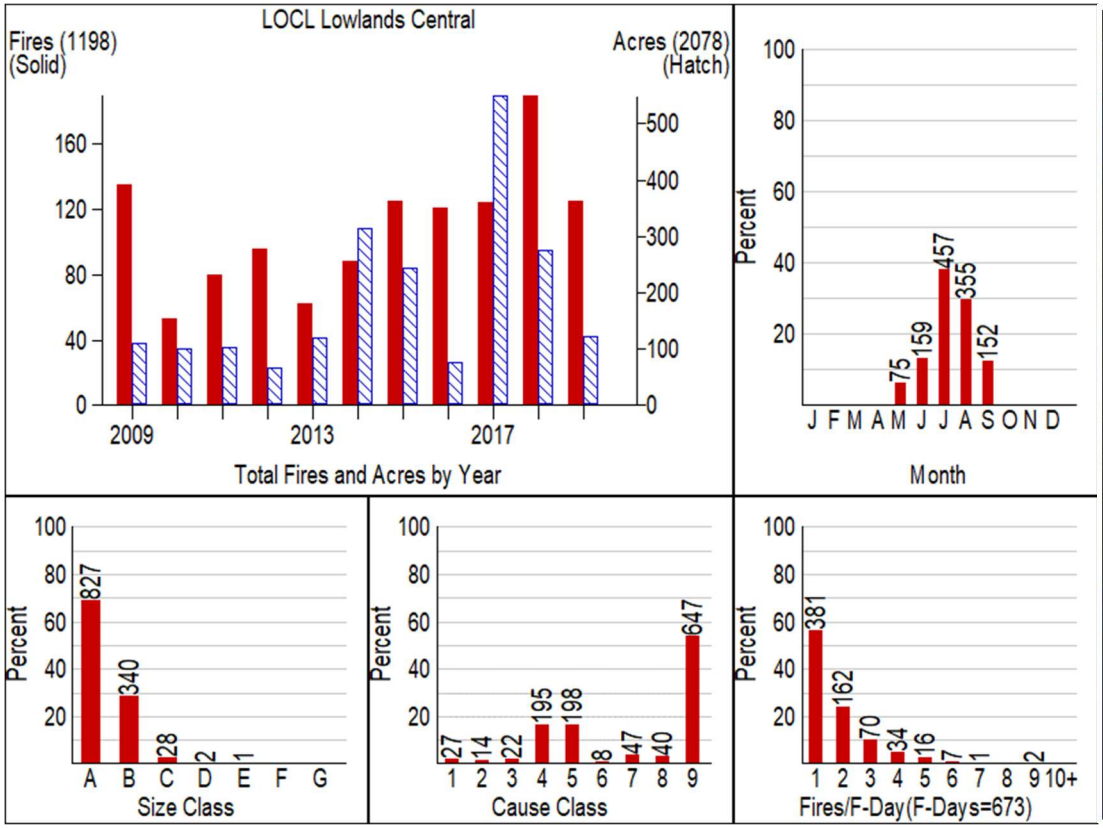


Figure 2. Fire Summary Graph for analysis months and years for Lowlands Central FDRA

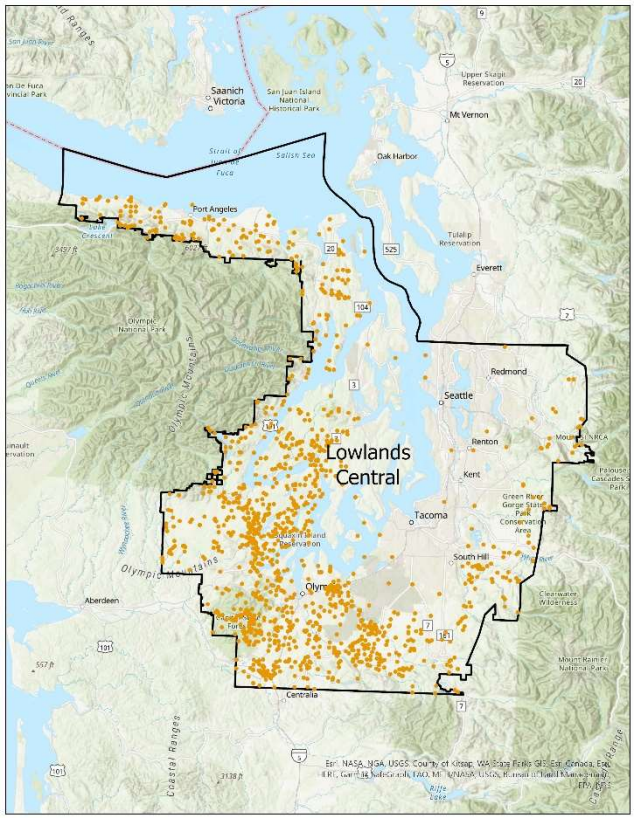


Figure 3. Map of fires used for Lowlands Central analysis

Table 1. Select fire summary graph data for Lowlands Central FDRA.

Fire Cause Classes		Fires By Month Lightning vs Human			Fire Size Percentiles	
1	Lightning	Month	Lightning	Human	Percentile	Acres

2	Equipment				100	384
3	Smoking	May	1	74	99	25.5
4	Campfire	June	4	155	98	13
5	Debris	July	7	450	97	7.7
6	Railroad	August	10	345	95	4.5
7	Arson	Sept	5	147	90	1.8
8	Children				80	0.8
9	Misc				70	0.3

Season and Size Determination

Table 2. Season, large fire size in acres, and multiple fire day used in analysis for Lowlands Central FDRA.

Season	Large Fire	Multiple Fire Day
May 1st – Sept 30th	5	2

Table 3. Fire problem analysis table for Lowlands FDRA.

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
Public	Overnight campers.	4 - Campfire	Unattended (and escaped) Campfires around developed recreation sites and dispersed camp sites.	Low	Communicated by Dispatch Center daily to agency personnel and through prevention messaging and public use restrictions	FDRA experiences high number of statistcal unattended campfires in developed and dispersed sites. Maintain and update fire danger website(s), coordinate traditional and social media releases, increase fire prevention patrols with elevated preparedness and response levels.
Industry	Permit burns	5 - Debris Burning	Escaped permitted debris burns	High	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	*SPECIFIC*	*GENERAL*	*SPECIFIC*			
					change. Personal communications with active permit burners, and website maintenance.	conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Public	Rule, Permit Burns, illegal burning	5 - Debris Burning	Escaped debris burns	Low	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels change. Personal communications with active permit burners, and website maintenance.	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Industry	Spark emitting equipment operations	9 - Miscellaneous	Ignitions caused by equipment use including: timber harvest, firewood cutting, right of way maintenance, and	High	Website, IFPL phone line, media releases, and IFPL/restriction coordination calls	Determine and post the IFPL levels to the website and phone line. Communicate changes in the IFPL level to communications staff for potential media release, and conduct tool

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
			other engineering operations.			inspections on active operations.
Public	General public	9 - Miscellaneous	Smoking fires, vehicle caused fires, powerline fires, other undetermined human caused ignitions	Very Low	Accurately maintain website, phone systems and sign plans. Traditional and social media releases for best practices.	Emphasize origin protection to Incident commanders and fire investigator training to increase success of fire cause determinations.

Fire Danger Decision Analysis

Table 4. The season, large fire, and multiple fire day as defined in the fire problem analysis for Lowlands FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis for Lowlands Central FDRA.

Season	Large Fire	Multi Fire Day	Number of Weather Days	Number of Fire Days	Number of Large Fire Days	Number of Multi Fire Days
May 1-Sept 30	5 acres	2 or more fires	1652	668	54	290

Sig Catalogue

Table 5. Final SIG station parameters as determined through correlation analysis for Lowlands Central FDRA.

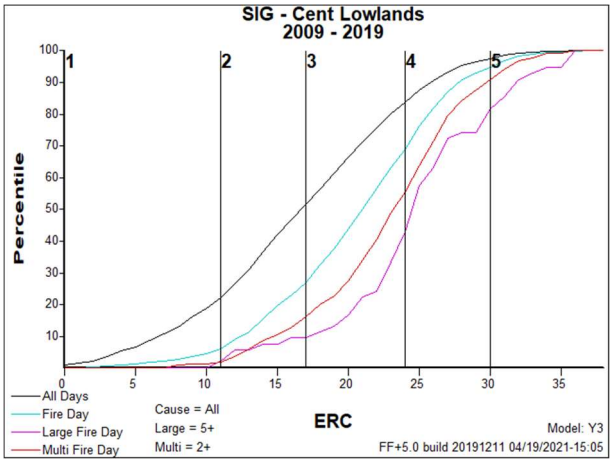
Station ID	Name	Analysis Years	Season	NFDRS Fuel Model	Slope Class	Average Precip	Max SC	Station Weight
450207	Quilcene	2008-2019	May 1 – Sept 30	Y	3	45	5	1
451702	Enumclaw	2008-2019	May 1 – Sept 30	Y	2	49	5	1

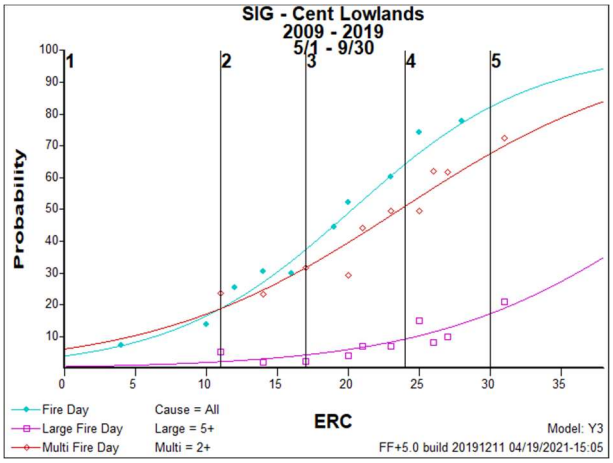
Correlation Analysis Table

Table 6. Correlation values for Lowlands Central FDRA.

FDRA	SIG/Station#	Years	Annual Filter	Variab	Mode	Green	Free	FD Typ	FD R^	FD Chi	FD P-V	FD P-Rang	LFI	LFD R^	LFD Chi	LFD P-V	LFD P-Rang	MF	MFD R^	MFD Chi	MFD P-V	MFD P-Rang
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	BI	Y3	16-May	31-Dec	All	0.88	42.34	0	0.05 - 0.88	5 (C)	0.58	13.02	0.1111	0.00 - 0.33	2 (C)	0.81	12.32	0.1374	0.08 - 0.76
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	BUI		16-May	31-Dec	All	0.83	49.76	0	0.17 - 0.87	5 (C)	0.69	4.85	0.7737	0.03 - 0.19	2 (C)	0.48	25.7	0.0012	0.27 - 0.66
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	ERC	Y3	16-May	31-Dec	All	0.98	5.67	0.6844	0.04 - 0.94	5 (C)	0.7	9.21	0.3249	0.01 - 0.32	2 (C)	0.92	5.78	0.6716	0.06 - 0.82
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	FFMC		16-May	31-Dec	All	0.84	45.98	0	0.01 - 0.64	5 (C)	0.47	18.94	0.0152	0.00 - 0.16	2 (C)	0.58	22.59	0.0039	0.02 - 0.56
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	FM100	Y3	16-May	31-Dec	All	0.98	4.23	0.7529	0.03 - 0.75	5 (C)	0.81	3.93	0.686	0.01 - 0.18	2 (C)	0.88	3.8	0.7035	0.10 - 0.63
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	FM1000	Y3	16-May	31-Dec	All	0.95	15.05	0.0199	0.03 - 0.84	5 (C)	0.63	3.2	0.5254	0.02 - 0.16	2 (C)	0.95	2.34	0.8009	0.07 - 0.74
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	ISI		16-May	31-Dec	All	0.92	23.74	0.0025	0.18 - 0.99	5 (C)	0.77	6.43	0.5989	0.03 - 0.55	2 (C)	0.86	7.89	0.4447	0.22 - 0.92
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	SC	Y3	16-May	31-Dec	All	0.94	9.38	0.0092	0.10 - 0.87	5 (C)	0.87	2.92	0.2323	0.01 - 0.38	2 (C)	0.93	2.54	0.2805	0.14 - 0.78

Decision Points





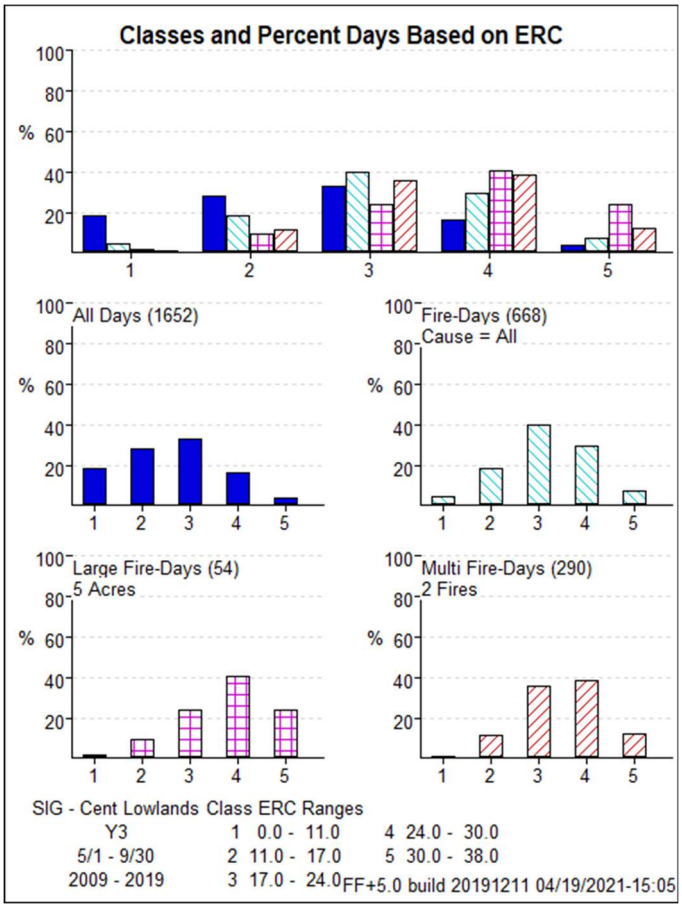


Figure 4. ERC-Y Breakpoints for Lowlands Central FDRA

Table 7. For each ERC bin as Class. Number of weather days or All Days (AD) expressed as the number of days in the analysis period and proportion of the analysis period. Number of fire days (FD) is the proportion of fire days, and proportion of all days within the given class with a fire day. Number of large fire days (LFD) is the proportion of fire days with a large fire, and the proportion of all days within the given class with a large fire. Number of days with multiple fires (MFD) is the proportion of multiple fire days, and the proportion of all days within the given class with multiple fire days.

Class	ERC Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		# AD	%AD	#FD	%FD	%AD	#LFD	%LFD	%FD	%AD	#MFD	%MFD	%FD	%AD
1	0-11	306	19	29	3	9	1	2	3	0	4	1	14	1
2	11-17	464	28	125	19	27	5	9	4	1	34	12	27	7
3	17-24	549	33	268	40	49	13	24	5	2	104	36	39	19
4	24-30	275	17	198	30	72	22	41	11	8	112	39	57	41
5	30-38	58	4	48	7	83	13	24	27	22	36	12	75	62

Table 8. Staffing level and adjective rating by ERC-Y range for Lowlands Central FDRA.

Staffing Level and Adjective Rating for Lowlands FDRA					
Lowlands ERC-Y	0-11	11-17	17-24	24-30	30-38
Staffing Level	1	2	3	4	5
Adjective Rating	Low		Moderate	High/Very High	Extreme

B-6: South Lowlands FDRA Analysis

Description

General Location: The Lowlands Central FDRA extends from the Southern Thurston county in the south to approximately the King Snohomish county line in the north, and between the Olympic and the Cascade foothills. It includes the Kitsap Peninsula and the lower elevations of the eastern half of the Olympic Peninsula.
Vegetation: Timber Grass and Brush, Douglas Fir/Hemlock forests with Oak prairie in some locations.
Climate: This is the most densely populated region of western Washington. In the rain shadow of the Olympics the annual precipitation ranges from 32 to 45 inches. Average summertime highs range from 65° F near the water, to 75° F inland.
Topography: The majority of the FDRA is made up of gently rolling terrain below 800ft MSL, with a few mountainous sections along the Cascade foothills that reach up to 3,800ft MSL.

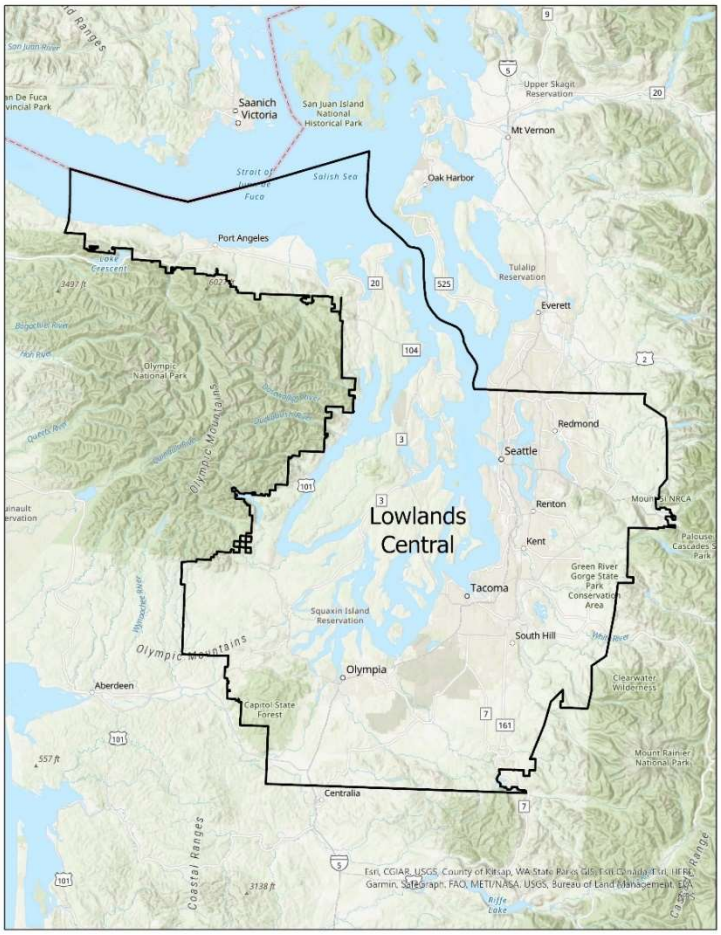


Figure 1. Overview map of Lowlands Central FDRA.

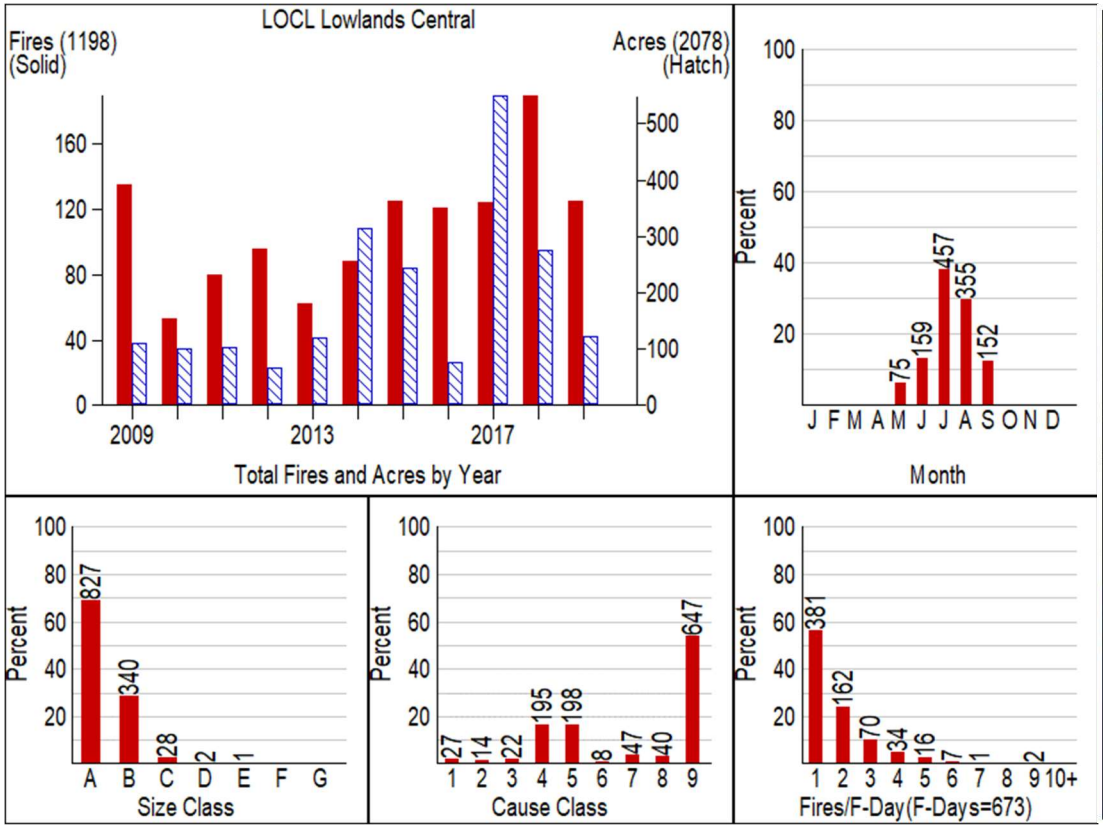


Figure 2. Fire Summary Graph for analysis months and years for Lowlands Central FDRA

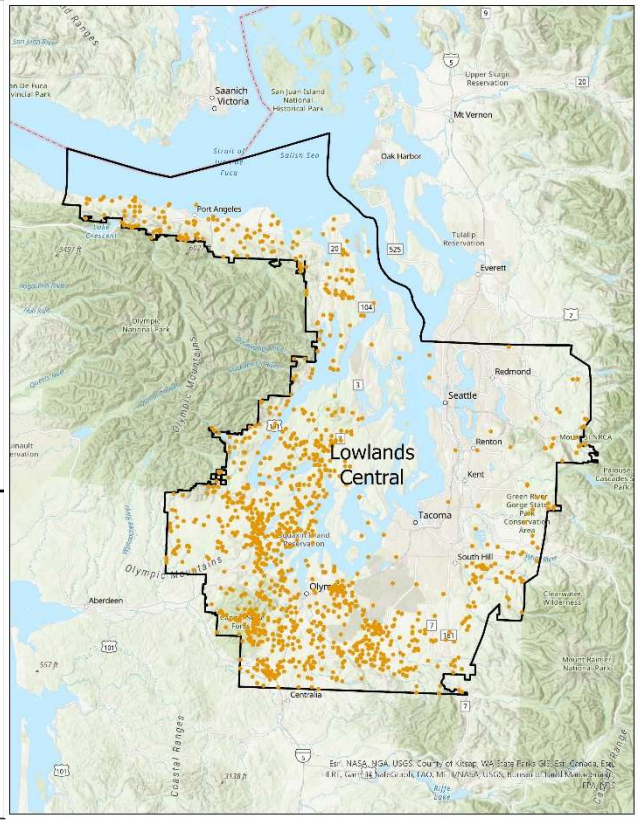


Figure 3. Map of fires used for Lowlands Central analysis

Table 1. Select fire summary graph data for Lowlands Central FDRA.

Fire Cause Classes		Fires By Month Lightning vs Human			Fire Size Percentiles	
1	Lightning	Month	Lightning	Human	Percentile	Acres

2	Equipment				100	384
3	Smoking	May	1	74	99	25.5
4	Campfire	June	4	155	98	13
5	Debris	July	7	450	97	7.7
6	Railroad	August	10	345	95	4.5
7	Arson	Sept	5	147	90	1.8
8	Children				80	0.8
9	Misc				70	0.3

Season and Size Determination

Table 2. Season, large fire size in acres, and multiple fire day used in analysis for Lowlands Central FDRA.

Season	Large Fire	Multiple Fire Day
May 1st – Sept 30th	5	2

Table 3. Fire problem analysis table for Lowlands FDRA.

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
Public	Overnight campers.	4 - Campfire	Unattended (and escaped) Campfires around developed recreation sites and dispersed camp sites.	Low	Communicated by Dispatch Center daily to agency personnel and through prevention messaging and public use restrictions	FDRA experiences high number of statistcal unattended campfires in developed and dispersed sites. Maintain and update fire danger website(s), coordinate traditional and social media releases, increase fire prevention patrols with elevated preparedness and response levels.
Industry	Permit burns	5 - Debris Burning	Escaped permitted debris burns	High	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	*SPECIFIC*	*GENERAL*	*SPECIFIC*			
					change. Personal communications with active permit burners, and website maintenance.	conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Public	Rule, Permit Burns, illegal burning	5 - Debris Burning	Escaped debris burns	Low	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels change. Personal communications with active permit burners, and website maintenance.	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Industry	Spark emitting equipment operations	9 - Miscellaneous	Ignitions caused by equipment use including: timber harvest, firewood cutting, right of way maintenance, and	High	Website, IFPL phone line, media releases, and IFPL/restriction coordination calls	Determine and post the IFPL levels to the website and phone line. Communicate changes in the IFPL level to communications staff for potential media release, and conduct tool

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
			other engineering operations.			inspections on active operations.
Public	General public	9 - Miscellaneous	Smoking fires, vehicle caused fires, powerline fires, other undetermined human caused ignitions	Very Low	Accurately maintain website, phone systems and sign plans. Traditional and social media releases for best practices.	Emphasize origin protection to Incident commanders and fire investigator training to increase success of fire cause determinations.

Fire Danger Decision Analysis

Table 4. The season, large fire, and multiple fire day as defined in the fire problem analysis for Lowlands FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis for Lowlands Central FDRA.

Season	Large Fire	Multi Fire Day	Number of Weather Days	Number of Fire Days	Number of Large Fire Days	Number of Multi Fire Days
May 1-Sept 30	5 acres	2 or more fires	1652	668	54	290

Sig Catalogue

Table 5. Final SIG station parameters as determined through correlation analysis for Lowlands Central FDRA.

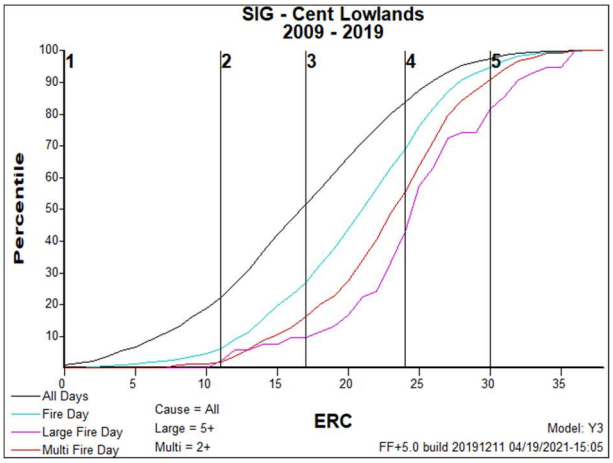
Station ID	Name	Analysis Years	Season	NFDRS Fuel Model	Slope Class	Average Precip	Max SC	Station Weight
450207	Quilcene	2008-2019	May 1 – Sept 30	Y	3	45	5	1
451702	Enumclaw	2008-2019	May 1 – Sept 30	Y	2	49	5	1

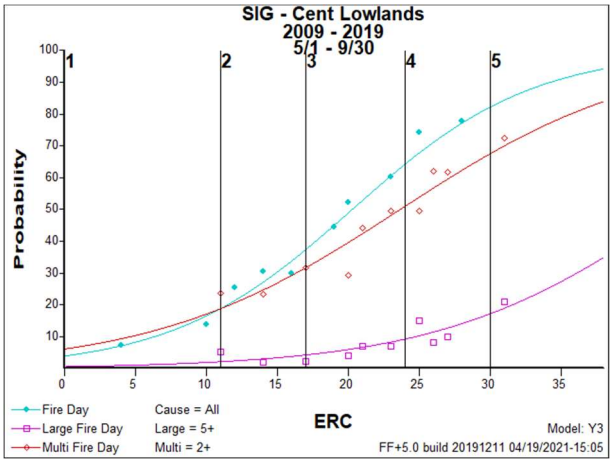
Correlation Analysis Table

Table 6. Correlation values for Lowlands Central FDRA.

FDRA	SIG/Station#	Years	Annual Filter	Variab	Mode	Green	Free	FD Typ	FD R^	FD Chi	FD P-V	FD P-Rang	LFI	LFD R^	LFD Chi	LFD P-V	LFD P-Rang	MF	MFD R^	MFD Chi	MFD P-V	MFD P-Rang
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	BI	Y3	16-May	31-Dec	All	0.88	42.34	0	0.05 - 0.88	5 (C)	0.58	13.02	0.1111	0.00 - 0.33	2 (C)	0.81	12.32	0.1374	0.08 - 0.76
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	BUI		16-May	31-Dec	All	0.83	49.76	0	0.17 - 0.87	5 (C)	0.69	4.85	0.7737	0.03 - 0.19	2 (C)	0.48	25.7	0.0012	0.27 - 0.66
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	ERC	Y3	16-May	31-Dec	All	0.98	5.67	0.6844	0.04 - 0.94	5 (C)	0.7	9.21	0.3249	0.01 - 0.32	2 (C)	0.92	5.78	0.6716	0.06 - 0.82
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	FFMC		16-May	31-Dec	All	0.84	45.98	0	0.01 - 0.64	5 (C)	0.47	18.94	0.0152	0.00 - 0.16	2 (C)	0.58	22.59	0.0039	0.02 - 0.56
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	FM100	Y3	16-May	31-Dec	All	0.98	4.23	0.7529	0.03 - 0.75	5 (C)	0.81	3.93	0.686	0.01 - 0.18	2 (C)	0.88	3.8	0.7035	0.10 - 0.63
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	FM1000	Y3	16-May	31-Dec	All	0.95	15.05	0.0199	0.03 - 0.84	5 (C)	0.63	3.2	0.5254	0.02 - 0.16	2 (C)	0.95	2.34	0.8009	0.07 - 0.74
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	ISI		16-May	31-Dec	All	0.92	23.74	0.0025	0.18 - 0.99	5 (C)	0.77	6.43	0.5989	0.03 - 0.55	2 (C)	0.86	7.89	0.4447	0.22 - 0.92
LOCE	SIG - Cent Lowland	2009 - 2019	5/1 - 9/30	SC	Y3	16-May	31-Dec	All	0.94	9.38	0.0092	0.10 - 0.87	5 (C)	0.87	2.92	0.2323	0.01 - 0.38	2 (C)	0.93	2.54	0.2805	0.14 - 0.78

Decision Points





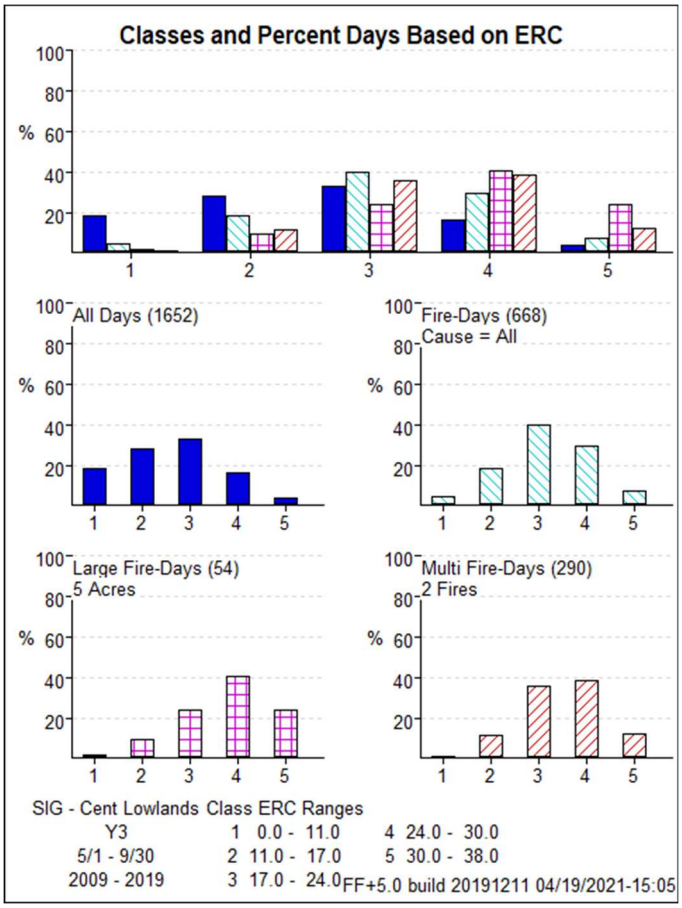


Figure 4. ERC-Y Breakpoints for Lowlands Central FDRA

Table 7. For each ERC bin as Class. Number of weather days or All Days (AD) expressed as the number of days in the analysis period and proportion of the analysis period. Number of fire days (FD) is the proportion of fire days, and proportion of all days within the given class with a fire day. Number of large fire days (LFD) is the proportion of fire days with a large fire, and the proportion of all days within the given class with a large fire. Number of days with multiple fires (MFD) is the proportion of multiple fire days, and the proportion of all days within the given class with multiple fire days.

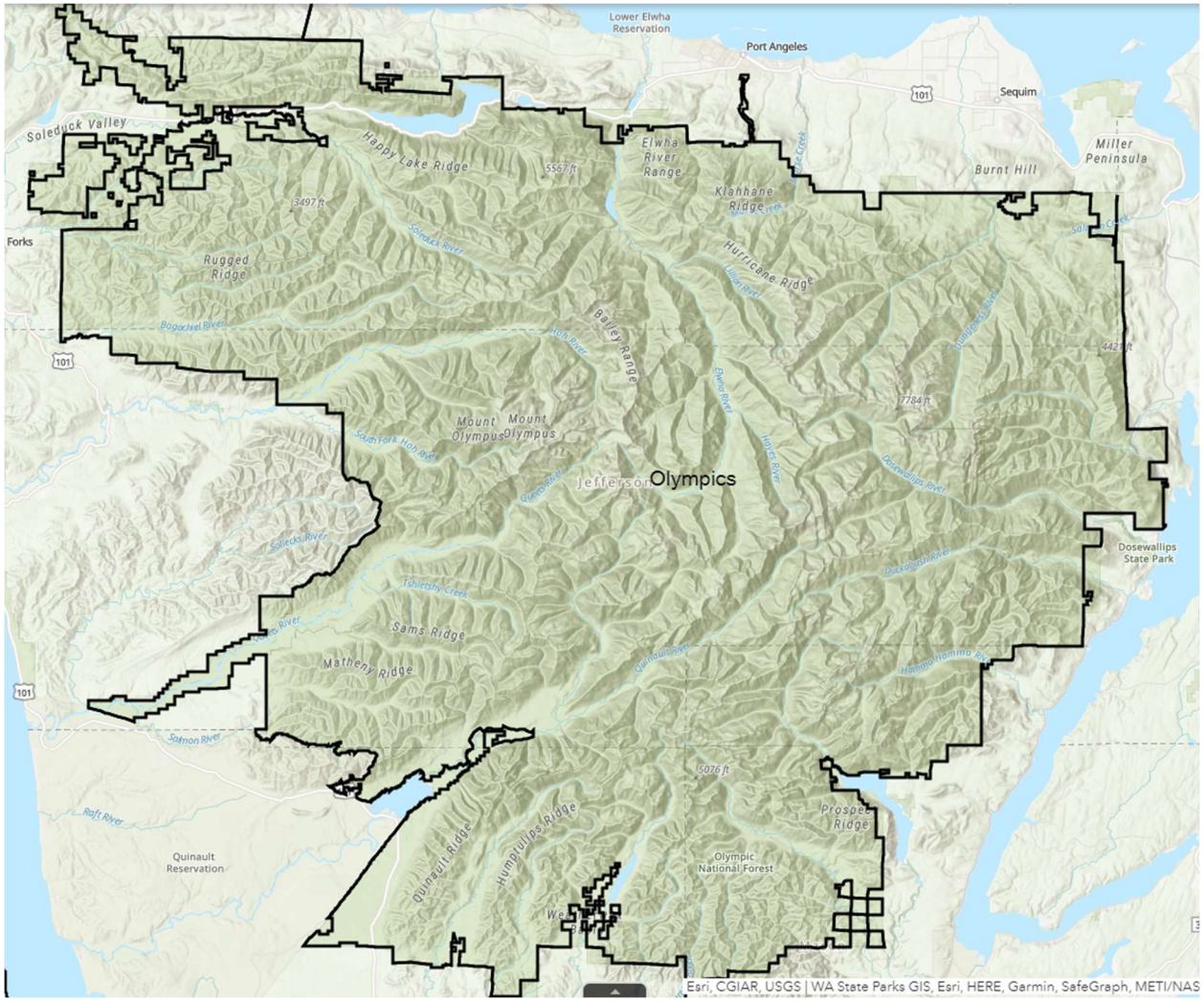
Class	ERC Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		# AD	%AD	#FD	%FD	%AD	#LFD	%LFD	%FD	%AD	#MFD	%MFD	%FD	%AD
1	0-11	306	19	29	3	9	1	2	3	0	4	1	14	1
2	11-17	464	28	125	19	27	5	9	4	1	34	12	27	7
3	17-24	549	33	268	40	49	13	24	5	2	104	36	39	19
4	24-30	275	17	198	30	72	22	41	11	8	112	39	57	41
5	30-38	58	4	48	7	83	13	24	27	22	36	12	75	62

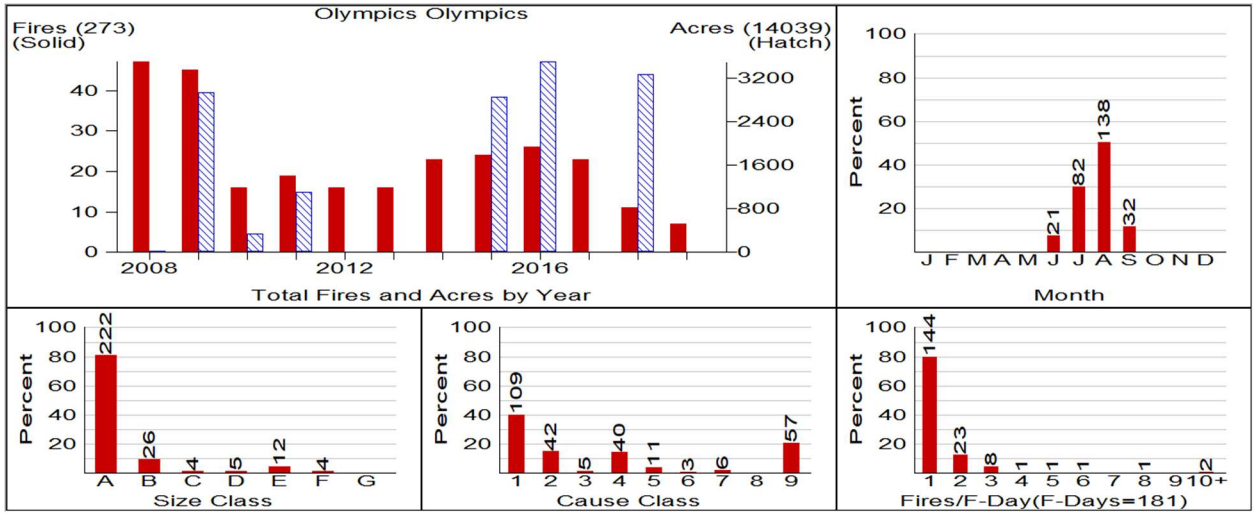
Table 8. Staffing level and adjective rating by ERC-Y range for Lowlands Central FDRA.

Staffing Level and Adjective Rating for Lowlands FDRA					
Lowlands ERC-Y	0-11	11-17	17-24	24-30	30-38
Staffing Level	1	2	3	4	5
Adjective Rating	Low		Moderate	High/Very High	Extreme

B-7: Olympics FDRA Analysis

Olympics





Season and Size determination

Season	Large Fire	Multiple Fire Day
June 15th-Sept 30th	3 acres	3 fires

Fire Danger Decision 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 15th-Sept 30th	3 acres	3 fires	1296	344	41	21

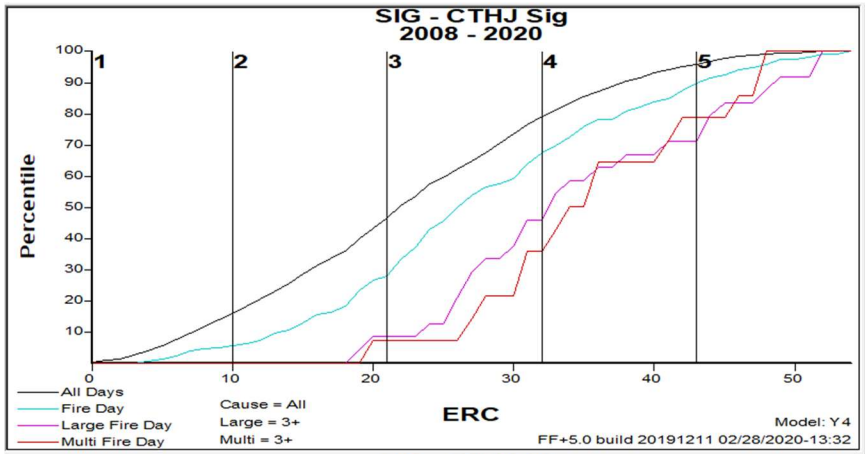
SIG Catalogue

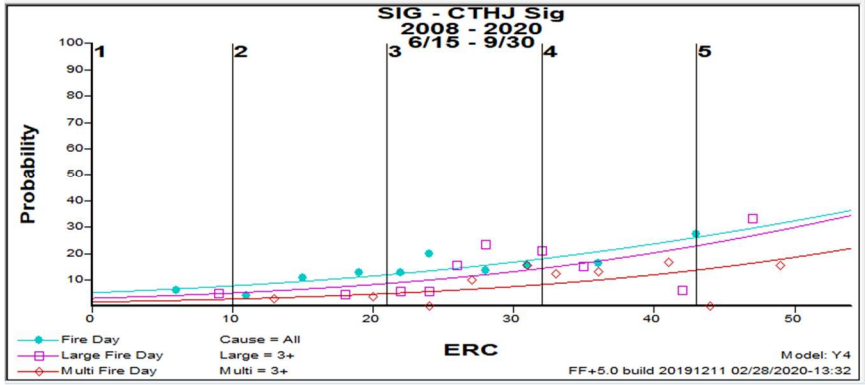
Station ID	Name	Analysis Years	Analysis Time of Year	NFDRS Fuel Model	Slope Class	Climate Class	Greenup Date	Freeze Date	Herb Annual	Station Weight
450117	Cougar	2008-2019	June 15th-Sept 30th	Y	4	4	06/13	12/31	N	1
450121	Tom Creek	2008-2019	June 15th-Sept 30th	Y	4	4	05/15	12/31	N	1
450124	Hurricane	2008-2019	June 15th-Sept 30th	Y	4	3	07/17	12/31	N	1
450911	Jefferson	2008-2019	June 15th-Sept 30th	Y	4	4	06/13	12/31	N	1

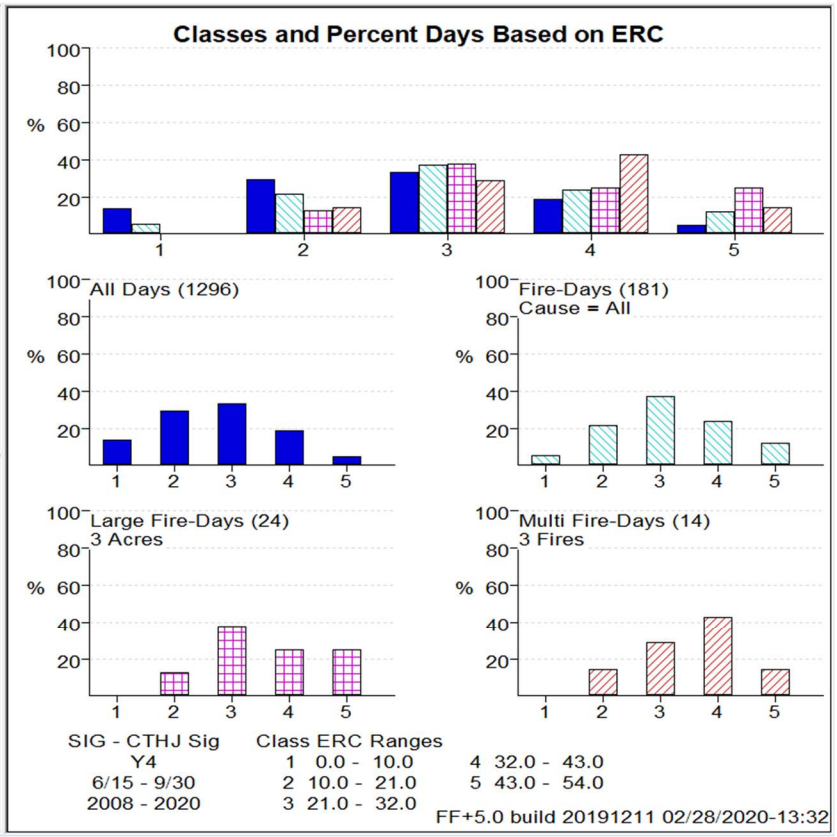
Correlation Analysis Table

SIG/Station	Variable	Model	Greenup	Freeze	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
450117	ERC	Y4P4	13-Jun	31-Dec	All	0.69	13.21	0.1047	0.06 - 0.32	3 (C)	0.45	6.19	0.6264	0.04 - 0.29	3 (C)	0.57	2.63	0.9552	0.02 - 0.19
450121	ERC	Y4P4	15-May	31-Dec	All	0.61	13.04	0.1106	0.07 - 0.31	3 (C)	0.53	5.57	0.6952	0.03 - 0.36	3 (C)	0.27	13.48	0.0964	0.02 - 0.23
450124	ERC	Y4P3	17-Jul	31-Dec	All	0.87	4.76	0.783	0.05 - 0.36	3 (C)	0.25	11.04	0.1992	0.04 - 0.32	3 (C)	0.2	7.32	0.503	0.02 - 0.21
450911	ERC	Y4P4	13-Jun	31-Dec	All	0.74	11.4	0.18	0.06 - 0.39	3 (C)	0.59	3.22	0.9196	0.04 - 0.33	3 (C)	0.12	14.42	0.0714	0.03 - 0.19
SIG - CTHJ	ERC	Y4	13-Jun	31-Dec	All	0.75	11.02	0.2004	0.05 - 0.36	3 (C)	0.5	6.48	0.5935	0.04 - 0.34	3 (C)	0.34	5.55	0.6971	0.02 - 0.22

Decision Points







Class	ERC Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		# AD	% AD	# FD	% FD	% AD	# LFD	% LFD	% FD	% AD	# MFD	% MFD	% FD	% AD
1	0-9	181	14	10	6	6	0	0	0	0	0	0	0	0
2	10-20	379	29	39	22	10	3	13	8	1	2	14	5	1
3	21-31	430	33	67	37	16	9	38	13	2	4	29	6	1
4	32-42	241	19	43	24	18	6	25	14	2	6	43	14	2
5	43+	65	5	22	12	34	6	25	27	3	2	14	9	3

B-8: Coast FDRA Analysis

Fire Danger Rating Area Analysis – Western Washington FDOP

Coast FDRA

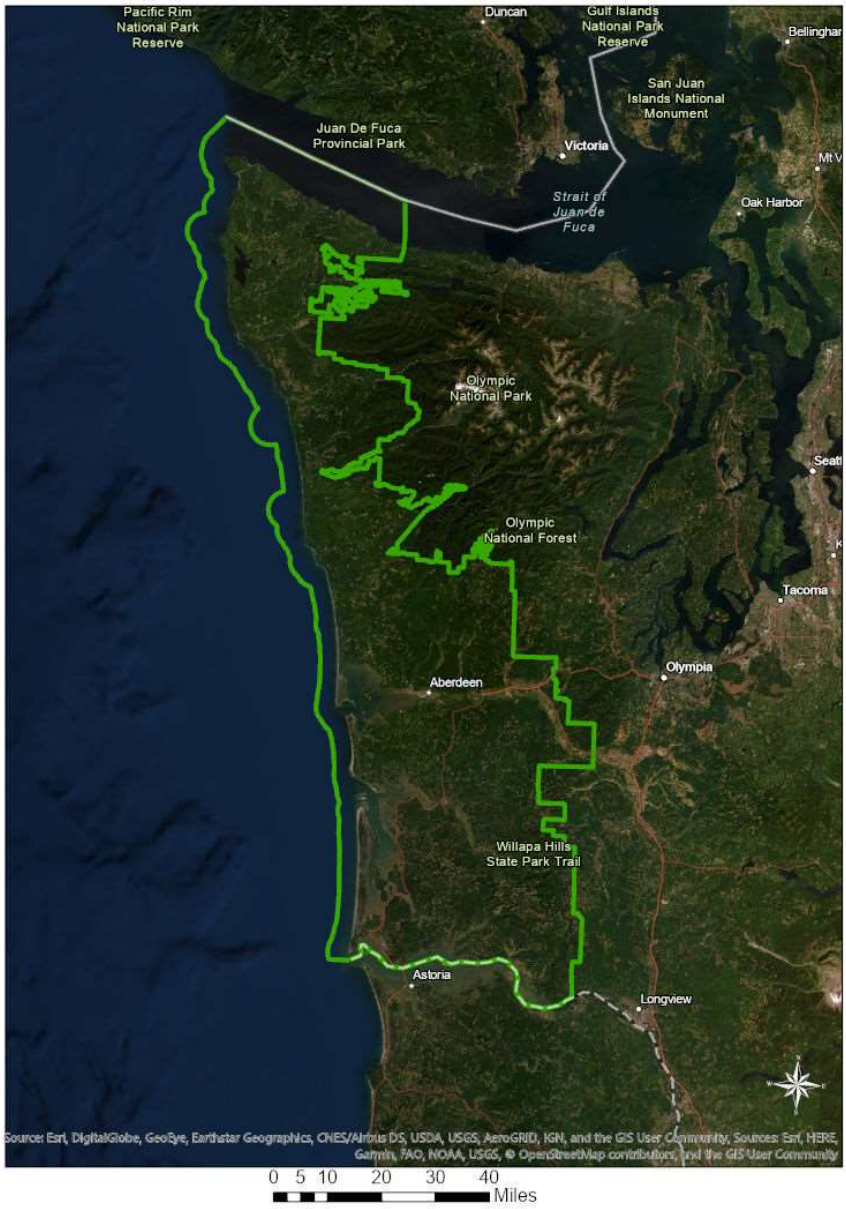


Figure 1. Overview map of Coast FDRA.

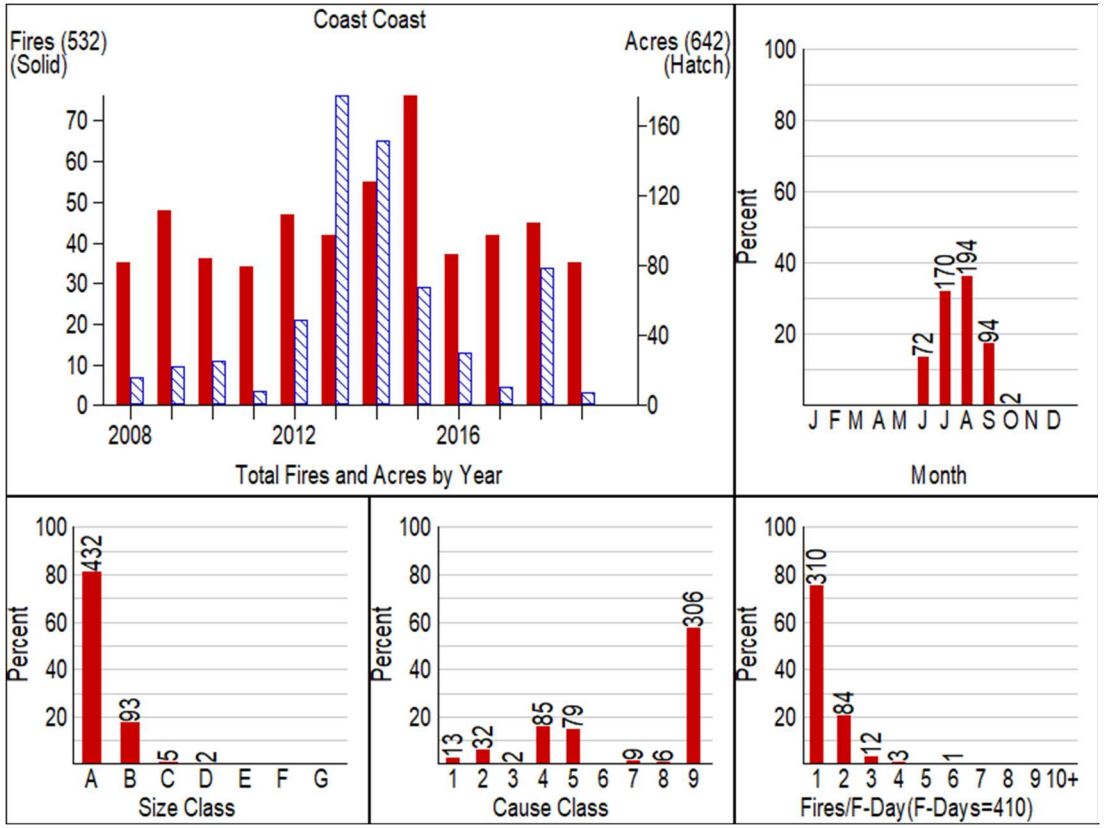


Figure 2. Fire Summary Graph for analysis months and years for Coast FDRA

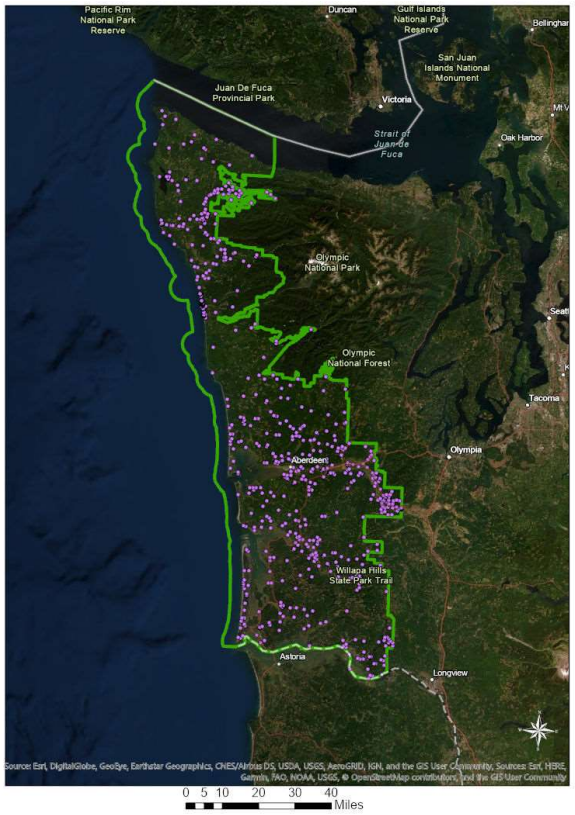


Figure 3. Map of fires used for Coast analysis

Table 1. Select fire summary graph data for Coast FDRA.

Fire Cause Classes		Fires By Month Lightning vs Human			Fire Size Percentiles	
1	Lightning	Month	Lightning	Human	Percentile	Acres

2	Equipment				100	127
3	Smoking				99	16.2
4	Campfire	June	1	71	98	6.4
5	Debris	July	0	170	97	4.8
6	Railroad	August	7	187	95	3.1
7	Arson	Sept	5	89	90	1
8	Children	Oct	0	2	80	0.3
9	Misc				70	0.1

Season and Size Determination

Table 2. Season, large fire size in acres, and multiple fire day used in analysis for Coast FDRA.

Season	Large Fire	Multiple Fire Day
June 1st – October 1st	5	3

Table 3. Fire problem analysis table for Coast FDRA.

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	***SPECIFIC***	***GENERAL***	***SPECIFIC***			
Public	Overnight campers.	4 - Campfire	Unattended (and escaped) Campfires around developed recreation sites and dispersed camp sites.	Low	Communicated by Dispatch Center daily to agency personnel and through prevention messaging and public use restrictions	FDRA experiences high number of statistcal unattended campfires in developed and dispersed sites. Maintain and update fire danger website(s), coordinate traditional and social media releases, increase fire prevention patrols with elevated preparedness and response levels.
Industry	Permit burns	5 - Debris Burning	Escaped permitted debris burns	High	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels change. Personal	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when conditions warrant.

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	*SPECIFIC*	*GENERAL*	*SPECIFIC*			
					communications with active permit burners, and website maintenance.	Restrict new ignitions through public use restrictions and burn bans.
Public	Rule, Permit Burns, illegal burning	5 - Debris Burning	Escaped debris burns	Low	Communicate burn restrictions and fire danger levels daily to agency staff. Social and traditional media releases when fire danger or restriction levels change. Personal communications with active permit burners, and website maintenance.	Dispatch centers update the burn risk pages for the FDRA's as needed. Coordinate with communications staff and local fire districts to release media posts. Fire staff contacts active burn permit holders when conditions warrant. Restrict new ignitions through public use restrictions and burn bans.
Industry	Spark emitting equipment operations	9 - Miscellaneous	Ignitions caused by equipment use including: timber harvest, firewood cutting, right of way maintenance, and other engineering operations.	High	Website, IFPL phone line, media releases, and IFPL/restriction coordination calls	Determine and post the IFPL levels to the website and phone line. Communicate changes in the IFPL level to communications staff for potential media release, and conduct tool

TARGET GROUP		IGNITION CAUSE		RELATIVE DEGREE OF CONTROL	COMMUNICATION METHODS	WORKLOAD DESCRIPTION
GENERAL	*SPECIFIC*	*GENERAL*	*SPECIFIC*			
						inspections on active operations.
Public	General public	9 - Miscellaneous	Smoking fires, vehicle caused fires, powerline fires, other undetermined human caused ignitions	Very Low	Accurately maintain website, phone systems and sign plans. Traditional and social media releases for best practices.	Emphasize origin protection to Incident commanders and fire investigator training to increase success of fire cause determinations.

Fire Danger Decision Analysis

Table 4. The season, large fire, and multiple fire day as defined in the fire problem analysis for Coast FDRA and the number of qualifying weather days, fire days, large fire days, and multiple fire days used in correlation analysis for Coast FDRA.

Season	Large Fire	Multi Fire Day	Number of Weather Days	Number of Fire Days	Number of Large Fire Days	Number of Multi Fire Days
June 1-Oct 1	5 acres	3 or more fires	1475	410	16	16

Sig Catalogue

Table 5. Final SIG station parameters as determined through correlation analysis for Coast FDRA.

Station ID	Name	Analysis Years	Season	NFDRS Fuel Model	Slope Class	Average Precip	Max SC	Station Weight
450130	Ellis MT	2008-2019	June 1 - Oct 1	Y	3		5	1
450306	Minot LO	2008-2019	June 1 - Oct 1	Y	2		5	1
450312	Humptulips	2008-2019	June 1 - Oct 1	Y	4		5	1
450407	Huckleberry Rdg	2008-2019	June 1 - Oct 1	Y	4		5	1

Correlation Analysis Table

Table 6. Correlation values for Coast FDRA.

SIG/Station#	Variable	Model	Greenup	Freeze	FD Type	FD R^2	FD Chi^2	FD P-Val	FD P-Range	LFD	LFD R^2	LFD Chi^2	LFD P-Val	LFD P-Range	MFD	MFD R^2	MFD Chi^2	MFD P-Val	MFD P-Range
SIG - proposed	BI	Y3	1-Jun	31-Dec	All	0.94	6.27	0.6166	0.12 - 0.61	5 (C)	0.05	4.52	0.8072	0.03 - 0.05	3 (C)	0.23	14.46	0.0706	0.01 - 0.13
450130	BI	Y3P4	1-Jun	31-Dec	All	0.9	8.63	0.3745	0.16 - 0.67	5 (C)	0.23	7.33	0.501	0.02 - 0.09	3 (C)	0.44	5.1	0.7471	0.02 - 0.17
450306	BI	Y2P4	15-May	31-Dec	All	0.88	9.55	0.2979	0.15 - 0.59	5 (C)	0.01	6.67	0.4641	0.03 - 0.04	3 (C)	0.12	16.19	0.0398	0.02 - 0.12
450312	BI	Y4P4	17-Jun	31-Dec	All	0.92	7.62	0.4714	0.15 - 0.56	5 (C)	0.06	4.08	0.85	0.03 - 0.04	3 (C)	0.36	6.9	0.547	0.01 - 0.15

450407	BI	Y4P3	1-Jun	31-Dec	All	0.92	8.1	0.4236	0.14 - 0.55	5 (C)	0.01	11.04	0.1995	0.03 - 0.05	3 (C)	0.01	10.63	0.2238	0.05 - 0.07
SIG - proposed	ERC	Y3	1-Jun	31-Dec	All	0.88	14.56	0.0682	0.12 - 0.67	5 (C)	0	6.15	0.6308	0.03 - 0.04	3 (C)	0.38	9.99	0.2658	0.01 - 0.19
450130	ERC	Y3P4	1-Jun	31-Dec	All	0.92	8.13	0.4207	0.15 - 0.65	5 (C)	0	14.68	0.0658	0.03 - 0.05	3 (C)	0.53	5.27	0.7286	0.02 - 0.16
450306	ERC	Y2P4	15-May	31-Dec	All	0.91	7.78	0.4552	0.14 - 0.68	5 (C)	0.06	6.59	0.5819	0.03 - 0.05	3 (C)	0.43	7.27	0.5075	0.02 - 0.17
450312	ERC	Y4P4	17-Jun	31-Dec	All	0.94	6.37	0.6059	0.14 - 0.68	5 (C)	0.01	5.05	0.7519	0.03 - 0.04	3 (C)	0.44	9.14	0.3307	0.01 - 0.21
450407	ERC	Y4P3	1-Jun	31-Dec	All	0.91	7.73	0.4606	0.13 - 0.68	5 (C)	0	8.75	0.3635	0.04 - 0.04	3 (C)	0.32	4.98	0.7594	0.02 - 0.14
SIG - proposed	FM100	Y3	1-Jun	31-Dec	All	0.85	13.22	0.1044	0.06 - 0.58	5 (C)	0.03	10.8	0.2134	0.03 - 0.06	3 (C)	0.39	8.62	0.3752	0.00 - 0.16
450130	FM100	Y3P4	1-Jun	31-Dec	All	0.88	9.01	0.3416	0.08 - 0.54	5 (C)	0.06	3.83	0.872	0.03 - 0.05	3 (C)	0.52	5.87	0.6621	0.01 - 0.16
450306	FM100	Y2P4	15-May	31-Dec	All	0.93	4.95	0.763	0.07 - 0.60	5 (C)	0.03	12.67	0.0806	0.03 - 0.06	3 (C)	0.4	6.02	0.6452	0.01 - 0.15
450312	FM100	Y4P4	17-Jun	31-Dec	All	0.97	2.82	0.9451	0.08 - 0.57	5 (C)	0.01	8.53	0.2882	0.03 - 0.04	3 (C)	0.57	6.22	0.6227	0.00 - 0.19
450407	FM100	Y4P3	1-Jun	31-Dec	All	0.81	13.26	0.1033	0.08 - 0.57	5 (C)	0	3.27	0.9159	0.04 - 0.04	3 (C)	0.64	3.94	0.8622	0.01 - 0.16
SIG - proposed	FM10000	Y3	1-Jun	31-Dec	All	0.84	12.92	0.1148	0.08 - 0.53	5 (C)	0.04	7.42	0.3863	0.03 - 0.06	3 (C)	0.31	10.7	0.1522	0.00 - 0.13

450130	FM1000	Y3P4	1-Jun	31-Dec	All	0.85	10.2	0.251	0.09 - 0.53	5 (C)	0	6.09	0.5296	0.03 - 0.04	3 (C)	0.38	3.06	0.9306	0.02 - 0.11
450306	FM1000	Y2P4	15-May	31-Dec	All	0.91	5.68	0.6831	0.08 - 0.56	5 (C)	0.03	11.66	0.0699	0.03 - 0.06	3 (C)	0.51	3.21	0.8649	0.02 - 0.12
450312	FM1000	Y4P4	17-Jun	31-Dec	All	0.84	13.77	0.0879	0.08 - 0.57	5 (C)	0.04	12.31	0.0909	0.02 - 0.06	3 (C)	0.77	2.14	0.9517	0.01 - 0.16
450407	FM1000	Y4P3	1-Jun	31-Dec	All	0.87	7.33	0.5013	0.11 - 0.54	5 (C)	0.05	2.43	0.8767	0.03 - 0.05	3 (C)	0.55	3.42	0.8438	0.01 - 0.14
SIG - proposed	KBDI	Y3	1-Jun	31-Dec	All	0.71	18.13	0.0203	0.21 - 0.61	5 (C)	0.2	4.75	0.7841	0.03 - 0.09	3 (C)	0.37	5.97	0.6508	0.02 - 0.16
450130	KBDI	Y3P4	1-Jun	31-Dec	All	0.77	17.68	0.0237	0.21 - 0.62	5 (C)	0.37	5.76	0.6746	0.02 - 0.14	3 (C)	0.01	26.37	0.0009	0.05 - 0.08
450306	KBDI	Y2P4	15-May	31-Dec	All	0.35	41.13	0	0.25 - 0.52	5 (C)	0	6.61	0.4701	0.03 - 0.04	3 (C)	0.15	13.41	0.0985	0.04 - 0.14
450312	KBDI	Y4P4	17-Jun	31-Dec	All	0.37	39.94	0	0.25 - 0.57	5 (C)	0.08	9.05	0.3377	0.03 - 0.07	3 (C)	0.03	26.76	0.0008	0.05 - 0.10
450407	KBDI	Y4P3	1-Jun	31-Dec	All	0.33	40.58	0	0.25 - 0.47	5 (C)	0.18	8.69	0.3695	0.03 - 0.09	3 (C)	0.15	6.08	0.6387	0.04 - 0.10

Decision Points

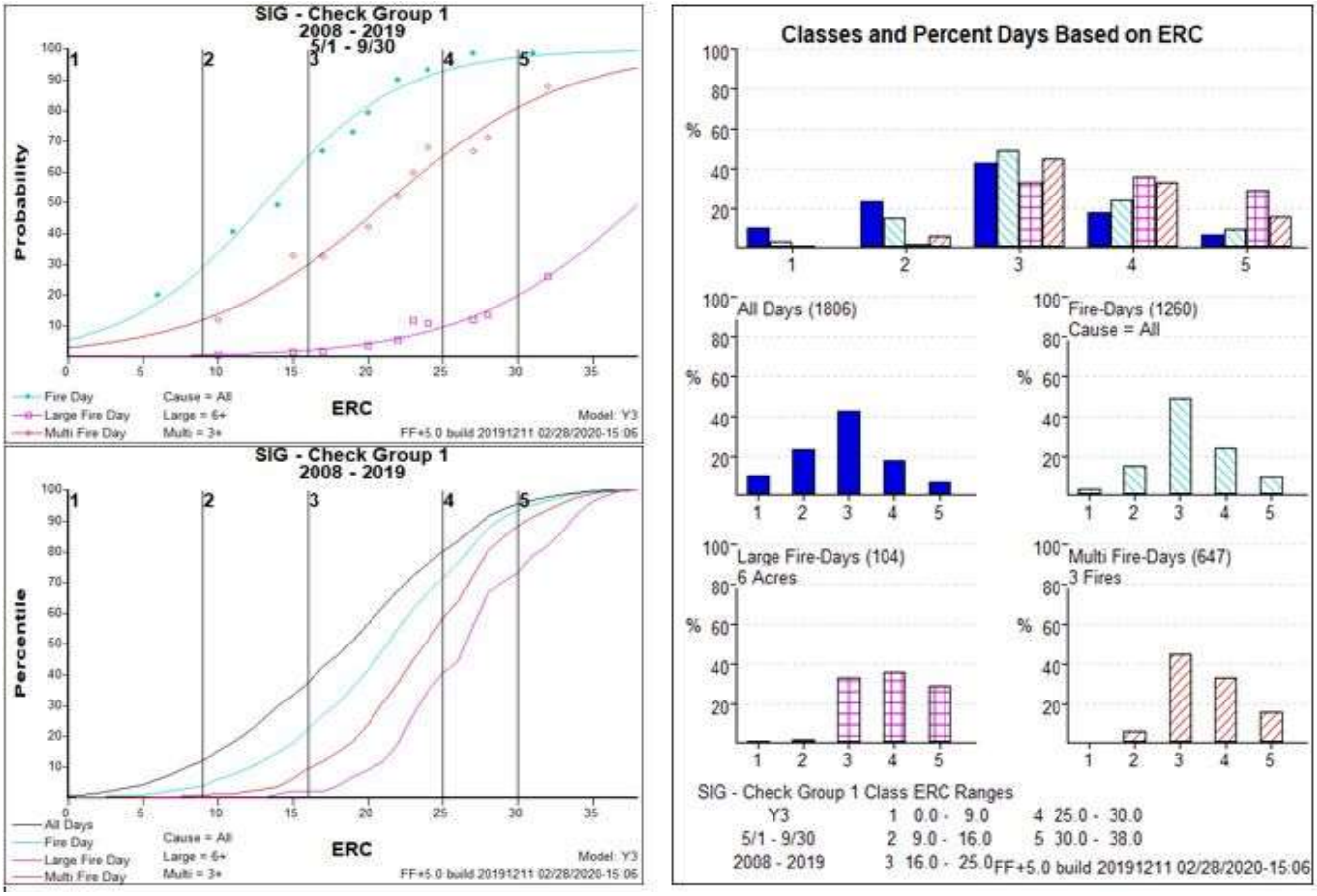


Figure 4. ERC-Y Breakpoints for Coast FDRA

Table 7. For each ERC bin as Class. Number of weather days or All Days (AD) expressed as the number of days in the analysis period and proportion of the analysis period. Number of fire days (FD) is the proportion of fire days, and proportion of all days within the given class with a fire day. Number of large fire days (LFD) is the proportion of fire days with a large fire, and the proportion of all days within the given class with a large fire. Number of days with multiple fires (MFD) is the proportion of multiple fire days, and the proportion of all days within the given class with multiple fire days.

Class	ERC Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		# AD	%AD	#FD	%FD	%AD	#LFD	%LFD	%FD	%AD	#MFD	%MFD	%FD	%AD

1	0-9	180	10	36	3	20	1	1	3	1	4	1	11	2
2	9-16	418	23	188	15	45	2	2	1	0	36	6	19	9
3	16-25	776	43	615	49	79	34	33	6	4	292	45	47	38
4	25-30	316	17	306	24	97	37	36	12	12	214	33	70	68
5	30-38	116	6	115	9	99	30	29	26	26	101	16	88	87

Table 8. Staffing level and adjective rating by ERC-Y range for Coast.

Staffing Level and Adjective Rating for Coast FDRA					
Coast ERC-Y	0-8	9-15	16-24	25-29	30-37
Staffing Level	1	2	3	4	5
Adjective Rating	Low		Moderate	High/Very High	Extreme

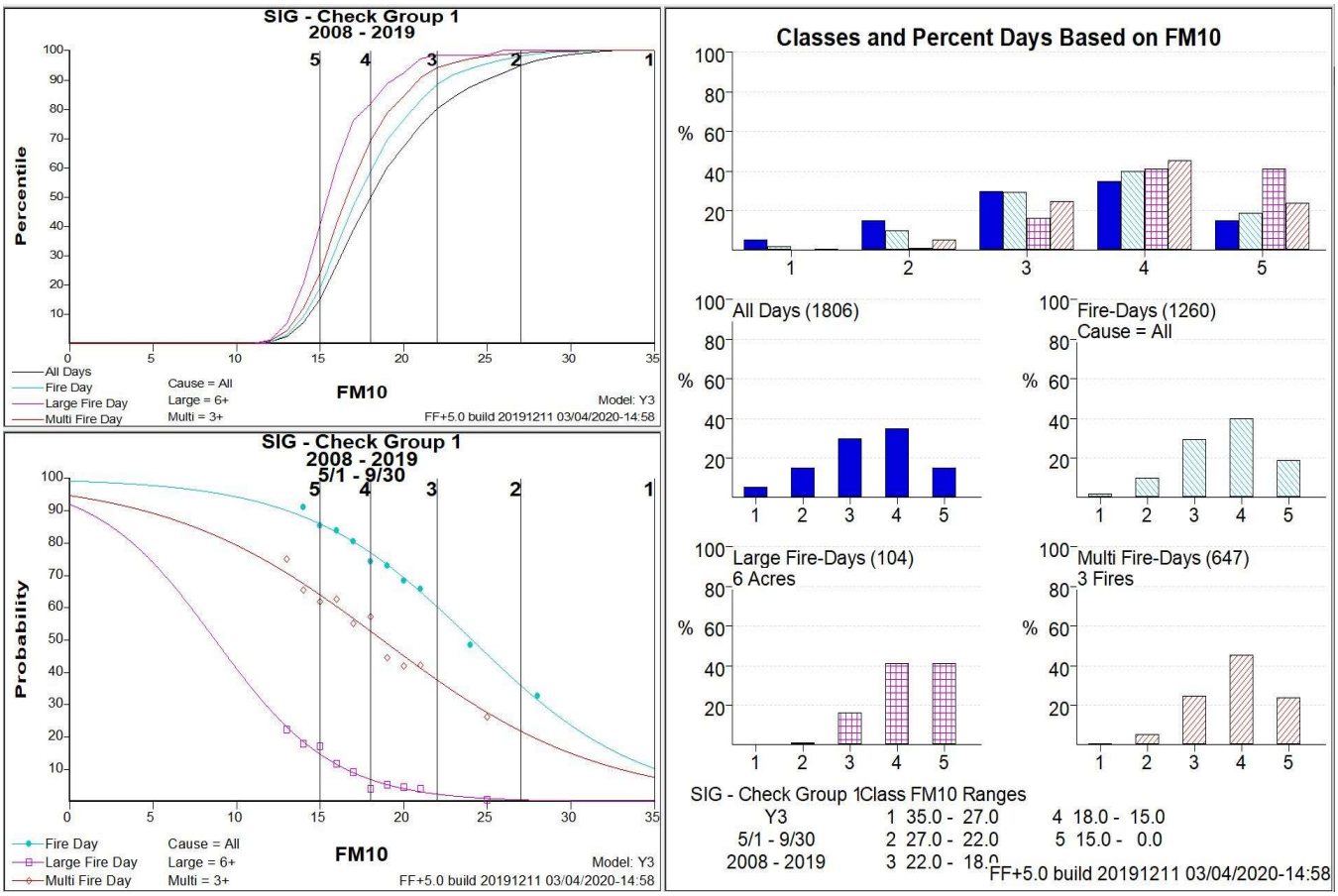


Figure 5. 10HR Breakpoints for Coast FDRA

Table 9. For each ERC bin as Class. Number of weather days or All Days (AD) expressed as the number of days in the analysis period and proportion of the analysis period. Number of fire days (FD) is the proportion of fire days, and proportion of all days within the given class with a fire day. Number of large fire days (LFD) is the proportion of fire days with a large fire, and the proportion of all days within the given class with a large fire. Number of days with multiple fires (MFD) is the proportion of multiple fire days, and the proportion of all days within the given class with multiple fire days.

Class	10HR Range	All Days (AD)		Fire Days (FD)			Large Fire Days (LFD)				Multiple Fire Days (MFD)			
		# AD	%AD	#FD	%FD	%AD	#LFD	%LFD	%FD	%AD	#MFD	%MFD	%FD	%AD
1	35-27	89	5	25	2	28	0	0	0	0	5	1	20	6

2	27-22	257	14	111	9	43	1	1	1	0	29	4	26	11
3	22-18	514	28	352	28	68	13	13	4	3	147	23	42	29
4	18-15	626	35	488	39	78	43	41	9	7	274	42	56	44
5	15-0	320	18	284	23	89	47	45	17	15	192	30	68	60

Table 10. Response level rating by 10HR range for Coast.

Staffing Level and Adjective Rating for Coast FDRA					
Coast 10HR	35-27	27-22	22-18	18-15	15-0
Response Level	1	2	3	4	5