





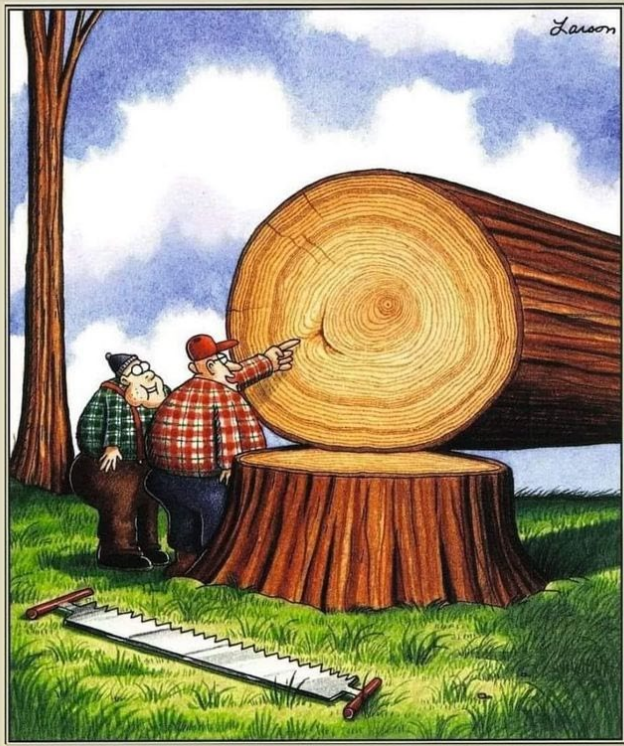




Southeastern Arizona Dispatch Zone

INTERAGENCY FIRE DANGER OPERATING PLAN

	
	
	
	
	
	<div data-bbox="566 518 1289 1465"><p data-bbox="630 1356 1247 1444">"And see this ring right here, Jimmy? ... That's another time when the old fellow miraculously survived some big forest fire."</p></div>

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Southeastern Arizona Dispatch Zone

Interagency Fire Danger Operating Plan

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INTRODUCTION

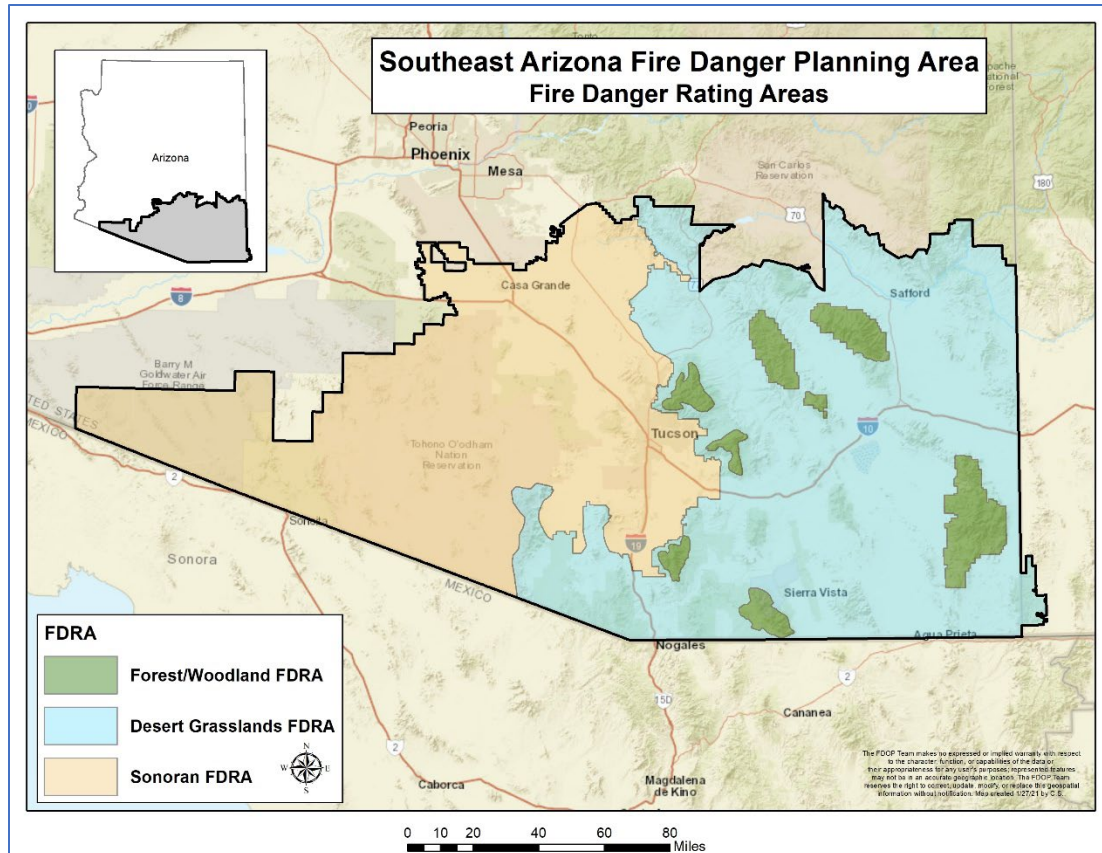
The purpose of this document is to improve response to wildland fires through analysis of historic weather and fire occurrence data. The information and tools provided in this interagency Fire Danger Operating Plan (FDOP) and associated subordinate plans (e.g., Preparedness Level Plan, Staffing Plan, Response Plan, Prevention Plan) will help inform decision makers and fire managers with base level analysis of normal conditions and help identify breakpoints for hazardous conditions. This document is critical to improving firefighter and public safety.

This interagency FDOP covers cooperating agencies in the Southeastern Arizona Zone ((AZ-SEZ); federal suppression resources are dispatched through the Tucson Interagency Dispatch Center (AZ-TDC) (Map 1). Cooperating agencies in this interagency FDOP may have agency-specific plans in place that provide guidance for daily staffing, initial attack response, or prevention planning. These agency-specific plans may be incorporated by reference in the applicable subordinate plan related to this interagency FDOP.

Note: The acknowledgement of the decisions in this Fire Danger Operating Plan (FDOP) will be tempered with the professional judgement of decision makers which may incorporate agency-specific needs. Although flexible, the guidelines within the FDOP incorporate enough structure to offer a high degree of decision support that are based on local wildfire knowledge, weather information, and fuel conditions. These guidelines are meant to be viewed as a checklist or reminder that aid a systematic thought process that leads to informed actions and an efficient allocation of resources.

FIRE DANGER RATING AREAS

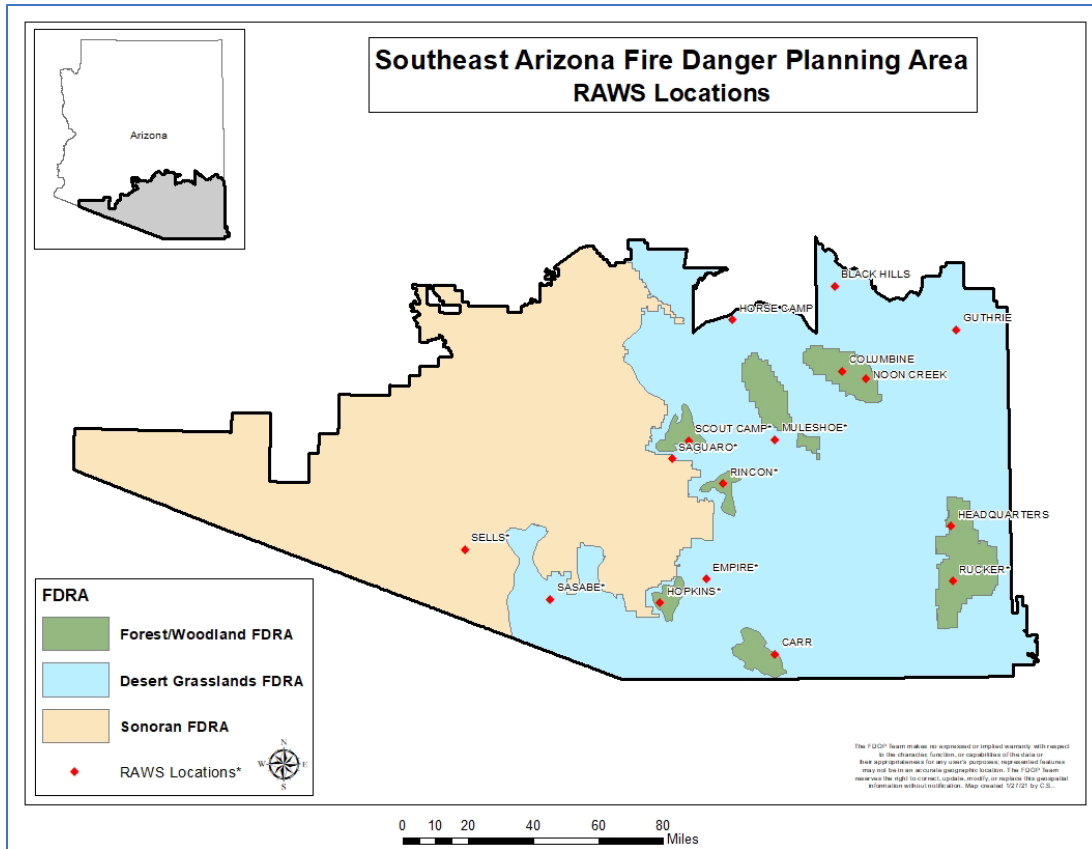
A Fire Danger Rating Area (FDRA) is defined as a large geographic area relatively homogenous with respect to climate, vegetation, and topography. Because of these similarities, it can be assumed that the fire danger within a FDRA is relatively uniform. Fire Danger Rating Areas were delineated on a regional level using Southwest Geographic Area Subject Matter Experts (SWA SME) based upon an analysis of the three climate, vegetation, and topography factors. Three FDRAs for the AZ-SEZ were reviewed with AZ-TDC personnel and adjusted based on local knowledge and input. The final FDRA delineations are displayed in Map 1.



Map 1. Southeastern Arizona Dispatch Zone Fire Danger Rating Areas

WEATHER OBSERVATIONS

Remote Automated Weather Station (RAWS) data was compiled and analyzed by SWA SME's. Pivot tables were created to compare RAWS data outputs from each station and provided to the AZ-TDC Zone for review. This information assisted the AZ-TDC and SWA SME group in identifying Special Interest Groups (SIG's) for each FDRA (Map 2). FDRA-specific SIG's are used for historical fire and weather data analyses using FireFamilyPlus (FFP). These analyses help determine which NFDRS 2016 fuel models and indices statistically correlate best with historical weather and fire occurrence. The analysis process also helps to identify appropriate fire business thresholds (breakpoints) which can be used in the development of decision tools to assist with determining preparedness levels, staffing levels, response levels, and adjective fire danger rating levels.



Map 2. Southeast Zone Selected Weather Sites

HISTORICAL WEATHER ANALYSIS

Quality controlled hourly data for all operational and NFDRS compliant weather stations in and near the analysis area were used as the basis for the weather data analysis. Data were obtained from the Wildland Fire Application Information Portal [RAWS FW13 web page](#) for the 2000-2022 time period.

The evaluation period for this analysis was determined to be 2013 through 2022. More specific information can be found in Appendix 1 of this document.

FIRE WEATHER AND FIRE OCCURRENCE OPERATING PROCEDURES

A. Pocket Cards

The Fire Danger Pocket Card is a tool based on the National Fire Danger Rating System (NFDRS) to help the firefighter develop an awareness of the current fire situation that you are about to step into. The prime objective of the NFDRS is to provide a measure of the seriousness of local burning conditions. The Pocket Card provides a visual reference of those conditions and how they compare to previous fire seasons.

A Pocket Card (PC) will be developed for each FDRA within the AZ-SEZ. Each FDRA within the AZ-SEZ will use the NFDRS v.4 fuel model that statistically correlates best using the FFP analysis process and the

NFDRS Energy Release Component (ERC) index. Depending on the analysis for each FDRA, fuel models Y and Z were shown to correlate well statistically with Energy Release Component (ERC) and the Burning Index (BI) in the analysis process using historical fire and weather occurrence (see Appendix 3A).

AZ-SEZ Pocket Cards will be evaluated and updated every two years, prior to fire crews working in the field environment. FireFamilyPlus (FFP) will be used to create the Pocket Cards.

B. Daily Schedule

Personnel at AZ-TDC are responsible for WIMS program implementation, station catalog maintenance, and the dissemination of the daily fire-danger outputs to the field. AZ-TDC will communicate these outputs daily.

NFDRS components and indices are calculated using the NFDRS processor within the Weather Information Management System (WIMS) program. AZ-TDC is responsible for the daily monitoring and editing of inputs including the need to turn snow flags either on or off.

Designated AZ-TDC personnel are responsible for assuring that station catalog information is reviewed on a yearly basis. Only designated personnel will have edit access to all catalogs and will adjust inputs as necessary after station analysis has been performed.

The afternoon forecast package will consist of the fire weather forecast, the current day's fire-danger indices and the next day's forecasted indices for the AZ-SEZ. The adjective fire danger level will be calculated daily and AZ-TDC website to allow fire danger signs to be updated as appropriate. The AZ-TDC will update the AZ-SEZ Preparedness Level weekly during fire season.

C. Roles and Responsibilities

1. Compliance with Weather Station Standards.

The Remote Automated Weather Station (RAWS) owner, at the field level (e.g., BLM, USFS, USFWS, BIA, etc.), is responsible for ensuring weather data quality and the scheduled maintenance for each station in the weather station network in the Southeastern Arizona Zone (AZ-SEZ). Oversight of the AZ-SEZ RAWS network will be coordinated through the Tucson Interagency Dispatch Center (AZ-TDC).

2. Validation of Historic Fire Data

The Fire Management Planning Specialist or other personnel as determined by the Fire Staff Officer for each cooperating agency in the AZ-SEZ will validate the historic fire occurrence data on an annual basis.

3. Validation of Weather Data

The Fire Management Planning Specialist or other personnel as determined by the Fire Staff Officer for each cooperating agency in the AZ-SEZ will validate any weather data outside of WIMS on an annual basis.

APPENDIX 1 – WEATHER AND FIRE OCCURRENCE DATA

In this section, document the process used to evaluate weather and fire occurrence data, select representative weather stations, establish fire season length and climatological breakpoints.

High quality data is important to inform decisions - it is better to have accurate data for a shorter timeframe than questionable data for a longer term.

1. WEATHER DATA

Quality controlled hourly data for all operational and NFDRS compliant weather stations in and near the analysis area were used as the basis for the weather data analysis. Data were obtained from the Wildland Fire Application Information Portal [RAWS FW13 web page](#) for the 2000-2022 time period.

The data were then ingested into the FireFamilyPlus application, where data completeness and quality were reexamined to identify concurrent years of optimal and most recent data for all stations.

Lastly, a year-round comparative analysis was done using stations with 5+ concurrent data years for the purpose of finding similarly behaving stations and identifying outliers. Similarly behaving stations with 10+ years of data were considered for the creation of SIGs to represent each Fire Danger Rating Area (FDRA).

All the weather data, processes and analysis outcomes described above are archived and/or documented in detail. The dispatch zone is responsible for maintaining the weather database and reviewing this information on an annual basis.

2. FIRE OCCURRENCE DATA

Fire occurrence is compared against calculated same-day fire danger values to find statistical relationships between fire activity and fire danger. This allows NFDRS v4 fire danger metrics to be used to help predict fire activity and related fire management business.

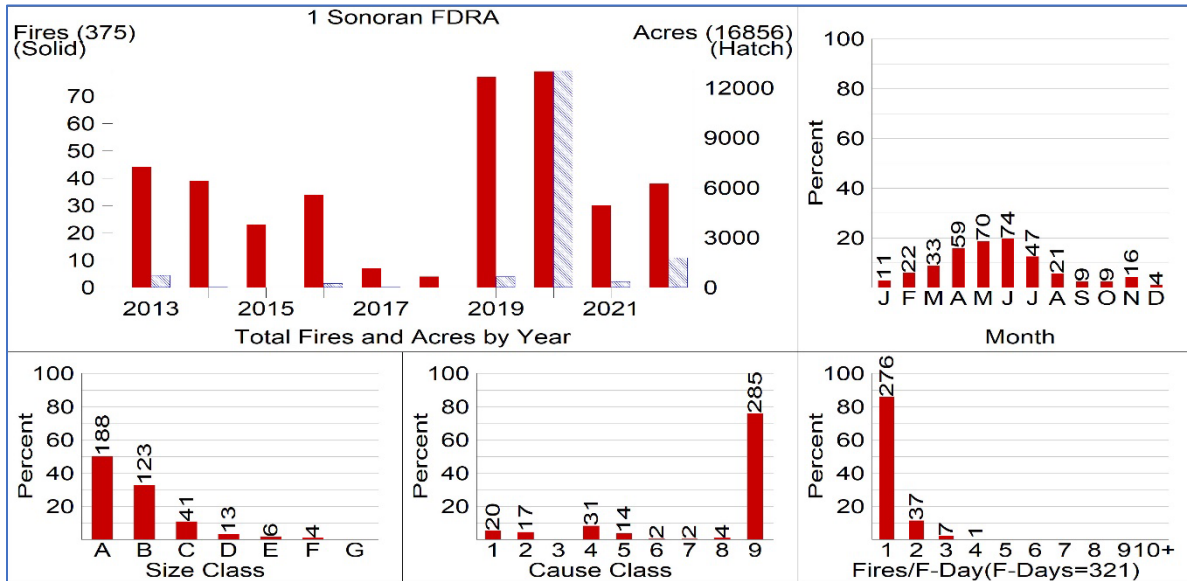
Fire occurrence data for federal agencies, and most states within the U.S., are available from multiple resources in a variety of file formats. There is no authoritative standard. There are also known data quality issues, which vary across the available corporate datasets. It can take an extensive amount of work to develop a fire occurrence dataset suitable for analysis.

Interagency fire occurrence tabular data can be downloaded using the web-based application InFORM: . <https://in-form-nifc.hub.arcgis.com/> InFORM replaces legacy wildland fire reporting systems, including the Wildland Fire Management Information (WFMI) system. Via automated data exchange services (i.e. IRWIN and the geospatial National Incident Feature Service), InFORM

shares data with other fire applications such as WildCAD, FireCode, EGP, WFDSS, and FAMWeb-209.

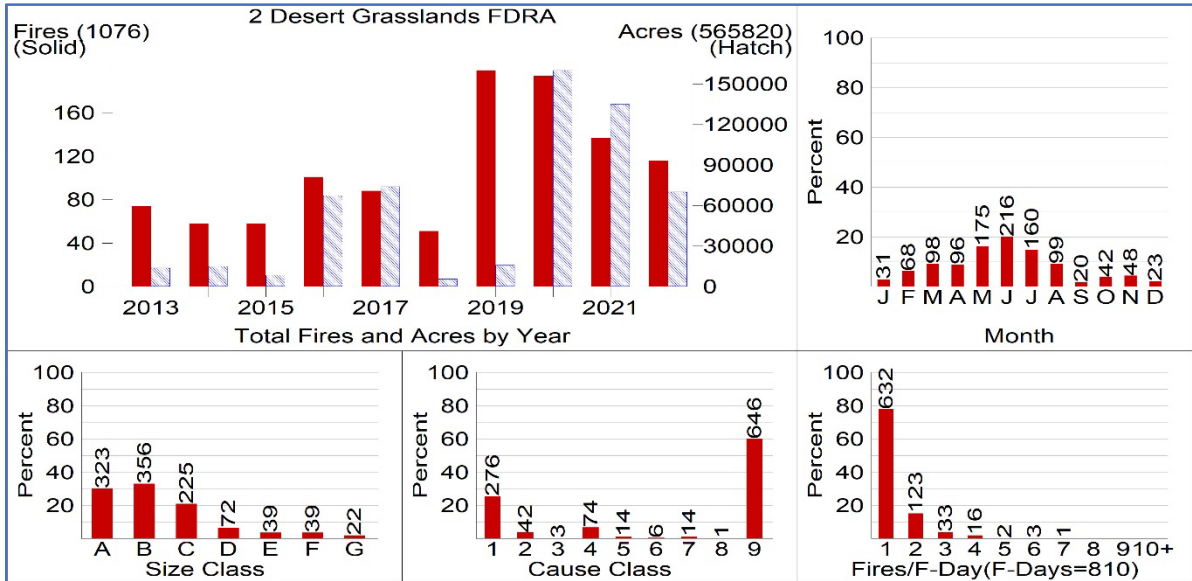
APPENDIX 2 - FIREFAMILYPLUS FIRE SUMMARY GRAPHS

Over the course of the 2013 - 2022 analysis period for the Sonoran FDRA, the historical fire occurrence shows 76% of all unplanned ignitions being classified in the Miscellaneous category (Cause Class 9). This FDRA also shows 50% of all recorded fires being in the Class A category (<0.25 acres) and 33% are in the Class B category (0.26-9.9 acres). The data for this FDRA also shows that 86% of all recorded fire days experience one fire per day and 12% of all fire days experience 2 fires per day (Graph 1).



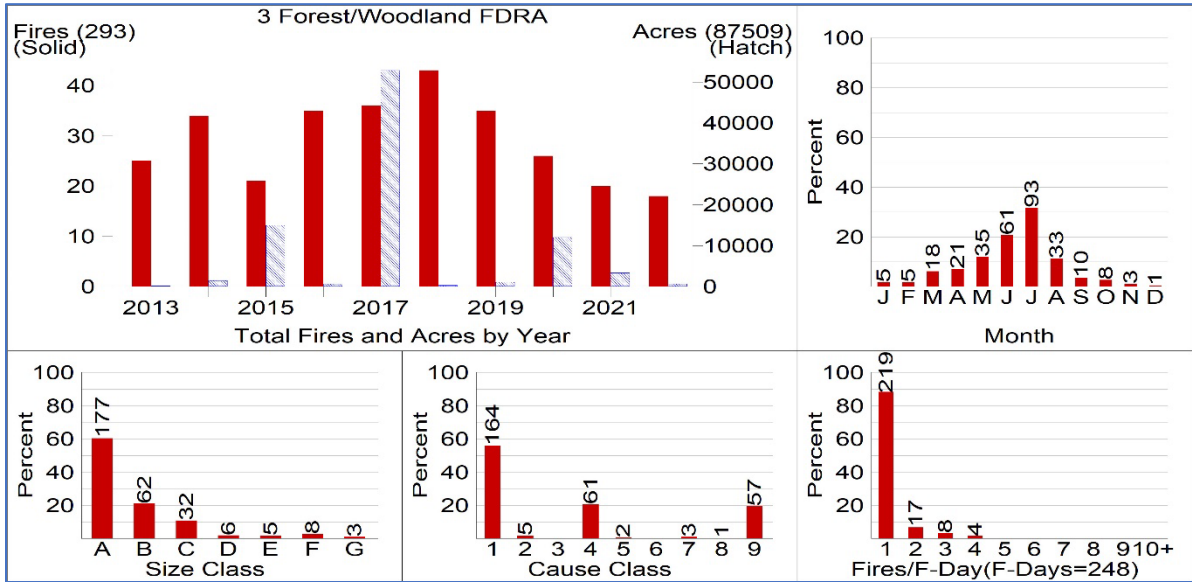
Graph 1. Sonoran FDRA – FireFamily Plus full calendar year fire summary graphs.

Over the course of the 2013 - 2022 analysis period for the Desert Grassland FDRA, the historical fire occurrence shows 60% of all unplanned ignitions being classified in the Miscellaneous category (Cause Class 9) and 26% of all unplanned ignitions were recorded as being caused by lightning (Cause Class 1). This FDRA also shows 30% of all recorded fires being in the Class A category (<0.25 acres) and 33% are in the Class B category (0.26-9.9 acres). The data for this FDRA also shows that 78% of all recorded fire days experience one fire per day and 15% of all fire days experience 2 fires per day (Graph 2).



Graph 2. Desert Grassland FDRA – FireFamily Plus full calendar year fire summary graphs.

Over the course of the 2013 - 2022 analysis period for Forest Woodland FDRA, the historical fire occurrence shows only 56% of all unplanned ignitions being caused by lightning. The remaining 85% of all ignitions are recorded as human-caused; 21% are recorded as Class 4 (Campfires), and 19% are recorded as Class 9 (Miscellaneous). This FDRA also shows 60% of all recorded fires being in the Class A category (<0.25 acres) and 21% are in the Class B category (0.26-9.9 acres). The data for this FDRA also shows that 88% of all recorded fire days experience one fire per day and 7% of all fire days experience 2 fires per day (Graph 3).



Graph 3. Forest Woodland FDRA – FireFamily Plus full calendar year fire summary graphs.

APPENDIX 3 - FIREFAMILYPLUS ANALYSIS ATTRIBUTES AND OUTPUTS

The FireFamilyPlus (FFP) version 5.0 software program was utilized to statistically analyze which NFDRS v4 fuel model(s) and NFDRS indices (e.g. ERC, BI, IC, etc.) correlated best with the historical fire occurrence and weather data for each FDRA. Table 3 shows the analysis period, the Multi-Fire Day (MFD) and Large Fire Day (LFD) thresholds for each FDRA, as well as the NFDRS v4 fuel model that statistically associates best for each FDRA.

When analyzing the historical weather and fire occurrence data for the full calendar year, the data did not correlate well with the NFDRS output variables (ERC, BI, SC, etc.). The reasons for this varied with each FDRA. The SWA SME group decided to define the fire business analysis period for all three FDRAs to be March 1st through August 31st. These timeframes encompass the bulk of the historical fire occurrence for each FDRA and correlate well with the NFDRS output variables.

FDRA Number	FDRA Name	NFDRS v4 Fuel Model	Analysis Period	*MFD Threshold	**LFD Threshold (acres)
1	Sonoran	ERC _Y , BI _Y	3/1/2013 – 8/31/2022	2	35
2	Desert Grassland	ERC _Y , BI _Y	3/1/2013 – 8/31/2022	2	50
3	Forest Woodland	ERC _Y , BI _Y	3/1/2013 – 8/31/2022	2	18

Table 3. FireFamilyPlus analysis attribute table. NFDRS v4 fuel models listed in this table statistically correlate best with the associated FDRA. *MFD: Multi-Fire Days; **LFD: Large Fire Day acreage.

A. NFDRS Analysis Outputs & Decision Point Determinations

Sonoran FDRA

Large Fire Size (acres)	35
Multiple Fire Day (fires/day)	2

SIG: Sonoran FDRA

Weather Station Number	021202	021206	021209		
Weather Station Name	Saguaro	Sasabe	Sells		
NFDRS v4 Fuel Model	Y	Y	Y		
Data Years Used in Analysis	2013-2022	2013-2022	2013-2022		

FDRA	Component Index	NFDRS v4 Fuel Model	Probability Range	R ²	Chi ²	
Sonoran FDRA						
March 1 st – August 31 st	ERC	Y	0.03 – 0.30	0.79	14.6	Fire Day
March 1 st – August 31 ^s	ERC	Y	0.00 – 0.05	0.36	20.76	Large Fire Day
March 1 st – August 31 ^s	ERC	Y	0.00 – 0.08	0.59	14.1	Multi-Fire Day
March 1 st – August 31 ^s	BI	Y	0.02 – 0.39	0.79	14.4	Fire Day
March 1 st – August 31 ^s	BI	Y	0.00 – 0.07	0.56	7.5	Large Fire Day
March 1 st – August 31 ^s	BI	Y	0.00 – 0.11	0.61	10.7	Multi-Fire Day

Table 4. Sonoran FDRA fire probability analyses results using ERC_v and BI_z - FireFamily Plus (v 5.0).

Desert Grassland FDRA

Large Fire Size (acres)	50
Multiple Fire Day (fires/day)	2

SIG: Desert Grassland FDRA

Weather Station Number	021007	021205	021414		
Weather Station Name	Muleshoe	Empire	Rucker		
NFDRS v4 Fuel Model	Y	Y	Y		
Data Years Used in Analysis	2013-2022	2013-2022	2013-2022		

FDRA	Component Index	NFDRS v4 Fuel Model	Probability Range	R ²	Chi ²	
Desert Grassland FDRA						
March 1 st – August 31 ^s	ERC	Y	0.12 – 0.61	0.87	14.2	Fire Day
March 1 st – August 31 ^s	ERC	Y	0.02 – 0.29	0.81	13.8	Large Fire Day
March 1 st – August 31 ^s	ERC	Y	0.02 – 0.25	0.61	29.2	Multi-Fire Day
March 1 st – August 31 ^s	BI	Y	0.12 – 0.59	0.84	11.8	Fire Day
March 1 st – August 31 ^s	BI	Y	0.02 – 0.27	0.76	12.2	Large Fire Day
March 1 st – August 31 ^s	BI	Y	0.02 – 0.22	0.48	28.2	Multi-Fire Day

Table 5. Desert Grassland FDRDA fire probability analyses results using ERC_γ and BI_γ - FireFamily Plus (v 5.0).

Forest Woodland FDRA

Large Fire Size (acres)	18
Multiple Fire Day (fires/day)	2

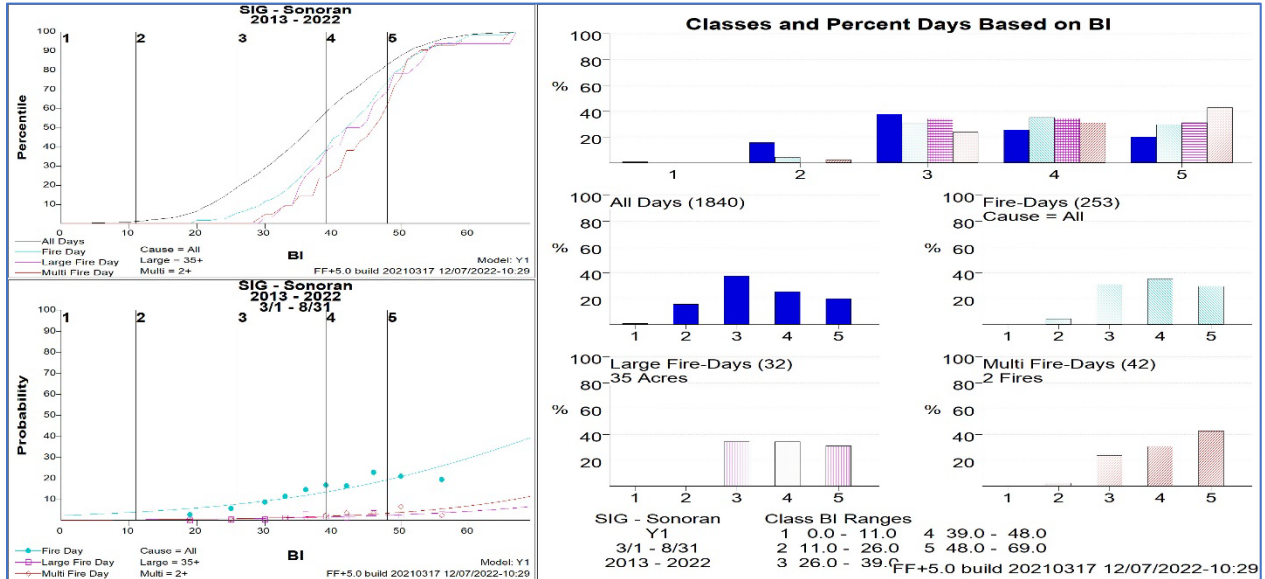
SIG: Forest Woodland FDRA

Weather Station Number	021207	021208	021302		
Weather Station Name	Rincon	Scout Camp	Hopkins		
NFDRS v4 Fuel Model	Y	Y	Y		
Data Years Used in Analysis	2013-2022	2013-2022	2013-2022		

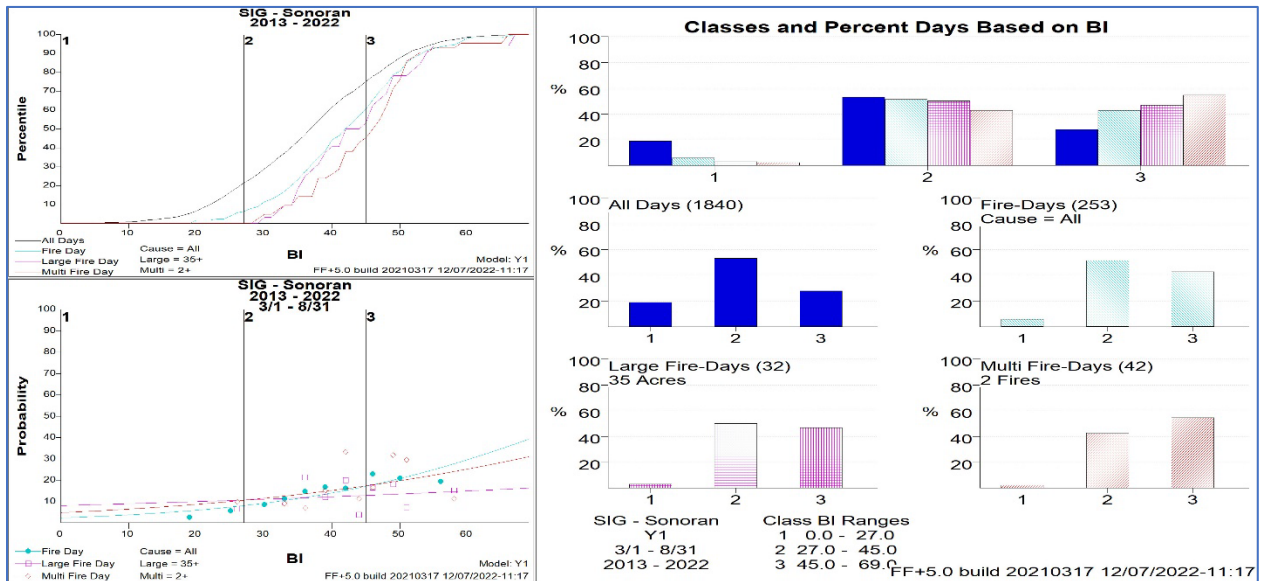
FDRA	Component Index	NFDRS 4v Fuel Model	Probability Range	R ²	Chi ²	
Forest Woodland FDRA						
March 1 st – August 31 ^s	ERC	Y	0.08 – 0.16	0.42	7.3	Fire Day
March 1 st – August 31 ^s	ERC	Y	0.00 – 0.06	0.54	6.4	Large Fire Day
March 1 st – August 31 ^s	ERC	Y	0.01 – 0.03	0.29	7.3	Multi-Fire Day
March 1 st – August 31 ^s	BI	Y	0.09 – 0.15	0.32	4.9	Fire Day
March 1 st – August 31 ^s	BI	Y	0.01 – 0.04	0.25	12.2	Large Fire Day
March 1 st – August 31 ^s	BI	Y	0.01 – 0.02	0.04	6.6	Multi-Fire Day

Table 6. Forest Woodland FDRA fire probability analyses results using ERC_Y and BI_Y - FireFamily Plus (v 5.0).

B. FireFamilyPlus Decision Points Graphs Sonoran FDRA

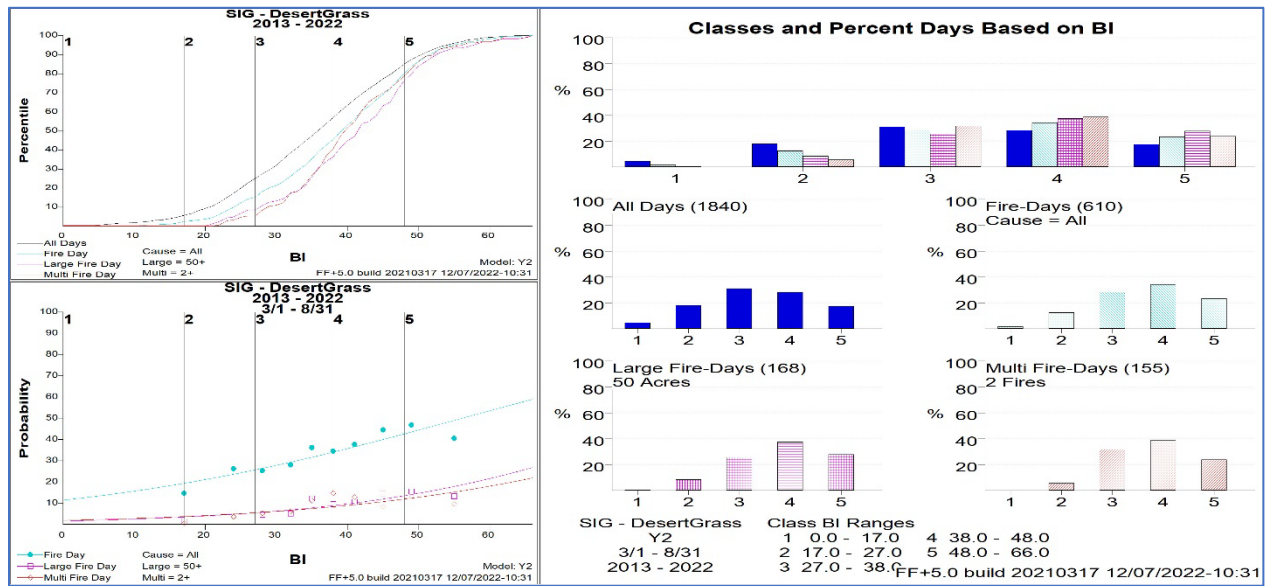


Sonoran FDRA ERC-Y 5-class value ranges.

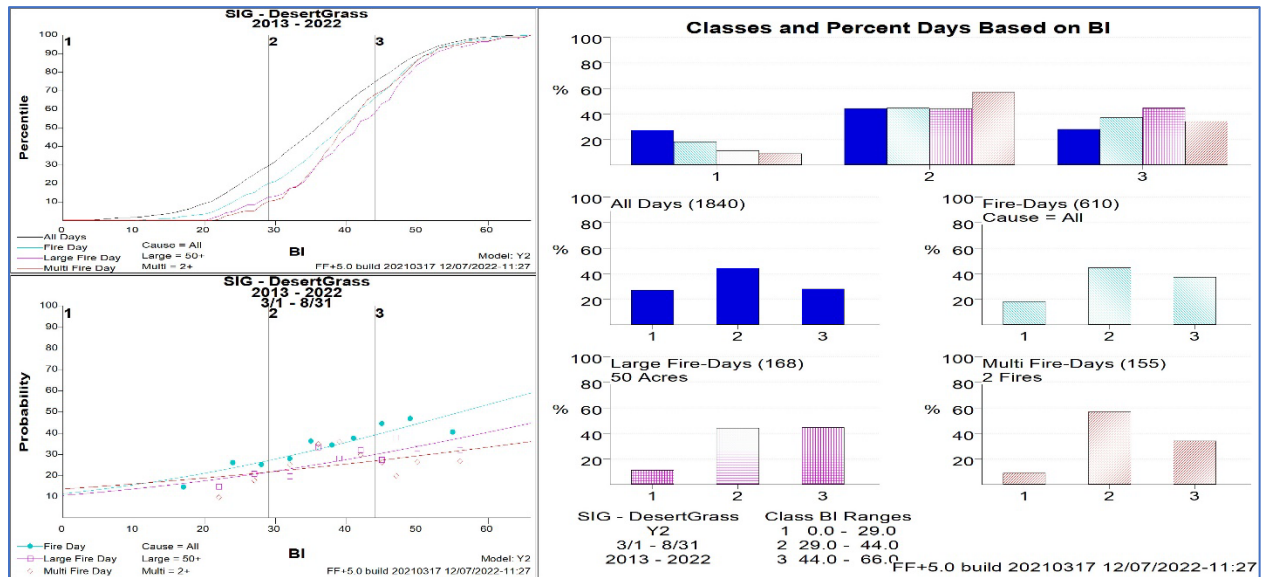


Sonoran FDRA BI-Y 3-class conditional value ranges.

Desert Grassland FDRA

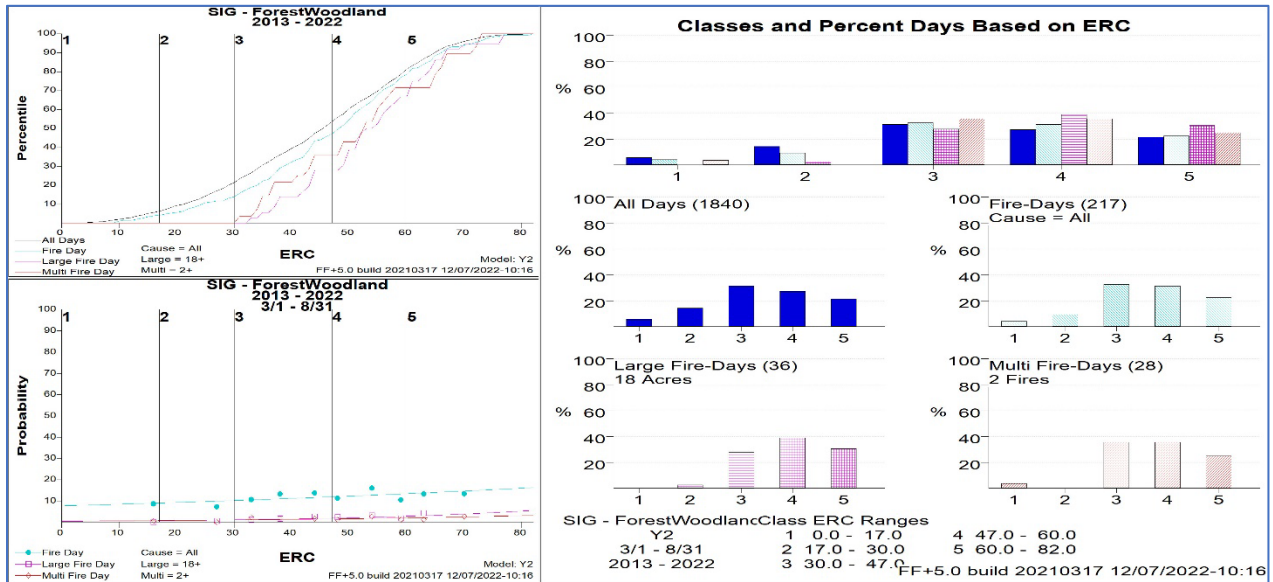


Desert Grassland FDRA ERC-Y 5-class value ranges.

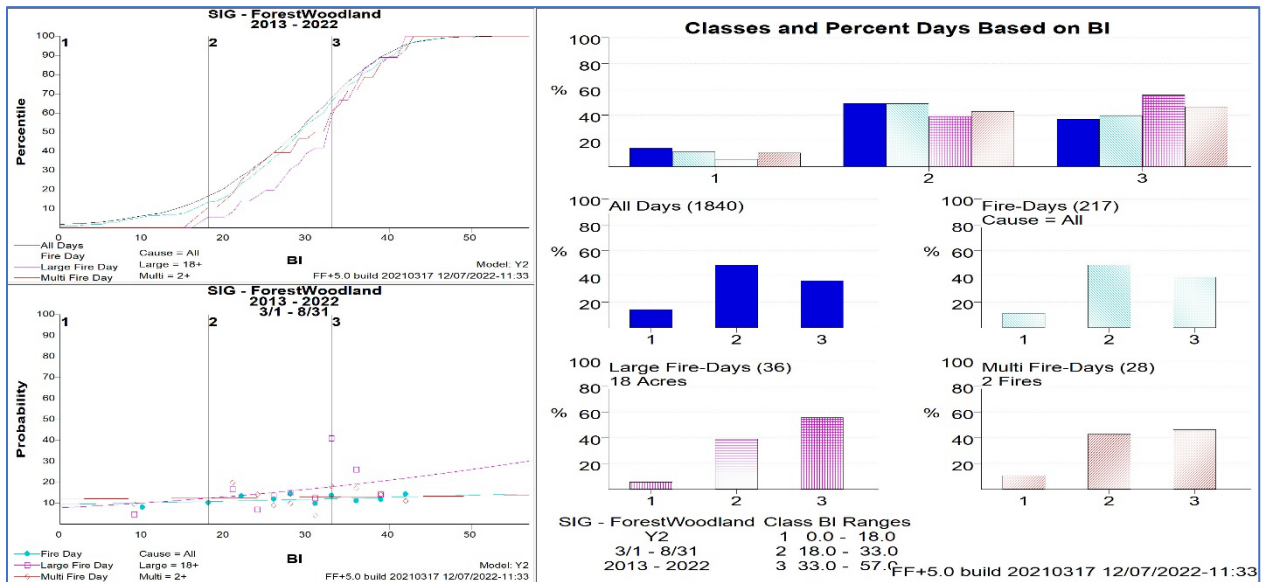


Desert Grassland FDRA BI-Y 3-class conditional value ranges.

Forest Woodland FDRA



Forest Woodland FDRA ERC-Y 5-class value ranges.



Forest Woodland FDRA BI-Y 3-class conditional value ranges.

APPENDIX 4 – FIREFAMILYPLUS METRICS AND DECISION CLASS OUTPUTS

The following charts were created in MS Excel and display the five- and three-class decision point threshold values that were identified for each FDRA using FFP. These decision class values are used to help develop the decision tools (e.g. decision matrix, charts, etc.) that are used in the FDOP subordinate plans.

Decision support tools can be categorized as either long-term or short-term. The NFDRS index that is most commonly utilized for long-term decisions is the Energy Release Component (ERC) index. This index does not vary widely on a daily basis and works well for preparedness level planning and helping to determine adjective fire danger rating levels. The NFDRS indices that are more commonly used for short-term decisions include Burning Index (BI), Ignition Component (IC), and Spread Component (SC). These indices can change relatively quickly over the course of a single burning period and work well to help determine staffing or response levels. The statistical analysis process using FFP revealed both ERC and BI to have a strong correlation to the historical weather and fire occurrence data in all three FDRAs. Based on the statistical analysis, Fuel Model Y correlated well and was chosen to be used in conjunction with ERC and BI for all three FDRAs in the Southeast Zone.

The graphs in Appendix 4 show the historical fire activity distribution and probabilities by FDRA in relation to either a long-term indicator (e.g. ERC) or a short-term indicator (e.g. BI). These historical fire activity distribution and probabilities charts are also displayed as either a five-class (5-class) or three-class (3-class) matrix, as well as either long-term (stable) or short-term (sensitive) metrics.

The charts also display how the long- and short-term responses can work together in a matrix format (e.g. 5x3 or 5x5) to assist with fire management-related decisions such as staffing, response, planning, or adjective fire danger levels for each FDRA.

SEZ - SONORAN FDRA – FFP METRICS AND DECISION CLASS OUTPUTS

Fire Business Analysis - Fire Activity Based Fire Danger Metrics and Thresholds			
Fire Danger Rating Area:	SEZ, Sonoran	Analysis Period:	2013>2022
Large Fire (LFD):	35+ acres	Annual	ERCy, March 1 - August 31
Multi-Fire Day (MFD):	2+ fires	Filter:	Bly, March 1 - August 31
Slope Class:	1	SIG:	Saguaro (021202)
Herbaceous Type:	Annual		Sasabe (021206)
			Sells (021209)

Southeastern Arizona Zone (SEZ) - Sonoran FDRA fire business attributes used in the Fire Analysis program in FireFamilyPlus.

Fire Activity Distribution by "Long Response" NFDRS2016 Indicator...						ERCy	5-Class Long Response (Stable) Metric
	0-29	29-43	43-68	68-82	82+		
All Days	4%	19%	40%	23%	15%		
Fire Days	0%	10%	37%	30%	23%		
LFDs	0%	4%	32%	30%	34%		
MFDs	0%	4%	26%	48%	22%		

Fire Activity Probabilities by "Long Response" NFDRS2016 Indicator...						ERCy	Any Day/Climo
	0-29	29-43	43-68	68-82	82+		
Fire Day	0%	4%	8%	11%	13%	8.3%	
LFD	0%	1%	2%	3%	5%	2.4%	
MFD	0%	0%	1%	2%	2%	1.2%	

Fire activity distribution in the SEZ - Sonoran FDRA using ERC and fuel model Y (ERC_Y) in a 5-class decision matrix.

Fire Activity Distribution by "Short Response" NFDRSv4 Indicator...				Bly	3-Class Short Response (Sensitive) Metric
	0-38	38-46	46+		
All Days	19%	51%	31%		
Fire Days	7%	54%	39%		
LFDs	2%	53%	45%		
MFDs	4%	65%	30%		

Fire Activity Probabilities by "Short Response" NFDRSv4 Indicator...					Bly
	0-38	38-46	46+	Any Day/Climo	
Fire Day	3%	9%	10%	8.3%	
LFD	0%	2%	3%	2.4%	
MFD	0%	1%	1%	1.2%	

Fire activity distribution in the SEZ - Sonoran FDRA using BI and fuel model Y (BI_Y) in a 3-class decision matrix.

Fire Activity Distribution by "Short Response" NFDRSv4 Indicator...						Bly	5-Class Short Response (Sensitive) Metric
	0-60	60-83	83-102	102-131	131+		
All Days	6%	21%	35%	24%	13%		
Fire Days	3%	11%	38%	28%	21%		
LFDs	2%	9%	30%	32%	28%		
MFDs	4%	9%	39%	30%	17%		

Fire Activity Probabilities by "Short Response" NFDRSv4 Indicator...						Bly	Any Day/Climo
	0-60	60-83	83-102	102-131	131+		
Fire Day	4%	4%	9%	10%	13%	8.3%	
LFD	1%	1%	2%	3%	5%	2.4%	
MFD	1%	0%	1%	1%	2%	1.2%	

Fire activity distribution in the SEZ - Sonoran FDRA using BI and fuel model Y (Bly) in a 5-class decision matrix.

5-Class Long Response (ERC) x 3-Class Short Response (BI) Matrix Analysis							5 x 3 ERC x BI Matrix
		ERCy					
		0-29	29-43	43-68	68-82	82+	
Bly	0-38	I	I	II	III	IV	
	38-46	I	II	III	IV	V	
	46+	II	III	IV	V	V	

Metric Level	All Days	Distribution by Metric Level			
		Fire Day	LFD	MFD	
V	27%	32%	45%	35%	
IV	17%	31%	26%	35%	
III	30%	24%	23%	22%	
II	11%	10%	6%	9%	
I	15%	4%	0%	0%	

Metric Level	Probability of:			
	Fire Day	LFD	MFD	
V	10%	4%	2%	
IV	15%	4%	2%	
III	6%	2%	1%	
II	7%	1%	1%	
I	2%	0%	0%	
Climo	8.3%	2.4%	1.2%	

Decision Matrix for the SEZ - Sonoran FDRA using a 5x3 format and ERC fuel model Y, and BI fuel model Y (ERCy, Bly). The top table displays the metric level distribution (I through V) using the 5x3 decision class matrix. The middle table displays the distribution percentages at each of the five metric levels for "All Days", "Fire Day", "Large Fire Day" (LFD), and "Multi-Fire Day" (MFD). The bottom table displays the probability percentages for "Fire Days", "LFD", and "MFD" each metric level.

5-Class Long Response (ERC) x 5-Class Short Response (BI) Matrix Analysis							5 x 5 ERC x BI Matrix																																	
		ERC _y																																						
		0-29	29-43	43-68	68-82	82+																																		
	0-60	I	I	II	III	III																																		
	60-83	I	II	II	III	IV																																		
B _{ly}	83-102	II	II	III	IV	IV																																		
	102-131	II	III	IV	IV	V																																		
	131+	III	III	IV	V	V																																		
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Decision Matrix for the SEZ - Sonoran FDRA using a 5x5 format and ERC fuel model Y, and BI fuel model Y (ERC_y, BI_y). The top table displays the metric level distribution (I through V) using the 5x5 decision class matrix. The middle table displays the distribution percentages at each of the five metric levels for “All Days”, “Fire Day”, “Large Fire Day” (LFD), and “Multi-Fire Day” (MFD). The bottom table displays the probability percentages for “Fire Days”, “LFD”, and “MFD” each metric level.

SEZ - DESERT GRASSLAND FDRA – FFP METRICS AND DECISION CLASS OUTPUTS

Fire Business Analysis - Fire Activity Based Fire Danger Metrics and Thresholds			
Fire Danger Rating Area:	SEZ, Desert Grassland	Analysis Period:	2013> 2022
Large Fire (LFD):	50+ acres	Annual	ERCy, March 1 - August 31
Multi-Fire Day (MFD):	2+ fires	Filter:	Bly, March 1 - August 31
Slope Class:	2	SIG:	Muleshoe (021007)
Herbaceous Type:	Perennial		Empire (021205)
			Rucker (021414)

Southeastern Arizona Zone (SEZ) - Desert Grassland FDRA fire business attributes used in the Fire Analysis program in FireFamilyPlus.

Fire Activity Distribution by "Long Response" NFDRSv4 Indicator...						5-Class Long Response (Stable) Metric
	0-30	30-43	43-58	58-73	73+	
All Days	11%	20%	26%	25%	18%	
Fire Days	4%	15%	25%	30%	27%	
LFDs	1%	10%	20%	35%	33%	
MFDs	0%	6%	31%	38%	25%	

Fire Activity Probabilities by "Long Response" NFDRSv4 Indicator...						Any Day/Climo
	0-30	30-43	43-58	58-73	73+	
Fire Day	11%	25%	32%	40%	48%	33.1%
LFD	1%	5%	7%	13%	16%	9.1%
MFD	0%	3%	10%	13%	12%	8.4%

Fire activity distribution in the SEZ - Desert Grassland FDRA using ERC and fuel model Z (ERCz) in a 5-class decision matrix.

Fire Activity Distribution by "Short Response" NFDRSv4 Indicator...				3-Class Short Response (Sensitive) Metric
	0-30	30-45	45+	
All Days	29%	44%	27%	
Fire Days	20%	45%	35%	
LFDs	13%	43%	44%	
MFDs	10%	57%	32%	

Fire Activity Probabilities by "Short Response" NFDRSv4 Indicator...				Any Day/Climo
	0-30	30-45	45+	
Fire Day	23%	34%	44%	33.1%
LFD	4%	9%	15%	9.1%
MFD	3%	11%	10%	8.4%

Fire activity distribution in the SEZ - Desert Grassland FDRA using BI and fuel model Y (Bly) in a 3-class decision matrix.

Fire Activity Distribution by "Short Response" NFDRSv4 Indicator...						Bly	5-Class Short Response (Sensitive) Metric
	0-18	18-28	28-39	39-49	49+		
All Days	5%	19%	31%	28%	17%		
Fire Days	2%	12%	30%	35%	21%		
LFDs	1%	8%	26%	41%	24%		
MFDs	0%	6%	33%	40%	21%		

Fire Activity Probabilities by "Short Response" NFDRSv4 Indicator...						Bly	Any Day/Climo
	0-18	18-28	28-39	39-49	49+		
Fire Day	14%	22%	32%	41%	42%	33.1%	
LFD	1%	4%	8%	13%	13%	9.1%	
MFD	0%	3%	9%	12%	10%	8.4%	

Fire activity distribution in the SEZ - Desert Grassland FDRA using BI and fuel model Y (Bly) in a 5-class decision matrix.

5-Class Long Response (ERC) x 3-Class Short Response (BI) Matrix Analysis							5 x 3 ERC x BI Matrix
		ERCy					
		0-30	30-43	43-58	58-73	73+	
Bly	0-30	I	I	II	III	IV	
	30-45	I	II	III	IV	V	
	45+	II	III	IV	V	V	

Metric Level	All Days	Fire Day	LFD	MFD
V	28%	38%	47%	37%
IV	16%	19%	22%	26%
III	23%	21%	17%	25%
II	7%	6%	5%	7%
I	26%	16%	10%	5%

Metric Level	Probability of:	Fire Day	LFD	MFD
V		45%	15%	11%
IV		40%	12%	14%
III		30%	7%	9%
II		28%	7%	9%
I		20%	3%	1%
Climo		33.1%	9.1%	8.4%

Decision Matrix for the SEZ - Desert Grassland FDRA using a 5x3 format and ERC fuel model Y, and BI fuel model Y (ERCy, Bly). The top table displays the metric level distribution (I through V) using the 5x3 decision class matrix. The middle table displays the distribution percentages at each of the five metric levels for "All Days", "Fire Day", "Large Fire Day" (LFD), and "Multi-Fire Day" (MFD). The bottom table displays the probability percentages for "Fire Days", "LFD", and "MFD" each metric level.

5-Class Long Response (ERC) x 5-Class Short Response (BI) Matrix Analysis							5 x 5 ERC x BI Matrix																																		
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Decision Matrix for the SEZ - Desert Grassland FDRA using a 5x5 format and ERC fuel model Y, and BI fuel model Y (ERC_y, BI_y). The top table displays the metric level distribution (I through V) using the 5x5 decision class matrix. The middle table displays the distribution percentages at each of the five metric levels for “All Days”, “Fire Day”, “Large Fire Day” (LFD), and “Multi-Fire Day” (MFD). The bottom table displays the probability percentages for “Fire Days”, “LFD”, and “MFD” each metric level.

SEZ - FOREST WOODLAND FDRA – FFP METRICS AND DECISION CLASS OUTPUTS

Fire Business Analysis - Fire Activity Based Fire Danger Metrics and Thresholds			
Fire Danger Rating Area:	SEZ, Forest Woodland	Analysis Period:	2013>2022
Large Fire (LFD):	18+ acres	Annual	ERCy, March 1 - August 31
Multi-Fire Day (MFD):	2+ fires	Filter:	Bly, March 1 - August 31
Slope Class:	2	SIG:	Rincon (021207)
Herbaceous Type:	Perennial		Scout Camp (021208)
			Hopkins (021302)

Southeastern Arizona Zone (SEZ) - Forest Woodland FDRA fire business attributes used in the Fire Analysis program in FireFamilyPlus.

Fire Activity Distribution by "Long Response" NFDRSv4 Indicator...						5-Class Long Response (Stable) Metric
	0-18	18-30	30-47	47-60	60+	
All Days	4%	19%	40%	23%	15%	
Fire Days	0%	10%	37%	30%	23%	
LFDs	0%	4%	32%	30%	34%	
MFDs	0%	4%	26%	48%	22%	

Fire Activity Probabilities by "Long Response" NFDRSv4 Indicator...						Any Day/Climo
	0-18	18-30	30-47	47-60	60+	
Fire Day	0%	4%	8%	11%	13%	8.3%
LFD	0%	1%	2%	3%	5%	2.4%
MFD	0%	0%	1%	2%	2%	1.2%

Fire activity distribution in the SEZ - Forest Woodland FDRA using ERC and fuel model Y (ERC_Y) in a 5-class decision matrix.

Fire Activity Distribution by "Short Response" NFDRSv4 Indicator...				3-Class Short Response (Sensitive) Metric
	0-18	18-34	34+	
All Days	19%	51%	31%	
Fire Days	7%	54%	39%	
LFDs	2%	53%	45%	
MFDs	4%	65%	30%	

Fire Activity Probabilities by "Short Response" NFDRSv4 Indicator...				Any Day/Climo
	0-18	18-34	34+	
Fire Day	3%	9%	10%	8.3%
LFD	0%	2%	3%	2.4%
MFD	0%	1%	1%	1.2%

Fire activity distribution in the SEZ - Forest Woodland FDRA using BI and fuel model Y (BI_Y) in a 3-class decision matrix.

Fire Activity Distribution by "Short Response" NFDRSv4 Indicator...						Bly	5-Class Short Response (Sensitive) Metric
	0-12	12-18	18-31	31-37	37+		
All Days	6%	21%	35%	24%	13%		
Fire Days	3%	11%	38%	28%	21%		
LFDs	2%	9%	30%	32%	28%		
MFDs	4%	9%	39%	30%	17%		

Fire Activity Probabilities by "Short Response" NFDRSv4 Indicator...						Bly	Any Day/Climo
	0-12	12-18	18-31	31-37	37+		
Fire Day	4%	4%	9%	10%	13%	8.3%	
LFD	1%	1%	2%	3%	5%	2.4%	
MFD	1%	0%	1%	1%	2%	1.2%	

Fire activity distribution in the SEZ - Forest Woodland FDRA using BI and fuel model Y (Bly) in a 5-class decision matrix.

5-Class Long Response (ERC) x 3-Class Short Response (BI) Matrix Analysis							5 x 3 ERC x BI Matrix
		ERCy					
		0-18	18-30	30-47	47-60	60+	
Bly	0-18	I	I	II	III	IV	
	18-34	I	II	III	IV	V	
	34+	II	III	IV	V	V	

Metric Level	Distribution by Metric Level			
	All Days	Fire Day	LFD	MFD
V	27%	32%	45%	35%
IV	17%	31%	26%	35%
III	30%	24%	23%	22%
II	11%	10%	6%	9%
I	15%	4%	0%	0%

Metric Level	Probability of:		
	Fire Day	LFD	MFD
V	10%	4%	2%
IV	15%	4%	2%
III	6%	2%	1%
II	7%	1%	1%
I	2%	0%	0%
Climo	8.3%	2.4%	1.2%

Decision Matrix for the SEZ - Forest Woodland FDRA using a 5x3 format and ERC fuel model Y, and BI fuel model Y (ERCy, Bly). The top table displays the metric level distribution (I through V) using the 5x3 decision class matrix. The middle table displays the distribution percentages at each of the five metric levels for "All Days", "Fire Day", "Large Fire Day" (LFD), and "Multi-Fire Day" (MFD). The bottom table displays the probability percentages for "Fire Days", "LFD", and "MFD" each metric level.

5-Class Long Response (ERC) x 5-Class Short Response (BI) Matrix Analysis							5 x 5 ERC x BI Matrix
		ERC _y					
		0-18	18-30	30-47	47-60	60+	
	0-12	I	I	II	III	III	
	12-18	I	II	II	III	IV	
B _{Iy}	18-31	II	II	III	IV	IV	
	31-37	II	III	IV	IV	V	
	37+	III	III	IV	V	V	
		Distribution by Metric Level					
	Metric Level	All Days	Fire Day	LFD	MFD		
	V	18%	24%	34%	22%		
	IV	29%	40%	40%	48%		
	III	23%	20%	15%	17%		
	II	24%	14%	11%	13%		
	I	7%	2%	0%	0%		
		Probability of:					
	Metric Level		Fire Day	LFD	MFD		
	V		11%	5%	1%		
	IV		12%	3%	2%		
	III		7%	2%	1%		
	II		5%	1%	1%		
	I		2%	0%	0%		
	Climo		8.3%	2.4%	1.2%		

Decision Matrix for the SEZ - Forest Woodland FDRA using a 5x5 format and ERC fuel model Y, and BI fuel model Y (ERC_y, BI_y). The top table displays the metric level distribution (I through V) using the 5x5 decision class matrix. The middle table displays the distribution percentages at each of the five metric levels for "All Days", "Fire Day", "Large Fire Day" (LFD), and "Multi-Fire Day" (MFD). The bottom table displays the probability percentages for "Fire Days", "LFD", and "MFD" each metric level.