



CASE STUDY – SOUTHEAST ZONE (REGION 3)

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CASE STUDY – Southeast Zone (Region 3)

OBJECTIVE(S)

Upon completion of this lesson, participants will be able to:

1. Demonstrate an approved FDOP which incorporates preparedness plans (i.e. Dispatch, Preparedness, Staffing Levels).
2. Understand that the Case Study is intended to provide an overview of the decision-making **process** from an FMO perspective. This study is intended to provide a local view of the interagency planning and implementation of a fire danger operating plan.
3. List several fire management decisions based on NFDRS outputs.
4. Discuss the Southeast Zone (SEZ) Fire Danger Operating Plan (FDOP) connection between local fire occurrence issues and decisions based on fire danger products.

NARRATIVE

I. INTRODUCTION

Nationally, land management agencies implement decisions effecting target groups to mitigate potential fire ignition issues. The National Fire Danger Rating System (NFDRS) provides fire managers with a decision-making tool. The NFDRS is one tool in the fire manager's toolbox that can assist with the periodic assessment of potential fire danger. Like every other tool, it must be maintained in good condition to ensure that it is working properly when it is needed.

The Southeast Zone (SEZ) Interagency Fire Danger Operating Plan (FDOP) was initially developed in 2012 and has since been revised several times. Each revision reflects plan adjustments that were the result of feedback from fire managers as well as annual analyses of historical fire occurrence and weather data. The SEZ FDOP working group continues to solicit advice and work towards improving the plan to meet fire managers needs and expectations. FDOP plan maintenance has been a priority for the SEZ working group and interagency partners.

II. PROVIDE APPLICABLE INFORMATION TO THE APPROPRIATE AUDIENCE

The National Fire Danger Rating System and the Weather Information Management System (WIMS) are the principle applications used by the federal land management agencies to assess fire danger. At every scale, fire danger rating is a key consideration for staffing and prepositioning preparedness resources, regulating industrial activity, or placing restrictions on public lands. These assessments are used by and affect a wide variety of stake holders including federal and state agencies, local governments, industrial and other private entities, as well as the general public, participation in a recognized fire danger system and careful management of weather and fire data is vital to ensure accurate assessments and the consistent application of fire danger rating, especially for broader scale assessments.

The SEZ FDOP identified a fairly broad range of agency partners, cooperators, industrial companies, and general public groups and individuals. These entities have been grouped into three primary categories:

A. **Agency:** There are six agencies cooperating in the administrative unit of the SEZ analysis area. They include:

- National Park Service: Saguaro NP; Chiricahua NM; Coronado NM; Fort Bowie NHS; Organ Pipe Cactus NM; Tumacacori NHP
- Coronado National Forest: Douglas Ranger District; Nogales Ranger District; Safford Ranger District; Sierra Vista Ranger District; Santa Catalina Ranger District
- BLM Gila District: Tucson Field Office; Safford Field Office
- US Fish and Wildlife Service: Buenos Aires NWR; San Bernardino NWR

- Tohono O'odham Nation
- Arizona Department of Forestry and Fire Management, Southeast District

III. PREPAREDNESS INFORMATION FOR AGENCY PERSONNEL

The FDOP process blends science, historical data, established processes, and local knowledge to provide a unified framework for local interagency unit managers and administrators to make informed decisions that result in safe, efficient, and effective responses to fire situations.

Available fire danger and fire weather information can be categorized into two groups:

- **Current Information:** Current information can provide decision makers with current conditions in regard to fire danger and fire behavior potential. National Fire Danger Rating System daily outputs are readily available and should be incorporated into the decision-making process.
- **Forecast Information:** Forecast information is available in many forms. Each geographic area employs Predictive Services personnel who can provide the most applicable and current forecast information to aid decision makers as they try to gauge potential fire impacts over the next few days or weeks.

NFDRS information helps FMOs to provide daily fire preparedness direction based on fire danger, fire activity, and local suppression resource availability/commitment. The FMO relies on the Tucson Dispatch Center as an important resource to help provide daily fire danger information to local units such as the daily adjective fire danger rating, staffing level, response level, and preparedness level for the zone.

The Southeast Zone FDOP has been instrumental in helping newly hired FMO's become familiar with the fire danger issues specific to the zone. The FDOP provides continuity of information for leadership personnel (fire and non-fire leadership). Information in the FDOP helped new fire personnel understand the purpose of the FDOP; the identified Fire Danger Rating Areas (FDRAs); climatology, vegetation, topography, and fire history associated with each FDRA; the time period considered to be fire season for the zone (pre- peak- and post-); and the decision support tools for preparedness planning associated with the FDOP. The FDOP also aids FMO's and Duty Officers (DO's) with being able to inform various target audiences with current, applicable information.

A. Target Groups

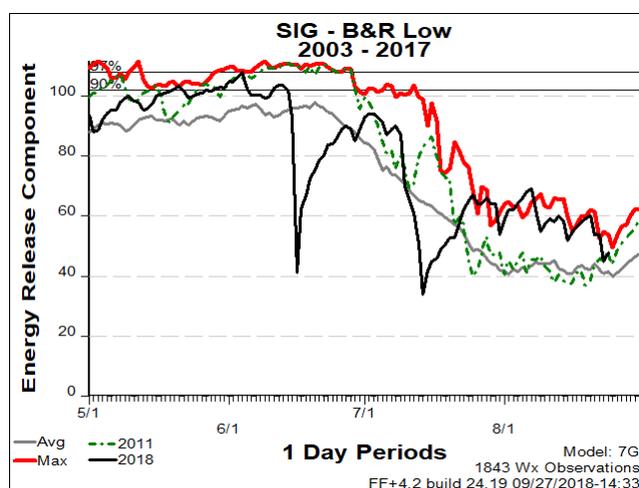
1. Agency Administrators

Agency Administrators are provided with current, appropriate information that provides an accurate depiction of the daily fire danger situation. FMO's provide the appropriate fire danger and fire weather information to ensure that the Agency Administrator is aware of the current fire danger

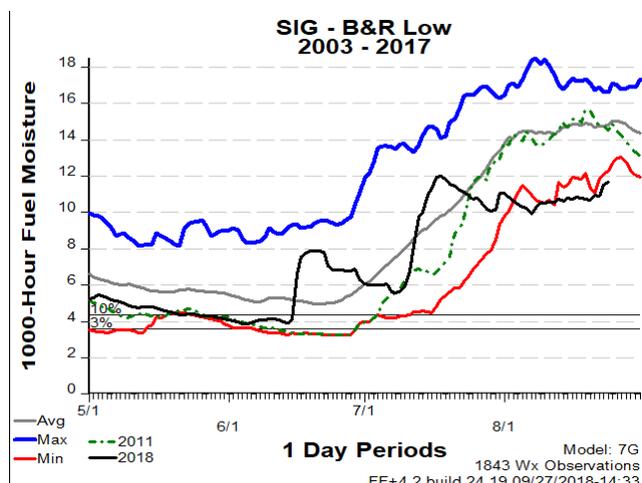
and preparedness levels for the zone. This information helps Agency Administrators understand the current fire danger assessment and helps to justify decisions such as: determining the level of availability for support staff outside of the fire organization; consideration of restrictions or closure orders; and justification severity requests to augment local suppression resource capabilities.

On large, extended fires where decision documentation is required (i.e. WFDSS) decision makers need to be provided with current, appropriate information to assist them with their decision-making process. Initial decision documents are often created under hasty conditions where a decision is needed that provides the Agency Administrator's overall direction on how the incident is to be managed. Fire Management Officers (i.e. Fire Staff, District FMO, NPS FMO, etc.) in the SEZ do provide current fire danger and fire weather information to their respective Agency Administrators to assist in their decision documentation process.

SEZ Fire Managers utilize graphical NFDRS outputs to display trending fire danger conditions to Agency Administrators. Agency Administrators may not always understand the significance of the various NFDRS variables (i.e. ERC, 1000-Hr Fuel Moisture), however graphical displays help Fire Managers present current fire danger conditions in a format that is easier for non-fire personnel to understand. For example, if ERC values are trending above the 90th or 97th percentile thresholds as an area approaches peak fire season (see Graph 1), this provides a visual indication with regard to drying fuel conditions. If 100-hour fuel moisture levels are trending downward and are below the 10th or 3rd percentile thresholds this also indicates significantly dry fuel conditions (see Graph 2).



Graph 1. ERC Graph during the 2018 peak fire season, SEZ Basin & Range Low FDRA. 2011 fire season (green line) also displayed for reference.



Graph 2. 1000-Hour Fuel Moisture Graph during the 2018 peak fire season, SEZ, Basin & Range Low FDRA. 2011 fire season (green line) also displayed for reference.

2. Local Unit Personnel (Fire and Non-Fire Personnel)

FMO's at the local unit level utilize NFDRS information in daily briefings for suppression personnel. Local unit FMO's are responsible for ensuring that firefighters understand the value of the daily NFDRS outputs (i.e. ERC, BI, IC, SC, Pocket Cards) in conjunction with daily fire weather forecasts and what these variables may indicate with regard to daily preparedness planning and potential fire danger.

NFDRS information is also considered when determining the availability of suppression resources for project work or the need to pre-position suppression resources during periods of elevated fire danger levels. Local FMO's use NFDRS information when considering whether prescribed fire projects can either proceed or need to be delayed.

Duty Officers utilize the Staffing Level tool to guide daily internal fire operational decisions at the local level. The Staffing Level specifies appropriate daily staffing for initial response resources, such as when to implement 7-day coverage and adjusted work schedules, and the number of personnel committed to initial attack resources.

3. Industrial Cooperators

FMO's work with Public Information Officers to communicate with organizations or businesses that either utilize the natural resources or have permits to conduct activities on federal, state, or private lands for commercial purposes. These entities include, but are not limited to, utility companies (power, communications), ranchers, railroads, timber harvesting, ski resorts, construction, etc.

The primary 'Industry' partners in the SEZ planning area includes the ranching industry, power companies (i.e. Tucson Electric Power, Arizona Public Service), communication companies, AZ Dept. of Transportation and associated road construction companies, and railroad companies. Any disruptions or restrictions to how these industrial entities can operate on public lands can have significant economic impacts not only to the industry but to their customers as well.

NFDRS tools within the FDOP help FMO's and Agency Administrators in the decision-making process when considering restrictions or limitations on industrial activities on public lands during periods of elevated fire danger.

4. Public

FMO's work with Public Information Officers to communicate with individuals or groups who use the land for recreational purposes such as off-highway vehicle (OHV) activities, camping, hiking, hunting, fishing, skiing, firewood gathering, mountain biking, trail riding, etc. This group also includes those living within the wildland-urban interface.

Public recreational use on federal and state lands in the SEZ planning area is significant. Throughout the year the SEZ planning area experiences substantial impacts from the public. Individuals as well as recreation groups pursue numerous recreation opportunities on weekends, during hunting seasons, as well as various vacation related activities during the course of the calendar year.

NFDRS tools within the FDOP help FMO's and Agency Administrators work with PIO's when considering restrictions or closures on public lands during periods of elevated fire danger. It is important for the public and the media to understand why certain restrictions or closures are being considered or implemented. NFDRS outputs are just as important when considering the removal of restrictions or closure orders to allow public recreational use to resume on public lands. Fire Program Managers for all cooperating agencies within the SEZ utilize the Adjective Fire Danger Rating tool to convey current fire danger conditions to the public.

IV. SEZ ADJECTIVE FIRE DANGER RATING

Fire danger is a broad scale assessment while fire behavior is site specific. In other words, fire danger ratings describe conditions that reflect the potential, over a large area, for a fire to ignite, spread and require suppression action. SEZ Fire Managers use this information to communicate potential fire danger conditions to Agency Administrators, agency personnel, the public, and industrial cooperators in a manner that is easily understood.

Fire business thresholds were identified by the SEZ working group using FireFamily Plus (FFP) to analyze the historical fire and weather records and determining which NFDRS indices showed the highest correlation values with the historical data. The SEZ working group developed a matrix for each FDRA to determine the daily

Using Fire Danger Products to Manage Readiness, Risk, and Response Decisions

adjective rating based on the current or forecasted value of the Energy Release Component (ERC) and Ignition Component (IC) (Example 1). The combination of these two indices, which correlate very well with the historical data using Fuel Model Y, into a simple matrix has proven to work well in determining an accurate Adjective Fire Danger Rating level.

Sonoran FDRA					
Adjective Fire Danger Rating					
ERC-Y ↓	L	M	H	VH	E
0 - 20	L	L	L	M	M
21 - 36	L	M	M	M	H
37 - 61	M	M	H	H	VH
62 - 78	M	H	VH	VH	E
79 +	H	VH	VH	E	E
IC-Y →	0 - 19	20 - 39	40 - 59	60 - 79	80 - 100

Table 9.1. Sonoran FDRA Adjective Fire Danger Ratings

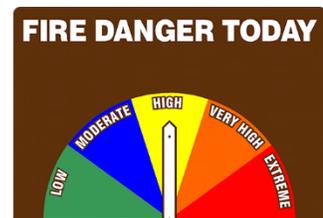
Basin & Range Low Elevation FDRA					
Adjective Fire Danger Rating					
ERC-Y ↓	L	M	H	VH	E
0 - 30	L	L	L	M	M
31 - 45	L	M	M	M	H
46 - 59	M	M	H	H	VH
60 - 73	M	H	VH	VH	E
74 +	H	VH	VH	E	E
IC-Y →	0 - 19	20 - 39	40 - 59	60 - 79	80 - 100

Table 9.2. Basin & Range Low Elevation FDRA Adjective Fire Danger Ratings

Basin & Range High Elevation FDRA					
Adjective Fire Danger Rating					
ERC-Y ↓	L	M	H	VH	E
0 - 17	L	L	L	M	M
18 - 32	L	M	M	M	H
33 - 46	M	M	H	H	VH
47 - 61	M	H	VH	VH	E
62 +	H	VH	VH	E	E
IC-Y →	0 - 19	20 - 39	40 - 59	60 - 79	80M - 100

Table 9.3. Basin & Range High Elevation FDRA Adjective Fire Danger Ratings

Example 1. Adjective Fire Danger Rating Matrix – Three SEZ FDRAs



V. SEZ PREPAREDNESS LEVEL CRITERIA

Preparedness Level (PL) Plans are required at the national, state/regional, and local levels. These plans address the five Preparedness Levels (1-5) and provide management direction based on identified levels of burning conditions (fire danger), fire activity, resource commitment/availability, such as incident management teams assigned, and other considerations.

Tucson Dispatch Center is a significant partner in the use and timely dissemination of NFDRS information for the SEZ. Once the PL has been determined several procedures and guidelines are to be followed by key personnel (i.e Agency Administrators, Fire Program Managers, Duty Officers, Dispatch Center personnel, Prevention Specialists, etc.). These procedures and guidelines are defined in the Appendix section of the FDOP. The SEZ working group recently revised the process for determining the PL for the SEZ planning area. An MSEXcel worksheet was created to guide personnel through the process (see Example 2). The MSEXcel worksheet has four tabs (“Southeast Zone SIGs”, “Basin & Range High”, “Basin & Range Low”, and “Sonoran”). The “Southeast Zone SIGs” tab calculates the PL for the Zone. The other three tabs calculate the Adjective Fire Danger Rating for each Fire Danger Rating Area (see Example 3).

SEZ Preparedness Level				Date: 9/27/2018				
For Internal Use Only								
Data should be entered only in cells with red borders.								
Last 5 Consecutive Days	B&R High FDRA	B&R Low FDRA	Sonoran FDRA		Current Date	B&R High FDRA	B&R Low FDRA	Sonoran FDRA
WIMS ERC (Fuel Model Y) Current Date	55	66	70		WIMS IC (Fuel Model Y) Current Date	35	46	50
WIMS ERC (FM-Y) Previous Date	56	66	70					
WIMS ERC (FM-Y) 3 Days Ago	56	65	68					
WIMS ERC (FM-Y) 4 Days Ago	51	62	69					
WIMS ERC (FM-Y) 5 Days Ago	52	63	69					
ERC 5-Day Average:	54	64	69		Average ERC for the Zone	63		
SEZ ERC Decision Points:	0-27 = 0	28-41 = 1	42-56 = 2	57-70 = 3	71-90 = 4	3		
SEZ Resource Commitment:	None = 0	Light = 1	Moderate = 2	High = 3	Heavy = 4	0		
SEZ Fire Activity:	None = 0	Light = 1	Moderate = 2	High = 3	Heavy = 4	0		
Southwest Preparedness Level:	PL = 1	PL = 2	PL = 3	PL = 4	PL = 5	1		
7 Day Fire Potential SW06S:	None = 0	Light = 1	Moderate = 2	High = 3	Extreme = 4	1		
	Total:					5		
0-4 = Preparedness Level 1						FALSE		
5-9 = Preparedness Level 2						TRUE		
10-15 = Preparedness Level 3						FALSE		
16-20 = Preparedness Level 4						FALSE		
21-25 = Preparedness Level 5						FALSE		
PREPAREDNESS LEVEL:						2		
Southeast Zone SIGs				Basin & Range High	Basin & Range Low	Sonoran		

Adjective Fire Danger Rating

- B&R High FDRA: High
- B&R Low FDRA: Very High
- Sonoran FDRA: Very High

Southeast Zone Interagency Fire Danger Operating Plan
Fire Danger Rating Areas

Fire Danger Rating Areas:
■ Basin and Range-High FDRA
■ Basin and Range-Low FDRA
■ Sonoran FDRA

Example 2. Southeast Zone Preparedness Level Worksheet.

Date: 9/27/2018

SEZ Preparedness Level - Basin and Range Low Elevation FDRA

For Internal Use Only

Use the dropdown list in cell D19 to enter the Adjective Fire Danger Rating level from the matrix output on the right.

Current Date	Basin & Range Low FDRA	Current Date	Basin & Range High FDRA
WIMS ERC (FM-Y) Current Date	66	WIMS IC (FM-Y) Current Date	46

Adjective Fire Danger Rating: Very High

(ERC-G)	L	L	L	M	M
0 - 30	L	L	L	M	M
31 - 45	L	M	M	M	H
46 - 59	M	M	H	H	VH
60 - 73	M	H	VH	VH	E
74 - 95	H	VH	VH	E	E
IC-G →	0 - 20	21 - 45	46 - 65	66 - 80	81 - 100

Low
Low
Moderate
Moderate
Moderate
Moderate
High
High
High
Very High
Very High
Very High
Very High
Extreme
Extreme

Southeast Zone SIGs Basin & Range High Basin & Range Low Sonoran

Example 3. Southeast Zone FDRA worksheet, Adjective Fire Danger Rating.

VI. SEASONAL NFDRS LOCAL UNIT TRACKING INFORMATION

The SEZ Fire Danger Technical Group (FDTG) provides a weekly newsletter to FMO’s and Agency Administrators. The intent is to provide accurate NFDRS information to maintain current level of awareness with regard to fire danger information within the SEZ. This information is used by fire managers and the Tucson Dispatch Center to inform agency administrators and local unit personnel on trending fire danger conditions within each of the three FDRA’s within the zone. The National Weather Service (NWS), Tucson Office also uses this information to assist them in producing a weekly Southeast Arizona Fire Weather Outlook. The weekly NFDRS report in combination with the weekly NWS forecast informs both fire managers and agency administrators on current fire danger and fire weather conditions which can assist management in the decision-making process.

VII. SUMMARY

The development of a Fire Danger Operating Plan based on NFDRS information has provided SEZ fire program managers with decision support tools to help inform agency partners, the public, and industrial cooperators with current information on fire danger conditions within the zone. NFDRS information is included in daily fire preparedness briefings as well as agency management briefings to help provide management direction based on fire danger, fire activity, and resource commitment and availability.

The Southeast Zone FDOP development process has been a collaborative effort designed to provide fire managers with the opportunity to develop common tools to address identified fire management issues, establish reliable staffing levels based on current fire danger conditions, determine an appropriate level of initial attack response, assist with the decision-making process on emerging and long-

term fires, and most importantly help to maintain a high level of safety awareness for suppression personnel.

REVIEW OBJECTIVE(S)

Upon completion of this lesson, participants will be able to:

1. Demonstrate an approved FDOP which incorporates preparedness plans (i.e. Dispatch, Preparedness, Staffing Levels).
2. Understand that the Case Study is intended to provide an overview of the decision-making **process** from an FMO perspective. This study is intended to provide a local view of the interagency planning and implementation of a fire danger operating plan.
3. List several fire management decisions based on NFDRS outputs.
4. Discuss the Southeast Zone (SEZ) Fire Danger Operating Plan (FDOP) connection between local fire occurrence issues and decisions based on fire danger products.