FIRE PREPAREDNESS PLANS AND THEIR RELATIONSHIP TO THE FDOP

Contents

OBJECTIVE(S)

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

1. Outline the relationship of the FDOP to subordinate fire preparedness plans, including the staffing, response, preparedness and restriction plans.
2. Discuss the obstacles which may inhibit successful implementation of these preparedness plans and ways to overcome them.
3. Determine the essential components of each plan as it relates to the specific target groups and associated fire occurrences identified in Task 3.

NARRATIVE

I. INTRODUCTION

Avoidance of decision traps arising from mental shortcuts is possible using structured procedures for estimating probabilities of random events, assessing values associated with management outcomes, and integrating probabilities in fire management decision-making (Maguire & Albright, 2005). The NFDRS is a tool which provides the desired decision-support structure to counter the influence of cognitive bias since it is based upon statistical correlations and probabilities. To realize the benefits associated with NFDRS as a decision-support tool, we must develop systemic procedures for implementation. In other words, it is not enough to simply complete a thorough weather and fire analysis; we must integrate procedures which are not dependent upon the subjective influences of people with their wide array of experiences, training, and personalities.

II. APPLICATION OF NFDRS2016

The challenge for fire managers is to take the thresholds documented in the FDOP and develop pre-planned actions to be initiated at each decision point. Keep in mind that the actions to be taken are intended (in some way) to change the behavior of a specific target group previously identified in the fire occurrence workload analysis (Task 3). The opportunity to implement fire danger rating for decision-support has historically been integrated in preparedness plans. These preparedness plans are also known as "Management Tools" in the NFDRS curriculum. To ensure common terminology and application of a national fire danger system, the components and application of each preparedness plan are described in further detail as they relate to general target groups.

A. Staffing Plan

1. Application

a. **Staffing Level** thresholds (from the FDOP) form a basis for decisions which influence **daily** initial attack readiness.

b. Target Group => **Agency**

c. There is a relatively **high** level of controllability and responsiveness of the target group to staffing plan actions.

d. Example Staffing Plan Decisions:

(1) How many people should I have work tomorrow?

(2) Should I extend the fire suppression resources beyond their normal work hours today? How many people? Which resources? How many hours should I the extend the workday for?

(3) Should I reduce the staffing days for suppression resources from seven to five days?

(4) Example:

The Staffing Level in this example is based on an analysis of cumulative frequency of occurrence using the Ignition Component (IC) index as related to a given Response Level (Example Table 1). The local dispatch center will calculate Response Levels based on fire business thresholds.

Staffing Levels are expressed as numeric values where "1" represents the low end of the fire danger continuum and "5" represents the high end. Staffing Level is intended to provide fire managers with day-to-day decision support regarding staffing of suppression resources. Staffing Level will be used to determine staffing which requires employee overtime associated with working personnel beyond their normal work schedules. In addition, the extended staffing of shared resources such as air tankers, helicopters, Hot Shot crews and other large fire support resources will be a function of the Staffing Level (Example Table 2).

Response Level Worksheet

Fire Danger Rating Area (FDRA)	**Ignition Component (Fuel Model Y)**		
FDRA #1	0-39	40-70	71-100
FDRA #2	0-38	39-63	64-100
FDRA #3	0-15	16-45	46-100
Dispatch Level:	**Low**	**Moderate**	**High**

Example Table 1. Fire Season Dispatch Level Analysis based on the IC index. Fire Season Apr. 1 – Jul. 31.

Staffing Level Worksheet

Response Level		**Low**		**Moderate**		**High**	
Fire Activity?	N	1	2	2	3	3	4
Y/N	Y	2	3	3	4	4	5
		N	Y	N	Y	N	Y
		Significant Fire Potential?					
		Forecasted High Risk Day/Event (Y/N)					

Example Table 2. Fire Season Staffing Level Analysis based on the IC index using the Response Level Worksheet.

2. Staffing Plan Components

   a. The Staffing Plan should be based on the analyses completed as part of the unit's FDOP and the analysis rationale.

   b. Staffing Level helps define an appropriate degree of "*fire response readiness*" for a given day. A unit can operate with 3 to 9 levels of staffing. Most units typically use 5 (1, 2, 3, 4, 5) or 6 (1, 2, 3L, 3H, 4, 5) levels. The use of fire business thresholds to determine Staffing Levels is encouraged; however, they must be computed outside of the WIMS.

B. Response Plan

1. Application

   a. Response Levels (from the FDOP) are preplanned 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.

   b. Target Group => Agency

   c. Response Level Examples:

      (1) At what level is there an automatic dispatch for aircraft?

      (2) How is Staffing Level factored in?

      (3) What response level requires multiple resources (engines, dozers, etc.)?

2. Components

   a. The Response Plan should be based on the analyses completed as part of the unit's FDOP and the analysis rationale. When selecting an appropriate NFDRS index, consider an index that is sensitive to daily changes in weather and fire conditions (e.g. Burning Index, Ignition Component, Spread Component).

b. Identify Response Zones: If response zones need to be identified for the dispatch area, this needs to be completed prior to the development of FDRA's using a collaborative process. Response zones may be based on various criteria such as: common management objectives, land use, fire load, dispatch locations, estimated response times, WUI locations, topographical features, vegetation communities, etc. The Forest Service has been implementing the development of Potential Operational Delineations (PODs). Units that have identified and implemented PODs can use these spatial allocations as response zones.

c. Determine response levels (i.e. "Low", "Moderate", "High") using identified fire business threshold breakpoints (Example Table 1).

Response Level Worksheet

Fire Danger Rating Area (FDRA)	**Ignition Component (Fuel Model Y)**		
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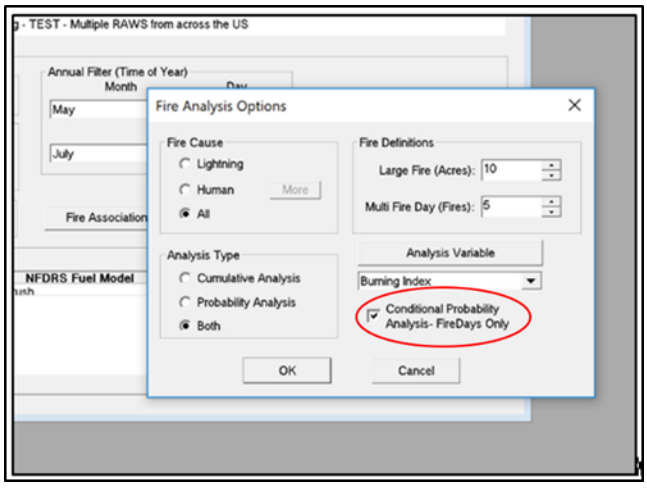
Example Table 1. Fire Season Dispatch Level Analysis based on the IC index. Fire Season Apr. 1 – Jul. 31.

d. When conducting response plan analyses and setting fire business threshold breakpoints using FireFamily (FFP) remember to check the "Conditional Probability Analysis – Fire Days Only" box in the Fire Analysis Options window.



3. Response Level Decision Traps

a. At times units may set up dispatch levels based only on current/full-time staffed resources. However, fire managers know additional resources can be ordered to support field units during high periods of initial attack activity. Assuming one can only set up dispatch levels

based on current budgeted resources is an example of a framing problem.

C. Preparedness Plan

1. Application

   a. **Preparedness Levels**: The preparedness level is a five-tier (1-5) fire danger rating decision tool that is based on NFDRS output(s) and other indicators of fire business (such as projected levels of resource commitment).

   b. Target Group => Agency

   c. Preparedness Level Examples

      (1) At what level should the MAC (Multi-Agency Coordinating) group be activated?

      (2) When should additional decision support resources be ordered (i.e. Decision Support Center, SOPL, additional dispatch personnel, etc.)?

      (3) At what point can fire managers allow suppression resources go to support off-unit fire activity or detail assignments?

      (4) When is the Duty Officer (DO) required to be on-site in the dispatch office?

2. Components

   a. Preparedness Levels often get confused with Staffing Levels. Staffing Levels only consider fire danger, while Preparedness Levels *incorporate additional items*, such as current level of local fire activity, live fuel moisture, and suppression resources committed.

   b. Preparedness Levels incorporate stable variables (e.g. ERC, Live Fuel Moisture, 100-hr Fuel Moisture, etc.) to help with long-term decisions, such as the need to request severity funding or activation of public-use restrictions.

3. Preparedness Level Decision Traps

   a. It is not uncommon for units to make determinations of preparedness levels based on limited criteria or a lack of understanding of appropriate criteria. This is an example of a shooting from the hip decision trap.

D. Prevention Plan

1. Application

   a. Prevention plans document the wildland fire problems identified by a prevention analysis. 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.

2. Components

   a. Program Administration

      Describe how the prevention/mitigation program for the local unit or zone is administered.

      - dentify interagency partners
      - Identify prevention/mitigation program leads
      - Describe prevention/education efforts with public information officers (PIOs)
      - How often are adjective fire danger signs updated; list locations of fire danger signs. Identify who determines when fire danger signs are updated.
      - Describe how prevention/education signs are maintained/updated with current information
      - List any additional program information specific to your program.
      - List links to prevention/mitigation program plans (i.e. https://www.nifc.gov/prevEdu/prevEdu_main.html)

      (1) Prevention/Mitigation Workload Analysis

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

         (b) The Prevention Plan will be used to support decisions which are 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 the combination of events and conditions signal that it is time to do something different, a "decision point" has been identified for each Fire Danger Rating Level within each Fire Danger Rating Area.

(2) Adjective Fire Danger Rating Levels: In 1974, the Forest Service, Bureau of Land Management and State Forestry organizations established five standard adjective descriptions for public information and signing.

(a) Adjective Fire Danger Rating Examples

- How frequently should adjective fire danger rating signs be updated?
- When should public service announcements begin?
- What other decision tools should be tied to this?

(b) Adjective Fire Danger Rating Level Decision Traps

- A common practice to determine adjective fire danger rating is to rely on the standard WIMS product. This could easily produce some inconsistencies with other decisions such as restrictions considerations. This would be an example of a status quo decision trap or an anchoring trap.

b. Mitigation

Describe actions initiated to reduce impacts of wildland fire to communities (i.e. Firewise programs, community wildfire protection program (CWPP) agreements, fuels reduction projects, etc.). Note: Incorporate associated planning documents by reference (i.e. CWPP, Firewise, etc.).

c. Prevention

Describe efforts to prevent unwanted human-caused fires. This involves efforts to:

- Complete fire risk assessments.
- Determine the severity of the situation.
- Facilitate community awareness and education in fire prevention including prescribed burning.
- Coordinate announcement of interagency restrictions and closures.
- Coordinate fire prevention efforts with the public, special target groups, state and local agencies, and elected officials.

- Promote public and personal responsibility regarding fire prevention in the wildland/urban interface.
- Assist Incident Management Teams in accomplishing their objectives in working with the public develop fire protection plans.

d. Education

Describe facilitating and promoting awareness and understanding of wildland fire. Education efforts may include:

- Equipment use
- Debris burning
- Campfire safety
- Vehicle maintenance (i.e. securing tow chains, no dragging vehicle parts, proper tire pressure, brake maintenance, etc.)

Note: *Incorporate education plans by reference.*

e. Enforcement

Describe actions necessary to establish and carry out regulations, restrictions, and closures.

During times of high fire danger, restrictions and/or closures may be imposed to mitigate the risk of wildland fires. Emergency closures have a substantial impact on the public and are only used under the most severe conditions. All Special Orders and Closures will be coordinated with local cooperators and regional agencies.

Fire restrictions and closures require a high degree of coordination among all levels within each agency and tribes, between all agencies and tribes within the restriction area, between restriction areas, and the restriction area and Geographic Area Restriction Coordinator. This process must be continuous from the time restrictions are first proposed, through the period of implementation, and until the rescinding of all restrictions / closures. The Cooperators in the restriction area will continuously monitor weather, fuel conditions and other factors that will indicate when restrictions or closures are warranted. The decision criteria are a combination of all values, not just one or two.

E. Public Use Fire Prevention Plan

1. Application

a. Restrictions/Closures - The public's activities can be regulated through the implementation of restrictions or closures. NFDRS can be used to

determine critical thresholds when these restrictions/closures should be considered.

b. Target Group => Public

2. Restrictions Examples (Public/Industrial)

a. When should local/state agencies stop issuing burn permits?

b. When should camp fire/smoking restrictions go into effect?

c. When should restricted access or closures go into effect?

d. When is firewood cutting allowed?

3. Components

a. The Prevention/Mitigation Plan outlines how the Adjective Fire Danger Ratings are communicated to the public, and applied, in terms of responsible personnel and assigned activities. Prevention activities are intended to reduce the occurrence of unwanted human-caused fires and include, but are not limited to:

- Education (signage, school programs, radio and news releases, recreation contacts, local business contacts, exhibits);
- Enforcement monitoring (patrol, restrictions, area closures);
- Administration (patrol, communication, FDOP, sign and other plans and planning activities).

4. Public Use Restrictions Decision Traps

a. Units which do not have clear criteria for establishing public restrictions may experience an overconfidence in judgement decision trap. Individuals performing under this trap fail to collect factual information.

F. Industrial Fire Prevention Plan

1. Application

a. Restrictions: Industrial activities can be regulated through the implementation of restrictions or closures. NFDRS can support the regulation of industrial entities involved in land management activities.

b. Target Group => Industry

2. Restrictions Examples

a. When are contractors restricted from harvest operations?

b. Implementation of “hoot owl” restrictions for:

- Power saws
- Cable Yarding
- Blasting
- Welding or cutting metal

c. When is commercial firewood cutting allowed/not allowed?

d. Implementation of Industrial Fire Precaution Levels (IFPL).

3. Components

a. The Prevention/Mitigation Plan outlines how the Adjective Fire Danger Ratings are communicated to industrial cooperators, and applied, in terms of responsible personnel and assigned activities. Prevention activities are intended to reduce the occurrence of unwanted human-caused fires and include, but are not limited to:

- Enacting Industrial Fire Precaution Levels.
- Engineering (public utility company, government agency/cooperator coordination)
- Enforcement/industrial program monitoring (patrol, permitting, inspections including firewood cutting, logging, mining, power line maintenance, and area closures).
- Administration (patrol, communication, fire danger signage, and other plans and planning activities).

4. Industrial Restrictions Decision Traps

a. As noted in the Public Use Restrictions section above, units that have not identified clear criteria for establishing industrial restrictions may experience an overconfidence in judgement decision trap. Individuals performing under this trap fail to collect factual information.

III. IMPLEMENTATION CHALLENGES

A. Funding

1. Issue: Insufficient budget for FDOP development/updates including subordinate plans (Preparedness, Initial Response, Staffing, and Prevention plans).

2. Possible mitigation: Work with fire management and budget staff to identify possible funding sources for FDOP development/updates.

B. Expertise

1. Issue: The expertise to complete the FDOP does not exist; specialized skills (i.e. GIS, FireFamilyPlus) are not readily available.

2. Possible mitigation: Training/workshops to educate and provide skills and guidance; ask for outside assistance.

C. Cognitive Bias

1. Issue: Support is lacking due to misunderstanding of the process and decision support tools.

2. Possible mitigation: Education and awareness; implementation of decision-support tools intended to counter decision traps resulting from human biases.

D. Time

1. Issue: Limitations on time and priorities which ultimately affect time available to commit to and complete the FDOP project.

2. Possible mitigation: Evaluate priorities; budget time for non-peak workload periods.

IV. SUMMARY

Wildland fire operations have inherent risks that are difficult to mitigate. The use of NFDRS tools and information can optimize the outcome of the decision-making process which ultimately impacts the public, industry, and agency personnel.

Decision-support tools may be able to leverage how managers respond to risk information to mitigate some cognitive biases and decision heuristics (Thompson, Calkin, Scott, & Hand, 2016). The Fire Danger Operating Plan (FDOP), including the associated subordinate plans, is intended to provide fire managers and agency administrators with high quality, current fire danger information. The FDOP provides NFDRS-based tools and information which offers the desired decision-support structure to counter the influence of cognitive bias because it is based upon statistical correlations and probabilities.

The FDOP and associated subordinate planning documents provide systemic procedures for implementation that are not dependent upon the subjective influences of people. These systematic procedures offer support for fire managers by assisting with planning and operational decisions, preparedness,

resource needs, requesting severity funding, personnel briefings, increased situational awareness, and when considering implementing fire restrictions or closures.

It is important that NFDRS information and associated planning documents/tools are understood and utilized by upper-level decision makers (i.e. fire managers, agency administrators). It is equally critical that *all* firefighters understand *why* NFDRS information is essential and can assist with vital, risk-based decision making.

REVIEW OBJECTIVE(S)

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

1. Outline the relationship of the FDOP to subordinate fire preparedness plans, including the staffing, response, preparedness and restriction plans.
2. Discuss the obstacles which may inhibit successful implementation of these preparedness plans and ways to overcome them.
3. Determine the essential components of each plan as it relates to the specific target groups and associated fire occurrences identified in Task 3.

REFERENCES

Calkin, D. C., Finney, M. A., Ager, A. A., Thompson, M. P., & Gebert, K. M. (2011). Progress towards and barriers to implementation of a risk framework for US federal wildland fire policy and decision making. *Forest Policy and Economics, 13*(5), 378-389. Retrieved 12 21, 2018, from https://sciencedirect.com/science/article/pii/s1389934111000268

Maguire, L. A., & Albright, E. A. (2005). Can behavioral decision theory explain risk-averse fire management decisions? *Forest Ecology and Management, 211*(1), 47-58. Retrieved 12 21, 2018, from https://sciencedirect.com/science/article/pii/s0378112705000381

Thompson, M. P., Calkin, D. E., Scott, J. H., & Hand, M. S. (2016). *Uncertainty and Probability in Wildfire Management Decision Support*. Retrieved 12 21, 2018, from https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/9781119028116.ch4