

**An Interim Report on the Interplay of  
Wildland Fire Suppression Costs and Decision-making**

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**Introduction**

Strategies selected to suppress wildfires have significant potential to affect suppression costs. Likewise an emphasis on cost containment may affect strategy selection. However, little systematic documentation exists as to how these factors interact. Our study's objective was to assess the interplay of suppression expenditures with an increased emphasis on flexibility in fire management responses that allows for selection of a range of fire management options on a given fire event.<sup>1</sup>

This paper is an interim report of findings from the qualitative research conducted to address the following questions:

- 1) How do wildland fire management strategies and tactics influence wildland fire costs?
  - (a) Does selection of less than full perimeter control strategies such as point protection or monitoring result in reduced suppression costs for the Forest Service?

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<sup>1</sup> When the interviews were conducted, an increasing emphasis was being placed on Appropriate Management Response (AMR), a policy that had been around since the mid 1990's and that allowed for an array of suppression responses ranging from monitoring through full perimeter control. Since the time the interviews were conducted, new policy has been implemented that directs fire managers to consider the full range of suppression options available when responding to a wildland fire. Suppression options are to be selected to achieve Land Management Plan/Fire Management objectives, together with mutually developed multi-jurisdiction wildland fire objectives.

- (b) Do strategies and tactics aimed at less than full perimeter control shift the cost burden to non-federal entities?
- 2) How does an increasing emphasis on cost containment influence the strategies and tactics used on wildland fires?
- 3) How does the use of the wildland fire decision support system (WFDSS) influence the strategies/tactics or costs of suppressing fires?

A later section in the paper covers some salient topics pertaining to wildland fire responses and costs that were independently raised by many study interviewees. Topics included information about costs that extended beyond the five sampled fires, other fire-related information not targeted in this study, and interviewee perceptions of anticipated events and experiences. Interviewees felt strongly about these topics and wanted their views communicated to the study audience. The study team believes this emergent information warrants inclusion in the paper but needs to be addressed in a separate section.

## **Methodology**

The study team used a qualitative inquiry approach to gather data for this study. This approach allows researchers to gather information from those having first-hand knowledge of, and experience with, the topics under investigation. In our study, it allowed four different groups involved in fire suppression efforts to express their real-life experiences and perceptions of the interplay of more flexible suppression responses and suppression costs. Such knowledge is valuable for several reasons. First, people's

perceptions, grounded in their experiences, are their reality and constitute the basis for their decisions and actions. This knowledge is key to understanding why those involved in implementing more flexible suppression responses behave as they do. Second, knowledge of the experiences and perceptions of these implementers can help those with different experiences and perceptions identify where communication, training, or mitigation can be improved and/or policy clarified. Specifically, our approach will enable us to produce an in-depth description and understanding of how flexibility in management responses played itself out on the fires we studied.

We used a written interview guide to direct and focus conversations on topics pertinent to the flexible suppression responses and their interaction with wildland fire costs. This guide covered 1) the influence of wildland fire management strategies and tactics on wildland fire costs, 2) the influence of the increasing emphasis on cost containment on selection of strategies and tactics used on wildland fires, and 3) the influence of the new wildland fire decision support system (WFDSS) on the selection of strategies/tactics and on costs of suppressing fires. Our guide was a “living document,” updated after each interview to include new information and more narrowly focus our discussions on our research questions. As we moved from interview to interview, we asked current interviewees to validate and clarify information given us by previous interviewees.

During fall of 2008 and winter 2009, our two-person interview team conducted 25 in-depth, unstructured interviews with 30 persons, who represented five large wildland fires that burned in the West in 2008.

While a variety of strategies and tactics were used on each of the five focus fires, as a whole, they run the gamut from greater emphasis on aggressive suppression to minimal aggressive suppression activity. Once they escaped initial attack, all five fires were initially intended to be managed with less than full suppression strategies. However, because of safety and fire behavior concerns, one was managed for full suppression almost from the start. Final fire ranged from 3,280 to 67,147 acres. All were long duration fires, ranging from 18 days to 60 days in length.

Interviewees included agency administrators (AAs), incident commanders (ICs), state and local cooperators, and county commissioners (representing stakeholders). Interviews were confidential, open-ended, conversational style discussions, lasting between 1.5 and 2 hours. This allowed us to discover interviewees' definitions of the situation—their perceptions and interpretations of the interplay of flexible suppression responses and fire costs and their own roles in the interplay of these two phenomena. While we focused on the five target fires, interviewees often referred to other experiences and events to illustrate points they were trying to make with respect to strategy selection, cost reduction, and decision support tools.

Interviews were tape recorded, transcribed verbatim, and supplemented with field notes and analytic memos as suggested by Schatzman and Straus (1973). Interviewees' confidentiality was protected through the use of identification codes and transcripts were edited to remove references to names of people and places.

We are using an inductive analytic process where we carefully study the transcribed interviews, code the written text in terms of content categories and their distinctive features (also known as properties or characteristics) and identify more

general themes (that is, emphasis areas). We use ordinal scale descriptors— “some,” “many,” “most,” and “virtually all”—to capture a general sense of what proportion of interviewees identified a particular experience or impression. We are also confirming the themes and categories we discover by asking interviewees themselves to review draft copies of written products and respond with corrections and comments. In so doing, we will “reality test” our interpretations and validate our proposed categories, properties, and conceptual framework (Gold 1997). Where consensus is lacking, we will describe the multiple perspectives identified and account for situations that deviate.

## **Findings**

### **Selection of Wildland fire Management Strategies**

By and large, strategies were selected by agency administrators to meet their respective unit’s objectives. Formulation of objectives was guided by land management and fire management plan direction and cost consciousness. Typically, unit objectives included community/firefighter safety, fuels treatment, and ecological restoration. Strategies selected also took into account a variety of fire contextual factors, including topography, time of year, weather, resource availability, fuels conditions, values at risk, and costs.

### **Influence of Wildland Fire Management Strategies and Tactics on Wildland Fire Costs**

Many of the less than full suppression strategies' (hereafter referred to as "LTFS") influences on costs discussed in this section are tied to long duration fires, which may occur even with full perimeter control strategies. Duration of the event, not strategies used, may be key to understanding the concerns cooperators/stakeholders and some agency employees have with LTFS fires. This stems from the likelihood that long duration fire occurrence increases with LTFS.

*Does Selection of Less Than Full Perimeter Control Strategies and Tactics Reduce Forest Service Suppression Costs?*

One cannot assess with certainty the effect of less than full suppression strategies on costs because one cannot apply different strategies to the same event (at the same time/locale) for comparison. What follows are the perceptions and experiences of fire experts and stakeholders relative to the effect of LTFS on costs of the five sampled fires, one or more of which they were associated with. In virtually all fires included in this study, managers opted for predominantly LTFS. AA and IC interviewees suggested that LTFS led to lower per acre costs but not always to lower total fire costs. Interviewees explained that by using LTFS and associated tactics, fires burned over extended periods of time and in some cases the total costs of these longer-duration fires may have exceeded what costs would have been if full suppression had been or could have been used. However, in some of these instances, topography, weather, fuels loading, and

resource availability prohibited managers from successfully implementing full suppression strategies, even if they had wanted to choose aggressive full suppression.

It was also felt that the cost benefits of LTFS are more likely to be seen over the long term. A long term benefit of LTFS mentioned by most interviewees was fuels treatment accomplishment. They said this will ultimately lead to ecological restoration, reduced fire danger, and potentially lower costs in the future.

Some AAs noted the effects on their employees of long duration fires—impacts that although possible regardless of the strategy selected are regarded as more likely to occur when AAs select LTFS.<sup>2</sup> Impacts include disruption of regular work activities, inability to meet work targets (including fulfillment of contract obligations), and mental/emotional/physical wear and tear on employees. This wear and tear is the result of being required to work longer days for lengthy periods and in some instances enduring unpleasant interaction with local citizens, even during their off-duty hours. Incidence of employee illnesses associated with these stressors, together with long-term poor air quality, were reported to rise during such events. These are costs to the agency, as well as to the individual, both of which these AAs think have been overlooked.

*Do Strategies and Tactics Aimed at Less Than Full Perimeter Control Shift the Cost Burden to Non-federal Entities?*

Cooperators and stakeholders offered their assessment of the cost effects of LTFS fires on them and their constituents. Most thought that had the agency selected full

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<sup>2</sup> Many interviewees believe that selecting LTFS, rather than full aggressive suppression strategies, increases the likelihood of long duration fires and their consequences.

perimeter control for the fires in question, cooperator and stakeholder costs would have been less. They based this on their perception that the longer the fires burned, the more they cost. Types of costs discussed by interviewees included: cooperator structure protection costs; cooperator monitoring and preparedness costs; cooperator opportunity costs; county/city government labor/supply/equipment costs; county/city government opportunity costs/out of pocket expenses; farm and ranch loss costs; tourism business loss costs; and ordinary citizen costs.

**Cooperator structure protection costs.** In typical pre-existing cost share agreements, initial attack on wildland fire is performed by cooperators without charge up to the end of the first burning period. If the fire goes into extended attack status, the Forest Service may pay non-federal cooperators to remain in a suppression role. If they are released from initial attack duty and reordered by the agency, cooperators are typically reordered to protect structures and paid for their work. Cooperators on the fires included in this study reported they did not accrue structure protection costs for incidents managed under LTFS. The Forest Service covered these costs for fires either threatening private structures within National Forest boundaries or threatening to escape to private land. In some cases, the agency shouldered more of these costs than they reportedly would have preferred because they had not yet secured cost share agreements with cooperators. In other cases, the agency assumed the costs because cooperators refused to cost share on incidents the agency managed for resource benefits, if they ignited on non-wilderness National Forest lands.

Opinions on cooperator costs were held and discussed by many interviewees, not just by those cooperators directly affected. Many interviewees, including some AAs,

stated there is a lot of confusion about cost share and structure protection agreements, among both agency personnel and cooperators. This was blamed on the perception of differing suppression mandates of the various agencies involved. Some cost share agreements remained in a state of flux at the time of the interviews.

**Cooperator monitoring and preparedness costs.** Despite not having to pay for structure protection costs, cooperators said they experienced increased need for staffing and repositioning of forces in their protection areas threatened by long-duration fires, which they believe are a more likely result of LTFS selection. They reported the Forest Service did not cover the additional costs they incurred for monitoring and preparedness unless the fire escaped Forest Service jurisdiction or its threat became imminent.

**Cooperator opportunity costs.** In some instances where they were ordered for and paid to do structure protection, cooperators reported that an additional cost of LTFS fires was the increased chance that their resources became unavailable to respond to other emergencies that occurred within a cooperator's protection area. Longer fire assignments were more commonly perceived to be necessary in LTFS managed incidents than in incidents managed for full perimeter control.

**County/city government opportunity costs and out of pocket expenses.** In all LTFS fires, there were reported unreimbursed expenses accruing to county and local law enforcement, fire departments, county commissioners, city council, public works, and private citizens.<sup>3</sup> Such costs were opportunity costs for labor, equipment, and supply expenses.

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<sup>3</sup> Most interviewees stated that LTFS selection has greater potential to lead to long duration fires with their associated costs than if aggressive suppression strategies had been used. If the latter is used and fails—and long duration fires ensue—there is forgiveness (“we all tried and it didn’t work” attitude) as opposed to a conscious decision to select LTFS that may lead to long duration, undesirable impacts.

Opportunity costs were common for a variety of city/county government departments. For example, when Sheriffs Office officials were tied up by fire assignments they could not respond to non-fire disturbances and violations or engage in non-fire patrol operations. City government officials and county commissioners who had to spend time on fire-related business (including public meetings) could not fully attend to regular city/county business.

Out of pocket expenses included county/city government labor, supplies, and equipment expenses associated with responding to the fire. Examples given included road department employee work on roads and bridges affected by the fire, establishment and maintenance of road blocks by county law enforcement, and law enforcement supervision of citizen evacuations.

**Farm and ranch loss costs.** Rural area stakeholders also reported additional costs to farmers and ranchers from long-duration LTFS fires. For example, some interviewees said that grazing lands and federal allotments were burned over by the LTFS fires they experienced. Some cattle were also killed while grazing on federal allotments.

Cooperators believed that had their fire been a full suppression fire, it would not have burned for a long duration and reached an area where allotments and cattle were located.

**Tourism business loss costs.** Economic losses to the tourism and outdoor recreation industries because of fire danger and smoke were cited by interviewees. Guest booking at guest ranches dropped off and/or reservations were cancelled. Restaurants and other tourist related businesses experienced perceived declines in business. Tourists were

perceived by some as taking alternative routes to prime attractions so that they could avoid fire impacts<sup>4</sup>.

**Ordinary citizen costs.** Interviewees, particularly stakeholders and AAs, reported a variety of socio-emotional costs to persons residing near live fires that had become long-duration events because of selection of LTFS. The concern of having their property burned over, along with the need to remain continually vigilant during long-duration fire activity, wore heavily on community members, even those who accepted the necessity of LTFS. A rule of thumb given the interviewee team by fire managers was that community tolerance for fire impacts decreases when fires last longer than about 10 to 14 days. Some AAs believed that public tolerance lasted up to a month. Other impacts mentioned by interviewees included disruption of normal routines; displeasure with smoke, ash and reduced visibility; and growing weariness with the continual presence of firefighting personnel and equipment. In one area, a thick smoke inversion hovered over the locale for several months causing temperatures to drop an average of 30 to 40 degrees. Depression and other health impacts were associated with this phenomenon. Short-term impacts to those evacuated and longer term impacts to persons with smoke-related health issues were reported by interviewees representing all fires.

The degree of concern we heard about LTFS resulting in additional costs for cooperators and stakeholders varied by dynamics of human residential populations living near a fire. The more urban, dense, or proximal populations were to an incident, the greater the perceived additional costs associated with LTFS, again, because such

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<sup>4</sup> Once again, selection of LTFS is perceived to lead to greater likelihood of long duration fires and their associated costs (financial and otherwise). Potential costs are perceived by most cooperators and stakeholders to accrue to all, including the Forest Service, but mostly to cooperators and stakeholders.

strategies were seen as fostering longer-duration fires than full perimeter control strategies would.

### **Influence of the Increasing Emphasis on Cost Containment on Selection of Strategies and Tactics Used on Wildland Fires**

According to virtually all interviewees, the agency's increased emphasis on wildland fire cost containment has instilled a strong cost consciousness in its employees. This consciousness permeates employees' thinking, and virtually all agency interviewees reported they are true believers in the importance and necessity of reducing fire costs. All employees were reported to be very aware of how much Forest Service non-fire programs have been curtailed to meet unprecedented suppression expenses of the past decade.

Most agency interviewees said the Forest Service's increasing emphasis on cost containment has reduced pressure on them to select full perimeter strategies and associated tactics and encouraged them to opt for more LTFS. According to the interviewee views and experiences, this was true despite the fact that full perimeter control, which uses aggressive tactics to in an attempt to extinguish fires quickly, if successful, remains the cheapest dollar strategy in the short-term, provided that such fires can be successfully controlled in a short period of time. Agency interviewees, both AAs and ICs, offered several reasons besides cost containment for their declining use of full perimeter control strategies. First, they perceive that the agency resources needed to successfully and timely accomplish full perimeter control have continually declined. Some interviewees described how agency crews have dropped from a high of around

1200 crews a decade ago to last year's approximately 400. Second, they report large wildland fires have become more frequent and longer in duration during the past 15 years. Third, heavy fuel loadings, together with steep, inaccessible terrain in many ignition locations, have prevented crews from safely utilizing full perimeter control lines around these fires. Finally, the agency's increased need to accomplish fuel treatments has encouraged fire managers to choose wildland fire for resource benefit strategies whenever conditions are favorable.

ICs reported they strove to meet host unit's objectives, including cost containment, by successfully implementing LTFS.<sup>5</sup> Typical incident management objectives mentioned by AAs included safety considerations, fulfillment of land management and fire management plan direction, accomplishment of fuels treatment and ecological restoration, and cost containment desires.

ICs negotiated with AAs in cases where they found LTFS needed to change to successfully accomplish unit objectives and practice cost saving tactics. Most noted that although using LTFS strategies and associated tactics kept their fires' cost per acre low, total fire costs (as mentioned earlier) may have been greater because teams were unable to immediately implement a full perimeter control strategy upon their arrival. Reasons cited by ICs for this inability included 1) host unit's choice of LTFS to keep suppression costs commensurate with perceived values at risk, 2) resource shortages, 3) inaccessible terrain, 4) firefighter safety, and 5) land management/fire management plan objectives (which included fuel treatment accomplishment, among other things).

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<sup>5</sup> ICs stated that it is important to select and implement strategies and tactics on the basis of whether they will lead to successful (desired) outcomes

Some interviewees discussed the short-term versus long-term cost tradeoffs associated with increased use of LTFS and resultant tactics. Although implementation of LTFS may not save much in the short term, interviewees think its long-term benefits will include restored forest ecosystems and reduced firefighting costs.

### **Influence of the New Wildland Fire Decision Support System (WFDSS) on the Selection of Strategies/Tactics and on Costs of Suppressing Fires**

Interviewee assessments of WFDSS's utility in helping ICs and AAs make decisions were mixed. We were told that specialists such as fire behavior analysts and long-term analysts were typically the ones who understood and ran the WFDSS "models" (also known as "tools"). We were unable to interview fire behavior analysts or long-term analysts.

Interviewees mentioned two WFDSS models, FSPRO and RAVAR.<sup>6</sup> FSPRO (Fire Spread Probability model) provides strategic projections of fire spread and displays them as radiating rings of probability, places where a fire could burn if no suppression action is taken. These are depicted on an output map. RAVAR (Rapid Assessment of Values At Risk model) identifies values-at-risk—providing dollar values for some, such as structures, and descriptive measures of others—located in each spread band produced by an FSPRO run.

Many interviewees, especially stakeholders and cooperators, knew little about the WFDSS models. Most AAs and ICs used WFDSS tool output to help them 1) assess risks

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<sup>6</sup> When interviewees talked about "the models," or "tools," they referenced primarily FSPRO and to a much lesser extent RAVAR.)

associated with fires anticipated to burn long term, 2) evaluate long-term implementation plans<sup>7</sup> developed by long-term analyst teams to manage the fires, and 3) select appropriate strategies/tactics for such fires. They reported that WFDSS tool output was one of many pieces of information they considered in making decisions on strategies and tactics. Many reported they lacked understanding of when WFDSS tools can and should be used and what their capability is.

Some cooperators said they have not been included in WFDSS tool training but would like to be. Some of these also said the models do not adequately account for private property and stakeholder values (especially non-monetary values) when evaluating values at risk.

Fire managers who valued the tools said model output increased their comfort level in choosing LTFS. Some said model output helped them conceive “worst-case” scenarios. Others said the tools validated what they planned to do anyway. Some said it made them stop and think through things more carefully. Gaining utility and value from the WFDSS tools was associated with the availability of WFDSS analysts capable of interpreting output and explaining the tool – how the models worked, what they could and could not do – and providing meaningful answers to the Agency Administrator.

Other interviewees did not see a lot of value in the tools. Many of these cited cases (in both their current and past fires) of FSPRO being unable to provide solid information because of the extreme fire behavior and weather characteristics associated with their fires. They explained that FSPRO uses historical data, so it did not have weather datasets reflective of 21<sup>st</sup> century weather patterns and fire behavior. In general,

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<sup>7</sup> A long term implementation plan is a strategic plan with protection objectives for managing an unplanned, long-duration wildland fire. It details the where, when, and how of actions required to protect identified values.

such interviewees perceived that WFDSS tools were neither site specific nor well-calibrated for their specific fire events; rather they reflected an average that did not adequately represent what they needed. Interviewees with this impression believed fire manager experts (including fire behavior analysts and fire management officers) made better predictions of probable fire advance than did FSPRO.

When asked whether WFDSS tool output contributed to cost reductions, interviewees who perceived it did said it did so only indirectly by providing input to long-term implementation plans. In requesting such plans for managing their long-term fires, fire managers desired some idea of how their fire might behave along the way, including what values might be at risk. Interviewees believed FSPRO and RAVAR output helped long-term analyst teams better predict fire behavior and associated values at risk. Among other things, interviewees said long-term analysts used FSPRO and RAVAR output to help them develop management action points (geographic points on the ground or specific points in time where reevaluation of suppression activity is warranted) and points of protection (specific points that need protection, for example, a campground).

Interviewees believed that knowledge gained from these tools helped AAs and fire managers be more conservative in their decisions to take aggressive suppression actions, order resources (timing and amount of) and release or retain resources (timing, amount of, and type of). For example, they felt more comfortable deciding to order fewer resources and order them at a later point in time if the scientific information provided by the models validated their proposed decision.

Some AAs reported that the WFDSS tools helped them more carefully think through the ramifications of choosing an alternative for managing their wildfire. The strongest champion of the tools' utility concluded: "I don't necessarily know if they influenced cost in terms of keeping it lower, but I think that it helped make a more informed decision about where you're going to spend money and why you were going to spend money."

### **Some Salient Issues and Concerns Raised by Interviewees**

As mentioned in the paper's Introduction, this section provides some wildland fire response and cost information that was independently offered by interviewees. It includes cost information that extends beyond the five sampled fires, other fire-related information that we did not target in the study, and interviewee perceptions of anticipated events and experiences.

Most State and local cooperators interviewed strongly believed the Forest Service's increasing move towards LTFS will increase future cooperator costs. They and stakeholders had difficulty supporting the use of LTFS for several reasons. In all cases, State interviewees noted their respective agencies are charged with a full suppression mission, exclusively. They also said that allowing fires to burn large acreages under minimum suppression strategies increases the opportunity for large fires to escape onto private land. That is due to unanticipated events, especially regarding weather and winds. If the incidence of long-duration agency fires escaping onto private land increases because of upfront decisions that favor LTFS, cooperators perceived their future

opportunity costs and structure/property protection costs will rise, as will stakeholders' economic and social costs.<sup>8</sup> Whereas these cooperators acknowledged the unnatural fuels buildup on National Forests (together with the need to treat fuels), declining forest health, and dangerous recent fires, they, as well as some stakeholders, believed the agency needs to resume active management of its forests, including harvest of trees, even though it may include upfront costs. They think this option will pay off over time to reduce fire costs and the possibility of shifting the fire cost burden to their agencies.

Additionally, many cooperator and stakeholder interviewees said they disagree with the use of LTFS early in the fire season or during the peak of a severe fire season. They maintained that LTFS, if used late in the fire season, would garner wider acceptance.

Such interviewees acknowledged that using fewer resources than are available on early season fires, in efforts to save more and achieve resource benefits, may be beneficial to the Forest Service. However, they reported it is not beneficial to cooperators and stakeholders. Examples were given where the choice of LTFS early in a fire season was viewed as costing stakeholders their home, their cows, or their tree farm. Remarked one interviewee: "That's not just a house; that's my home, and you're talking about burning that." Another interviewee stated:

Interviewee: Again, well, they're [that is, the Forest Service] saying, "All we're doing is burning up country." Well, no, now you're burning up country and a pretty good herd of

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<sup>8</sup> Cooperators and stakeholders expressed their resistance to LTFS and associated tactics that they perceived as likely to result in higher financial and social costs to them and their constituents. Cooperators' paradigms for fire management are governed by their mission, not necessarily by their risk aversion.

cows and this guy's hunting camp and this guy's summer—the rest of his summer range....

Some interviewees thought the interface between WFDSS tools and the public needs improvement. Educating cooperators and stakeholders on model utility and limitations prior to using them was a suggested action. Cooperators somewhat familiar with the WFDSS tools were under the impression that, for the most part, the tools validated managerial decisions already made with respect to strategies and tactics.

We were told that despite the preceding difficulties, individual relationships between federal and state cooperators remain solid but are challenged by their suppression policy differences. They depend heavily on each other in suppression activities, and they willingly share resources and expertise as they continue working on solutions to their differences that all can live with.

In some of the fires studied, fuels conditions, topography, and extreme fire behavior made conditions so dangerous that local government officials said they understood the agency's need to select LTFS in these extreme cases. They believed that if the agency were more easily able to actively manage National Forests, the fuels conditions and extreme fire behavior referenced would be less of an issue. They also said their local National Forest managers had done a good job communicating to local stakeholders 1) the extent and nature of local National Forest health deterioration, 2) associated increase in fuel loadings, and 3) the difficulty of applying full suppression strategies and tactics in such volatile contexts. In many cases, locals reportedly received regular, complete information from the agency prior to and throughout each fire.

## Summary

Generally, AAs and ICs of all five fires reported that because wildfire suppression cost containment has been rigorously stressed with the agency, cost consciousness has permeated their entire fire management operation. Moreover, they have focused on complying with land management and fire management plans' direction, accomplishing fuels treatment, restoring forest ecosystems, ensuring firefighter and community safety, responding to resource shortages, and containing costs wherever it is possible to do so. In efforts to accommodate some or all of these factors, they frequently have opted for LTFS.

Cooperators explained that LTFS potentially increases their costs because of additional need for monitoring, presuppression staffing, and reduced availability of their forces when needed to respond to incidents at home. Additionally, the suppression mandate from their constituency does not include LTFS opportunities and increases the difficulty of working out cost agreements with federal neighbors that use LTFS.

Stakeholders expressed concern about health and economic impacts (including reduced tourism and recreation dollars) on local communities when fires are allowed to burn long-term. They and their constituents also experienced long-term anxiety about their respective fires' potential to escape and force them to evacuate, as well as a personal sense of loss in response to burned over property and loss of favorite recreation areas. Depression caused by long-term smoke inversions was also noted.

While virtually all interviewees described the nature of the forest health crisis confronting the agency, they differed with the agency on how the situation might best be mitigated. Cooperators and stakeholders questioned current agency fire management

practices. For instance, rather than declaring early season incidents to be fires for resource benefits, they recommended accomplishing similar benefits through application of post fire season management ignited and/or natural forms of prescribed fire. They believed this practice would virtually eliminate the negative impacts of fires driven by unanticipated severe weather events. They also proposed increasing the amount of timber harvest in areas plagued with heavy fuel loading, instead of relying on wildland fire as a solitary fuels management tool.

All interviewees expressed interest in continuing dialogue among agency managers, stakeholders, and cooperators in order to achieve the best mix of strategy selection. Through this process, ecological restoration, lower agency suppression costs, and improved mitigations of socio-economic costs to cooperators and stakeholders can take place.

## References

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