Gash Creek Fire Lessons Learned Analysis

Bitterroot National Forest
September 7 – 11, 2006

Executive Summary

The Bitterroot National Forest, recognizing a need for improved methods and policies for future fire management, has tasked three respected firefighters to explore topics such as communication of leaders intent and strategic principles, long term organizational shifts accommodating large scale 'Appropriate Management Response' and alternative tactical operations. This document provides recommendations to overcome internal and external barriers to effective tactical actions, as well as recommendations to improve public and cooperator understanding of progressive fire and vegetation management.

The '*Preface*' looks at the intent of a Lessons Learned Analysis, as applied to Gash Creek.

The '*Two Suggestions*' are specific positive actions the Bitterroot National Forest can initiate.

The '*Confinement Strategy'* outlines suppression / management strategies that when applied could help better meet Forest Service Objectives.

'*Issues*' lists barriers preventing economical large fire suppression.

'*Leaders Intent and Strategic Considerations'* is an objective analysis of the communication of the leaders intent, how it emerges in the Delegation of Authority, the WFSA, and then the Incident Action Plan, and finally as manifested on the ground.

Appendices include:

- A- *Gash Creek Fire Map*
- B- *Gash Creek Narrative*- the basic fire story
- C- *Event / Decision Timeline*
- D- *WFSA Revision Data Table*

By initiating this introspective analysis, the Bitterroot National Forest endorses the values and exhibits the products of a 'Learning Culture'.

Gash Creek Fire Lessons Learned Analysis

Preface

The lessons to be learned from the Gash Creek Fire could apply to just about any fire in the country. This fire, starting on the Bitterroot National Forest west of Victor, Montana on July 24, 2006, was managed by a Type 2 Incident Management Team for 30 days, burning over 8,000 acres and costing over $8 Million. Incident objectives such as maintaining firefighter and public safety and protecting structures were met, yet in the final analysis the Agency Administrator was uncomfortable with the results.

Why did events surrounding this fire unfold the way they did? Were different outcomes possible? If something different and better could have occurred, why didn't it? What specific factors led to this particular outcome? Were there key decision points beyond which outcomes were practically pre-determined? Our analysis attempts to answer these questions.

The remarkable thing about the Gash Creek fire was that it wasn't particularly remarkable: it was just like a lot of other fires that burn every year nationwide. Thus it should not surprise anyone that social and political considerations were primary drivers of some of the decisions that were made. Fires do not exist in a vacuum. In terms of management strategies, the social/political context in which fires burn is as important as the ecological context in which they burn. This fact, which is always there but isn't always acknowledged, must be taken into account when considering what could, should or did happen on a fire.

An alternative strategy that could have been pursued on this fire would have involved the introduction of more fire to the landscape through the burnout of a significant amount of acreage. Furthermore, this burnout would have occurred on a slope that is in full view of the Bitterroot Valley and many of its residents. Given the controversies and litigation surrounding firing operations that occurred in the Bitterroot during the fires of 2000, a reluctance to undertake such an operation is not surprising. Even a successful firing operation would have entailed some risk in terms of possible negative public reaction. Obviously, an unsuccessful firing operation would have had been disastrous. Balanced against this were the expenditure of money and the level of firefighter exposure to risk incurred under the selected strategy. Again, these types of tradeoffs are common on fires throughout the U.S.

A phenomenon discussed by the analysis team that may be of use when considering other fire situations is that of "risk deferral". The concept of risk avoidance has long been recognized: it is natural for people to avoid risk when possible, and firefighters, managers and Agency Administrators are no different in this regard. However, in the face of heavy fuels accumulations in or near the Wildland Urban Interface, "avoiding risk" equates to simply "deferring risk". In other words, an acre that we keep from

burning today is just waiting to burn another day, perhaps with consequences far more disastrous than if that same acre burned today.

It could well be that we should accept some risk today – by introducing fire to a landscape through firing operations or allowing it to burn through an area – to lower future risk to that landscape and the resources on it. The control afforded by a firing operation in terms of achieving lower levels of fire behavior and thus more desired fire effects is simply not afforded when a wildfire sweeps through an area. Unfortunately, as we noted frequently during our analysis, there are currently no incentives for managers and Agency Administrators to accept such risk, much less embrace it. On the other hand, there are many incentives present for risk deferral, none less potent than the court of public opinion. Agency management at the highest levels needs to identify opportunities to provide incentives for Agency Administrators to accept risk instead of deferring it.

Finally, an observation is in order regarding the quality of management on the Bitterroot National Forest. It takes some courage for anyone to request an outside analysis of their management actions and decisions – but that's just what this Forest Supervisor did. This sets the bar very high, in terms of setting an example for others to follow. The willingness to be "examined under a microscope" and the faith that you'll be better off for it in the long run are admirable. In fact, the fire management and resource staff on the Forest as well as the Incident Management Team involved appear to be consummate professionals and are to be commended for their openness during the analysis process.

Yet the lingering questions remain: even with this caliber of people involved, how did we get a result we aren't happy with, and what can we do to change that in the future?

Suggested Actions derived from the Gash Creek Fire

Two compelling suggestions emerge, one dealing with strategic planning, or 'Gaming', for future fires along the east-facing slopes and drainages called the Bitterroot Front, and second, a method to build community understanding and support of appropriate fuels and fire management along the Bitterroot face.

Experience and insights were gained from informal interviews with employees involved with the Gash Creek Fire; these systemic concerns involve our relationship with suppression, fuels and the community.

Gaming the Bitterroot Face

The eastern edge of the Bitterroot Face transitions to open pine and grass, conditions where firefighters are most successful during suppression. The west side is wilderness, with rocks and management objectives unconcerned with fires natural course. However, running north and south is a largely unbroken fuel bed running from the West Fork to Lolo. Experience has shown that fires will indeed run up to the wilderness, and firefighters are successful in holding the fire along the transition zone, but limiting spread south, and particularly north has proven difficult. Where previous fires have punched 'holes' in the continuous vegetation, firefighters have additional options, or 'decision space'. These decision opportunities are further developed in the 'Big Picture Strategy' portion of the Lessons Learned Analysis report. On the Gash Creek Fire, by the time initial and extended attack options had failed, the fire moved across the face, crossing Sweathouse Creek and Smith Creek before running into the 2003 Big Creek fire. Devoid of fuels, Gash Creek fire's northern progress was halted.

When considering a variety of management options, and providing for firefighter safety and prudent expenditure of public funds, these breaks in the fuel allow safe and responsible options. Knowing a fire will not exceed five or ten thousand acres, planned ignitions and unplanned ignitions escaping initial attack are now limited in their risk- they will not take out the entire face at once. In time, a number of fires will recreate an un-even aged mosaic of recently and less recently burned forest, and fires natural role will have been restored.

Fire managers report a past fire will remain a viable fuel break for at least 10 years. From Stevensville south, numerous previous fires and rock faces break up fuel continuity. There are no similar holes from Stevensville north. Emerging fires are more likely to create catastrophic results, capable of threatening a larger number of homes and communities.

This suggestion is to identify and prioritize hazardous fuels projects along the Bitterroot Front that will provide a series of holes capable of halting the north-south progression of fires, and provide fire managers with more options when deciding strategy and tactics. These fuel breaks may be accomplished with introduced fire, mechanical manipulation,

or both. They will take advantage of naturally occurring fuel breaks such as cliffs, rocks, lakes, and trails.

Building Community Understanding and Support

Public concern during the Gash Creek fire was intense. In fact, the Bitterroot National Forest has intense public scrutiny. This suggestion is influenced by recent successful presentations of the Nuttall and I-90 Tarkio Shelter Deployments. Utilizing Sand Tables and PowerPoint slides, an engaging story is told, with integrated discussion opportunities creating an interactive and absorbing experience for participants. The goal is to share a Gash Creek Fire case study with the public. As the story develops, real life decision points are presented, and the audience has time to share their thoughts. Presenters will listen and integrate audience input, and then move along with the story. The issues surrounding each decision gate is presented, and audience opinion is solicited. By completion, participants will have considered carefully the important issues and pressures confronting firefighters and fire managers. They will better understand the nuts and bolts of firefighter safety, hazardous fuels, suppression tactics, and fuel reduction opportunities.

As Sand Table demonstrations are best suited for audiences of less than forty people, many presentations should be made to a wide variety of audiences. Miss no opportunity to reach cooperators, commissioners, public interest groups, schools, environmental organizations, parents groups, political organizations and anyone else. Everyone interviewed during the Lessons Learned Analysis understood and supported the Forest Service objectives; we seem to be speaking with one voice. Relayed comments from the community indicate the public is not on board with these values. Utilizing our greatest resource, our people, this concerted effort is designed to engage our potentially equal resource, the public. Appealing to intelligence and education, many unexpected benefits and support will emerge.

Ten or fifteen employees, each presenting ten or fifteen sessions, divides the mission in to manageable tasks. All the employees encountered during the LLA interviews would do a fine job representing the agency and the issues at hand.

The following principle assumptions should be clearly communicated:

1. The Forest Service and families of firefighters are not willing to commit to unmitigated risk
2. This country will burn
3. Backing fires generally cause less damage than running crown fires
4. Negative fire effects can be reduced by strategic introduced ignitions
5. Wild fire is or will solve the fuels problem
6. Management and large expenditures of funds are currently being dictated by random lightning strikes, and dysfunctional arsonists.

Gash Creek Confinement Strategy

The Gash Creek Fire was a human-caused ignition which occurred on July 24 on the Bitterroot National Forest. The initial WFSA strategy for the fire was to implement direct ground attack supported by helicopters and airtankers to keep the fire off of private lands to the east and contain it to about 500 acres within roads, handlines, and dozer lines.

At the end of the burning period on July 27 the Gash Creek Fire was estimated to be about 925 acres with a perimeter of over 5 miles. Fire spread had occurred on almost all portions of the fire perimeter. Very little line had been successfully held. The revised strategy in the WFSA update allowed for indirect attack on portions of the fire perimeter, but provided direction to continue contain the fire on all sides. Approximately $271,000 had been spent by the end of the day.

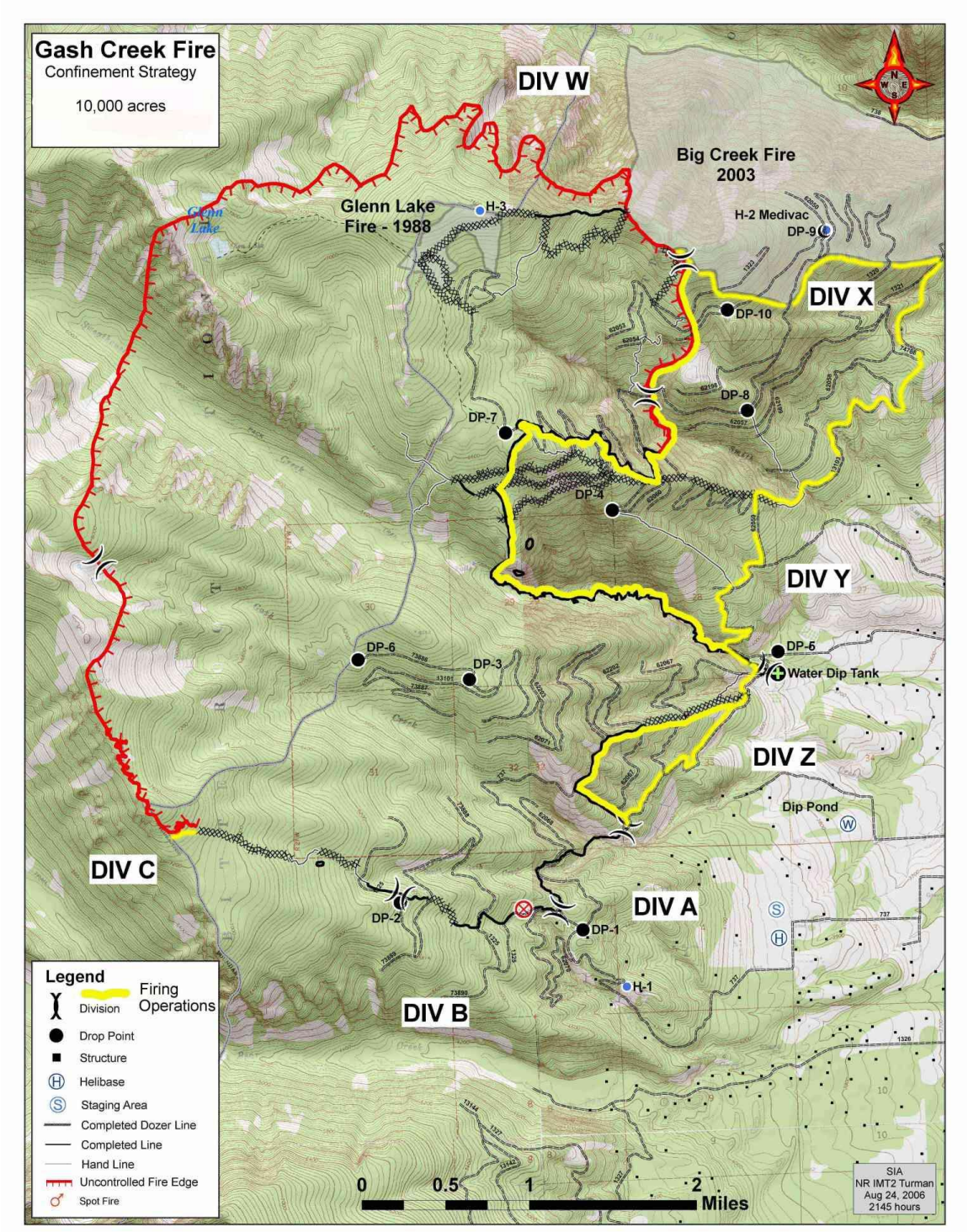
The WFSA update of July 27 would have provided an opportunity to step back and develop a strategy which would allow the fire to grow to a larger size while reducing:

- fire suppression resource needs,
- firefighter exposure to hazards,
- aircraft use,
- incident management team assignment length, and
- overall costs of managing the fire

This "Confinement Strategy" would have emphasized immediate construction of a fire spread barrier (firelines in combination with firing operations) on the USFS boundary with private lands. This line of defense would have utilized existing roads with dozer and hand lines connecting the roads where necessary. The east perimeter line of defense would be anchored on the north to the Big Creek fire area (burned in 2003). The south end would connect to a fireline constructed along the ridge between South Gash Creek and Bear Creek. Note: this east-west fireline was actually constructed and successfully held in the early stages of the Gash Creek Fire.

Firing operations would have been a critical component of this strategy. Careful application of fire (appropriate sequencing and time-of-day/night operations) could have provided an excellent barrier to fire spread while avoiding overly severe fire effects. Note: interviews with operations section personnel indicate that they believe most of the area could have been fired in a manner that would have achieved effects very similar to a prescribed fire.

It is estimated that the "Confinement Strategy" could have been completed within one week. Firing could have been conducted between July 27-28 (Bear Creek to Sweathouse Creek); and August 1-2 (Sweathouse Creek to Big Creek). Even when considering the periodic "red flag" conditions which occurred during August, it is likely that the firing, holding and mopup would have secured the fire sufficiently for release of the incident management team after the red flag conditions of August 7-8.



Advantages of the "Confinement Strategy"

Engines, hand crews, dozers, helicopters, airtankers, and overhead/logistical support would have been reduced both in duration of assignment and overall numbers. Less control line would have been constructed. Firing and holding operations would have been

completed with fewer resources because roads and natural barriers would have been utilized for holding/containment lines. Where constructed, these lines would have been straighter and/or would have been placed in locations where they were easier to construct and defend. Cost would have been reduced and resources would have been available for other fire assignments.

Firefighter exposure to hazards would be significantly reduced by

- limiting tactical assignments to the lower eastern perimeter slopes and the southern perimeter ridgeline
- utilizing road systems, and dozer lines for crew and engine placement which afford excellent escape routes and/or safety zones

Aviation resources would have been used much less. It is estimated that less than 50% of the flight time for helicopters and fixed wings would have occurred.

Cost for the fire (completion of the east fire barrier operation and turnback to the forest) would have been about $3.5 million. Fire size would have been approximately 10,000 acres. An additional 3 miles of interface would have had fire hazard significantly reduced for the Gash Fire as well as future wildfires.

Chances of success for this operation would have been very good. Interviews with operations section personnel indicate that they believe that the eastern barrier could have been completed quickly and that the actual weather experienced would have afforded ample opportunities for controlled firing operations. Duration of the fire threat to communities would have been substantially reduced by rapid establishment of the eastern control line and broadening it through firing operations under favorable conditions for holding.

	Actual Strategy	"Confinement Strategy"
Cost	$8.1 million	$3.5 million
Safety – Aviation Exposure		Significantly reduced
Flight time	535 hours	200 hours
Safety – firefighter exposure		Significantly reduced
Personnel days/hours	9500/114,000	4500/54,000
Impacts to ecosystems		Significantly reduced
Dozer lines	Substantial use except in wilderness area	Reduced miles and better placement to avoid damage
Fire effects	Patches of very severe fire effects due to wind driven and upslope runs under unfavorable conditions	Reduced severity due to firing operations under favorable conditions

Issues Identified During the Lessons Learned Analysis and Recommendations

DECISION SUPPORT ISSUES

FARSITE inaccuracies. Forest personnel indicated that FARSITE runs depicted unrealistic fire spread to the south.
FSPro availability. Currently, FSPro can be run only from the Missoula Fire Sciences Lab (due to the computing power need to run the program). This limitation prevents more widespread use of the program at early stages of a fire. The early stages of a fire (during the first 2 -3 burning periods) often set the tone for the life of the fire. Sound decision support at these stages could inform decisions which could save the most money and avoid the most firefighter exposure to hazards.
Other risk assessment techniques. Rapid, accurate risk assessment techniques are needed during the initial stages of a wildfire that escapes initial attack. There may be a need to develop additional risk assessment techniques or more thoroughly institutionalize currently-available risk assessment techniques.

DECISION SUPPORT RECOMMENDATIONS:

FARSITE:
Better understanding of FARSITE outputs and assumptions; better linkage between FARSITE analysts and Operations Section personnel; Tonja needs a PC that can run FARSITE (FARSITE PC can be purchased with program funds outside of the scheduled replacement program).

There were many comments that the FARSITE run provided by Tonja was inaccurate because it showed the fire running to the south. Discussion with operations section personnel (Billy Phillips) indicate that the fire would have run to the south without a lot of helicopter and ground-based suppression action.

FSPro:
Bitterroot NF - development of additional skilled personnel to run FSPro (Tonja Opperman could be trained);
Regional or National level - development of "advanced fire assessment service center" regional and/or national
Note: it should be recognized that the FSPro "run" for this fire was relatively accurate.

Other risk assessment techniques:
JFSP will be sponsoring a risk assessment roundtable to determine needs/uses, state-of-the-science and what needs to be done to meet needs.

WFSA ISSUES

WFSA as a decision-making tool did not work well on this fire. Many personnel indicated that the WFSA was used to document a selected strategy rather than evaluate a range of strategies. The WFSA process was viewed as being cumbersome with regard to uncertainty and dynamic fire situations.

WFSA RECOMMENDATION

A desire was expressed to incorporate WFIP-type "management action points" or "trigger points" so that pre-planned strategic responses could be identified in the WFSA. This would frame the selected alternative better, providing an indication of specifically what management response would occur should the selected strategy (or a portion of it) fail. e.g.: "*if the fire spots over the line in Division Bravo near DP2 and begins running to the southeast, a dozerline would be constructed between the south ends of the 73889 and 73890 roads and the interior would be burned out*."

INCENTIVE ISSUES

We received many comments on the lack of incentives for line officers, resource management specialists, incident commanders, operations section personnel, and others to even consider a much larger, confinement approach which would "give up many acres" through firing operations to avoid more hazardous, riskier, suppression resource-intensive strategies.

INCENTIVE RECOMMENDATIONS

Provide a portion of the funds to the forest (for discretionary use or use on hazard fuels projects) that would be saved when utilizing a lower cost confinement approach versus a costlier direct attack approach. E.g.: if the average cost of a 5-10,000 acre fire on the BRF is $6 million and the confinement approach cost $3 million, then the forest would get a percentage of the $3 million cost that was averted through the confinement approach. A practical amount might be 10% or $300k. Even $100k might be sufficient incentive for Forest Supervisors to give greater consideration to a less costly suppression strategy.
Other incentives to consider include:

- Personal monetary awards
- Performance appraisal elements
- Enhanced consideration for promotion

Providing incentives for the IMT could also result in less costly large fire management. If an IMT was able to manage a large fire at substantially less cost than average a percentage of the cost averted could be given to the IMT for use in purchasing equipment to improve their efficiency. New computers, GPS units for

ops and SITL personnel, team shirts/hats, jackets, helibase trailer, communications hardware, etc…

Allowing forests to count the area burned by wildland fire which maintains or improves conditions class as accomplishment for FNOther or Hazardous Fuels would encourage managers to consider less costly, larger scale strategies.

DISINCENTIVE ISSUES

Following the 2000 fire season a lawsuit was filed against the USFS alleging that a backfire operation near Sula resulted in the burning and total loss of several homes. This litigation (known as "Backfire 2000") has been a significant barrier to Bitterroot National Forest personnel in considering the use of fire to fight fire. While there is recognition that this tool is cost-effective and relatively low risk, it is used much less frequently because of the litigation. Confinement strategies are less cost-effective and riskier without the option of using large-scale firing operations when appropriate.

Public perceptions of firefighting effectiveness are oftentimes based on the amount of resources that they see applied to the suppression effort. Use of highly visible (and costly) airtankers, helicopters, and dozers are viewed as necessary for protecting private property and rapid suppression of wildfires. When these resources are not visible, some members of the public believe that the Forest Service is not providing adequate protection to community interests. Many line officers believe that they will be severely condemned by the public if a low cost confinement strategy experiences an unexpected change which results in fire burning onto private lands. They also believe that if a costly direct attack approach is being used that they will be less criticized even if homes are destroyed. Consequently, there is a strong bias for selecting strategies which utilize large numbers of ground and air suppression resources.

DISINCENTIVE RECOMMENDATION

Shared responsibility for decisions might increase the likelihood that less costly strategies would be selected and implemented. The shared responsibility would need to be made public.

POLICY ISSUES

Current policy states that each fire will be given a single strategy and that if a fire is given a suppression strategy at any time it cannot be changed to wildland fire use at a later time. Although there is much flexibility to utilize monitoring, confinement and other strategies that do not require full perimeter containment, many field personnel are reluctant to devise and implement a "suppression"

strategy that does less than full perimeter containment (via firelines and natural barriers).

Current policy does not allow one to consider benefits derived from a fire to inform the strategy development and implementation. In many cases, this drives managers to develop strategies which emphasize keeping the fire as small as possible. In a complicated manner, this concept interacts with inadequate risk evaluations to drive up costs and, in some cases increase risk in one area while reducing it in another; i.e.:

- risk of the fire burning onto private lands vs risk of injury to firefighters;
- risk of ground personnel to injuries vs risk of aviation resources incurring damage;
- risk of fire impacts to ecosystem properties vs risk of damage from suppression actions;
- likelihood of the success of a strategy which has low firefighter safety risks vs likelihood of a strategy which has higher firefighter risks but also higher chance of success.

Many managers are unclear as to the flexibility which currently exists within policy. Interviews with land managers and fire managers indicate that the division between wildland fire use and suppression contributes to this lack of complete understanding. It is not clear to all that even under a suppression response in the WUI, one may elect to implement a "partial perimeter containment" or even "point protection" strategy. Conversely, a wildland fire use event may use dozers and engines and airtankers to check the spread of a fire in a specific direction or protect values that might otherwise be damaged.

POLICY RECOMMENDATIONS

A change in policy allowing decision-makers to consider the benefits which may accrue from a less costly but larger wildfire might encourage line officers and fire managers to select strategies which result in greater areas of "treatment".

Eliminating the distinction between wildland fire use and suppression, and making the policy very clear to all would contribute to less costly strategies. It is likely that managers would allow much larger burns which, if managed prudently, would contribute to long term risk reduction without inappropriately increasing short-term risk.

RISK ASESSMENT ISSUES

In development, selection and implementation of strategies, risk is understood and evaluated in inconsistent and (almost always) incomplete ways. Those developing the WFSA, line officers signing the WFSA, and incident managers implementing the strategies all indicated variations in their understanding of risk assessments.

Chance of success in implementing strategies is also understood in varying ways by these areas.

A fundamental risk concept that is often overlooked is the nexus between short term risk avoidance and long term risk deferral. Strategies which seek to use intensive, costly suppression efforts in an attempt to keep the fire as small as possible are often associated with the managers desire to reduce the risk of damage to private lands from the wildfire. Even if this strategy turns out to be ineffective (the fire burns onto private land) the manager is subject to less personnel criticism because it is perceived by the public that the intensive attack strategy was appropriate. A less costly strategy which allows the fire to grow larger and utilizes far fewer suppression resources may be perceived by the public to be inappropriate and might engender strong criticism even if it proves to be effective in protecting private lands. The long term consequences of these disparate strategies depict the "risk deferral" concept. The manager who selects the costly, small fire strategy contributes to an overall increase in long term risk for the area (fuels in the area that would have burned continue to increase). The manager who selects the less costly, larger fire size strategy contributes to reducing the long term risk and providing more decision space for management of future unplanned ignitions. The manager in the first instance is only deferring the risk to a later time.

RISK ASSESSMENT RECOMMENDATIONS

Develop better risk assessment instruction for WFSA and other training sessions sessions.

BITTERROOT NF WILDFIRE RISK REDUCTION STRATEGY

ISSUE: The Bitterroot "Face" is the east-facing slope of the Bitterroot Range which descend to the USFS-private lands interface from Lolo on the north to West Fork on the south. Wildifres occurring along this "Face" pose great risk to communities, interface and intermix in the Bitterroot Valley. The Forest does not have a truly integrated strategy to address the risk of wildfire.

RECOMMENDATION: Analysis has been done to prioritize some areas. However, a comprehensive, integrated analysis has not been completed. This analysis would need to prioritize activities to most rapidly reduce the impacts of unplanned ignitions and provide managers with more strategic options when an unplanned ignition occurs. This analysis would need to address the entire "Face".

Leader's Intent and Strategic Considerations

An Analysis of:

Wildland Fire Situation Analysis
Delegation of Authority
Incident Action Plan Objectives

Delegation of Authority and Leader's Intent

The big question on the Gash Creek fire, or any other fire, is: what is the leader's intent for this fire? What does the Agency Administrator want as an outcome? Incident Management Teams (IMT) work for Agency Administrators, and they attempt to follow direction provided by the Agency Administrator as they develop strategies, articulate incident objectives and implement tactics. If the Agency Administrator provides objectives to the IMT, they should be clear statements describing desired outcomes.

The Agency Administrator for the Gash Creek fire provided the Incident Management Team with 10 "main objectives" in a Delegation of Authority letter on July 26. These 10 main objectives were stated as follows:

Your main objectives for this incident are:

1. *Provide for firefighter and public safety.*
2. *Protect structures and private property.*
3. *Establish containment and control lines within the boundaries of the Selected Alternative.*
4. *Utilize MIMT.*
5. *Comply with our EMS by insuring practices to prevent weed introduction and spread according to the Operational Control for the Fire Suppression, Fire Use & Invasive Weeds Significant Aspect document (attached to your briefing package).*
6. *Keep cost effectiveness an important part of your decision making process, but do not compromise firefighter safety. Document any decisions that significantly affect costs.*
7. *Use LCES analysis to document potential hazards associated with tactical operations, identify mitigation measures and include in each operational period Incident Action Plan.*
8. *Develop and implement a rehabilitation plan for the impacts associated with operations. Utilize the general and specific guidelines provided by the assigned Resource Advisor.*
9. *Follow established agency work/rest guidelines for all personnel assigned to the incident.*
10. *Maintain regular communications with affected Forest Service personnel in order to keep the Forest and public current with suppression efforts.*

A couple of aspects of these objectives provided to the IMT are noteworthy. First, some of them are tasks to be accomplished, not objectives. Examples of these would be #4, #7, #8 and #9. Number 5 is worded like a task – "comply with our EMS", but actually contains an objective – "prevent weed introduction and spread". Second, the way this section of the Delegation letter is worded, it tells the IMT "your main objectives are…" which implies that these "main objectives" equate to incident objectives. However, an agency administrator can instruct an IMT to do certain things without stating them as incident objectives; for example, "follow established agency work/rest guidelines…"

The dictionary definition of the noun "objective" is as follows:

a : something toward which effort is directed **:** an aim, goal, or end of action **b :** a strategic position to be attained or a purpose to be achieved by a military operation

Incident Management Teams tend to view incident objectives as closely fitting definition b above; many analogies have been drawn between military and firefighting operations. This is important, because some of the "main objectives" provided in the Delegation of Authority were used almost verbatim as Incident Objectives in Incident Action Plans throughout the duration of this incident.

In discussions with the Agency Administrator and his staff, the review team distilled the following "really important objectives", which is our own very subjective impression of what the most important issues <u>really</u> were for this Agency Administrator:

1. *Provide for firefighter and public safety.* The metric for deciding whether or not this objective was achieved would be a count of fatalities or serious injuries sustained during the incident.
2. *Protect structures and private property.* The metric for deciding whether or not this objective was achieved would be a count of the number of structures burned, or acres burned on private land.
3. *Avoid negative publicity associated with this fire.* It is very difficult to establish a metric for this objective, because while the presence of negative publicity is easy to measure, the absence of it is almost impossible to measure. How many people didn't say anything negative because they were pleased with the outcome, or did folks who didn't say anything just not care about this fire? Of the people who did say something negative, how many have 'legitimate' complaints and how many are just chronic complainers with an axe to grind with the Forest Service?
4. *Don't spend a lot of money.* This is also a difficult objective for which to establish a metric, because the definition of "a lot" of money isn't clear. It is also difficult to meaningfully contrast the costs of fire suppression with the values of things that were "saved" by suppression actions (e.g., private property and structures, merchantable timber, etc.). This is also difficult to measure because it's not always clear which valuable things would have been lost, absent some or all suppression actions.

5. *Protect resource values.* This is embodied in instructions like "prevent weed introduction and spread" and "practice MIMT". Metrics for measuring this objective could be difficult to establish, because "minimum impact" is a subjective term and it would not be known until much later if weeds were introduced to the area through fire suppression activities.

The first two objectives listed above are taken verbatim from the Delegation of Authority letter provided to the IMT. They are standard objectives in most letters of delegation and Incident Action Plans. The fact that the protection of structures and private property is ranked so high in the list of objectives is an indicator of the importance of objective #3: burning up homes is a sure way to accumulate negative feeling in a community.

Objective #3 above is not contained within any of the objectives provided to the IMT, yet public relations considerations were powerful drivers of management decisions on this fire. It is probable that the Agency Administrator did not provide this direction to the IMT because the IMT might not be in a position to manage public expectations in the Bitterroot Valley; they were here to manage the fire. Yet it is clear that to the Agency Administrator, avoiding negative publicity was a powerful motivator that influenced management decisions. This can be stated as a truism that would apply to almost any large fire in the nation.

Objective #4 was stated in the objectives provided to the IMT in the Delegation letter, but not in the same wording we supplied above. The cost-related objective furnished to the IMT was:

Keep cost effectiveness as an important part of your decision making process, but do not compromise firefighter safety. Document any decisions that significantly affect costs.

Worded this way, accomplishment of this objective is even harder to measure than *"don't spend a lot of money"*. Ultimately, almost any expense can be justified under the guise of not compromising firefighter safety. Documentation of decisions significantly affecting costs is also fairly problematic: a decision not to order something may significantly affect costs, but again it can be difficult to measure the absence of something.

Objective #5 above encompasses several of the "main objectives" provided to the IMT and is typical of "do no harm" direction given to IMT's to ensure that the damage from fire suppression does not exceed resource damage occasioned by the fire.

Some of the other objectives furnished to the IMT in the Delegation letter could be considered even more problematic. Objective #3 in the Delegation letter reads as follows:

Establish containment and control lines within the boundaries of the Selected Alternative.

This objective was a good one in the initial stages of the fire – perhaps for the first four days – when direct attack and full containment were considered to be achievable. At the

end of the day on July 29th, direct attack and full containment were no longer realistic: the fire was well established in the Selway-Bitterroot Wilderness. It was widely recognized, both by IMT members and Forest staff we interviewed, that once the fire went into the Wilderness all bets were off in terms of full perimeter containment. It is not considered to be "worth it", in terms of both cost and high levels of risk exposure to firefighters, to try to contain fire in the wilderness. Besides, if the fire goes high enough up into the wilderness, it runs into a pretty formidable array of rocks and has nowhere else go to anyway.

Perhaps this is a flaw associated with Delegations of Authority: they aren't updated the way some other incident-related documents are such as the Wildland Fire Situation Analysis (WFSA). Direction given to an IMT when they assume command of a fire may not be the same direction they should receive on day 8 or day 13 of their assignment.

To make matters worse, on this fire the same IMT was in place from July 26 until August 25. Typically, if another IMT came in after 14 days to replace the initial IMT, they would receive a new Delegation letter and reconsideration of the objectives contained therein would occur. However, this did not happen on the Gash Creek fire.

Let's further consider this objective, *Establish containment and control lines within the boundaries of the Selected Alternative.* This objective essentially directs the IMT to achieve full perimeter containment, yet that is decidedly not something that the Agency Administrator wants after about day 4 of the fire. It's possible that, had resource availability not been so limited by the regional and national fire situation, the IMT might have attempted to achieve this objective. Let's say that another IMT had been brought in to replace the first IMT after 14 days, and they had received this same objective in their Delegation letter. It's also possible that this new IMT might have attempted to achieve full perimeter containment, incurring unnecessary and unwanted costs and unacceptable levels of risks to firefighters.

Further complicating matters relative to this objective is the fact that the Delegation letter was amended twice, on August 3rd and 6th. The upshot of these amendments was to allow the use of helicopters, retardant, chainsaws and portable pumps in the wilderness, at "the minimum necessary to meet suppression objectives in the WFSA". These amendments to the Delegation of Authority might be considered to be in conflict with several of the Agency Administrator's four "really important objectives" we listed above. For example:

Protect structures and private property. There are few structures and little private property in the wilderness. The Delegation amendment stated that the objective was now to "keep the fire from spreading north into Sweathouse Creek." The structures and private property to be protected were all miles away from the wilderness boundary, on the eastern flank of the fire.

Avoid negative publicity associated with this fire. Clearly there are risks associated with authorizing the use of mechanized equipment in a wilderness area, in terms of potential negative publicity with wilderness advocacy groups.

Don't spend a lot of money. Fighting fire in wilderness is expensive, because the need for extensive air support is practically guaranteed.

Another of the "main objectives" from the original Delegation of Authority letter needs to be considered:

4. Utilize MIMT.

This two-word statement is not an objective, it is instruction to use a particular set of tools and tactics. It implies that "Minimum Impact Management Tactics" should be used, but it is not clear if the definition of this or any description of the techniques to be employed was ever furnished to the IMT. It may be that this was meant to instruct the team to "do the least harm you can with your suppression activities, but use the tools you need tactically". However, since IMT's are composed of interagency personnel, it cannot be assumed that all members of any IMT know or understand what is meant by "MIMT".

It can be assumed that a great deal of discussion occurred between members of the IMT and the Agency Administrator and his staff regarding all of the issues above. It may be that, in the minds of both the IMT and the involved Forest staff, there was no lack of clarity or conflicting direction. Yet the fact remains that the written direction was somewhat ambiguous and in some cases self-conflicted.

How can these problems be addressed in the future? What should be done differently in terms of establishing clear, measurable and obtainable objectives on the next fire? We recommend the following:

1. Provide fewer objectives in the delegation letter, but articulate them more fully in terms of what the desired outcomes are. Ensure that objectives are obtainable and measurable. The broad categories that need to be addressed are:
    a. Firefighter and public safety
    b. Resources to be protected
    c. Desired outcome in terms of containment/control
    d. Limitations on cost expenditures
2. Limit "objectives" to descriptions of desired outcomes and avoid including simple task statements in lists of objectives. For example, development and implementation of a rehabilitation plan is a task, not an objective.
3. Revisit objectives furnished to IMT's periodically throughout the duration of the incident. Identify trigger points for revisiting objectives, such as significant changes in fire weather or movement of the fire.
4. Determine whether objectives furnished in early stages of the incident are still valid. If they are not, work with the IMT to revise as appropriate.
5. Monitor IMT progress toward achievement of objectives.

Wildland Fire Situation Analysis and Strategic Considerations

Many people view the WFSA simply as a vehicle to describe the allowable parameters for a fire in terms of dollars to be spent, acres to be burned, or geographic locations where the fire can burn. WFSA revisions are commonly triggered when any of those parameters are exceeded. The Gash Creek fire was not unique in this regard.

While it is widely recognized that the WFSA software currently in use in the field has limitations, the process of developing a WFSA represents an opportunity. Development of a WFSA affords the opportunity for collective strategic consideration of a fire. In other words, the agency administrator and his or her staff can put their heads together with the Incident Management Team (IMT) and really think about what to do with a given fire. While some of that occurred on the Gash Creek fire, it appears that some opportunities for a more strategic, less tactical approach to this fire may have been lost.

Such opportunities did present themselves: in the first 7 days of the Gash Creek fire, 3 WFSA's were developed. This is not atypical for a large fire with a continuously expanding perimeter; fire size tripled between each WFSA revision during this time period.

As of September 10, a total of 6 WFSA's have been developed for the Gash Creek fire (see attached table). Again, this is not unusual on large fires, however the point is that there were a number of opportunities for the Agency Administrator and the IMT to look at this fire together, strategically.

What did these WFSA's indicate was the selected alternative (or strategy) for the fire? The first two WFSA's (#2 and #3), which were in effect for the first 4 days of the fire, indicated a direct attack strategy. At this point, the fire was still relatively small: 200-600 acres. As with most emerging fires, the desire was to catch it small and prevent a larger, more prolonged fire "siege". WFSA #3 was developed on July 27 (day 4) of the fire, because the fire had burned more acreage than was allowed in WFSA #2.

The third WFSA called for a "modified direct/indirect" strategy. Was this a distinctly different strategy than that prescribed in the first two WFSA's? Not really. In fact, this too was similar to what happens on many large fires. As a fire grows, it becomes evident that direct attack alone will not be feasible for a variety of reasons: firefighter safety, inability to achieve objectives through direct attack alone, and the desire to take advantage of natural or human-made barriers. The change from a "direct attack" strategy to one that allows for "indirect attack" simply acknowledges reality on the ground.

For the rest of the fire – from July 27 on -- a "modified direct/indirect" strategy was pursued. In other words, significant changes to the basic strategy for dealing with this fire did not occur at any point during the incident.

Some of the direction contained in the various WFSA versions can be interpreted as in conflict with other direction contained in the same document. For example, WFSA #3 states the following under "Rationale for selecting this alternative":

This alternative focuses on protecting structures and private land on the east side of the fire while allowing for safe firefighter operations on the west side of the fire.

Presumably, since the west side of the fire isn't anchored, is in really rugged terrain in the wilderness and also uphill from the main fire, safe firefighter operations on the west side of the fire equate to no firefighter operations on the west side of the fire. Aerial operations, unsupported by people on the ground, would be the only option on this side of the fire, most of the time.

Again, in reference to the protection of private land and structures, WFSA #4 and WFSA #5 both say the following, under "Selected Alternative Description:

Focus fire suppression efforts near private land along NF boundary and along flanks that are outside wilderness and that pose a threat to private lands and national forest improvements.

This would seem to represent consistent and clear direction to concentrate suppression efforts on the east side of the fire, "near private land", with protection of structures and private land being a high priority.

Unfortunately, the same WFSAs also contain direction that appears to run counter to this emphasis. WFSA #3 and WFSA #4 provide the following direction, under "Selected Alternative Description":

Utilize direct and indirect fireline construction techniques taking advantage of natural barriers and ridge tops above and west of the fire, flanking next to the black and providing a more realistic and safer opportunity for success.

It is not quite clear from reading these WFSA's precisely how "success" would be defined. Would it be full perimeter containment/control, or something less? Would the simple prevention of fire spread to the east – in the direction of structures – be considered "success"?

WFSA #5 puts it quite differently:

Specifically, containing fire spread to the upper reaches of Smith Creek to west of the 1321 Road, to the west of the 2003 Big Creek Fire and along the south side of Big Creek is desirable.

Yet this WFSA, too, contains instructions to *"focus fire suppression efforts near private land along the NF boundary"* etc.

In discussions with members of the IMT and the Forest staff, it is clear that the strategy employed on this fire after day 4 was that of a "delaying action". Repeated attempts were made to keep the fire from spreading to the north, so that it would not get into yet another east-west oriented drainage where a cold front with westerly winds could push it toward structures and private property. Several people directly involved in operations attempting to halt fire spread on the ridge tops expressed ambivalence about whether or not this tactic would succeed. Others expressed the opinion that it would have succeeded, absent some "unusual" weather, e.g., outflow winds from a thunderstorm directly over a critical piece of fireline.

Does the attempt to halt fire spread on ridge tops differ from the WFSA direction to "focus fire suppression efforts near private land"? Clearly, many of the fire suppression actions undertaken on the Gash Creek fire occurred miles from the nearest private land. However, in the minds of Operations personnel, the whole point of focusing efforts far up the drainages was to ensure that the fire had a long way to go in order to reach private land.

This is the crux of the tactical and strategic dilemma presented by the Gash Creek fire: in order to "focus fire suppression efforts near private land", you have to <u>have</u> fire near private land. If there is no fire near private land, firefighters would have to bring the fire there themselves. In a social/political context, this is something that Forest Service managers and firefighters in the Bitterroot Valley are very reluctant to do. On the Gash Creek fire, two primary reasons for this reluctance manifested themselves. First, bringing fire to the houses would have entailed lighting approximately an additional 1,000 acres of Forest land in the Smith Creek drainage. This almost certainly would have caused some negative public reaction, which would be counter to the Agency Administrator's "really important objective" of avoiding negative public reaction associated with this fire. Second, bringing fire to the houses also entails a degree of risk – there is no assurance that this tactic will be successful and you could lose some houses. It's one thing if houses are lost to a wildfire during a frontal passage with high westerly winds, it's another thing entirely if houses are lost subsequent to an agency firing operation. That would produce an extremely high degree of negative public reaction, one that most Agency Administrators would likely be unwilling to accept. This is an especially sensitive subject in the Bitterroot Valley since the 2000 fire season.

Once the fire went into the wilderness on day 4, the strategy appears to have become that of a "delaying action" although it was never really articulated that way. Understanding the factors described above helps us understand why the response to the Gash Creek fire unfolded the way it did. Delaying actions are expensive, because in this terrain and these fuel types, extensive use of aviation resources is necessary. Further, delaying actions by definition take a lot of time, and fire suppression operations conducted over lengthy time periods are costly. In the final analysis, the cost of a delaying action is balanced against

risk to the agency and its employees if management actions such as firing operations don't go as planned.

Is a strategy of "modified direct/indirect attack", described repeatedly in WFSAs for this fire, the same thing as a "delaying action"? This appears to be more than just an issue of semantics. "Modified direct/indirect attack" implies a continuing attempt to contain and control the fire – something most people involved with the incident realized was not going to happen without a lot of help from the weather. A strategy of "delaying action", if accurately described in the WFSA, might have enabled clarity of vision for the Agency Administrator and staff, the IMT, firefighters and the public. It would allow those involved to mutually recognize "okay, we're just trying to minimize fire spread until the weather changes, because that's the only option we're willing to accept". This alternative could be recognized as less than desirable, but perhaps the lesser of evils in relation to other alternatives. It would inform everyone involved that they're in it for the long haul.

Another subtlety emerges here when considering a formalized and accepted strategy of "delaying action". Perhaps to firefighters, it would indicate just how aggressive they should be in dealing with this fire. Conventional wisdom would say that firefighters and managers might accept higher levels of risk when attempting to achieve perimeter containment. This is acceptable because perimeter containment results in lowered exposure to risk for firefighters <u>over the long term</u>. If instead, firefighters are told that they are conducting a delaying action and full perimeter containment is no longer being contemplated, they might consider aggressive actions on this fire in a totally different light.

Resource Availability and Probability of Success

In all WFSA versions that were prepared for this fire, mention is made that national Preparedness Level 5 and Geographic Area Preparedness Level 4 create a situation where "resource availability is at a premium and may influence the outcome of the fire." This was an accurate description of the situation at the time and proved to be true for the entire duration of the fire. Limited resource availability influenced the outcome of this fire as well as most other fires throughout the U.S. in July and August 2006. Yet, even with this acknowledgement of resource availability limitations, the following statement was made in WFSA #5_1:

At this time, the fire is in critical need of 4 dozer bosses, 1 Type 2 crew and 2 Safety Officers. This has impacted suppression operations. Assuming it is possible to replace crews with the same type crews as they time out, the number and type of aerial resources remains the same, and engine availability is maintained, it is anticipated that resources will be able to maintain line construction rates commensurate with fire spread.

What this appears to be saying is that, in the best-case scenario – no loss of resources – we should be able to maintain our delaying action. It is not clear what course of action would be pursued if this best-case scenario does not occur, i.e., if we actually lose crews, aircraft and engines that are not replaced.

Probabilities of success were low for all the WFSA versions created for the Gash Creek fire. In none of the six WFSA versions did the probability of success of the selected alternative exceed 60%. Three of the WFSA versions had probabilities of success less than 55%. What do these low probabilities of success mean?

First, we have to either accept or reject these probabilities. If we reject these percentages as being meaningless, then they do us no good and we have to come up with some other way of estimating whether or not we'll be successful with a given strategy. If we accept these probabilities of success as reasonably accurate, then we are admitting that we stand a really good chance of being unsuccessful. In fact, for several of the WFSA versions, we stand about the same chance of being successful as we do of being unsuccessful: it's close to fifty-fifty.

What is important about this recognition? Perhaps it indicates that we need another alternative, one with a greater chance of success. Maybe, if "delaying action" or "partial perimeter containment" were among of the alternatives, there might have been alternatives with higher probabilities of success. Indeed, in hindsight we can say that the delaying action was successful, at least in terms of preserving public safety and private property. Yet it was also an expensive approach; accepting it as a selected alternative would have allowed for acceptance of that fact ahead of time as opposed to uncomfortable realization after the fact.

Fire Cost and Acreage Estimates

The attached Gash Creek Fire WFSA revisions table clearly shows that suppression costs for the Gash Creek fire were consistently underestimated. The first WFSA prepared, WFSA #2 on July 25, estimates suppression costs of $464,000. These costs might have been accurate if the selected strategy – direct attack and full containment/control – had been successful. However, by the end of the day on July 28, actual costs were estimated at $576,000. Throughout the incident, costs continued to escalate and at least one WFSA revision was prepared solely for the purpose of allowing for a higher cost level. In contrast, predicted acreage was over-predicted in all the WFSA versions after #3.

In fact, suppression costs estimated for the "extreme outcome" were less than the actual suppression costs incurred, in all WFSA versions prior to WFSA #5 prepared on August 12.

A "what-if" is worth considering here. The difference in cost between the first WFSA ($464,000) and the last WFSA ($8.9 Million) is significant. What if the second WFSA prepared for the Gash Creek fire had indicated a potential cost around $8.9 Million? Would that have driven the agency administrator and IMT toward consideration of other alternatives for managing the fire? In hindsight we can clearly see a steady, incremental escalation in predicted costs for this fire, tracking right along with the actual growth of

the fire itself. Could this have been more accurately predicted earlier in the incident, and would this more accurate prediction have resulted in a different selected alternative?

Incident Action Plan Objectives

An analysis of objectives found in Incident Action Plans (IAPs) for the Gash Creek fire should display a picture of leader's intent as it is being interpreted and implemented. In this case, the leader is the Agency Administrator (Forest Supervisor).

On July 27, the IAP contained 5 objectives:

1. *Firefighter and public safety in all aspects of this incident*
2. *Protect structures and private property*
3. *Contain and control fire bounded by FR 1325 on the south and west and FR 737 to end of FR 1325 on the north and FR 737 to junction with FR 1325 on the east.*
4. *Use Minimum Impact Management Tactics (MIMT).*
5. *Implement cost effective use of all resources but do not compromise firefighter or public safety.*

Objectives 1, 2, 4 and 5 are almost verbatim from the Delegation of Authority provided to the IMT on July 26. Objective 3 indicates that the main effort during this operational period was directed at containment/control of the fire through direct attack. This is consistent with WFSA direction in effect at the time.

Interestingly, although the reference to use of MIMT is made in incident objectives for the duration of the incident, this phrase is never defined, nor are standards for how to accomplish it described in the Incident Action Plan.

In the IAP for July 31, the following objectives are displayed:

1. *Firefighter and public safety in all aspects of this incident*
2. *Protect structures and private property*
3. *Contain and control fire bounded by the north ridge above Bear Cr. to the Idaho border, then following the ridge north and east from Sky Pilot to the Forest boundary in Section 28 and following the Forest boundary to where it intersects with the north ridge above Bear Cr..*
4. *Use Minimum Impact Management Tactics (MIMT).*
5. *Implement cost effective use of all resources but do not compromise firefighter or public safety.*
6. *Prevent the import and export of invasive weeds by implementing vehicle, equipment, and gear cleaning measures as described in the IAP invasives mitigation sheet.*

A couple of things come to mind in examining these particular objectives. As discussed above, at the end of the day on July 29th direct attack and full containment were no longer considered to be either realistic or achievable: the fire was well established in the

Selway-Bitterroot Wilderness. It was widely recognized, both by IMT members and Forest staff we interviewed, that once the fire went into the Wilderness all bets were off in terms of full perimeter containment, due to limitations on resource availability, risk to firefighters and costs. Yet the incident objectives clearly state intent to "contain and control fire". This is perhaps a result of some of the conflicting direction contained in the Delegation of Authority and the WFSA's and is a continuing theme for most of the rest of the incident.

On July 31, WFSA #4 was in effect. There are several references made in WFSA #4 to "confining the fire" in the wilderness, yet the IAP continues to describe an objective to "contain and control fire". The reality on the ground was that limited suppression actions ever occurred in the wilderness, and there was never really an intent or effort made to contain/control fire in the wilderness. Yet the inconsistency between what was actually happening and what was written down in various places must be noted.

A week later, the IAP for the August 7 day operational period contains almost exactly the same objectives as those stated in the IAP for July 31. The only difference is found in objective #3:

Contain and control fire bounded by the north ridge above Bear Cr. to the Idaho border, then following the ridge north and east from Sky Pilot to the Forest boundary in section 28 to where it intersects with the north ridge above Bear Cr.

Again, this objective clearly describes the main effort as being to "contain and control fire". The difference between this objective and a similar objective found in the July 31 IAP simply reflects the fact that the fire has moved from where it was a week ago. A great deal of effort was now being focused on preventing the fire from spreading to the north, across Sweathouse Creek.

A week later, the IAP for the August 13 day operational period contains exactly the same incident objectives as those stated in the IAP for August 7. By this date, the fire situation has changed significantly: the fire has spread extensively across Sweathouse Creek to the north and is now threatening to spread into the Smith Creek drainage.

A week after this, the IAP for the August 20 day operational period contains identical objectives to the IAP for August 13, except for objective #3:

Contain and control the fire from spreading onto private land and moving into Big Creek drainage to the north and Bear Creek to the south.

Although the words "contain and control" are still used, it is now clear that they are meant in a limited sense: contain and control the fire only in specified areas. Again, this change in incident objectives was dictated by what the fire had already done. Limited available resources and high risk to firefighters attempting to suppress fire in the wilderness also indicated a more limited approach to "contain and control" efforts.

On August 25, the day of command transfer to a Type 3 organization at 1700, incident objectives expressed in the IAP are identical to the August 20 objectives, with the following exception in objective #3:

Contain and control the fire from spreading onto private land and from moving beyond Big Creek drainage to the north and Bear Creek to the south.

Again, this simply reflects the fact that the fire has already moved into the Big Creek drainage as well as direction contained in WFSA #5_1. It also indicates a fundamental change in the approach to the fire, late in the life of the incident: we still have an objective to "contain and control" but now we're talking about it in a specific, limited sense.

In reality, both the IMT and the Forest staff knew, after about day 4 of the incident, that full perimeter containment/control was neither achievable nor desired. Yet numerous subtle indicators of intent to achieve this remained, in all the written documents: the Delegation of Authority, the WFSAs and the Incident Action Plans. This makes it very difficult to tell, after the fact, precisely what the Agency Administrator's intent was for this fire and how that intent translated into action on the fire.

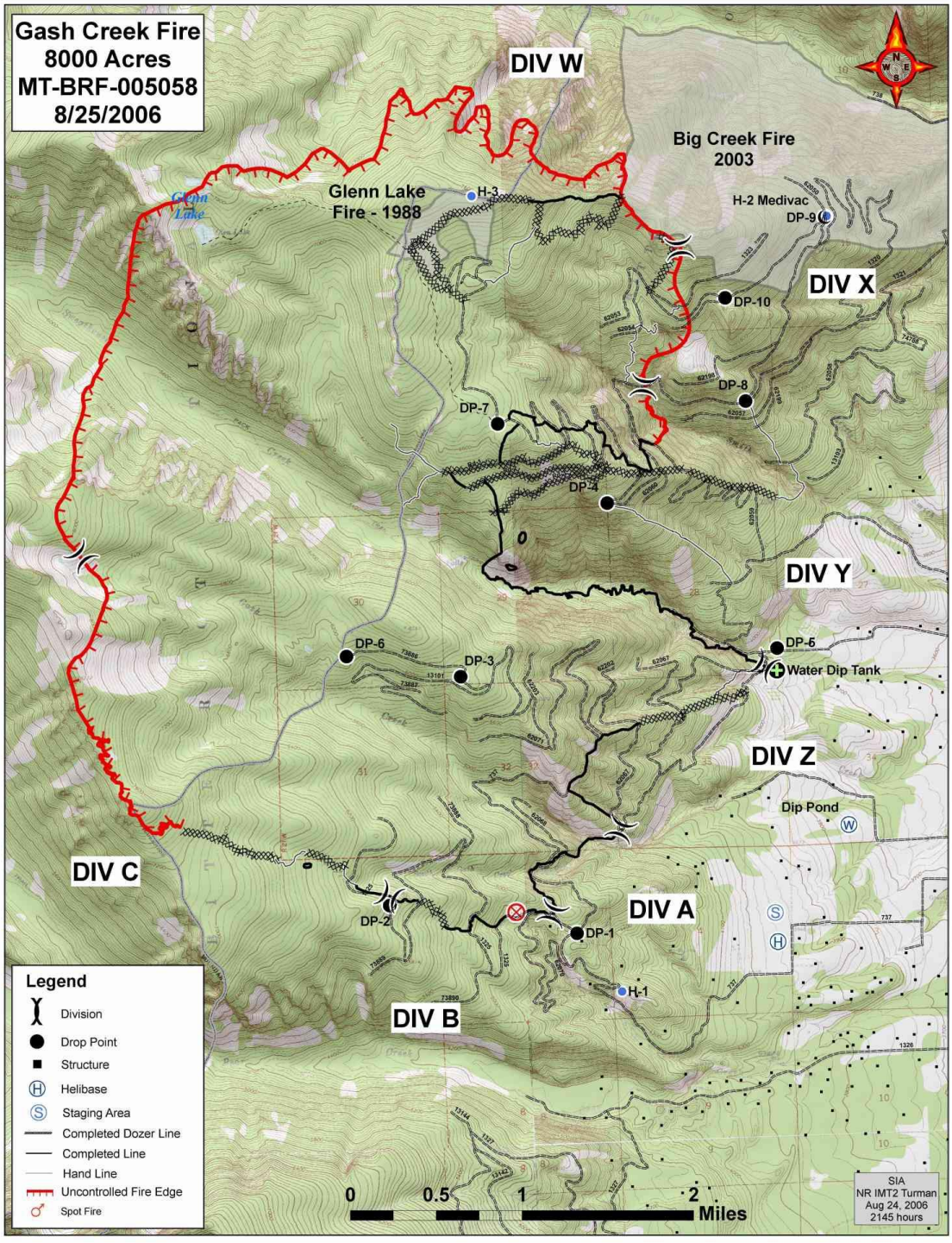
Summary

By conventional measures, the Gash Creek fire was a success. The primary objectives, of protecting firefighter and public safety and protecting private structures and property, were achieved. Yet in hindsight, the Agency Administrator and his staff have lingering questions about why this fire took so long and cost so much money, given the fact that it spread pretty much like it might have been predicted to in this fuel type and terrain at this time of year.

Leader's intent must be expressed with crystal clarity from the earliest stages of an incident. Furthermore, a leader's intent may change as the fire situation changes, and incident objectives derived from that expressed intent must change as well when that happens. Unfortunately, incident objectives that are valid in their own right often conflict with other incident objectives. For example, "put the fire out" often conflicts with "don't spend a lot of money", and it may also conflict with "don't hurt any firefighters" and "don't cause any resource damage". If an agency administrator desires something less than full perimeter containment and control, what is the best way to express that clearly? And are IMT's comfortable implementing such strategies?

Recommendations

1. Be careful with the wording and content of Delegations of Authority. Try to describe desired outcomes instead of specific approaches to managing a fire. Separate tasks from objectives.
2. Although imperfect, the WFSA is a decision document that describes a selected alternative, or strategy, for a fire.
    a. Ensure that personnel are trained and available for WFSA preparation when needed. Consider designating a "WFSA duty officer" at all times during fire season to ensure that this function can be performed skillfully. Engage Regional or Washington Office WFSA expertise as needed.
    b. Conduct mock WFSA preparation exercises during the pre-season. Eventually, you will have a library of pre-loaded WFSAs for various parts of the Forest that can be pulled out and modified when a real fire starts. Forest staff routinely involved in WFSA preparation will have the benefit of constant practice and the Agency Administrator will be refreshed as well.
    c. Carefully analyze the WFSA after it is completed to ensure that it clearly describes a strategy and that it does not contain conflicting direction.
    d. Ensure that key personnel from the IMT are involved in all WFSA revisions and involve them in discussions of strategy.
    e. Try to determine why a given WFSA alternative has a low probability of success and what the alternative would be if a selected strategy is not successful.
    f. An Agency Administrator can ask for more, different alternatives if needed, and can ask for alternatives that are more likely to succeed.
    g. Consider the fact that estimates of suppression costs contained in WFSA's consistently under-predict actual costs.
3. Monitor Incident Action Plans and pay particular attention to Incident Objectives. If these objectives differ from the desired outcome expressed by the Agency Administrator, take action as needed.


Gash Creek Fire
8000 Acres
MT-BRF-005058
8/25/2006
DIV W
Big Creek Fire
2003
Glenn Lake
Fire - 1988
H-3
H-2 Medivac
DP-9
DIV X
DP-10
DP-8
DP-7
DP-4
DIV Y
DP-6
DP-3
DP-5
Water Dip Tank
DIV Z
Dip Pond
DIV C
DP-2
DIV A
DP-1
H-1
DIV B
Legend
Division
Drop Point
Structure
Helibase
Staging Area
Completed Dozer Line
Completed Line
Hand Line
Uncontrolled Fire Edge
Spot Fire
0
0.5
1
2
Miles
SIA
NR IMT2 Turman
Aug 24, 2006
2145 hours

Appendix B

Gash Creek Fire Narrative

This Narrative is taken directly from the Operation's Portion of the Gash Creek Final Incident Narrative, edited to meet the needs of the Lessons Learned Analysis initiated by the Bitterroot National Forest.

The arson caused Gash Cr. Fire started on 7/24/06 at approximately 1600 hrs. The fire was aggressively attacked by the Stevensville Ranger District fire group. It was evident right from the inception that the combination of fuels, weather and topography were conducive to large fire growth. Response was a coordinated effort between the Forest Service and the Victor Rural Fire Department. Efforts were made to contain fire at the smallest possible size utilizing a combination of fire engines, helicopters w/bucket and fixed wing retardant. An ICT4 was initially assigned but transitioned to an ICT3 at 2000. A coordinated effort continued through the night and the following day's operational period. It was apparent on Tuesday afternoon that the fire was quickly exceeding the ability of the local resources to contain the fire and a request was made to order a Type II Incident Management Team.

Doug Turman's Northern Rockies Incident Management Team was ordered. The formal handoff of the incident occurred at 2000 hrs at the end of the operational period. The transition was seamless due to the fact that several of Doug's team were assigned to the Type III organization already in place.

With our primary objectives of protecting life and property and firefighter safety, a coordinated effort between the Bitterroot National Forest, The Victor Rural Fire Department and the Ravalli County Sheriff's Office took place to produce a Population Protection Plan for the surrounding private lands east of the fire.

Ordered resources were in short supply due to the fire activity occurring locally, regionally and nationally. This affected our ability to respond rapidly to fire growth. During the transitional operation period on Tuesday, the IMT's Operations Section assisted the local Type III organization and Victor Rural in assessing structure protection needs as well as providing available resources to direct attack fire perimeter. Hot dry conditions combined with variable winds and extremely receptive fuels overcame initial actions to contain fire spread, however, in some critical areas, direct attack proved to be very successful allowing us to establish a formidable anchor from which to work. After gathering intelligence and formulating a tactical plan, it was clear that night operations would be necessary. Night operations were initiated immediately after transition and proved to be very effective their entire duration. During the next several days resources began to arrive leading to our ability to effectively direct attack the fire perimeter with flanking actions on the south and east flanks, cupping the fire to protect structures.

When adequate and appropriate resources arrived (i.e. Type I hand crews and mechanical equipment), our focus moved to containing fire spread to the north. Mechanical and crew

actions were established on the dominant east/west ridge which separates Gash and Sweathouse Creeks. Contingency planning was initiated using the Sweathouse Prescribed Burn and its' adjacent road system as our anchor. Mechanical equipment was used to reestablish old control lines and water handling equipment was pre-positioned. Progress was slow and successful until the afternoon of 7/30 when a forecasted cold front passage occurred, pushing fire aggressively to the northwest followed by an aggressive push to the east. Ember loft created spotting ¼ to ½ mile to the north and east. Division Zulu (north flank of fire) then disengaged, and the Population Plan was implemented; three residences were evacuated and several others alerted of eminent fire danger. Fire conditions moderated after sundown and resources reengaged.

The Woodchuck Fire (to the north and east) provided a strike team of engines to assist our structure protection efforts. Contingency Planning allowed proactive response to fire growth the following operational period.

The Sweathouse Prescribed Burn of 2004 attributed to our ability to catch the numerous spot fires that occurred to the north of Sweathouse Creek. This action allowed us to use Sweathouse Creek proper as our control line on the north flank of the fire. With the timely arrival of Type I crews, a securing action along the creek was now possible.

With a one hundred plus year accumulation of fuels and 1000 hr fuel moistures of 10%, it was obvious that fire behavior would be erratic. Crew actions in Sweathouse Creek were slow and calculated with a variety of tactical actions necessary to provide a safe, efficient, and effective working environment. Working from east to west and containing fire spread along the creek bought time while allowing the western edge to consume fuels in the high elevation alpine forests below Gash Point. The divide ridge which separates Gash Point Basin from the North Fork of Bear Creek would be used as a natural barrier to check fire spread to the west. This tactical approach allowed us to limit firefighter exposure to hazards addressed cost containment objectives.

Lightning fires on 8/7 and 8/8 on the Bitterroot and adjacent forests prompted requests for assigned resources. Our situation allowed us to accommodate their needs. On two separate occasions we provided aviation assets which rapidly controlled new starts.

An afternoon thunderstorm appeared directly over the Gash Creek Fire on 8/8. Very strong (30 – 40 mph) and erratic winds occurred fanning the fire and causing spots on the north side of Sweathouse Creek. The spot's location prohibited immediate control operations by ground resources due to safety concerns. They were held in check during the evening hours by water from helicopters. The plan was to attack these spots individually; constructing direct line the next morning. However, during the early morning hours of 8/9, extreme winds were experienced in camp, and most likely, over the incident as well. When ground resources arrived on scene the next morning, numerous new spots were found on the north side of Sweathouse Creek. For safety and efficiency these spots could not be managed individually; instead a control line was established to contain the entire area. As the fire was now well established on the slope north of

Sweathouse Creek, the Operations Section began plans to extend a control line to the north to tie into the 1988 Glen Lake Fire.

Over the next several days, the contingency lines that had been constructed in late July on the north side of Sweathouse Creek were enhanced and extended by both hand and machine. On 8/12 a firing operation was completed below road #62063 creating a good buffer into the bottom of Sweathouse Creek. A machine line was constructed from the 1321 road north of DP-7 paralleling the Glen Lake Trail to the Glen Lake Fire area and to within about 50 feet of the wilderness boundary. On 8/13 a successful firing operation secured the line from DP-7 south to road #62063.

8/14 was a different story. Fire activity north of Sweathouse Creek picked up around 1100. By 1200 some resources were re-positioned for safety. At 1315 there was a report that the tail end of a water tender had slipped off the #1321 road and the cab was now completely blocking the road; the driver was unhurt. At 1400 fire behavior increased dramatically, especially in Division X, and the escape route for resources moving down the #1321 road was blocked by the water tender. The fire continued to increase in intensity and pushed aggressively to the east northeast. Around 1600 the Victor Rural Fire Department Chief joined the team at ICP because the fire was moving toward a trigger point identified in the Population Protection Plan. At 1630 all resources began to leave the #1321 road by utilizing the "Z" road (62059); however, not all vehicles could navigate this narrow, steep, and rocky road with switchbacks requiring 2 or 3 point turns. Remaining on the line or along the #1321 road above the blocking vehicle were 5 crew buggies, 1 Type 3 engine, 2 Type 2 water tenders, 2 school buses, 1 excavator, and 1 dozer. At 1800 the fire run began to breach a trigger point and Stage I of the Population Protection Plan as activated.

For Safety, a feller/buncher and dozer were moved into the 2003 Big Creek Fire. Several personnel on the ridge between the Glen Lake Fire and the Big Creek Fire left their locations by heading north into the Big Creek drainage.

Later that evening, because the fire was backing down into the area where the water tender was stuck, the team sent a task force to open the road by nudging the tender and allow vehicles to be driven down around the tender. The task force had a thorough briefing and implemented the mission, freeing four crew buggies and a Type 3 engine.

The next day, 8/15, most of the other trapped vehicles were brought down from above the water tender site. Fire behavior was still quite intense and the day's plans were focused on indirect control lines. During the early morning hours of 8/16 .2 inches of un-forecasted rain fell. Efforts were re-focused on opportunities afforded by the rain by establishing direct control lines. Cool weather with high relative humidities continued throughout the day. More rain (.2") fell during the night of 8/16 with cool, moist weather through the day of 8/17, and a little more rain in the afternoon.

The water tender was finally removed on 8/17 by a crane company. Intense fire behavior and then inclement weather prevented removing the water tender earlier.

Operations on the days of 8/18, 19, 20, and 21 took advantage of the lull brought by cool moist weather. Lines were completed on the fire's edge in Divisions W, Y, and X immediately followed by hose lays and mop-up. Rehabilitation of control lines and other impacts progressed in Divisions C, A, B, and Z.

On 8/22 a dry cold front passage was predicted and experienced. The fire that had been skunking around in the north fork of Sweathouse Creek gained a head of steam and ran out of that bowl to northwest of the 1988 Glenn Lake Fire, flanking the control lines on the ridge between the Big Creek Fire and the Glen Lake Fire. There was an orderly withdrawal of resources from Divisions W and X due to the extreme fire behavior. These resources were staged at the mouth of Big Creek should they be a needed for structure protection. The fire slopped over into the Big Creek drainage in several places but its eastward movement was impeded when it hit the west flank of the 2003 Big Creek Fire. The midnight IR flight showed the fire about 1/3 down into the Big Creek drainage. This was corroborated by helicopter recon the next morning.

The Big Creek Fire posed a major barrier to the eastward march of the fire, and the team planned glide path on 8/23 to a Type 3 organization.

On 8/25 a transition took place to a Type III IMT with one type 1 crew, two engines, two excavators and nine miscellaneous overhead.

While challenging, the Gash Creek Fire was ultimately very rewarding with no serious injuries and the water tender incident being the most serious accident. The cooperation of the Bitterroot National Forest, all the valley Rural Fire Departments, Ravalli County Sheriff's Office and the Community of Victor were exceptional and led to the overall success of our Team mission.

Appendix C

Gash Creek Fire
Event/Decision Timeline

As of 9/8/06

Monday, July 24

Fire starts on Bitterroot Forest land at 1530. Initial attack commenced.

Tuesday, July 25

Type 2 IMT arrives, receives briefing. Extended attack continues. WFSA #2 prepared. Direct attack strategy selected. Fire size 200 acres.

Wednesday, July 26

Type 2 IMT assumes command @ 0800. Fire size 640 acres. Cost to date $150,000.

Thursday, July 27

WFSA #3 prepared. Modified direct/indirect strategy selected. Fire size 700 acres. Cost to date $271,000.

Friday, July 28

Fire size 1050 acres. Cost to date $576,000.

Saturday, July 29

Strong dry cold front arrives. Fire moves into Sweathouse Creek drainage. Fire size 1650 acres. Cost to date $793,000.

Sunday, July 30

WFSA #4a prepared. Three private homes evacuated by Ravalli County Sheriff; fire within ½ mile of these structures. Red Flag warning issued. Dry cold front influencing fire behavior, winds out of SW and W. Trigger points hit; firefighters disengage and reposition. Fire size 1800 acres. Cost to date $1.2 M.

Monday, July 31

Voluntary evacuation orders remain in effect. Fire size 2100 acres. Cost to date $1.8 M.

Tuesday, August 1

Voluntary evacuation orders remain in effect. Fire size 2400 acres. Cost to date $2.1 M.

Wednesday, August 2

Voluntary evacuation order lifted. ~46 acres of private land have burned. Fire size 2600 acres. Cost to date $2.5 M.

Thursday, August 3

Fire size 2800 acres. Cost to date $2.8 M.

Friday, August 4

Red Flag warning issued. Fire size 3100 acres. Cost to date $3.3 M.

Saturday, August 5

Fire size 3450 acres. Cost to date $3.6 M.

Sunday, August 6

WFSA revision #4 b prepared – cost revision only, no alternative strategies considered. Transition to Type 3 organization discussed between IMT2 and Forest personnel. Fire size 3450 acres. Cost to date $3.6 M.

Monday, August 7

Red Flag warning issued for thunderstorms. Fire size 3550 acres. Cost to date $4.0 M.

Tuesday, August 8

Red Flag warning for thunderstorms. Spot fires occur in N. Fork of Sweathouse Cr. Type 1 helicopter assists with initial attack elsewhere on Forest. Fire size 3600 acres. Cost to date $4.2 M.

Wednesday, August 9

Downdrafts cause spotting and active fire on the N. side of Sweathouse Cr. drainage, and in heavy timber in the N. Fork of Sweathouse Cr. Planned transition to Type 3 organization cancelled. Decision made to extend IMT 2 for another 14 days. Fire size 3700 acres. Cost to date $4.4 M.

Thursday, August 10

Efforts are aimed at containing main fire activity to Glenn Lake basin and containing spots already outside the basin. Fire receives rain at night. Fire size 3900 acres. Cost to date $4.6 M.

Friday, August 11

Fire behavior moderated by previous night's rain. However, strong gusty winds dry fuels again quickly. Fire becomes very active mid- to late afternoon with strong westerly winds. Fire size 4500 acres. Cost to date $4.8 M.

Saturday, August 12

WFSA #5 prepared. Fire spots over FS road 1321. Fire size 5100 acres. Cost to date $5.1 M.

Sunday, August 13

Fire size 5200 acres. Cost to date $5.3 M.

Monday, August 14

Extreme fire behavior results in fire moving across 1321 road with a crown run into Smith Creek. ¼ to ½ mile spotting experienced. Fire movement is from W to E and N toward Big Creek. Water tender runs off 1321 road, blocking it and the egress of numerous resources/vehicles. Retardant used to protect vehicles. Fire makes a major run down Smith Cr., increasing fire size by over 1000 acres (acres are reported on 8/15 ICS-209). Fire size 5300 acres, cost to date $5.4 M.

Tuesday, August 15

Fire moves down Smith Cr. drainage toward 9 potentially threatened structures. Fire continues to move toward Big Creek. Fire size 6800 acres. Cost to date $5.7 M.

Wednesday, August 16

Fire behavior minimal due to widespread rain across the fire area totaling approximately 0.3 inches. Direct attack in many areas is now pursued. Fire size 6900 acres. Cost to date $6.1 M.

Thursday, August 17

Fire activity smoldering and creeping due to precipitation, cooler temperatures and increased humidity. Direct attack continues. Fire size 6900 acres. Cost to date $6.3 M.

Friday, August 18

Temperatures increase, humidities decrease, fire behavior increases. Fire size 7200 acres. Cost to date $6.5 M.

Saturday, August 19

Fuels continue to dry out. Costs adjusted lower with better information. Fire size 7200 acres. Cost to date $6.4 M.

Sunday, August 20

Fire behavior continues to increase. Efforts are aimed at putting in direct line prior to forecast arrival of cold front. Initial attack conducted on a fire near St. Mary's Lake in the wilderness. Fire size 7200 acres. Cost to date $6.6 M.

Monday, August 21

Fire behavior continues to steadily increase. Fire size 7300 acres. Cost to date: $7.1 M.

Tuesday, August 22

Red Flag warning issued; cold front hits fire around 1430. Temperatures are up, humidities down. Erratic winds stimulate major crown runs. Crews disengage. Fire spots over the ridge into the Big Creek drainage. Fire size 7800 acres. Cost to date $7.4 M.

Wednesday, August 23

Red Flag warning issued. Gusty winds experienced up to 25 mph. Fire size 7800 acres. Cost to date $7.7 M.

Thursday, August 24

WFSA #5_1 prepared. Temperatures down, humidities up, along with calmer winds. Transition to Type 3 organization being planned for 8/25. Demobilization occurring. Fire size 8,000 acres. Cost to date $7.9 M.

Friday, August 25

Fire receives about 0.3 inches of rain during the night. Transition to Type 3 organization occurring, with transfer of command planned for 1700 today. Fire size, 8,000 acres. Cost to date $8.1 M.

Saturday, August 26 to present

Incident managed by Type 3 organization. Little fire spread occurs.

Appendix D

Gash Creek Fire WFSA Revisions

As of 9/10/06

	WFSA #2	WFSA #3	WFSA #4 a	WFSA #4 b	WFSA #5	WFSA #5_1
Date Initiated	07/25	07/27	07/30	08/06	08/12	08/24
Fire Size at time of WFSA revision	200 acres	600 acres	1700 acres	3600 acres	5100 acres	7800 acres
Change in WFSA boundary?	N/A	Yes	Yes	No	Yes	Yes
Selected Alternative	Direct Attack	Modified direct/indirect	Modified direct/indirect	Modified direct/indirect	Big Creek/St. Mary's Addition	Big Creek/St. Mary's Addition
Probability of Success	56%	50%	57%	57%	51%	51%
Predicted Final Fire Size	521 acres	2240 acres	17,848 acres	17,848 acres	25,000 acres	25,000 acres
Estimated suppression cost of selected alternative	$464,000	$1.81 M	$3.79 M	$5.04 M	$7.88 M	$8.9 M
Worst Case cost	$2.044 M	$7.2 M	$7.25 M	$7.25 M	$9.625 M	$9.625 M
Worst Case acres	20,650	20,650	20,650	20,650	30,000	30,000

***Note: there was no WFSA #1**