ONE MISSION, TWO PERSPECTIVES: BRIANHEAD FIRE AERIAL IGNITION

Facilitated Learning Analysis

Credit: Kari Greer

Incident date: July 7, 2017
Brianhead Fire, Utah
Utah Forestry, Fire and State Lands – Southwest Area Office; U.S. Forest Service Dixie National Forest;
Bureau of Land Management – Color Country District

Background

On June 17, 2017, a human-caused fire began on lands administered by the town of Brian Head, Iron County, and the Utah Division of Forestry, Fire and State Lands. It spread into a large wildland fire on the Dixie National Forest (NF) and eventually the Bureau of Land Management (BLM). The previous month had seen no appreciable precipitation in southern Utah, with near record temperatures during mid-June that brought humidity below 10 percent and a Haines Index of 6. Driven by steep terrain, low relative humidity, an abundance of hazardous fuels, and erratic winds, the Brianhead Fire spread quickly. A Type II Incident Management Team (IMT2) was ordered that afternoon to manage the fire.

On June 23, a Type I Incident Management Team (IMT1) was ordered to manage the East Zone of the fire while IMT2 maintained its management of the West Zone. On July 3, IMT1 took command of the whole fire after IMT2 timed out. The primary strategy for the Brianhead Fire was full suppression with (1) a strong emphasis on risk management, limiting exposure to firefighters and the public, (2) minimizing loss of structures, and (3) maintaining positive relationships. Portions of the fire's perimeter to the south and west were quickly secured due to topography, lighter fuels, and firefighting efforts. A significant effort was put forth to mitigate the northern spread of the fire along Divisions I and J, utilizing complex firing operations, crews, engines, aircraft, and heavy equipment.

Credit: Kari Greer

Aerial ignitions, Brianhead Fire

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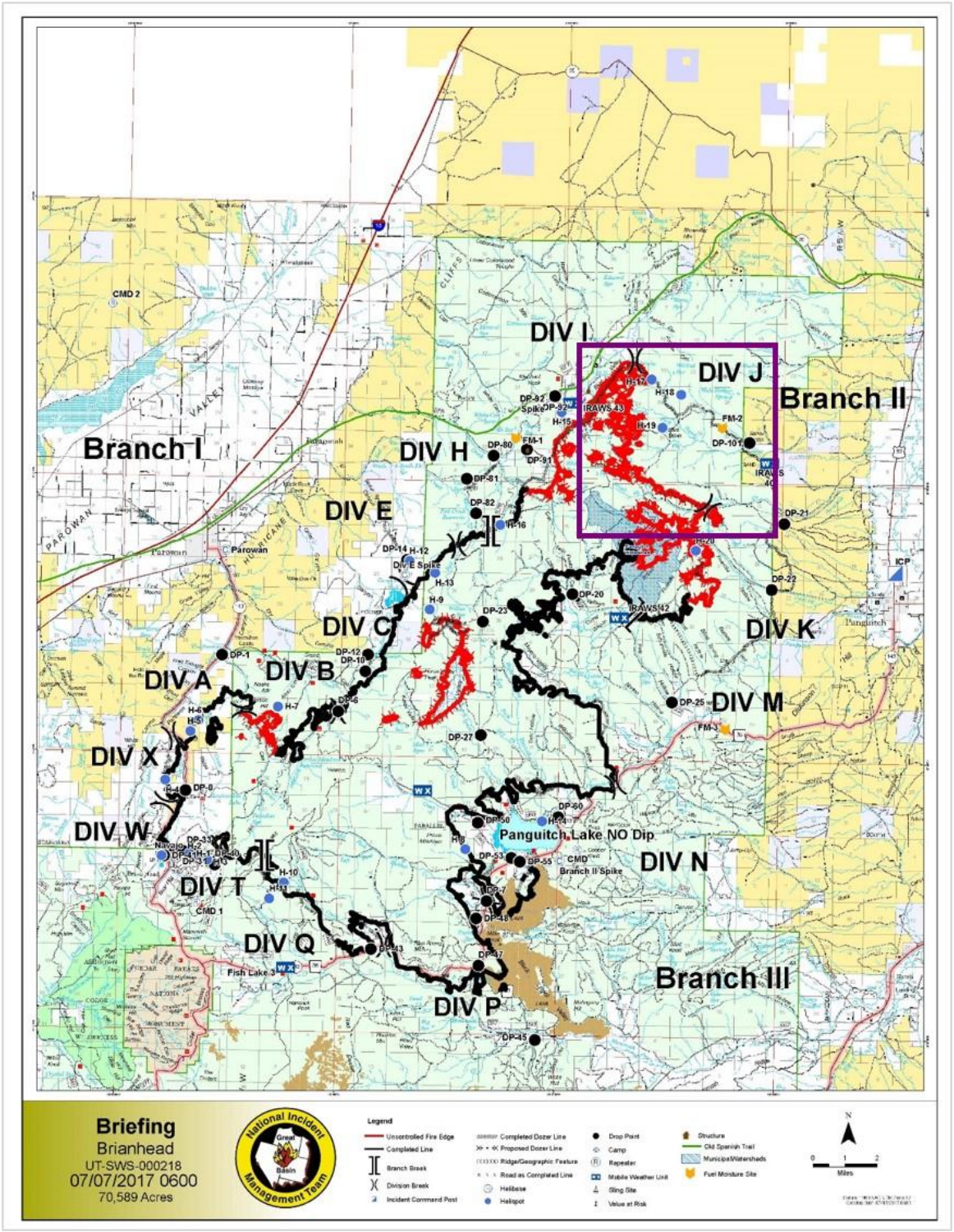
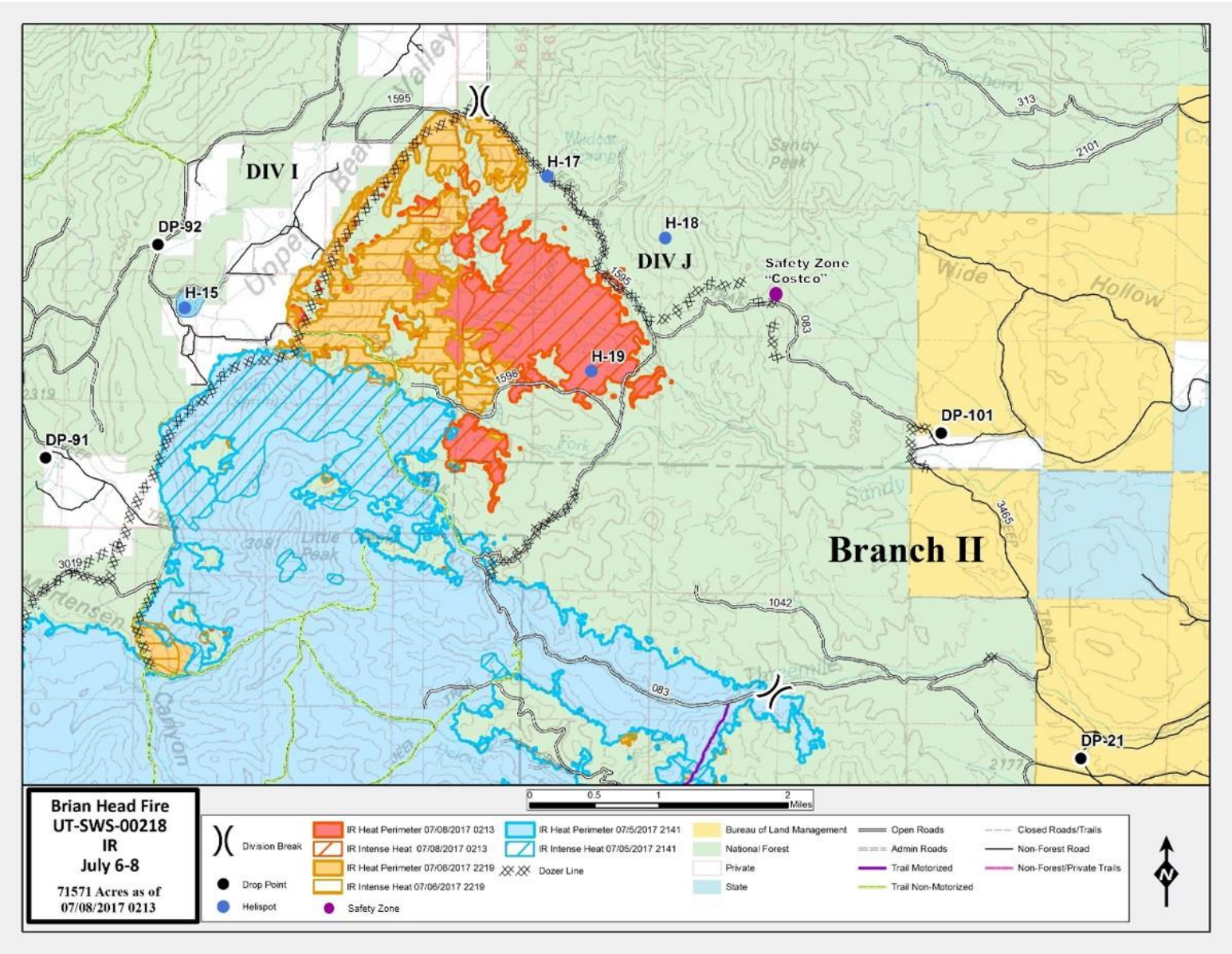
Hand ignitions, Brianhead Fire

In the days leading up to July 7, work in Divisions I, J, and K of the fire focused on reducing the fire intensity and securing the line through aerial and hand ignitions. The fuels in these Divisions ranged from mountain mahogany, mixed conifer, pine stringers, pinyon-juniper woodlands, and sage brush to grass. Topography in the area included steep mountain slopes leading to drainages of multiple directions and aspects, and hills and valleys of lighter fuels. Dry thunderstorms began to develop as monsoonal moisture flowed in from the desert southwest. A thunderstorm developed west of the incident area on July 7 during the mid-day hours, affecting the aerial ignition operation that occurred that day. With heavy winds pushing the fire eastward towards the road where ground resources were working, a decision was made to move to the safety zone. While there were no injuries or damage to equipment, the situation that occurred should be considered a near-miss by the definition in the 2017 Interagency Standards for Fire and Fire Aviation Operations (Red Book), but not an entrapment.

IMT1 timed out on July 8 and the fire's command transitioned to another IMT2. By the end of its spread, the fire had burned 71,673 acres: 63,648 acres on the Dixie NF, 749 acres on BLM land, 762 acres on Utah State land, and 6,514 acres on private lands.



Briefing map of the Brianhead Fire on July 7, 2017. Purple square indicates the focus area of the event.



Focus area of the event, Brianhead Fire.

The Story

From the Air

As he waits at the helibase, the Aerial Ignition Firing Boss (FIRB) considers his day's mission and the weather. He had spent the past few days conducting aerial ignitions with a plastic sphere dispenser in Division I. This fire was his first time directing aerial ignitions and he thought the work had been going well. He anticipated more firing at the head of the fire that day to secure indirect line in Divisions I and J. He had already discussed the plan with the Division I Supervisor (DIVS I) over the past few days and was waiting to discuss the plan with the Division J Supervisor (DIVS J). A line of dry thunderstorms was expected to develop near the incident area in the afternoon, which might conflict with the operation. It is already 1100 and he is starting to get antsy. If he is to achieve the desired fire effects, he'll need to get in the air soon. It is already later than he would have liked to start. Since he can't get hold of DIVS J, FIRB calls the Operations Section Chief (OSC1), who confirms that the operation was still on as planned for Divisions I and J. Finally a call comes in from DIVS J. FIRB and DIVS J discuss the plan and FIRB is ready to go.

Once up in the air, FIRB and the aerial ignition platform fly up into the high country along the Division I – Division J break (Division I/J). FIRB notifies personnel on Division I that he is going to start lighting the unburned islands up high. While they are firing in Division I, FIRB calls DIVS J on the tertiary air-to-ground frequency (A/G 3) to check in. The call is scratchy and FIRB can't hear DIVS J well. He tells him that he's firing in Division I and will call him back when he's done.

After about thirty minutes, the aerial ignition platform finishes firing in Division I and moves to Division J, lighting strips in the timber stringers and ridgelines where he sees opportunity to establish fire. Based on his local experience, he knows that this spotty pinyon-juniper fuel type does not readily burn in the absence of wind and high temperatures. Some of the plastic spheres that they had dropped earlier that week hadn't taken and he had needed to drop some extra spheres to burn some of those pockets. FIRB suddenly realizes that he has overshot and come too far down the ridge. It's a little closer to the road than he intended, and he immediately stops the firing. At DIVS J's request, he tries to get in touch with resources on the ground in Division J. After trying the Task Force Leader (TFLD) on A/G 3, he is told to use the primary air-to-ground frequency (A/G 1) instead. Based on prior fire behavior and his experience in these fuels, he's not overly concerned about the proximity of the aerial ignition to the road and lets the ground resources know that the fuels are sparse between them and the fire activity.

At this point, Air Attack (ATGS) overhears a TFLD expressing concern to FIRB about the proximity of the ignitions to the folks on the ground over A/G 1. Since the aerial ignition operations over the past several days had been successful, ATGS hadn't been concerned about the day's mission. But as he looks now, he sees that it does appear close and he is concerned with the proximity to the heavy equipment and the unsecured line they're working. He calls FIRB to check on the operation, and FIRB reports that he is done and heading back to the helibase.

Back on the ground by 1400, FIRB observes the smoke column from helibase. He sees that the thunderstorms are developing and the wind is picking up as he expected. He's confident that he has achieved the desired effects of the mission and executed the plan.

From the Ground

DIVS J is hoping to get a jumpstart on the day. He sends TFLD, the Heavy Equipment Boss (HEQB), and equipment to get an early start. Dozers will be working on a 1.5 mile section of open line near Blue Meadows, working north from the anchor point in the black. The Division's crews will be prepping line behind the equipment and finishing the direct line from the Division J/ K break, moving west to the indirect anchor point. At 0900, the incoming Division Supervisor takes a reconnaissance flight with DIVS J, who will be timing out the next day. While in the air, they discuss the aerial ignition operation and status of the line construction and prep within Division J. They notice that the previous day's ignitions at the Division I/J break did not consume very well.

Credit: Kari Greer

Topography and fuel types of the focus area

While DIVS J is in the air, OSC1 receives a call from FIRB. They discuss and confirm the plan for the day to conduct aerial ignition operations in Division I. Back on the ground, DIVS J looks for FIRB at the helibase. They had agreed to meet up to discuss a plan for the aerial ignition operation, but DIVS J can't find FIRB. DIVS J gets FIRB's cell phone number and drives up to Drop Point 21 to give him a call. It is the closest spot to the line with cell reception and a good place to see the crews working. Accustomed to having a FIRB working directly for him as a Division Supervisor, DIVS J calls him and the two discuss the plan to clean up the islands of unburned fuel up high in Division I. FIRB agrees to get everything together and get up in the air.

Once off the phone, DIVS J drives up to the Division J/K break to tie in with the hotshot crews. He receives a call from FIRB on A/G 3. FIRB asks if everything is ready for him to start. DIVS J reiterates the desire to clean up the unburned islands in the interior of Division I. FIRB says that the reception is scratchy. DIVS J then catches a ride on a UTV with one of the Hotshot Supervisors. This allows him to get to a high point so he can see the ground resources on Division J, as well as the aerial ignition operation.

Upon reaching the high point, DIVS J sees that there is fire mid-slope, further east than expected in Division J, and down past the Middle Fork confluence. With dozers working nearby to improve the road, he is uncomfortable with the situation. The fire behavior is picking up with the outflow from the thunderstorm, which is pushing the fire down the drainage. A Hotshot Superintendent notices some new smoke in the middle of Division J and sends a couple of crew members to check it out in a UTV. At the same time, TFLD notices fire in the interior of Division J and the helicopter flying low near the line. He's not expecting this and tries to contact FIRB on A/G 1, but is unsuccessful. The HEQB starts to see smoke north of Blue Meadows, but at this time is reassured by the Line Safety Officer (SOFR) and TFLD who have eyes on the fire that it isn't currently an impact though it's a bit close.

It seemed like he was going rogue.
- Ground resources

DIVS J calls FIRB on A/G 3 and asks him to call TFLD to let him know what's happening. DIVS J hears FIRB calling TFLD over A/G 3 and notifies him that TFLD does not have A/G 3 and directs him to try A/G 1. He

then hears FIRB touch base with TFLD on A/G 1. After believing the aerial ignitions to be complete, TFLD is surprised to see one more line of ignitions run along the ridge. Frustrated with the miscommunication, TFLD tells FIRB that he can head back to the helibase and "doesn't need to stick around." DIVS J calls FIRB to confirm if he had just dropped fire or if that was a dry run. FIRB responds that he did put some fire in there, but that he's done with the operation and is leaving the area.

DIVS J's discomfort with the developing situation and miscommunication is growing. He reminds the hotshot crews near the indirect anchor point to work with one foot in the black. As soon as the helicopter leaves, the winds increase with gusts estimated to be 40 mph. The fire behavior picks up and discussion among the SOFRs, TFLD, and the members of the hotshot crew scouting the situation leads to a decision to disengage ground resources from the indirect line. Among the resources at work and the overhead assigned to DIVS J, there are varying levels of anxiety – from some feeling a sense of urgency to others still not overly concerned for a rapid retreat. All, however, agree to disengage at this point.

The fire is moving down the Middle Fork drainage, towards the escape route. The heavy equipment operators are told to move past Blue Meadows up to the parking lot-sized Safety Zone known as "Costco." At Blue Meadows, the heavy equipment operators start creating a new safety zone, but are told that they have time to keep tracking the dozers with blades up to Costco. TFLD, the SOFRs, and the scouting hotshots meet up in UTVs with the heavy equipment along the road to Costco. As they all continue on, one of the dozers overheats and breaks down. They put a quick scratch line around the immobilized dozer and load the operator in a UTV, following the remaining dozer to Costco.

The group arrives at Costco, the safety zone, and feels heat coming off of the fire in the Middle Fork drainage. Uncertain of the progression of the fire, they make the decision to leave the dozer at Costco and continue all the way out to Drop Point 101. Along the way, the winds subside and they get into some cleaner air. While all are relieved to be out of the situation, there is confusion and frustration that the event happened in the first place.

Lessons Learned

A common operating picture is necessary for a safe and successful mission

There were different understandings of the intent and implementation of this aerial ignition. While the FIRB understood the operation to include aerial ignitions in Division J on July 7, those on the ground in the Division understood the ignitions to only occur up high in Division I.

I certainly never intended to put anybody at risk.
- FIRB

It was identified that the lack of face-to-face communications can often complicate the briefing process, making it more difficult to ensure that everyone had the same understanding of the plan. When face-to-face communication is not possible, communication must be more deliberate and diligent.

FLA Team Discovery: Anyone potentially affected by an operation needs to be briefed on the plan. Understanding of the plan should be vetted and confirmed for continuity – all involved must share a common operating picture. To ensure that everyone is on the same page, adhere to this suggested

briefing cycle: brief everyone to the plan; confirm understanding of the plan (two-way, giving and receiving); execute the operation as planned; if there is a deviation from the plan, re-brief everyone to the new plan. We share the responsibility to be clear in our communications and to acknowledge and confirm when we receive information.

A successful common operating picture depends on immediate and honest feedback. Providing real-time feedback allows time to rectify any deviations from the plan and opportunities to correct performance.

Review the 10 Fire Orders and the 18 Watch-Out Situations is suggested because they are still relevant and of great value to a successful common operating picture.

Discreet frequency use can be both good and bad

There was a formal decision made during the Brianhead Fire to use A/G 3 for aerial ignition operations in order to avoid interfering with other critical air-to-ground needs and to protect critical communications from interference. Not everyone was aware of the A/G 3 frequency. It wasn't included in the Air Operations Summary (ICS-220) or the Incident Radio Communications Plan (ICS-205) and wasn't briefed to everyone potentially affected. This meant that not everybody on the ground was aware of the on-going operation nor could communicate with the FIRB. Without accessible communication channels, people were unable to obtain up-to-date information or to voice their concerns. The common operating picture was incomplete to most involved or affected by this mission. The need for a more thorough brief on its availability and use was identified.

FLA Team Discovery: It is customary for IMTs to assign and limit the availability of a discreet frequency intended for the exclusive use of aerial ignitions. Among many benefits, this protects communications of such critical missions and tactics from the interference of other incident communications. It also ensures the aerial ignition mission communication does not interfere with other critical communication that may be on-going on a division tactical frequency or other air-to-ground frequencies.

It is suggested that the practice of assigning dedicated aerial ignition frequencies continue with the mission-critical intent described above, but that such frequencies are widely known and documented within the ICS-220 and ICS-205. Inappropriate use and interference on such aerial ignition frequencies can be prevented through documentation within the Incident Action Plan (IAP) and with thorough briefings. Just as the disciplined use of "bucket" air-to-ground frequencies has become an established protocol, alleviating congestion or conflict on a primary air-to-ground frequency, so too can a disciplined protocol be established in the use of a tertiary aerial ignitions air-to-ground frequency. It is a reasonable conclusion that ground resources will respect the intention of an aerial ignition A/G frequency and only use it if involved in the mission or if there is a need for critical or emergency communication regarding the aerial ignition mission.

Before commencing aerial ignitions, confirm the plan in direct communication with the DIVS.

A specific realization resulting from the aerial ignition operation in DIVS J was the need for direct communication from the aerial ignition FIRB to DIVS J before commencing the mission. In this situation, FIRB told DIVS J that he was working in DIVS I and would call him when he returned to DIVS J. Despite his

intentions, FIRB forgot to make the call – "I spaced him" – and ground resources in Division J were surprised when the operation started.

FLA Team Discovery: The two perspectives of this event – from the ground and from the air – indicate different understandings of the mission. Aerial ignition protocols, such as communicating intended start and stop points, ignition routes, and demonstrating "dry-runs," would have contributed to a common operating picture and may have prevented commencing the aerial ignition operation in DIVS J. Among the established standards for aerial ignitions is initial and on-going communications between the ground and air.

Local expertise vs. IMT expertise in the FIRB position has trade-offs

It is a common practice among IMTs to utilize a team member from within the Operations Section to fill the FIRB role in aerial ignitions. In this case, a team member who was local to the fire was identified, but was unavailable to fly the operation. Faced with the choice between putting a team member or somebody local in the FIRB position, IMT1 decided to go with a local fire manager to fill the role. A local fire manager is familiar with the site's fuels, weather influences, and the desired fire effects, and can take ownership in the outcome. It was recognized, however, that using a local expert has trade-offs. Introducing a new person into an existing, cohesive team requires more effort to build trust and become familiar with each other's operational protocols and communication styles.

FLA Team Discovery: Devoting time and effort into building trust and learning communication styles isn't always possible with the rapid pace of fighting a fire. In these situations, it may be effective to pair a local fire manager with a team member during ignition planning and in the helicopter. This can improve communications, provide clarity on the expectations for the mission, and provide for immediate feedback on results. In this case on July 7, a pairing of an experienced team member with the local FIRB may have facilitated a training and development opportunity.

Developing the aerial ignitions skillset requires time and constructive feedback

The Brianhead Fire was the FIRB's first experience directing aerial ignitions from within the helicopter. While he is a highly experienced fire manager with extensive knowledge of the local fuels, fire behavior, and the application of fire, he had no "slide tray" of past experience flying front seat of a helicopter while dropping fire. This would be a challenge for anyone to direct the patterns, timing, and amount of plastic spheres, and to apply the appropriate monitoring and communications techniques for the first time. The situation on July 7 was one in which an individual with an extensive skillset and background in the application of fire as a tool, found himself directing aerial ignitions from above just days into trying to develop this new skillset.

> *Yeah, it was my first time in the front seat.*
> *- FIRB*

FLA Team Discovery: Experiential learning is key to our professional development. Everyone is a "first-timer" at some point and efforts should be made to set an individual up for success through coaching and constructive feedback. Such skill development takes time as it is both highly complex and of rare opportunity. The wildland fire community and its governing agencies has no established and/or formal program to develop aerial ignition FIRBs. There is merely a decades-old tradition of on-the-job training to acquire the expertise in the proficient use of aerial ignition.

After Action Reviews should include everyone who was directly involved in the event

An After Action Review (AAR) was conducted with the Operations Section, but the IMT recognized that the effort did not include all ground resources directly affected. AARs are a familiar and helpful tool to allow us to reflect on what happened and how we can improve performance. They provide immediate, quality feedback, making it paramount that they are inclusive of all who were involved in the event. The flexibility of the AAR makes it scalable and enables us to bring in all perspectives.

Conclusion

The aerial ignition operation on July 7 was perceived differently by those involved. The perspective from the air was of an operation that successfully executed the plan and achieved the desired effects. The perspective on the ground was much different – ground resources felt confused and put at risk. This event illustrates how vital it is to ensure that there is a common operating picture and that communications are clear and accessible. The event is also an illustration of the Forest Service Life First principles in action. As soon as ground resources recognized something unexpected, they took immediate steps to get more information and a better understanding of what was happening. With the changing weather and fire behavior, decisions were made to disengage. This is a clear example of stopping, thinking, talking, and then acting to reduce exposure. While familiarity of the Life First initiative in other organizations has been identified as a challenge within the Forest Service, the abundance of non-Forest Service resources in DIVS J who automatically exhibited these behaviors shows otherwise. The quick recognition of something unexpected followed by deliberate actions and coordination was organic and a clear demonstration that the Life First principles are well-ingrained within the wildland fire culture.

Throughout this FLA, the FLA team heard a desire from many participants to learn from this experience. Everybody who was contacted was willing to participate and eager to see the results. The reporting and learning culture continues in the wildland fire community; the FLA process remains a key piece of the culture's integrity. In this case, the FLA team believes there was a missed opportunity to close the loop immediately following the event through an inclusive AAR. Other tools to provide some lessons beyond the local scene are the Rapid Lessons Sharing (RLS) and Lesson Learned Reviews (LLR) such as this FLA report, which provide actionable lessons and resources for more immediate information sharing. Together, AAR, RLS, and LLRs, provide a robust toolset for the wildland fire community to keep learning from our experiences, ensuring that we continue to operate in a safe and effective manner.

Credit: Kari Greer

Division J, Brianhead Fire

FLA Team

Concerns and confusion over this operation led to the interagency decision to conduct a Facilitated Learning Analysis (FLA). A team was assembled and reported to the Dixie National Forest Supervisor's Office in Cedar City, UT on July 27, 2017. The FLA team received an in-brief and delegation of authority from the State of Utah Forestry, Fire and State Lands; U.S. Forest Service; and Bureau of Land Management. The team made numerous attempts to discuss the operation with all key personnel involved in the event, however, not all individuals identified as integral were available. The events and timeline chronicled in this report are based on the best recollections of those interviewed. The team greatly appreciates the time and candidness of those who participated in the FLA.

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Rapid Lesson Sharing

If you have a lesson gained while working in the wildland fire service, share it so others can learn. Remember, your lesson can be a success, a way of doing things in a safer or more efficient way, a close call – anything with lessons for working in the wildland fire environment.

Submit RLS