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Department of
Agriculture

Forest
Service

September 2011

Mother Lode Fire
Facilitated Learning Analysis

Mount Hood National Forest
September 2011

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Cover Photo: H2 one day after extraction; from helicopter approximately 1000 09/08/2011.

Summary

The Mother Lode Facilitated Learning Analysis (FLA) was requested by the Mt. Hood Forest Supervisor on September 9, 2011. An FLA team was assembled to review the events that occurred on the Mother Lode Fire through September 7, 2011. The team was asked to develop a narrative of events that took place on the fire and to help share Lessons Learned for Fire Management on the Forest.

The fire was located on the South flank of Mother Lode Mountain in the Bull of the Woods Wilderness on the Clackamas Ranger District of the Mt. Hood National Forest. The initial lightning start was about .10 acres when detected on the afternoon of August 26th. The fire was on the upper third of the slope on steep, rocky ground with poor access. At the time of the initial start the Forest was engaged in initial attack on numerous lightning fires.

The Mother Lode Fire was managed under a monitoring strategy through September 4th when a Type 3 Incident Management Team was assigned to the fire. Four Type 2 IA crews, two helicopters and overhead were assigned. On September 6th firefighters disengaged the fire due to spotting outside of the perimeter and an increase in fire behavior. Nine firefighters withdrew to an area that had been identified as a medivac helispot and spent the night at that location. The remaining resources on the fire withdrew from the fire area to the East, utilizing a trail system.

The following day the Incident Commander Type 3 (ICT3) decided to remove all personnel from the fire. After the crew shuttle and gear back haul was complete, five helitack and three rappellers were forced to evacuate the helispot; fire activity picked up significantly. The eight firefighters moved away from the fire area and cleared a landing zone. They were successfully evacuated from the fire.

Firefighters participated in developing a narrative of events that occurred on the Mother Lode Fire. Fire Managers, Line Officers and Incident Commanders also participated in developing a narrative of events of what occurred during the fire. The two accounts were combined in a narrative. Both groups also discussed and developed Lessons Learned. Lessons Learned identified by each group were synthesized to form an organizational perspective.

Hindsight bias is a human cognitive bias that results in viewing past events as being more predictable than was actually possible at the time. Knowing the outcome of an event influences how preceding decisions and actions are viewed. Hindsight bias can lead to erroneous assumptions regarding cause and effect. One method of overcoming hindsight bias is recognizing that decisions and actions made sense at the time and then attempting to understand why.

The following are two accounts and Lessons Learned from the Mother Lode Fire.

Situation

Fuels

The over story in the fire area mainly consists of Douglas-Fir and mixed conifer with lichen draped from the branches. There is a mixture of hardwoods and shrubs in the understory. Rhododendron is the primary understory shrub. The litter and duff layer consists of short needles and moss. Fire movement is primarily through surface fuels; however, lichen in the tree branches contributes to fire spread in the canopy. When dry, the lichen reacts quickly to radiant heat, is receptive to embers and is a mechanism for aerial spotting. Ten hour fuel moistures were 10% and thousand hour fuel moistures were approximately 15%. Live fuel moistures were about 100%. The Energy Release Component (ERC) at Boulder RAWS was at the 99th percentile on September 7 (see Chart 1).

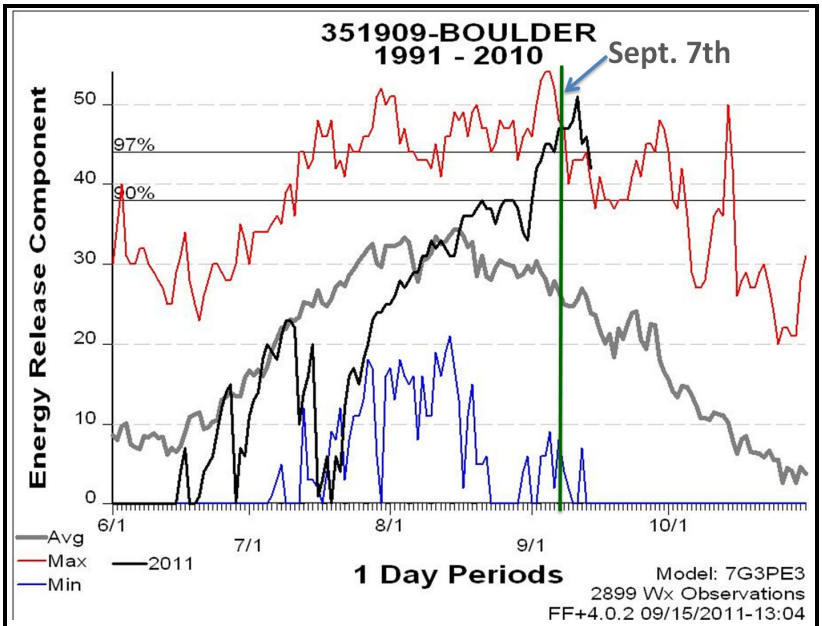

Chart 1: ERC showing September 7, 2011

Weather

The 2011 fire season in the Pacific Northwest started slowly with high snow pack and a cool and moist spring. Seasonal drying began in late July and continued through early September. On September 5th the Weather Service issued a Red Flag fire warning for warm drier weather and east winds. On September 6, 2011 the Northwest Geographic Area issued a Fuels and Fire Behavior Advisory for a prolonged period of hot, dry and unstable weather conditions resulting in dangerous burning conditions.

Topography

The Mother Lode Fire location is in the Bull of the Woods Wilderness on the southern portion of the Mt. Hood National Forest on the Clackamas Ranger District. The Bull of the Woods Wilderness borders the Opal Creek Wilderness on the Willamette National Forest. The topography in the fire area consists of steep rocky dissected terrain ranging in elevation between 3000' and 5000'. The mountain slopes are quite steep, with lower inclines ranging from 30 to 60 percent and upper inclines from 60 to 90 percent.

Fire Situation

The Forest had multiple lightning starts beginning on August 24th. The event resulted in numerous new fires. The largest was the Dollar Lake Fire on the Hood River Ranger District on the eastern part of the Forest. The Dollar Lake Fire transitioned from a Type 2 to a Type 1 incident. By September 7, Region 6 was at Preparedness Level 3 (PL 3).

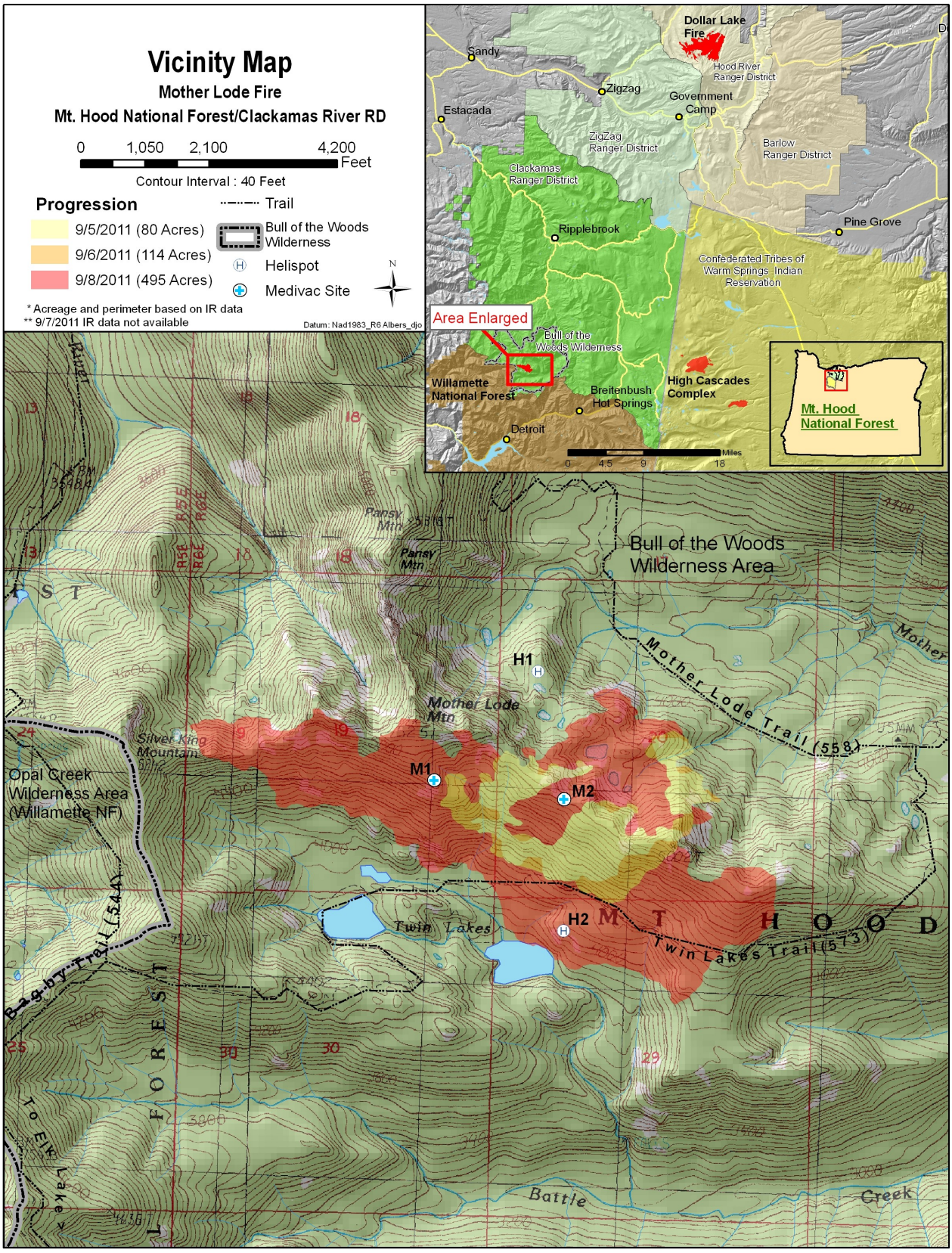

Figure 1: Vicinity Map of Mother Lode Fire. Perimeter disclaimer and IR data included with map.

Narrative

On August 26, 2011 a fire was detected near Mother Lode Mountain in the Bull of the Woods Wilderness on the Clackamas Ranger District of the Mt. Hood National Forest (NF). The fire was one of multiple new starts on the Forest that resulted from lightning starts on August 24 and 25. The lightning episode required the Forest to manage a heavy initial attack work load and to prioritize response to new fires. District fire managers flew the fire, later named the Mother Lode, on August 26. At the time the fire was about .10 of an acre on the upper third of the ridge. There was little fire activity. The fire location was steep and rocky with very poor access. District fire managers informed the Forest Fire Duty Officer that no direct action could be taken safely. Forest Fire Duty Officer concurred with the decision, the fire was not a priority.

The Acting District Ranger and Forest Fire Staff Officer were informed of and concurred with the decision not to staff the fire. Fire managers were wary of staffing fires in the Bull of the Woods Wilderness due to its rugged terrain, limited access to safety zones and the lack of good spike camp locations. They discussed recent fires where smokejumpers and hand crews had been utilized to staff fires adjacent to the fire area. Given the other activity on the Forest, the decision to monitor the Mother Lode Fire was supported.

The Acting District Ranger completed a Strategic Risk Assessment (SRA) that outlined the decision to implement a monitoring strategy. A Wildland Fire Decision Support System (WFDSS) analysis was not completed. The fire was entered into WFDSS as a Type 4 incident. Forest fire managers had the responsibility for completing WFDSS but they were busy and had to prioritize work. The Dollar Lake Fire on the Hood River Ranger District was being actively engaged at this time and initial attack activity added to the work load. The Forest Fire Duty Officer requested an FS Pro run for the fire but the priority for WFDSS was the Dollar Lake Fire. Mother Lode Fire was the second priority.

The Mother Lode Fire was monitored by engine crews from a position outside of the wilderness with additional status reports provided by the Willamette NF Air Attack. On August 29th the Forest Supervisor requested the District Ranger from an adjoining district to assume the role of District Agency Administrator because the Acting District Ranger was not a certified Agency Administrator. The estimated fire size was about 5 acres. A WFDSS analysis was completed at this time. The analysis reflected the monitoring strategy and confined the fire within the wilderness utilizing the trail system and the Mother Lode Mountain ridge system.

By Saturday, September 3rd, fire managers were beginning to feel taxed. Initial attack resources had continued to pick up hold over fires. The Dollar Lake fire had taken significant runs and required additional support from forest fire managers. The unit was short of qualified Agency Administrators for the Labor Day weekend. The District Agency Administrator and the Acting District Ranger had plans to be out of town for the weekend so a second District Ranger from the Eastside of the Forest was brought in to act as the District Agency Administrator for Mother Lode and any new incidents from the Labor Day weekend. Zone fire managers, all new to their positions, were feeling short on resources.

The Forest was notified that the Badger Fire, a large Type 2 incident to the East on the Warm Springs Reservation was likely to cross the Pacific Crest onto the district. Forest fire managers considered the situation. Forecasts were predicting prolonged and unseasonable conditions with the potential for East winds and instability associated with thermal troughs. Fire managers on the forest were uneasy, faced with supporting the Dollar Lake Fire as a Type 2 incident, the prospect of managing the Badger Fire moving onto the Forest and an unfavorable weather prediction.

Based on reconnaissance flights, the fire was thought to be about 6-10 acres and was not doing much. The new District Agency Administrator reviewed the SRA and WFDSS decision documentation, and with the recommendation by forest fire managers, decided to take suppression action on the fire. A local Type 3 IMT that had been assembled to preposition for the weekend was ordered for the Mother Lode. A new SRA was completed with two prospects, both supporting a full perimeter suppression strategy. The Prospect 1 strategy decision was to confine the fire to the wilderness utilizing a combination of direct and indirect tactics. Prospect 2 was a full perimeter control strategy utilizing direct attack. Prospect 1 was selected; the complexity analysis showed a short Type 2 team was required to manage the fire.

The Forest Supervisor requested that the vacationing District Agency Administrator return to work to provide coverage for the Eastside Fire Zone and there was a transition back to the original District Agency Administrator. He also had concerns about whether the suppression strategy was commensurate with values at risk. He engaged the incoming and departing District Agency Administrators in a conversation about risk and the "what ifs" regarding reliance on air resources to support the fire. Both were experienced District Rangers. They had discussed the strategy and felt that given that the fire was about 30 acres and was not moving, the IMT3 had the resources necessary to meet the suppression decisions in the SRA and objectives outlined in the WFDSS analysis.

At about 1800 on September 4th the Agency Administrator and Zone FMO briefed the Type 3 Incident Commander (ICT3) and his trainee, who was one of two Assistant Fire Management Officers (AFMO) for the zone. Objectives and values at risk were identified; the values at risk included the adjoining Opal Creek Wilderness on the Willamette NF. The ICs felt that the Dollar Lake fire was driving the decision to suppress the Mother Lode. However, they felt that provided they had sufficient air support the objectives could be met with 4 Type 2 IA crews.

The Forest Supervisor made plans to bring an additional District Agency Administrator in from another Forest. He planned to move the District Ranger, now serving as the District Agency Administrator for the Mother Lode, back to his Ranger District because it appeared that the Dollar Lake Fire was a threat to the Portland Municipal Watershed located on his district. In addition he made plans to bring in a Forest Supervisor from another unit in order to have an additional Forest Agency Administrator on the Forest in the event there were additional large fires to manage.

Type 3

Resources assigned to the fire included, 1 Operations Section Chief (Operations), 1 Division Supervisor, 1 Safety Officer, 1 Resource Advisor, 4 Type 2 IA crews, 11 Helitack, 1 Helibase Manager, 1 Helibase Manager (T), 1 Helicopter Manager, 1 Type 2 helicopter (Ship 1), and 1 Type 3 helicopter (Ship 2). An Incident Command Post (ICP) was established at Ripplebrook Guard Station and aviation missions operated out of Ripplebrook Helibase. An additional Type 2 helicopter was on order.

Staffing the Fire

Operations and the Assistant Crew Boss from Crew 1 flew into H1 (Figure 1) on the morning of September 4. Their mission was to hike into the fire from the north and gather intelligence. A squad from Crew 1 flew in shortly after. Fire activity dictated that they hike around the fire and approach from the South. They headed East from H1 to Trail 588 (Mother Lode Trail, Figure 1) and then connected into Trail 573 (Twin Lakes Trail). This change in plans delayed any relevant information sharing with the ICT3. Travel was extremely slow due to thick rhododendron and steep terrain.

Photo 1: H2.

The remainder of Crew 1 hiked into the fire on Trail 544 (Bagby Trail) from Elk Lake which is located South of the fire. Crew 1 met at H2 (Figure 1) and spent the rest of the day constructing the helispot. Since they were in the wilderness, the District Agency Administrator had to approve the number of trees that would be cut. Operations and Assistant Crew Boss 1 walked the fire perimeter and located Medivac Site 1 and 2 (Figure 1). They estimated fire size at 30-40 acres. Operations wanted to fly to the Incident Command Post (ICP) to speak with the ICT3 but could not because flight time was prioritized to deliver food and water. Logisitical support was a constant challenge.

The Division Supervisor, Safety Officer, Crew 2 and 3 arrived at Ripplebrook on September 4th. They felt they received an adequate briefing. Minimum Impact Suppression Tactics (MIST) were emphasized because they would be in the wilderness. The incoming Division Supervisor was assigned Division Alpha. The Crew Boss from Crew 2 agreed to work as Division Supervisor for Golf. He was a qualified Task Force Leader and was able to act as a Division Supervisor in the IMT3 organization.

On September 5th the District Agency Administrator approved construction of a helispot on the Mother Lode Fire and was considering trail closures for the area. One of the two Forest Deputy Fire Staff Officers was mobilized to the Dollar Lake fire when his IMT was activated. Forest fire managers brought in a fire manager from a neighboring unit to support the Zone FMO. Forest fire managers had conflicting size up for the Mother Lode Fire based on information from the Willamette Air Attack. The Air Attack estimated the fire was approximately 200 acres while the ICs estimated that the fire was 35 acres. The off forest fire manager questioned the 35 acre size and pressed the ICs to validate their size up. Concerns about fire size and complexity prompted a new complexity analysis.

There was friction throughout the day for the ICT3 and his trainee. They struggled to gain intelligence from resources on the fire. There was conflicting information regarding fire size. The ICT3 was frustrated by a lack of communication from the field personnel already on the fire because it restricted his ability to make relevant strategic decisions. Forest fire managers were concerned about the need to develop a strategy based on a 200 acre fire and the Fire Manager supporting the Zone FMO pressed the IC to consider ramping up his organization to meet the demands of a larger incident. Yet, based on intelligence from the air and ground resources, the ICs perception was that the fire was about 50-70 acres. The conflicting inputs were distracting.

Another District Agency Administrator transition occurred on the evening of September 5th when the Agency Administrator that had been requested from off the Forest assumed oversight of the Mother Lode Fire. This was the third Agency Administrator transition for the ICs. By late afternoon a

reconnaissance flight estimated the fire size to be about 130 acres. Based on his understanding of the fire situation the new Agency Administrator ‘s direction to the ICs that evening was to “keep the fire small.”

At this point the ICs felt that acreage seemed to be driving suppression strategy. The ICT3 and his trainee felt they didn’t have the information needed to make good decisions from overhead on the fire and were only getting “we can do it.” The District Agency Administrator directed the ICT3 to take full suppression action on the fire and order what was needed.

Another complexity analysis was completed by the ICs, the Zone FMO and the District Agency Administrator; the complexity rating showed a Type 2 team. The Forest Supervisor, Fire Staff Officer and District Agency Administrator spoke by phone. They had discussions about changing strategy to “herding the fire” or ordering a Type 2 team. The Forest Supervisor talked with the new District Agency Administrator and questioned if the values at risk where commensurate with the suppression strategy.

After the call the District Agency Administrator told the ICT3 to implement a strategy to take advantage of the moderate weather predicted for the next burning period and herd the fire away from the South and West. The ICT3 informed the District Agency Administrator that without air support he would not be able to meet objectives. He told the Agency Administrator that the end of shift on the 6th would be his trigger point; without additional air support they would need to pull resources from the fire.

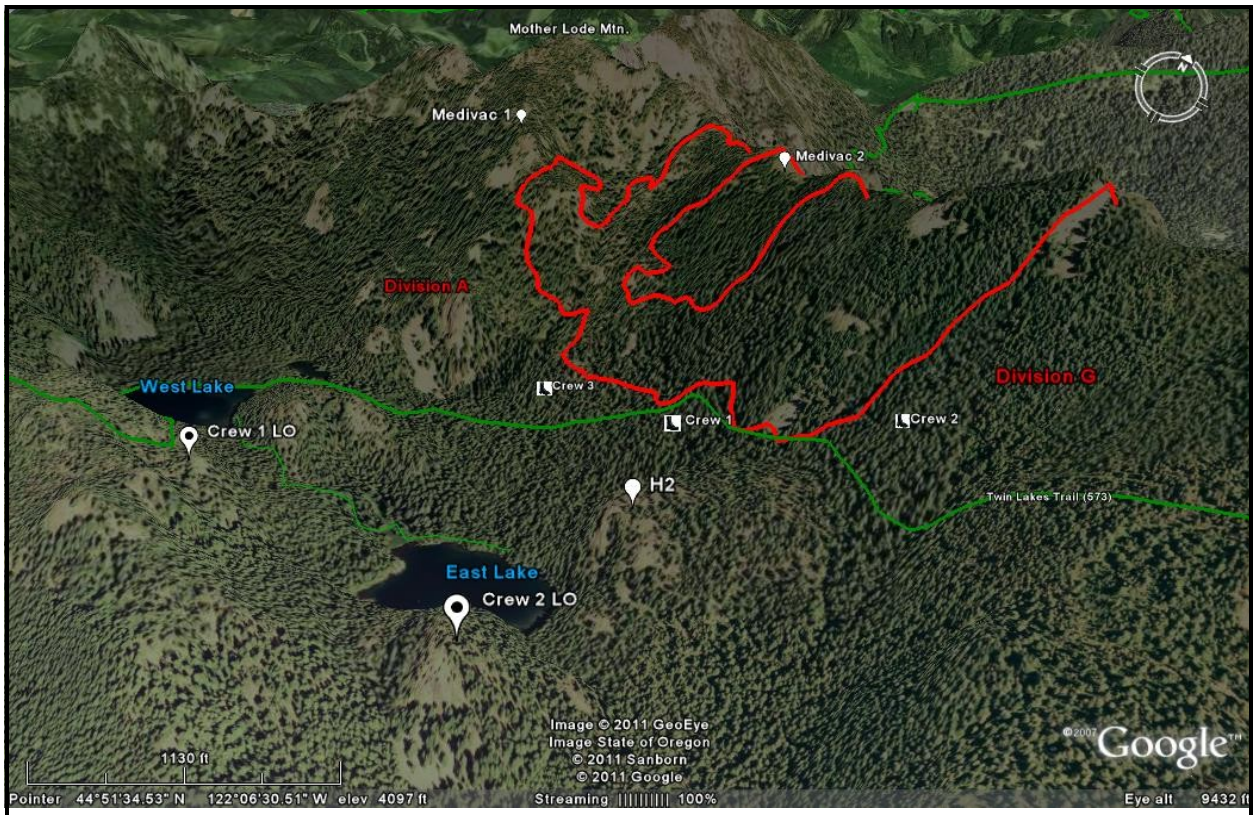

Figure 2: Operations view on Sept. 5th showing crew placements, medivac sites, helispots, lookouts and divisions. Perimeter is IR data from 09/05/2011. Point location confirmed with ground resources.

Division Supervisor Alpha, Division Supervisor Golf, the Safety Officer, Crew 2, 3, and 4 were shuttled to H2 on September 5th. Crew 4 arrived at H2 that evening and would not engage until September 6th. All crews established multiple escape routes. Escape routes varied between crews. They involved the trail systems in the area and H2. There was no "good black". There were differing opinions on whether the Twin Lakes and specific areas around them were safety zones or marginal areas if a worst case fire behavior situation occurred. Lookouts were posted by Crew 1 and 2 for the fire (Figure 2).

Engaging the Fire

Objectives for September 5th were clear to the firefighters. They needed to hold the fire on the Twin Lakes Trail and progress up the flanks. On Division Alpha, Crew 1 held the Twin Lakes Trail and improved H2 while Crew 3 began line construction on the West Flank. On Division Golf, Crew 2 engaged in line construction on the East Flank. No bucket support was available because of logistical missions.

Initially Crew 2 did not put in an adequate canopy break when they began line construction because they were trying to use Minimum Impact Suppression Tactics (MIST). Fire in this area commonly spreads through lichen (old man's beard) and passes crown to crown without burning through the surface or ground fuels. After dealing with a spot caused by fire traveling through the lichen they adjusted tactics and began constructing a wider canopy break which proved effective. Crew 2 had the support of Division Supervisor Golf (who was their crew leader).

Crew 3 also wanted to create a wider canopy break, but Division Supervisor Alpha had a different perception of MIST. It was clear the resource advisor did not want any trees cut on Twin Lakes Trail. From the start of engagement all crews questioned the validity of holding Twin Lakes Trail without a canopy break and it never was resolved. Differing perceptions of MIST continually clouded the decision making and created a friction point between resources.

An additional friction point occurred for Crew Boss 2 when he watched a chunk of wood from a snag roll over the trail near a Crewmember from Crew 1 and they did not take immediate action. Crew Boss 2 walked into the green and put out the small amount of fire that was outside the line. He was concerned because the trail was the anchor point for his crew progressing up the East flank.

Later that day, Operations decided Assistant Crew Boss 1 would take over as Field Operations when he flew back to Ripplebrook ICP. That evening, the ICT3(T) and Assistant Crew Boss 1 had a long conversation over the command frequency about who was authorized to place logistical orders and his operational role on the fire. By the end of the conversation it was clear that Assistant Crew Boss 1 would not be Field Operations and all supply orders should be run through division. This created a sense of mistrust and disconnection.

All resources slept at spike camp at H2. At the end of the day firefighters estimated fire size to be around 100 acres. Through the night trees fell and crews were worried that the fire would cross the trail. However, they were confident about their progress and the plan for the next operational period.

On the morning of September 6th the ICT3(T) briefed the firefighters telling them to continue the direct attack on the East flank but the priority was the Northwest and South. He also continued to emphasize MIST suppression tactics.

At the Forest level, a new WFDSS decision was completed. The complexity analysis continued to show a Type 2 Team. It was clear that adverse weather would impact the Forest. The risk assessment pointed toward increasing the organization on the Mother Lode Fire. Lots of time was spent discussing and rationalizing staying with a Type 3 organization.

The ICT3 felt that not wanting another Type 2 IMT on the Forest was driving decision making regarding the Mother Lode Fire. He was concerned that he was being asked to manage a fire and implement a suppression strategy that was beyond the scope of an IMT3.

Objectives for the 6th were clear to the firefighters at H2. They were to keep the fire from spreading West and South and to continue line construction on the Eastern flank if possible. Crew 4 was assigned to Division Golf. Firefighters felt positive when they reached the line in the morning and the Twin Lakes Trail had held overnight. Crew 4 held the Eastern portion of the Twin Lakes Trail. Crew 2 continued line construction on the East flank. Crew 3 continued line construction on the West flank and Crew 1 held the Western portion of the Twin Lakes Trail (Figure 3). Ship 1 and Ship 2 were used for bucket support.

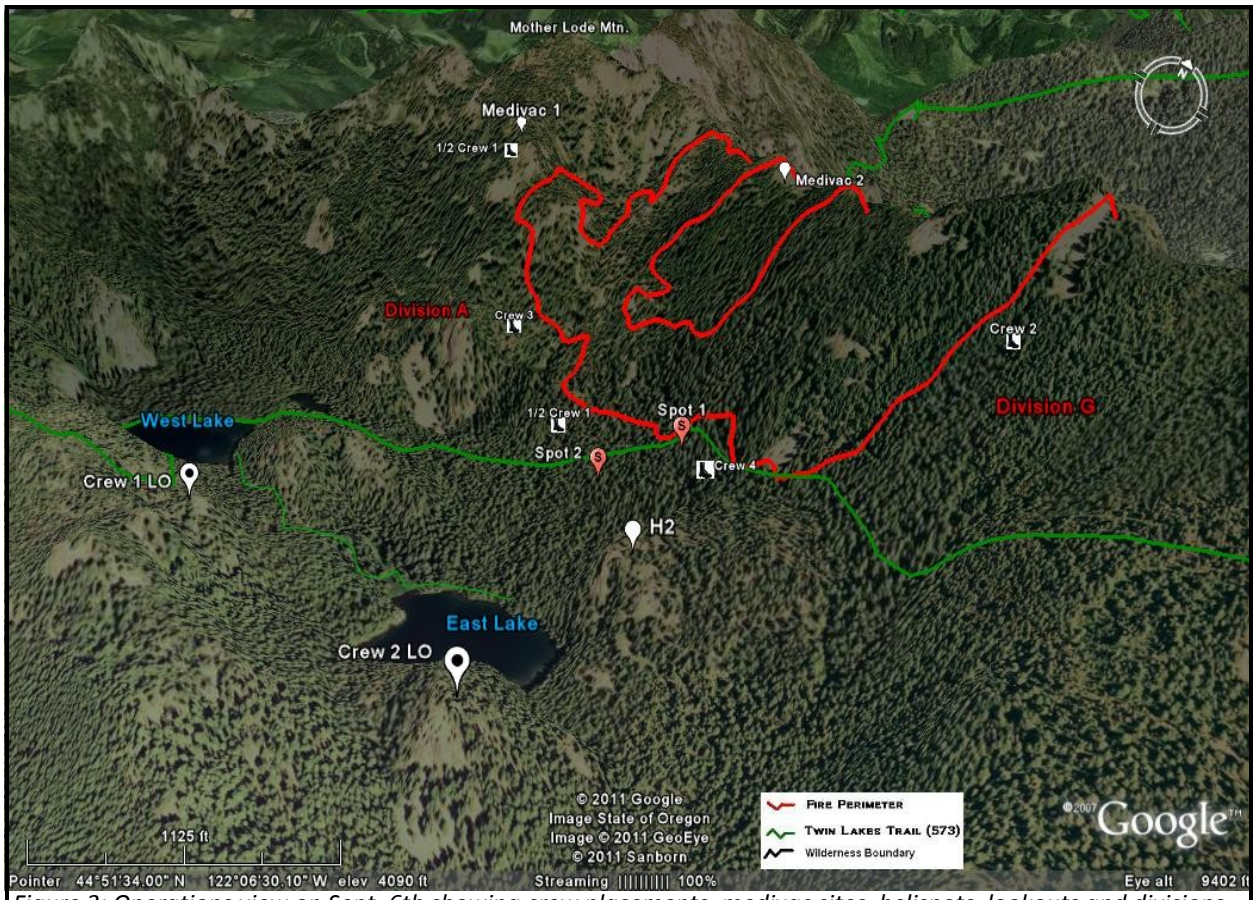

Figure 3: Operations view on Sept. 6th showing crew placements, medivac sites, helispots, lookouts and divisions. Perimeter is IR data from 09/06/2011. Point location confirmed with ground resources.

Gravity hazards and the potential for roll out were a continual risk on the fire, Especially for Crew 3 who had a large portion of underslung line to complete. This hindered progress and threatened crew safety. Crew 3 and Division Supervisor Alpha continued to have differing opinions on the appropriate use of MIST. This led to a heated discussion and deteriorated trust between them. Crew 3 continued to do what they thought was tactically appropriate. In the afternoon, half of Crew 1 moved ahead of Crew 3 in order to tie the Western flank into Medivac 1 near the ridgeline. Crew 2 had already tied into the ridgeline on the Eastern flank.

Disengaging the Fire

A spot below Twin Lakes Trail (Figure 3) was detected at approximately 1830. Crew 2 began line construction with half of Crew 1. At approximately 1900 one of the lookouts detected another spot west of spot 1. Crewmembers from Crew 1 and Crew Boss 2 quickly located the spot. Crew Boss 2 reports the size at 2 acres. The spot grew to 5 acres quickly.

Radio communication on the common tactical channel was heavy. Decisive decision making on crew and tactical channels were critical in moving resources to their escape routes and out of harms way. Division Supervisor Golf, Crew 2, Crew 2 Lookout, Crew 4, Safety Officer, and half of Crew 1 moved to H2. Crew 3 and Division Alpha moved to the West side of the West Lake (Figure 3). The Crew 1 Lookout joined them there. Worried they may be cut off from their escape routes, the half of Crew 1 near Medivac 1 moved there quickly. They had pre-identified that area as a place to ride the fire out in a worst case scenario.

The Safety Officer called for a head count of all resources. Each crew reported back from their locations. Everyone was accounted for and relieved. The Safety Officer called ICP to inform the ICT3. Around 2030 Crews at H2 began indirect line construction from the East Lake to H2 to the main fire edge with the intent to burn out if necessary. This would secure the southeastern edge of the fire and H2 simultaneously. Crew 3 and Division Supervisor Alpha moved from the West edge of the West Lake to H2. Crew 3 had multiple crewmembers who were not feeling well and were dehydrated. As darkness approached the Safety Officer and Division Supervisor Golf decided to cease operations and directed the firefighters from H2 to a location farther east on the Twin Lakes Trail away from the fire area for the evening.

The ICT3 was informed that the crews had disengaged the fire. At 2000 the ICT3 decided to pull crews off the fire and began to develop plans for a crew and cargo shuttle for the morning.

Later that evening the additional Forest Agency Administrator arrived on the district and met with the District Agency Administrator to discuss values at risk on the incident. The District Agency Administrator informed him about the events on the fire, that the firefighters had disengaged the fire and that the ICT3 was planning to pull resources off the fire the following morning.

The half of Crew 1 at Medivac 1 stayed there through the night. The area was a rocky nose with scree below adjacent to a dirty burn. They moved a few times through the night, within the rocky area, to avoid smoke and embers. They were in good spirits. It was a cold night and the ground was rocky, so they got very little sleep. In the morning they made their way to H2. They arrived hungry, thirsty and tired.

The Forest Agency Administrator touched bases with the ICT3 and ICT3(T) at about 0730 on September 7th to confirm the plans to take the crews off the fire.

Extracting the Crews

All resources met at H2 the morning of September 7th. The objective for the day was to extract all firefighters and equipment. All crews who camped east of the fire began securing the fire edge that threatened H2. They also scouted alternative routes to a trailhead if aviation resources were unavailable. Ripplebrook Helibase got word that morning that their mission for the 7th was to extract all personnel (85 people) from H2. The Helibase Manager, Helibase Manager (T), and Helicopter Manager began making plans to use Ship 1 and Ship 2 for crew shuttles and sling missions. They inserted 5 Helitack into H2 at approximately 0845 to begin crew briefings and manifest loads.

At approximately 0730 a Type 2 rappel capable helicopter (Ship 3) from the Dollar Lake Fire got word that they were being sent to Ripplebrook Helibase. At approximately 1030 they received a more detailed briefing about their assignment. The Ship 3 Manager called Ripplebrook Helibase Manager (T) because he had concerns about operating 3 helicopters out of a Helibase where there were only 2 pads. The Ripplebrook Helibase Manager (T) was surprised to hear they had been assigned to the fire.

Throughout the engagement of the fire the Helibase Manager and Helibase Manager (T) had concerns over where to put additional helicopters that were getting ordered. They assumed they would be put at a different location. To this point they had not had to face the issue because the orders were not filled. They agreed to make it work. Ship 3 arrived at the Helibase at approximately 1200.

The plan was for Ship 3 to hot fuel using Ship 2's fuel truck because their fuel truck had not arrived. They departed for H2 configured for crew shuttle with 3 Rappellers. The Ship 3 Manager stayed at Ripplebrook Helibase with 1 Rappeller. Ship 3 landed at H2 and began crew shuttle. When Ship 3 needed to refuel at Helibase the fuel truck was not compatible. This disabled one pad causing the other 2 helicopters to stagger their shuttle.

The crew shuttle ended approximately 1300. Essential gear was out by approximately 1400. The crew shuttle was very efficient and well organized. This left 5 Helitack and 3 Rappellers at H2. Air Attack and one Type 1 helicopter were on scene. They had arrived earlier that morning, and were on loan from another fire.

The crew shuttle began at 0830 and was complete at 1330. The remaining cargo was being removed from the fire. The Zone FMO talked with the crews to determine if there was a need for Critical Incident Stress debriefings. The crews declined.

Entrapment Avoidance

The Rappellers and Helitack continued to build loads of non essential gear while they waited for the sling missions to continue. They noticed some indicators of increasing fire behavior; scattered group torching and an increase in the main column. The fire edge closest to H2 was relatively calm, and was being checked by the Type 1 helicopter. When Air Attack had to leave the fire, the Lead Crewman from the Helitack Crew established communication with the Type 1 helicopter to act as lookout for H2. Shortly thereafter, the Type 1 helicopter had to leave the fire. Without the bucket support fire activity near H2 increased significantly.

At approximately 1500 Ship 1 returned for sling work but could not complete the mission because of smoke covering H2. He informed Air Attack on air to air. Ship 3 had just refueled at Helibase and was enroute to pick up the Rappellers. The Rappel Manager copied traffic on air to air in flight. As he approached the fire area for the first time he established communication with Rappeller 1 and could tell they were breathing hard. Ship 3 circled while Rappel Manager scanned the main ridge assuming that H2 was toward the top of the ridge. The fire activity the rappel manager saw along the ridge made him very uncomfortable. He estimated 200' flame lengths off of sustained crown runs. He said "This isn't good."

Photo 2: Spot fire approaching H2 at approximately 1500 09/07/2011.

The Rappellers and Helitack left H2 when fire behavior adjacent to the helispot increased. They headed for the East side of the East Lake (Figure 4). The foot travel was slow through the thick rhododendron. It took them approximately 12 minutes to get there. As they reached the lake they looked back at H2 and could see that it was now burning.

Photo 3: Looking North at H2 from east corner of East lake at approximately 1515 09/07/2011.

Recognizing that the Rappel manager could not establish their position, Rappeller 2 waded into the lake to signal their location to the helicopter. The Manager spotted Rappeller 2 and immediately felt a sense of relief. He began looking for places to land nearby. He hovered over the area he thought was the best location for an extraction site and Rappeller 2 acknowledged he saw the location. The Rappel Manager then called Air Attack to inform him they intend to let down 2 saws to cut H3. Rappeller 2 and 3 headed up the ridge to their South to begin looking for H3 . Rappeller 1 stayed to communicate the plan with the Helitack Crew. Rappeller 3 located H3 (Figure 4).

At about 1530 the ICT3 tells the Forest Agency Administrator that he needs to order a Type 2 team and stated that if they wanted to continue managing this at the 3 level, they will need to find a new Type 3 IC.

Photo 4: H3 in foreground with H2 in smoke. After extraction looking North toward H2 from helicopter at approximately 1635 09/07/2011.

At approximately 1545 Ship 1 flew back to helibase to reconfigure for crew extract. Ship 3 also started back to helibase to reconfigure for cargo let down. Enroute they chose to land in a dry creek bed. On the way out the Rappel Manager noticed two spots southeast of the main fire edge. Minutes later on the way back to H3 the spots were approximately 50 acres. They arrived at H3 and letdown the chainsaws. Ship 1 and Ship 3 orbited the fire waiting for H3 to be completed. During this time Ship 2 provided bucket support trying to cool the edge nearest H3.

Rappeller 2 and 3 began falling trees. Rappeller 1 positioned herself at a vantage to keep eyes on the fire. The Helitack Crew came up from the lake to help move material and there was a highly coordinated and tightly coupled effort to get the helispot done quickly. Rappeller 2 and 3 used close to a tank of saw gas each in approximately 40 minutes. When the Helispot was near completion the Helitack Crew called Ship 1 in to approve. Ship 1 decided H3 needed two more snags cut. As soon as they were felled the ship came in to load the Helitack Crew. Immediately behind them Ship 3 picked up the rappellers.

Photo 5: H2 one day after extraction taken from helicopter at approximately 1000 09/08/2011.

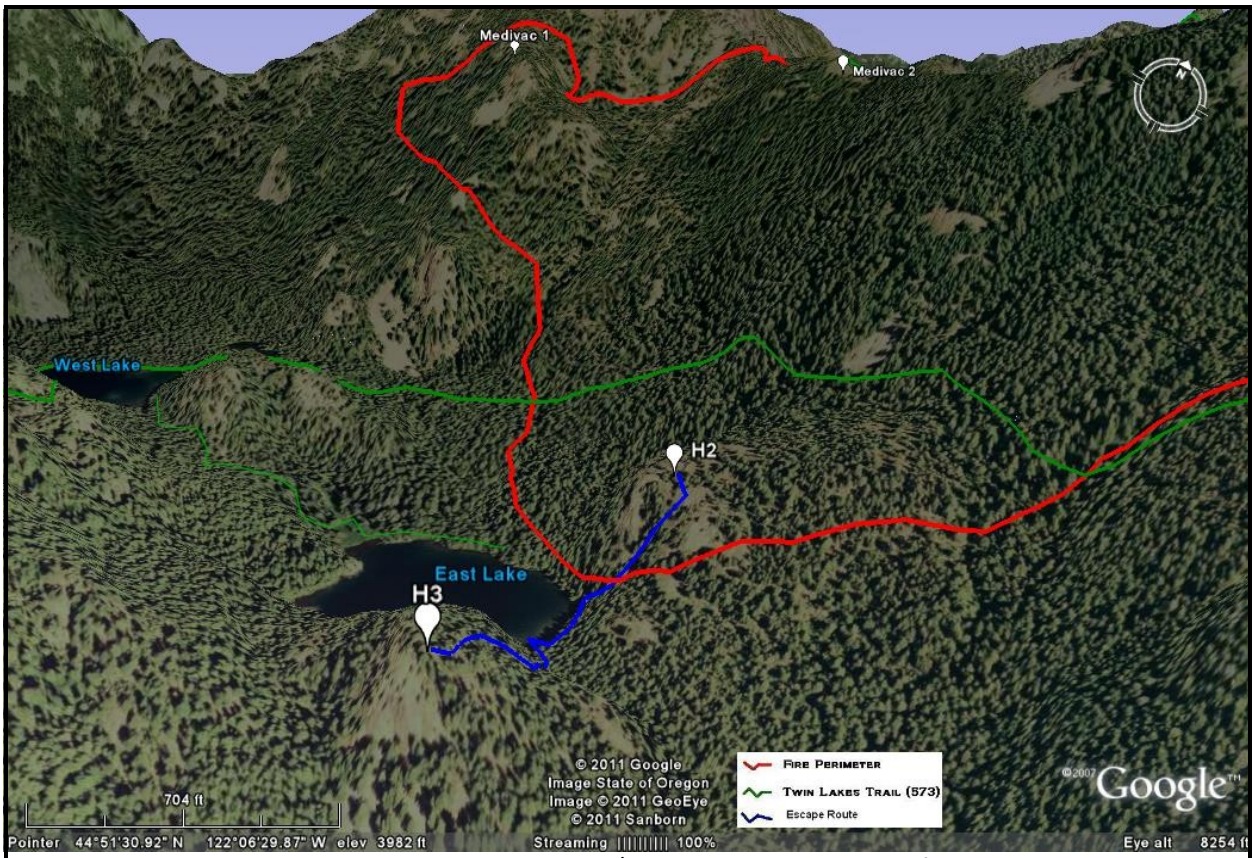

Figure 4: Perimeter interpolated through cooperation w/ ground resources at time of incident and IR data. Escape route (in blue) obtained from ground resource GPS unit.

Lessons Learned

The Mt. Hood Forest Supervisor asked the FLA team to develop a time line of events on the Mother Lode Fire and to develop Lessons Learned for Fire Management on the Forest. The FLA team participated in facilitated discussions with a group of firefighters involved in fire line and aviation operations. Line officers and fire managers engaged in similar discussions. Both groups considered Lessons Learned from their perspective and each group generated a number of recommendations. The recommendations were gathered through a dialogue with the participants on seventeen pages of flip chart notes.

To make sense of the information and to attempt to put the Lessons Learned into context with the two narrative accounts, the FLA team divided the information from the flip chart notes into six categories. The categories are: Organization, Safety Zones in Timber, MIST, Risk Management, Leaders Intent, Leadership and WFDSS. Some Lessons Learned fit into more than one category. The exercise of dividing the data highlighted both synergy and the dissonance between the firefighter group and the Agency Administrator and Fire Manager group.

The Forest faced a number of challenges in responding to the Mother Lode Fire. The following is an attempt to synthesize two Lessons Learned dialogues.

Organization

The Fire Program on the Forest is organized based on the traditional model with a staff organization reporting to the Forest Supervisor and Zone Fire Management Organizations reporting to the District Rangers. Fire Managers were brought in at the forest and zone level anticipating the need for additional help. This both added capacity and increased complexity. Combined with the complexity of an emerging incident, the established lines of communication made it difficult to obtain a clear picture of what was faced on the ground (fire size 35 acres or 200 acres).

Additional Agency Administrators were also brought in to meet line officer certification requirements and in anticipation of the need for additional capacity. The unintended outcome was creating additional layers to the already decentralized organization. This resulted in increased complexity, unclear roles and communication challenges (the ICT3 had multiple Agency Administrator transitions).

- The traditional Fire Management organization model may not be the most effective way to organize. The FLA participants recommended considering an organizational model that increases capacity, clearly defines roles and provides an efficient structure for real time decision making similar to the Incident Command System.
- Get people together in one room or utilize conference calls to improve communication. Use technology, such as Google Earth, to gain a shared picture of operations.
- Develop a more resilient method of providing additional Agency Administrator capacity. Fewer line officers with fire experience is likely a demographic trend. Line officer certification requirements combine with demographics to create a system that will always require additional outside help. This was difficult to manage in a slow year. It is unlikely that support from Forests with a large fire load will be available every year.
- Coordinate line officer leave on the Forest to ensure Agency Administrator coverage.

Safety Zones in Timber

Adequate safety zones often do not exist on site in timber fuel types in Region 6. A true safety zone was a 4 hour hike or 4 hour flight (approximate flight time for 85 personnel) away from the fire. Firefighters can work effectively in these locations by providing an additional safety margin. Firefighters can also feel organizational pressure to say they have a safety zone (like an alpine lake) when they engage a timber fire where escape routes are the most viable alternative.

- Alpine Lakes are not adequate safety zones. They may be suitable as a survivable area. Alpine Lakes are cold. Firefighters would be subject to hypothermia if forced to take refuge for a long period of time. Radiant heat from burning trees could force someone deep enough into the water where they have to swim. Swimming while breathing smoke will be difficult if not impossible.
- Firefighters can and do operate when they do not have adequate safety zones by ensuring an increased safety margin that incorporates solid lookouts, multiple robust escape routes, and constant communication on crew and tactical channels. Extreme burning conditions (such as ERCs above 97%) in timber fuel types make it difficult to provide an adequate safety margin in the absence of safety zones.

MIST

The application and direction for use of MIST on the Mother Lode Fire is common to other wilderness incidents. MIST is the application of suppression tactics that results in the least amount of impact possible while still meeting incident objects. However the use of Minimum Impact Suppression Tactics must be applied in a manner commensurate with burning conditions. The fuel conditions such as those at the Mother Lode Fire (97th percentile ERCs) are unforgiving. In a decision to suppress a wilderness fire under adverse burning conditions firefighters need to be able to apply tactics that are commensurate to the risk (deference to expertise).

- A rigid application of MIST in remote wilderness fires with extremely dry fuel conditions in remote, steep terrain increases risk exposure to firefighters.
- Deference to expertise in applying MIST means allowing firefighters to make and implement deliberate and time critical risk management decisions that balance risk with impacts.
- Resource Advisor role needs to be clearly defined as an advisory role and should not guide operational tactics.
- Agency Administrators, Fire Managers and ICs should monitor work to ensure that application of MIST does not result in task loading for firefighters.

Risk Management

Strategic Risk

Strategic Risk applied to Fire Management is a consideration of whether saving a value(s) is worth the risk to firefighters. The Strategic Risk Assessment (SRA) is a tool for evaluating saving a value against the risk to firefighters. The SRA develops prospects that outline how much firefighter risk is being

accepted to implement a strategy. In the Mother Lode SRA two prospects were considered. Prospect 1 evaluated a strategy to confine the fire within the Bull of the Woods and Opal Creek Wilderness boundaries using aviation and hand crews. Prospect 2 was a full suppression strategy that contained the fire to the smallest foot print. There was a clear decision and Prospect 1 was selected. It's not clear that the confine strategy outlined in Prospect 1 was communicated and understood at each level of the organization (firefighters on the ground were implementing a direct attack strategy). The FLA participants discussed how the Prospects developed in the SRA influenced strategy on the fire.

- The FLA participants decided to include a monitoring strategy Prospect in future SRAs in order to more fully evaluate firefighter risk. Framing alternatives impacts option selection. The SRA for the Mother Lode had two Prospects. By considering a monitoring Prospect, Line Officers and Fire Managers may have considered a Prospect between the monitoring Prospect and Prospect 1, such as a point protection Prospect, resulting in values saved with less firefighter risk exposure.
- Risk to firefighters can be evaluated based on hazards like fuel conditions, rough ground, remote access, ERCs and the quality of escape routes and safety zones. The worst case needs to be considered to disrupt confirmation bias. Firefigher exposure to hazards can then be more accurately weighed against values to be saved.
- The participants decided to communicate with the Willamette NF to determine the relative value of saving an adjacent Forest from fire incursion. The value could then be more accurately weighed against risk to firefighters.
- Communicating Risk is also part of the SRA. The STAAR risk model (Spread, Transfer, Avoid, Accept, Reduce) is a means of considering risk and provides a common language for risk decisions and communicating risk decisions to cooperators, stakeholders, and most importantly, to firefighters.

Deliberate Risk

Developing a common operating picture is essential at all levels of the organization. The ICT3 had optimistic assessments from the firefighters that had to be weighed against conflicting intelligence. The lack of a common picture of operations made risk management difficult. LCES and trigger points are a system of controls firefighters utilize to operate in hazardous environments. They are preplanned and reevaluated through the operational period. An additional control is to identify areas that don't fit the standard definition of safety zone but have a high probability of survival without deployment. Medivac 1 was never mentioned as a safety zone but it was clearly a survivable area that Crew 1 pre planned to use if an unexpected fire behavior event occurred.

- Firefighters at all levels need to consider the worst case as a barrier to confirmation bias so they can provide a critical assessment of on going operations. The organization requires critical feedback regarding the fire situation in order to make good risk management decisions.
- Identifying survivable areas such as rock scree, lakes, and fire scars, if there are no safety zones, may be necessary if escape routes are compromised.
- Trigger points need to be clearly established and evaluated.

Time Critical Risk

On the Mother Lode Fire cohesion within crews and between crews was evident when unexpected fire behavior occurred. Crew and Tactical frequencies were used to coordinate moving firefighters to a safe location quickly with a high degree of accountability. This would have been impossible on the tactical channel at the time of the event. Agency resources use frequencies from their local unit for this reason.

- Crew cohesion enabled firefighters to communicate, decide and move quickly to safe locations.
- Crew frequencies are essential for time critical risk communication and risk management.

Leaders Intent

Leaders intent is providing task, purpose and end state so that firefighters can take actions to achieve objectives in a dynamic environment. Rules based direction does not fit the variability found on the fire line. Centralized decision making can cause friction for firefighters (waiting for approval to fall trees to improve the safety margin of an established helispot). Leaders intent is a concise statement of the purpose of the operation and the desired end state. Good leaders intent also outlines what risk is acceptable. The Forest Supervisor engaged in risk conversations with Agency Administrators and Fire Managers. The risk decision in Prospect 1 was not being implemented on the ground. There was dissonance between Agency Administrators, ICs and firefighters on the ground (Herding vs Full Supression Strategy). The lack of a common understanding of intent was a friction point at all levels of management on the Mother Lode Fire.

- Clear strategic risk decisions are a good basis for clear leader's intent. Leader's intent provides consistent message regarding task, purpose and end state. Good leader's intent can also frame what risk is acceptable.
- A prescriptive application of MIST does not allow firefighters the flexibility to apply MIST based on current and expected fire behavior conditions. Good leaders intent regarding MIST tactics could reduce the conflict between firefighter safety and minimum impact.
- Sharing air resources between IMTs is necessary but potentially hazardous due to imperfect information and the potential for break downs in communication. Aviation resources operating on good leader's intent can successfully implement missions and achieve objectives.

Leadership

There were many examples of good leadership on the Mother Lode Fire. Exemplary operational leadership in tightly coupled situations was displayed on the fire. Strategic leadership from the Type 3 Management Team and the Forest was also apparent.

- Good implementation of controls (LCES) and decisive action by the crews on September 6th.

The experienced leaders on Crew 1 identified the medivac site and took decisive action to move crewmembers to that location when escape routes were threatened.

- Decisive actions by the Rappel Manager, the Rappellers and Helitack Crewmembers constructing H3 led to an efficient egress from the fire on September 7th.
- The Forest built capability by bringing in expertise from other forests as their span of control increased.
- The Forest brought in an FLA team and was open to learning about the decision processes that guided management of the Mother Lode Fire.

WFDSS

The Wildland Fire Decision Support System (WFDSS) is the standard tool for documenting suppression decisions. Ideally a timely WFDSS analysis requires line officer involvement and a team approach to ensure a good analysis of local resource objectives. The WFDSS analysis for the Mother Lode that documented the suppression strategy for the IMT3 was completed over the course of the fire. The WFDSS documentation relied heavily on the support of Fire Managers in the Supervisor's Office.

- The reliance on Forest Fire Managers (the Forest Fire Duty Officer) for WFDSS support impeded the ability to provide oversight. The participants discussed the need to develop a resilient method of providing additional WFDSS support.

FLA Team Members

Marilyn Klingensmith, *Fire Safety Specialist, FS R6 OR/WA BLM*
Audrey Matsumonjii, *Workforce Manager, R6 Fire and Aviation Management*
Rob Poyner, *Assistant Superintendent, Baker River IHC*
Anthony Engel, *Fire Staff Officer, Mt. Baker-Snoqualmie NF, Team Leader*

Technical Support

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Dan Osterkamp, *Squadleader, Mt. Hood IA Crew*
Katherine Lawson, *Planning & Sustainable Operations Clerk, Mt. Hood NF*
Kelly Sprute, *Public Affairs, Mt. Baker-Snoqualmie NF*
John Heckman, *Assistant Fire Staff Officer, Mt. Baker-Snoqualmie NF*