Incident Summary Page for the 100 Fires Project

Incident Name: Ferguson Fire	**Incident Date & Time:** 07/29/2018 @ 09:21
Incident Location: Sierra National Forest near Yosemite National Park, California	**Incident Size** 53,657 acres
Types of resources involved: National Park Service Interagency Hotshot Crew	**# of Fatalities/injuries:** 1 fatality

Reason this fire was selected for the 100 Fires list:

- Hotshot line of duty death

Conditions leading up to the event:

The Arrowhead IHC was assigned the Ferguson Fire in July of 2018. Prior to the day of the accident, the Arrowhead crew had worked 12 shifts on the fire and the Superintendent was assigned to another incident position and not with the crew. On July 29, the crew attended the morning briefings at Badger Camp in Yosemite National Park. They were tasked with improving and snagging a partially completed line on Division G, which was the northeast flank of the fire near the Yosemite NP/Sierra NF boundary. On the shift prior to the accident, Acting Arrowhead Superintendent Brian Hughes and a Squad Leader from another hotshot crew working on Division G had scouted this section of line and had identified a number of snags which needed to be fell before firing operations could take place. They determined these snags to be within the capabilities of the fallers on the crew.

Brief description of the event:

When the Arrowhead crew arrived at Drop Point 7 (DP 7) on Division G, Hughes went downhill to scout the area and check the snags he and the Squad Leader identified the day before. The Arrowhead crew's lead saw team followed Hughes soon after. This saw team and Hughes met at what would become the "accident tree" and determined, due to its size, it should be the first tree removed. It was decided Hughes would serve as swamper because he was more experienced than the sawyer's regular saw partner. The sawyer had his saw partner move uphill from the site. Hughes and the sawyer then assessed the snag together. It was still burning roughly 10 feet from its top. It was 57 inches in diameter at the cut point and about 105 feet tall. They judged the lean of the snag to be uphill and slightly side hill. Based on their assessment, they agreed the snag could be felled uphill and slightly left into an opening between trees. The sawyer identified his planned cutting sequence, telling Hughes where he envisioned starting his cuts and where he planned to be standing when finishing them. He also identified where his primary escape route would be when it fell. The sawyer noted the offside as his danger side because it was downhill of the falling snag and had a large drop-off with big boulders he would have to work around. Hughes agreed with the plan. The sawyer then "sounded" the tree and felt it was solid enough to proceed with the falling operation.

While the sawyer and Hughes sized up the snag, the rest of the Arrowhead crew worked its way down the handline from DP 7. The crew staged approximately halfway between DP 7 and the felling operation, remaining a safe distance away until the felling operation concluded. As the crew waited, Fireline Medic 1, one of two fireline paramedics assigned to Division G, made his way down to the vicinity of the crew.

Though the sawyer's chainsaw was equipped with a 36" bar, the snag would require a double cut. After clearing the hazards from the base of the tree he put in the face cut. When the sawyer started his back cut Hughes notified personnel by radio the back cut was underway. Due to the slope the back cut was approximately 69 inches from the ground, so the sawyer used an existing burn scar in the snag's offside to gain solid footing. When the sawyer had cut to the point where he wanted for the first half of his double cut, he checked the opposite side and found his back cut was slanted 2" below the face cut. The sawyer voiced this observation to Hughes then drove a wedge into the low side of his back cut. The sawyer then moved to finish the back cut, during this process a second wedge was driven. When the sawyer finished his back cut he drove another wedge, to no effect. The sawyer noticed the snag didn't appear to be sitting back. Hughes walked over to discuss the situation. They agreed there was still a lot of holding wood left on the offside. After removing more of the holding wood, the sawyer drove the wedges farther into the snag. Then the sawyer moved to the front of the tree to bore cut the center holding wood of the snag. Hughes used the axe to pound on the offside wedge. The sawyer told Hughes the snag was close to falling and he should move out of the cutting area.

Hughes walked approximately 20 feet down their primary escape route. Once Hughes was watching the snag again, the sawyer began driving the wedges; the sawyer heard a pop and saw the snag start to move. The sawyer moved away from the snag toward Hughes and yelled, *"Which way?"* Hughes responded *"This way!"* The two came together briefly. Hughes moved down the primary escape route, while the sawyer glanced up, saw the direction the snag was falling and immediately took a direct downhill path. It took approximately 10 seconds from when the snag began to fall until it came to rest in its final position. The snag fell in the direction of the primary escape route, hitting the ground approximately 145 degrees from the intended lay and grazing another standing dead snag as it fell. The snag rolled and/or bounced farther downhill and came to rest against other snags and brush. Hughes had been struck at some point before the tree stopped in the brush.

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The sawyer used the radio his saw partner had to report the accident, then found Hughes lying face down in a space between the snag and the ground created by a boulder the snag was resting on. Hughes was unresponsive and the sawyer said he could not locate a pulse. An Arrowhead crew Squad Leader relayed notification of the accident to Division G Trainee and requested two fireline paramedics and a helicopter. At 0932 DIVS G notified the Incident Command Post of an "Incident Within an Incident," (IWI) stating that Division G had a red priority medical emergency and requested the channel be cleared for emergency traffic.

Several members of the Arrowhead crew arrived soon after, they helped the sawyer pull Hughes out from under the snag and initiated CPR. Shortly after, Fireline Medic 1 and the Arrowhead Squad Leader arrived on scene. The Squad Leader took control of the scene as the Incident Commander of the IWI while Fireline Medic 1 took over the medical response.

As more members of the crew arrived on scene with a Traverse Rescue Stretcher, Fireline Medic 1 requested Hughes be moved a short distance uphill to an area that would provide a flat surface to work. At this time, a Rapid Extraction Module arrived on scene and set up rescue ropes in case there was a need to move him uphill to DP 7. The Arrowhead crew began cutting paths through the brush in case they needed to move Hughes uphill or sidehill.

The medics applied an Automated External Defibrillator (AED) to Hughes' chest and continued compressions. Approximately 33 minutes into the medical response, National Park Service helicopter 551HQ arrived overhead. The helicopter landed in a landing zone (LZ) downhill of the medical response which had been identified in the days prior. As 551HQ set down, two other hotshot crews from the division were working together passing Hughes down to the LZ. Once 551HQ landed, its crew saw the evacuation team about 600 feet from the LZ passing Hughes hand-to-hand down the line in a "conveyor belt" fashion above the helicopter. When the pilot realized the slope and lack of rotor clearance would prevent the "conveyor belt" from entering the LZ safely, he took off and hovered until Hughes could be carried to the lower side of the LZ. Once Hughes was loaded into the helicopter, a park medic took over treatment.

When 551HQ took off toward Mariposa Helibase, Hughes had been in traumatic arrest for 51 minutes, the helicopter crew agreed to initiate care based on Traumatic Cardiac Arrest protocols. After CPR and several rounds of medications had been administered and all other interventions had been exhausted, the park medic went through their sponsor medical facility and ceased life-saving efforts at 10:44 on the way to Mariposa Helibase. The medical examiner's report indicates Hughes died of multiple-system blunt force trauma.

Fire behavior factors that were present during the event:

The snag was reported to have had fire near the top and along sections of the bole on the day prior to the accident. The tree also had fire scars near the base from previous years.

Operational lessons available for learning from this incident:

Further stump analysis showed a sloping back cut with a maximum depth of two inches below the face cut. In addition, the offside holding wood was damaged and within an old fire scar. If stump shot is lost for the holding wood from a low back cut, be aware this increases the likelihood that the tree may not fall down the intended direction.

A tree that remains standing after all the cuts are completed indicates there are factors within the tree which were not accounted for in the initial size-up. In instances such as these, pulling back from the tree and doing a complete reassessment of the falling operation is warranted. Walking away from the tree, clearing the area of personnel, posting guards to ensure no one enters the area, and waiting for the tree to fall of its own accord should be viewed as a viable alternative.

When a tree begins to fall, take a moment to look up and determine the direction of fall before moving to safety.

Notable impact or historical significance for the wildland fire service from this incident:

Not applicable

Links to more information on this incident:

https://www.nwcg.gov/committee/6mfs/weekremembrance/wor-2020-day4
https://wildfiretoday.com/documents/FactualReportBrianHughes.pdf
https://wildfiretoday.com/documents/CorrectiveActionPlanHughes.pdf
https://wlfalwaysremember.net/2018/07/27/brian-hughes/
https://www.firehero.org/fallen-firefighter/brian-hughes/

The Wildland Fire Lessons Learned Center offers an excellent site which provides information on many wildland incidents.
Wildland Fire Lessons Learned Center's Incident Review Database (IRDB) (wildfire.gov)

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Brian Hughes

Figure 4: Cutting area showing slope and terrain. Pie wedge was re-placed on the stump

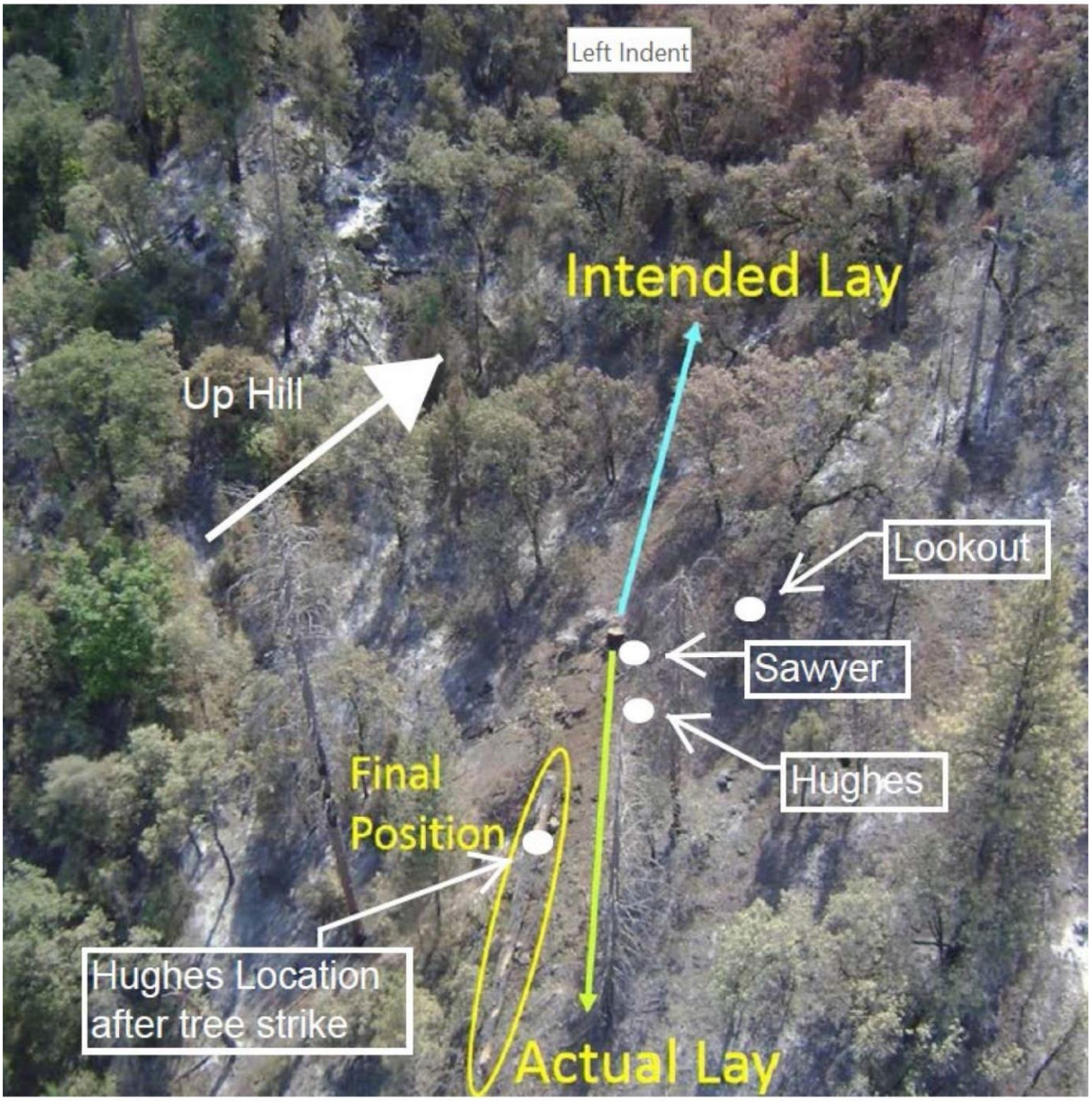

Figure 16: Aerial photograph of the accident site depicting the original location of the snag, the intended lay, and the actual lay and its final position.