Lone Pine Fire Tree Strike
Facilitated Learning Analysis

Contents

1. Introduction

Forest Background, Fire Behavior

The North Coast Interagency Fire Management program is a robust program that provides fire response to over 1.3 million acres of U.S. Forest Service, National Park Service, U.S. Fish and Wildlife Service, and privately owned or administered land. The elevations range from sea level to over 7,000 feet and the area is both ecologically and culturally diverse. There are more than 40 threatened, endangered, or sensitive animal and plant species that reside within the protection area. The Hoopa Valley, Yurok, and Karuk Native American tribes still reside and subsist off this land.

Historical fire occurrence here averaged 79 fires per year, burning 12,776 acres annually (1980-2018). However, more recent fire events are quickly shifting the average annual acreage burned to greater than 40,000 acres. Fuel types vary between grass prairies, oak savannahs, chaparral, conifer, and hardwood forests.

Fire behavior on the Six Rivers National Forest is driven by a multitude of factors. Several steep river canyons create strong diurnal winds that can move fires both with and against steep topographical features. Marine layers can influence fire activity, although this effect is reduced farther inland. Several high-severity fire scars in the area have regrown with thick brush, with both standing and downed large diameter snags. Most summer days can produce moderate to high rates of fire spread that can be compounded by weather events such as outflow, offshore, general, or diurnal winds—particularly when combined with steep topography and prolonged periods without moisture.

Weather and Indices

In the winter and spring months of 2023, northern California saw significant, persistent moisture impact the area. Trinity and Humboldt counties moved from having 100 percent of land area in a severe drought—or worse—in September of 2022, to being nearly completely recovered from drought conditions by July of 2023 (U.S. Drought Monitor). Moisture remained in high elevations and in fuels, so much so that the Six Rivers National Forest was implementing prescribed burns at the end of June.

As the fire season progressed in northern California, fire activity remained low to moderate and initial attack in the area remained largely successful. The fire load through June and July remained low compared to other years on the Six Rivers National Forest. Many local personnel noted that the season felt slow and that they weren't seeing much, if any, fire.

During August, however, a persistent high pressure set up over the area and began curing fuels. While temperatures can sporadically exceed 100 degrees from time to time on the Lower Trinity Ranger District, this District experienced a prolonged hot and dry period where maximum temperatures exceeded 100 degrees for several days in a row and minimum humidities ranged from low teens to low twenties. On August 14, the Energy Release Components (ERC) for the Lower Trinity Ranger District were at or above the 97th percentile.

Initial Attack

The Lone Pine Fire was discovered late in the evening of August 14, burning above Horse Linto Creek in the Trinity River drainage on the Six Rivers National Forest. The fire was one of many ignited by lightning on August 14 across the entire Forest. Access was difficult and ownership was yet to be definitively established. Resources from the neighboring Tribal Nation were dispatched to find access in the midnight hours. As they cut a personnel line in to access the fire, another incident was discovered on Tribal lands and all resources were directed back to station to redirect to the Two-Mile Fire.

Early on the morning of August 15, personnel from two engine modules from the Lower Trinity Ranger District were dispatched to the Lone Pine Fire. They attacked the fire using a hoselay and the only aviation resource available to them, a K-MAX helicopter. During initial attack, fire behavior increased in the heat of the afternoon when general winds combined with diurnal winds.

For more context on the initial attack entrapment on the Lone Pine Fire, please refer to the Lone Pine Entrapment FLA.

The fire was reported at 3-5 acres in the morning but grew to 20-30 acres by mid-afternoon. The Initial Attack Incident Commander (IA IC) looked at a Kestrel mid-afternoon and saw a temperature of 107 degrees and a relative humidity of 18 percent. After that, everything seemed to go wrong for the IA group.

Personnel on the fire had to conserve water and only apply it on one flank at a time. Fire that was only occasionally pulsing through brush in the morning began to start burning consistently with flame lengths greater than four feet. During direct attack on the left flank, two personnel found themselves with fire on three sides of them when they lost water to the hoselay they were on.

They were forced to escape through the green, in what was later termed as an entrapment. After the entrapment, the IA IC pulled all other personnel off the fire and sent them to station. He remained on scene to work with the K-MAX to make a plan in advance of the fire. Shortly afterwards, all personnel disengaged, the fire reversed slope at the bottom of a drainage and grew rapidly upslope and to the west. As the sun set on the Lone Pine Fire on August 15, the fire was estimated to be greater than 300 acres in size.

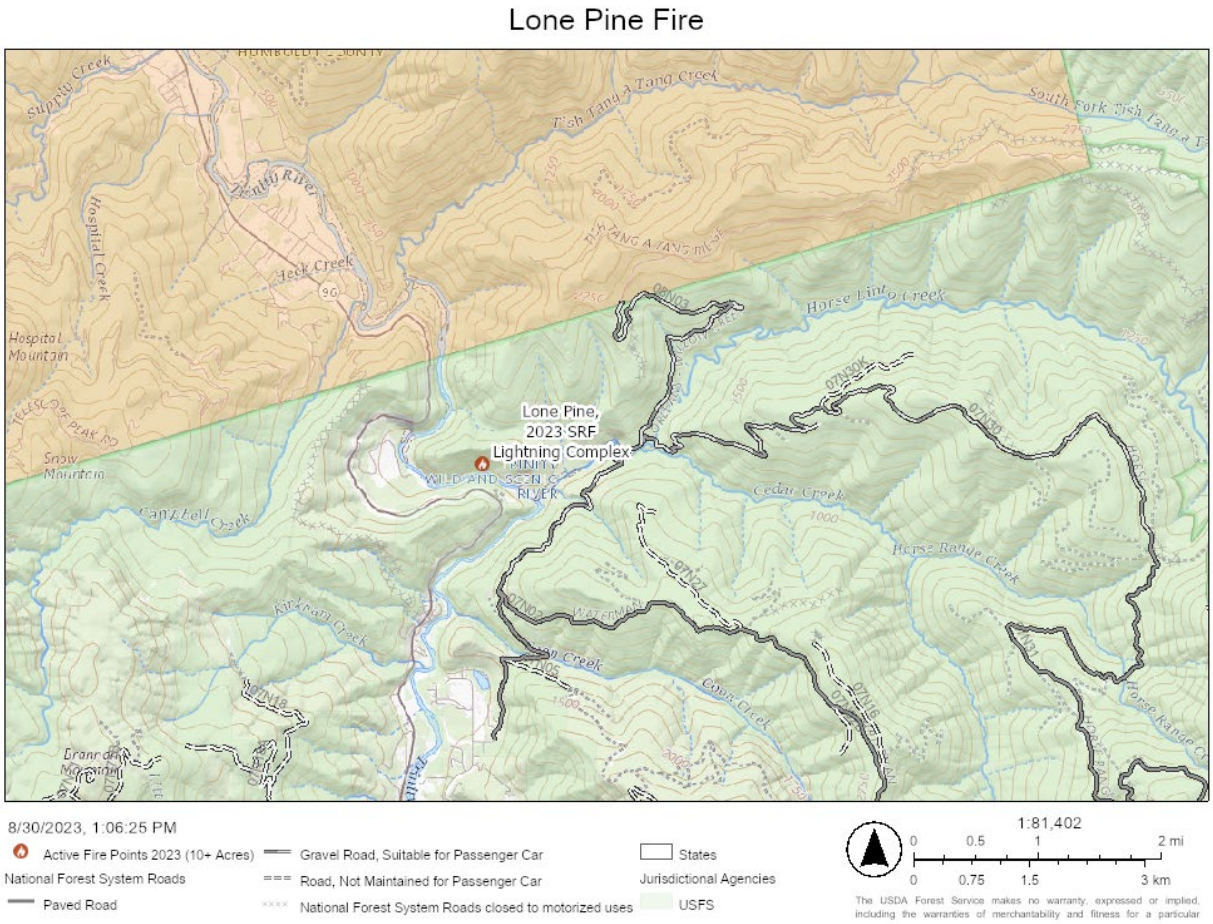

Figure 1. Map of the area of the Lone Pine initial attack. Source: Risk Management Assistance Dashboard.

Extended Attack

The evening of the August 15 found the leadership of the Lower Trinity Ranger District and Six Rivers National Forest making a concerted effort to tuck people back in from initial attack. Now, three days into lightning dispatch mode, with little to no backfill support for engines or mobilization of crews, it was clear to Forest and District leadership that they had to re-tool the organization for the marathon, not the sprint.

> *"People were gassed. I saw a lot of tired faces. People were stressed. Everyone was trying their best to deal with the situation we had. But we were doing so much more with so much less."*
>
> District Fire Management Officer

Operational resources were slow to arrive to fill outstanding orders for the Lone Pine Fire. Medical resources, that had been ordered early in initial attack, had yet to arrive. Resources backfilling the engines and crews that were already engaged on fires were few in number.

The Six Rivers National Forest ordered the ad-hoc Type 3 Incident Management Team (IMT3) for the Lower Trinity Ranger District to help establish an organization to support the wildfires. Included in the delegation for the IMT3 was eight fires and initial attack for the area.

The Lone Pine Fire was the priority fire for the IMT3 and for the Six Rivers National Forest, due to the fire being within a few miles of primary residences and it already impacting sovereign nation Tribal lands. If the fire was not caught, it would impact the Hoopa Valley, thousands of residences, and would burn numerous natural resources critical for ecosystem health and cultural values.

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AREA FORECAST DISCUSSION
National Weather Service Eureka CA
415 AM PDT Wed Aug 16 2023
.SYNOPSIS...Hot weather will persist throughout the area today with scattered thunderstorms
persisting in the northern half of the area. Cooler and calmer weather will gradually build
into the weekend.

.FIRE WEATHER...Scattered thunderstorms dropped about another 500 cloud to ground lightning
strikes across the area yesterday with very little rain reported. Another, very similar round
of dry thunderstorms is expected this afternoon focused in Trinity and eastern Humboldt
Counties (overall 20% chance of thunder), prompting another round of Red Flag Warnings. Any
thunderstorms will bring a risk of gusty outflow winds up to 50 mph. Otherwise, very hot and
dry conditions will continue with interior valleys above 100 with minimum RH generally 15 to
20%. Outside of thunderstorms, wind will remain gentle and terrain driven around 8 to 13 mph
above canopy cover. Cooler and more moist conditions will build in late week. Thunderstorm
activity will persist Thursday albeit with a higher chance of associated wetting rain (around
20%).
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On the morning of August 16, the IMT3 assumed command of the Lone Pine Fire, seven other smaller incidents, and initial attack in the fire area. They were able to conduct a briefing with some of the resources assigned and were able to engage the fire. Throughout the day, three different crews were assigned to the Lone Pine Fire and briefed.

2. The Tree Strike Story

Interagency Hotshot Crew Ordered

An interagency hotshot crew (IHC2) was traveling to fill a preposition order in Northern California during the initial attack of the Lone Pine Fire. By the time they reached Sacramento, they had been reassigned to the Lone Pine Fire and began preparing for the assignment. Crew overhead downloaded maps from the NIFC FTP site, shared them with the crew, and also pulled the local weather. “Basically, we prepare as if we are already there. Standard Ops,” explained IHC2’s Captain (CAPT2). The crew had worked in the same area the year before. They were familiar with the terrain and fuels. Many on the crew knew local firefighters and other crews already in the area. They reached out to gather more information.

Type 2 Initial Attack Crew 1 (T2IA1) was the first handcrew to arrive, early in the operational period. They were able to engage with the engine crews constructing handline up the fire’s right flank, from the base of the fire in Horse Linto Creek. T2IA1 “super-modded” with the personnel from a couple U.S Forest Service District engines as well as some contract engines. Approximately 40 people were working to dig fireline and support the fire’s right flank.

IHC2 arrived at the Lower Trinity Ranger District office at 1130. The crew’s Superintendent (IHC2SUPT) and Crew Boss Trainee (IHC2CRWB[T]) tied-in with the incoming IMT3’s Operations (IMT3OPS). He gave them some local information and directed them to the check-in location. Acting Operations (the ICT4 the day before during initial attack) for the Lone Pine Fire was out in the field, but the local Duty Officer provided a short briefing. He gave them the Communications Plan and told them the names of Operations and DIVS. IHC2SUPT asked about the medical plan and was told medicals would be run through the North Coast Interagency Communication Center (North Coast Dispatch) via the Forest Net. There were multiple fires in the area. The Lone Pine Fire was the priority for the Lower Trinity Ranger District and the Six Rivers National Forest.

IHC2 departed to the fire, with the IHC2SUPT wishing they had been able to get more specific information about the overall situation, but accepted they weren’t going to get all the information they wanted at this time. It took 15 minutes to get to the first intersection.

IHC2SUPT tried to contact Operations over the radio, but did not reach him. He decided to stage the squads and crew buggies at the 07N05 spur (Waterman Ridge Road – Fig. 2, Point 1) until he received further information. IHC2SUPT, IHC2CRWB(T), and both Captains proceeded up the road in a crew cab truck. They started seeing the Lone Pine Fire one-quarter mile up the road from the intersection. It was positioned on a ridge.

IHC2 overhead reached Horse Linto Campground, where multiple vehicles were staged (Fig. 2 – Point 2). IHC2SUPT repositioned the crew buggies to the campground to maintain positive communication as they continued toward the fire. They saw where the indirect handline left the road and marked it on their maps.

From just past the campground, they were finally able to reach Operations on the radio. He advised that they continue up to the intersection of the 8N03 and 8N37 roads, that would later become Drop Point 2 (DP2) (Fig. 2 – Point 4). They continued up the 8N03 Road. As they turned the corner, they noticed fire on both sides of the 8N03 and noted it as a concern (Fig. 2 – Point 3).

They arrived at the intersection and met with Operations, DIVS, and DIVS(t). By this time, DIVS had changed from the briefing they had received at the office. They were the first IHC to arrive and were already in contact with another IHC (IHC3) that would arrive later in the day.

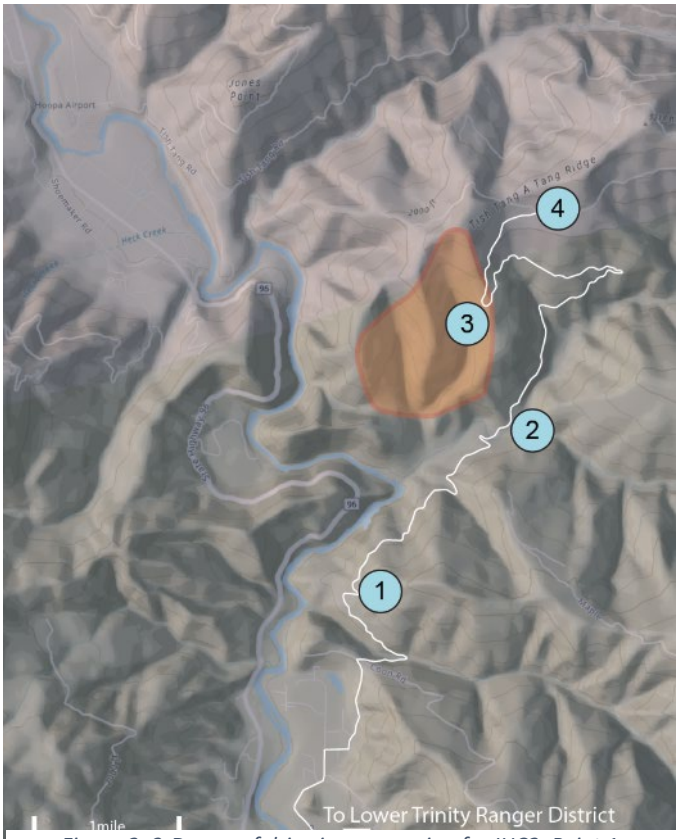

Figure 2. 3-D map of drive in progression for IHC2. Point 1: Waterman Ridge Road. Point 2: Horse Linto Campground. Point 3: Fire on both sides of the 8N03 Road. Point 4: Intersection of 8N03 and 8N37 roads.

Taking the time to identify and correct issues early was a focus of IHC2 to make things easier moving forward. IHC2SUPT suggested changing the Divisions to allow for expansion and creating drop points at their current location and the Horse Linto Campground. They brought up any concerns they had identified. The new Divisions were announced over the radio. Operations asked if the crew could provide a Heavy Equipment Boss (HEQB) for the dozer. IHC2SUPT assigned a crew Squad Boss (IHC2SB) to the task.

IHC2 would take the middle section of the fire, which included the fire on both sides on the 8N03 Road. They would tie into the Type 2 Initial Attack Crew's (T2IA1) existing line and work toward the top of the fire, where IHC3 would plug in when they arrived.

IHC2SUPT talked with his Captains and began splitting the Division. A-Module would handle the slopover and the section between the main and lower roads (Fig. 3 – A). B-Module would work down from the 8N37B Road toward A-Module (Fig. 3 – B) on the 8N03 Road, once the section had been scouted. A short squad would hot-spot above the 8N37B Road. The modules were briefed and IHC2SUPT heard typical radio commo as they got into place.

The IHC2's Captain1 was scouting ahead of B-Module and found that the fire was burning in leaf litter and the Mod would make fast progress. Intermittently, snags could be heard coming down in the interior of the fire, but there

was not a lot of work for the sawyers and swampers. As the Mod progressed from the 8N37B to the 8N03, they only had to drop one tree.

IHC3 arrived in the early afternoon and started scouting the top of the fire from the 8N37 Road to see where they could pick up the left flank. The fire was on the north side of Tish Tang A Tang Ridge but was still far to the west. They tried to find a way to tie it into the progress being made by IHC2. The dozer worked to line jack pots of fuels and then support B-Module as they made progress toward the top of the knob.

Figure 3. 3-D Map zoomed-in to show the top area of the Lone Pince Fire, depicting where IHC2 engages. A – Indicates A Module's assigned area. B – Indicates B Module's Assigned Area. 1 – Indicates first spot fire. 2 – Indicates second spot fire. DP2 – is Drop Point 2.

Communication between the ground resources was sufficient for safe and effective firefighting. The Superintendents and Captains from all three IHCs took time to scout ahead in their areas of engagement. Their assessment of the hazards in the area did not reveal any abnormal hazards from the typical wildland fire environment in Northern California. They noted that the forest stand was in particularly good health, given the seven-year drought the area had experienced.

Snags and other hazard trees were not so frequent that they felt the need to do anything besides direct attack. What they did note while scouting the area was that if the fire was allowed to grow, opportunities to safely engage it became fewer and fewer to the north and to the east.

Crews were being successful on the fire's right flank, but as the weather was getting hotter and drier they began getting outflanked by fire growth on the top of Tish Tang A Tang Ridge. IHC2SUPT and IHC3SUPT noted that they both had concerns about progressing fireline to the west during the shift.

The mid-slope road (8N37) on the north side of the ridge was overgrown and not favorable for holding. While IHC3 scouted farther to the west, they had to regularly check-in with lookouts and check the weather radar on their phones for predicted thunderstorms that had the potential to move the fire around quickly. At the top of the fire, the crews were getting frequent spot fires and flare-ups. They adjusted their line to accommodate the change in fire activity. IHC2 tied-in the slopover and the middle section of line, and both IHC2 Modules were working together on the active piece of fire near the top of the knob.

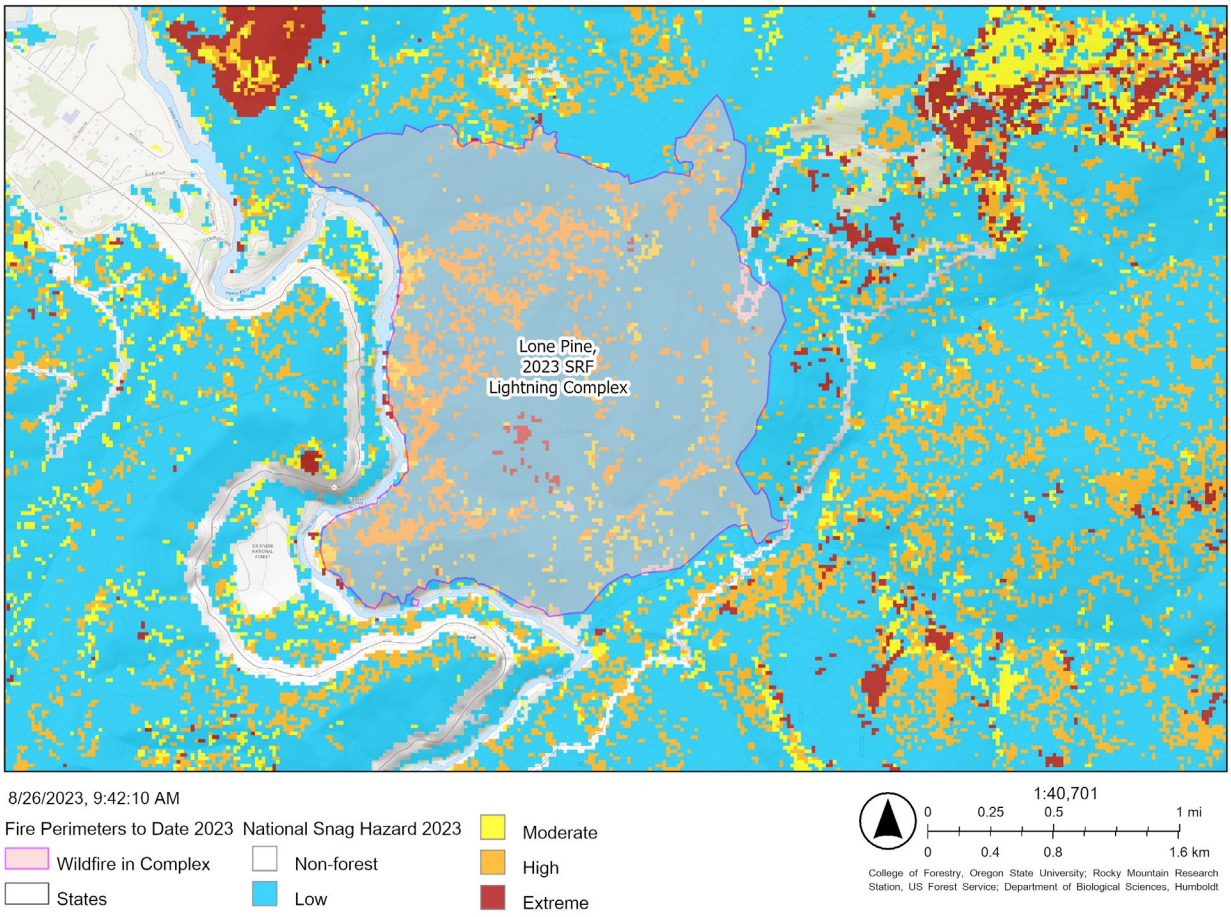

Figure 4. Map of Snag Hazard Index in the area of the Lone Pine Fire. Source: Risk Management Assistance Dashboard.

The Type 3 IMT determined a night shift would be prudent, given the potential for fire spread overnight. To support night shift, the team made the request to North Coast Dispatch for a slight change from the lightning dispatch plan. Instead of going to the District for radio communications, the night resources on the Lone Pine Fire would call to North Coast Dispatch for support using the Forest Net Repeaters. The neighboring Tribal District pulled all resources from the Two-Mile Fire to build a surge task force to help on the Lone Pine Fire. Their task force came with overhead, two engines, two water tenders, and several support personnel. Except for one contract water tender, the task force was well-suited to work a night shift alongside some of the resources already on the fire. As these resources arrived on the fire, one of the engines brought in a hoselay along the dozer line to support IHC2.

Prior to beginning night shift, overhead for IHC2 and IHC3 gathered with night shift resources to go over a plan that would identify who was staying on nights, who was staying for a swing shift, and what the priorities were for the night. IHC2 was in the process of securing a spot fire with dozer line and a hoselay. They would leave the line once that mission was completed (Fig. 3 – 1). IHC3 would remain on until 2400 to secure the lines that had been established during day. The night engines would work overnight to hold and secure the lines.

IHC2 completed their work securing the spot with the assistance of the dozer and hoselay support from engines on the road. They were regrouping on the dozer line and about to head for buggies when someone noticed a glow through some reprod (a stand of timber "reproduction"—more recently replanted trees after timber harvest) below them.

Spot Fires

IHC2 sent a senior firefighter to investigate. They confirmed that there was a second spot fire, approximately 100 feet by 100 feet that was producing substantial heat (Fig. 3 – 2). They believed that they could catch it quickly with the crew and water support.

Prior to engaging the crew on the second spot, Senior Firefighter1 scouted the area for hazards and conferred with Captain1. He identified a burning snag in the spot. He pushed on its base and "sounded" it with his hand tool. The height of the snag was difficult to determine because it was dark, but the snag held steady while he sounded it.

Sawyers on IHC2 cut in a personnel line to access this new spot and started cutting around it. Two saw teams turned left, one saw team turned right. Sawyer1 and Sawyer2 continued cutting fireline with their swampers on the left flank as the rest of the crew arrived, briefed on the hazards, and then engaged. Sawyer1 pointed out the snag to Sawyer2 and they cut their line wide around the hazard – but they did not stop working to brief with the rest of the crew.

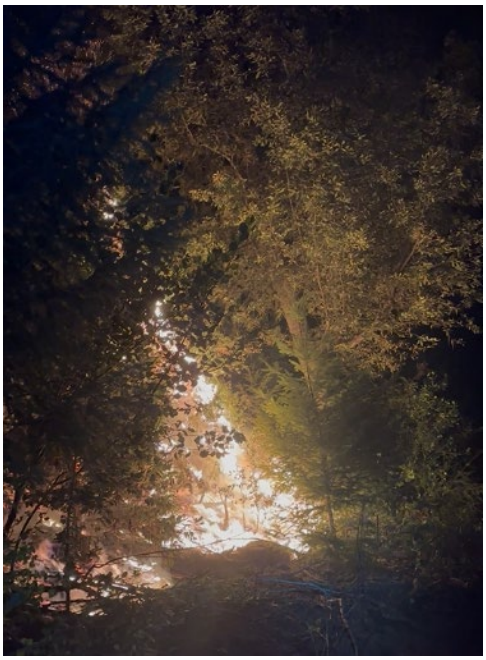

Figure 5. The nighttime fire behavior on the Lone Pine Fire.

As the rest of the crew engaged, they deployed a hoselay to the right, where the spot fire was more active and had the potential to impact their egress. The two saw teams working to the left were on the cooler edge and the line diggers followed 30-40 feet behind them.

Sawyer2 communicated that he would work around Sawyer1 and his swamper while they finished bucking a log on the ground. As they progressed, Swamper1 was 5-10 feet away from Sawyer1, picking up the log that had just been cut. No one in the area heard a noise that would alert them to a falling tree. As Swamper1 turned back around, he saw the identified hazard snag falling toward Sawyer1.

As the top five feet of this 30-foot, punky snag impacted Sawyer1 on the back of his hardhat, he dropped to the ground in a seated position. Swamper1 pulled Sawyer1 from under the burning snag. Sawyer2 heard the impact and looked behind him. He saw Sawyer1 on the ground and rushed to assist. Sawyer2 spoke to Sawyer1 and told him he had to move because there was fire all around him. He asked Sawyer1 to put his arms around him so he could help pull him away. Sawyer1 replied that he couldn't lift his arms.

Incident Within an Incident

Over the radio, the crew heard "firefighter down, positive tree strike."

IHC2 went into an Incident Within an Incident (IWI) response and immediately settled into roles that they had practiced during training and throughout the year. One of the first on scene, IHC2CPT1 assumed the role of patient care (POC). Separate from the care providers, the crew's role was to begin coordinating needs for the EMTs attending to Sawyer1 and to start extracting him from the fire area.

IHC2SUPT assumed the role of incident commander (IWI-IC), returning to the truck to utilize the mobile radio. He relayed traffic to Night Division AZ, who then relayed traffic to North Coast Dispatch. Crew supervision was assigned to IHC2CPT2.

IHC2's standard, non-medical roles during an IWI include:

- IWI IC
- Patient Care POC
- Crew Supervision
- Aircraft Coordinator (if needed)

IHC3 arrived at the truck of IHC2SUPT and asked, "How can we help?" IHC2 saw teams were already starting a personnel line from the spot fire toward the road, around 400 feet in length. IHC3 started saws up from the road toward the spot fire and assisted where needed.

> When an ambulance from the communities of Hoopa or Willow Creek responds to an emergency in this area, ground transport times to the nearest hospital can take an hour or more. From dispatch time to in service time, a "short" call can take three to four hours.

Sawyer1 was still in an unsafe environment along an unsecured fireline. He needed to begin moving toward definitive care due to the possibility of internal bleeding and a potential traumatic head injury. With the help of arriving crew members, they moved him away from the heat, using their hands to stabilize his cervical spine.

IHC2CPT1 and the EMTs elected to use a soft litter to carry Sawyer1 to the road. "He's alert and conscious, breathing," IHC2CPT1 said. "Let's get him going to the Supt. truck."

A crewmember held spinal stabilization as EMTs removed Sawyer1's pack from his body. He was then "log-rolled" onto the soft-litter.

IHC2 crewmembers surrounded Sawyer1, grabbing a handle on the litter, and helped carry him to the road where the backboard, C-collar, spider-straps, oxygen, and trauma kit were waiting. While not all IHC2 crewmembers were "hands on" with Sawyer1, they fell into the roles needed to support the IWI. It was hard to not engage directly, but through their training, they knew that they could be more effective supporting the scene in other ways.

"It was hard at first because it's your dude. But we stepped back, snapped out of it, and started getting to work."

Crew Boss Trainee, IHC2

Night DIVS AZ contacted North Coast Dispatch and requested air and ground ambulance to Drop Point 2 on the Lone Pine Fire for a "Red" medical—firefighter hit by a snag. The day shift dispatcher, who was about to leave, recognized the voice on the other end of the radio as someone she knew and had previously worked with in fire operations. She immediately jumped onto the console. She received the Medical Incident Report (MIR) on the first transmission. Everything was clear, concise. No follow-up questions were needed. She reached out to CAL FIRE to initiate a request for air and ground ambulance. Updates came in from DIVS AZ and from CAL FIRE regularly and smoothly.

K'ima:w Medical Center, on the Hoopa Native Reservation, staffs two ALS ambulances full time for 911 response in the area of the communities of Hoopa and Willow Creek. They received the call for an ambulance through their dispatch center and sent the ambulance from Willow Creek to respond to the fire area.

The ambulance received instructions to respond to the intersection of the 10N04 and 10N02 roads. But with no U.S. Forest Service maps, this information meant little to them. They proceeded toward Horse Linto Campground because it was a known landmark and they could navigate to that point. They encountered Forest Service personnel who told them that the patient was coming down the road to them. The ambulance was driving on tight, unfamiliar roads in the dark. They found a turnaround and waited to receive the patient.

Once Sawyer1 had been carried to the road, he was packaged and loaded into the back of the Superintendent's truck with six personnel to care for Sawyer1 and hold him steady. IHC3SUPT drove ahead of IHC2SUPT to clear the road to ensure there was nothing blocking it—such as trees or tenders. They made the decision to drive past Drop Point 2 to keep moving toward a higher level of care.

They drove down the switchbacks of the 8N03 Road and past Horse Linto Campground to the location they knew the ambulance was waiting for them. The paramedics staffing the ambulance noted the quality of Sawyer1's packaging and that it made for a very smooth transfer into the ambulance, allowing them to get moving quickly.

The ambulance spent less than 10 minutes on scene with the crew, receiving the patient's history, establishing IV access, and evaluating the patient. The paramedic in the back of the ambulance with Sawyer1 was the ideal care provider given the nature of the injury. He had retired from the fire service with more than 29 years' experience as a paramedic and nurse. The paramedic immediately began advocating for air transport for Sawyer1 to get the patient to a Level 2 Trauma Center—which would have a neurosurgeon on call. The nearest hospital accessible via reasonable ground transport would be a Level 3 Trauma Center and would not have neuro or spinal care available.

When the air ambulance was requested at the start of the IWI, North Coast Dispatch reached out to CAL FIRE Humboldt (HUU), a secondary 911 call center. Cal Fire HUU then began working to identify the closest available emergency resource. A request was placed to the closest air ambulance network and to the U.S. Coast Guard (USCG).

The air ambulance quickly declined the mission. The USCG station in Humboldt Bay was experiencing inclement weather. The Coast Guard Operations Center for the Humboldt Bay sector began collecting information about the mission to begin briefing the Operations Commander and flight crew. As information came in, they began working through their risk assessments, pre-flight checks, and approval processes.

The ground ambulance departed the area "Code Three" (lights and sirens) enroute to Providence St. Joseph Hospital in Eureka. Communication was still ongoing with the USCG to see if they would accept the mission. During the drive, the paramedic caring for Sawyer1 was calling ahead to the ER physician at Providence St. Joseph Hospital—advocating for Sawyer1 to go to Redding for a neurological evaluation.

As the ambulance headed toward the coastal highway, they received confirmation that the USCG had accepted the mission and would rendezvous with the ambulance at Berry Summit, a location well known to the pilots and ambulance company. Before they arrived at the rendezvous location, they confirmed that Sawyer1 would be transported to Redding.

The USCG Command Center had information about the situation, the location of the incident, possible elevations, frequencies, and on-scene weather for the initial report of an injured firefighter in the Weaverville area (approximately 39 miles east-southeast from Willow Creek).

> The risk profile for the U.S. Coast Guard (USCG) performing a Person In the Water (PIW) rescue mission is drastically different from an inland agency assist mission. USCG flight crews train for and are equipped to handle the dark and stormy night over the ocean. Flying inland, at high elevations, into active fire zones is a very different mission. In the past, USCG flights to evacuate injured wildland firefighters have resulted in Distinguished Flying Crosses (DFC) being awarded. The DFC is awarded for U.S. Armed Forces personnel for "*heroism or extraordinary achievement while participating in aerial flight*." The USCG takes these missions very seriously.

As more information came in, they were informed that the patient had a head injury, was in critical condition, and that the ambulance was asking to rendezvous at Berry Summit. With additional information about patient vitals, the Operations Commander was able to determine that denying the mission could result in the loss of life and made a call to their on-duty, regional flight surgeon. The flight surgeon recommended accepting the mission, based on patient status, and recommended that the flight try to remain below 1,000 feet.

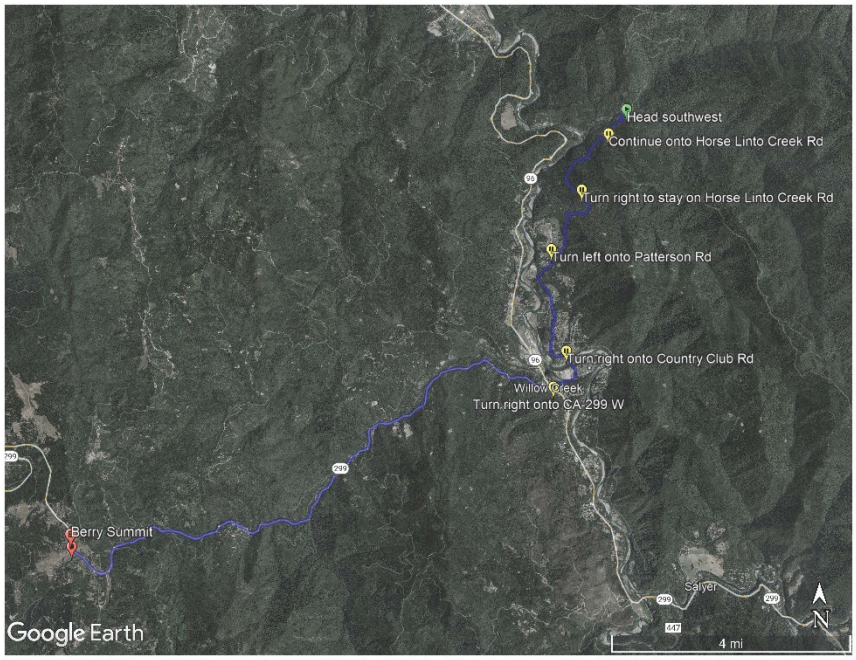

Figure 6. Map of road directions from Horse Linto Campground to Berry Summit scenic vista, 17.5 miles that takes 35+ minutes to drive.

The memorandum of understanding (MOU) that Humboldt Bay USCG has in place with the Air Force Rescue Coordination Center allowed the Operations Commander to give the final order to proceed.

With all approvals in place, the flight crew finalized preparations for the mission. They got word that the paramedic was requesting to be transported with the patient. The crew elected to leave their flight mechanic. The rescue swimmer would manage the cabin and aid in patient care. The rescue swimmer knew they would primarily be managing the cabin, as they would have higher qualified medical care on the flight with them (USCG swimmers are trained at an EMT-B level). With the elevation for the landing area known, they discussed defueling the aircraft to make it lighter but ultimately elected not to do this. The pilot, co-pilot, and rescue swimmer briefed to the mission in front of them and departed Arcata for Berry Summit.

Figure 7. The Berry Summit scenic vista on California Highway 299.

While the ambulance waited for the U.S. Coast Guard to arrive at Berry Summit, the paramedics conducted a secondary assessment. They still had to cut off Sawyer1's chaps and flame-resistant clothing. They carefully removed his boots and were able to evaluate all his extremities. While the secondary assessment was ongoing, IHC2SUPT was able to raise the USCG helicopter on CALCORD and talk them into the landing, advising of any hazards on the landing site. While there was a semi-truck and trailer parked at one end of the parking lot, the area was open and provided an ideal landing site.

Once the Coast Guard ship landed at Berry Summit, Sawyer1 and the paramedic from the Hoopa ambulance loaded into the helicopter. The ship lifted and departed the landing site, clearing any obstructions, then dove downslope to bank and head to Redding in the east. IHC2SUPT returned to Willow Creek to gather Sawyer1's ID, wallet, and other personal belongings, knowing that they would be needed once he arrived at the hospital.

In 2015, a wildland firefighter broke their leg in Oregon. Ordering and dispatching a medevac ship was a very different experience. Refer to the Gregg Creek Fire Broken Leg Extraction FLA to compare.

Hospital Care in Redding

From the point that dispatch was notified about a "Red" medical, the Six Rivers National Forest Safety Officer began working to establish Hospital Liaison coverage for Sawyer1. While dispatch was waiting to hear the location to which Sawyer1 would be transported, the Safety Officer began contacting St. Joseph Hospital in Eureka, advocating that the patient be transported to Mercy Medical Center in Redding.

When the Safety Officer arrived at St. Joseph Hospital, the ER physician confirmed that the patient was going to Mercy Medical Center and that the Coast Guard would be flying the patient straight to Redding. At that point, the Safety Officer began calling the network of Hospital Liaisons in northern California. He was able to make contact with his counterpart on the Shasta-Trinity National Forest, the Forest headquartered in Redding, closest to Mercy Medical. When Sawyer1 arrived at Mercy Medical, he was diagnosed with fractures to his Cervical Spine, C4 and C5, and a treatment plan was developed.

While IHC2SUPT would travel to Redding in the overnight hours to be with Sawyer1, the Shasta-Trinity National Forest provided a Hospital Liaison at first light the next morning, on August 17. The Six Rivers Safety Officer spent that day coordinating paperwork, initiating claims, and ensuring that the process had begun and was being followed to ensure the best care possible for Sawyer1.

The Angeles National Forest had been notified through several channels that one of their employees had been involved in a serious accident and was in the hospital in Redding. IHC2SUPT called his Division Fire Management Officer (DFMO) while he was on Berry Summit. He wanted the DFMO to hear it from him first. The Forest Fire Management Officer (FFMO) from the Six Rivers National Forest had texted the Angeles National Forest's FFMO during the overnight hours. The Forest Supervisor from the Six Rivers National Forest called his counterpart on the Angeles National Forest at first light, and also informed his FFMO.

Saywer1 was conscious when IHC2SUPT arrived in Redding and he was able to ask in what order he should notify Sawyer1's family. Sawyer1 said that his sister should be notified first because his mother had some health concerns that could have been exacerbated by this news. IHC2SUPT referred to the copy of emergency contact information that he kept with him. He notified Sawyer1's sister, who lives in the greater Los Angeles region.

She was able to fly to Redding that morning and see her brother just before he went into his first surgery at 10:30 a.m. Her flight was paid out of pocket, but later reimbursed by the U.S. Forest Service. Once she arrived in Redding, her lodging and per diem was also covered by the U.S. Forest Service (see text box on right).

Before departing for Redding, IHC2SUPT told IHC2CPT to get a pulse on the crew and decide whether to continue or to disengage and let him know in the morning. IHC2 came off the line after Sawyer1 and IHC2SUPT were gone. The crew was

"Family travel follows the standard invitational travel process and requires additional documentation. *Work with the CFO-B&F (Chief Financial Officer, Budget and Finance) Travel Operations Branch to arrange family travel* (see FSH 6509.33, section 3, Policy, and 3e, Family Travel). Charge family travel expenses to the fund and program where the employee was working when the incident occurred."

FSH 1309.19 - CASUALTY ASSISTANCE HANDBOOK CHAPTER 30 - SERIOUS INJURY AND MEDICAL EMERGENCY ADMINISTRATION - 31.3 - Family Member Travel and Per Diem

welcomed into the Lower Trinity Ranger District's compound and shown around. Personnel from the IMT3 assured the crew that they would be supported in whatever direction they decided to go. The Captains from IHC2 bought the crew pizza, let them eat, and then bedded everyone down.

On the morning of August 17, IHC2 debriefed at a nearby park to discuss their options. They shared their thoughts and feelings then discussed whether they wanted to travel to Redding to support Sawyer1 or if they wanted to remain on the fire and continue working.

There was the desire to continue working to remain engaged and focused on a mission, but they had to balance that with the added hazard from the distraction they would all feel. Ultimately, they elected to go to Redding to support their crewmate, whether or not they could see him in person. They asked to be demobbed from the fire and they traveled to Redding.

IHC2 noted that the demob process was as smooth as they'd ever experienced. The IMT3 made it a point to make the process seamless for them to transition off the fire and travel to be with Sawyer1. The crew spent the entire day camped in the hospital parking lot in Redding. Even though they were unable to see Sawyer1, they still felt the need to be near him to support him. They stayed in a hotel overnight then departed for the Angeles National Forest the next day. Sawyer1's module felt the impact really hit them during the drive home with an empty seat where Sawyer1 should have been.

The FFMO and DFMO from the Angeles NF elected to drive to Redding, to start working as a team, begin notifications, and setting the necessary actions in motion. They arranged for two Hospital liaisons from the Angeles National Forest to mobilize to Redding to support the family and take over long-term care.

These two Hospital Liaisons began to make notifications in accordance with the Forest Service Handbook and started planning on how they could best support Sawyer1 and his family while providing care and cover for the crew. Before they arrived in Redding, they knew that they had to reduce the Forest Service footprint to lessen the impact of the aftermath to those who were affected by the accident. Having experienced incidents like this before, both knew that one of the biggest impacts was the overwhelming expression of well-intentioned support. DFMO1 reiterated their intent, "Our goal was to the shield the firefighter, shield the family, and to shield the crew."

In Redding, Sawyer1 underwent his first surgery of many to come. It was clear that the recovery process was going to be lengthy and that his care was going to require much support, for a long period of time. Not only would Sawyer1 have several surgeries, his rehab was going to be a long, arduous process. The process of navigating OWCP would prove difficult as well.

ANF-FFMO and ANF-DFMO recognized the need for long-term help and established an employee post-injury team that held daily briefings. These briefings served several functions, including: a consolidated briefing for upwards reporting, information sharing between subject matter experts to liaisons and employees, patient updates, identification of hurdles or problems and finding solutions, providing support to one another, and ensuring appropriate delegation of responsibilities.

Having direct access to the USFS Albuquerque Service Center (ASC) subject matter experts made it possible for numerous bureaucratic hurdles to be cleared and for a long-term plan for Sawyer1's rehabilitation and recovery to be laid out. Ongoing treatment and

Roles & Responsibilities

	Coordinator/ Liaison	ASC point of contact
Forest POC	FFMO	
Hospital Liaison	LIAISON1	
Family Liaison	LIAISON1	
Benefits	LIAISON2	ASC Branch Chief
OWCP/HR Specialist	LIAISON2	HRM Specialist
ASC B&F Travel	LIAISON2	TBD
CISM Liaison	TBD	
Public Info	TBD	
Employee Supervisor	SUPT1	
District Fire Mgmt.	DFMO	

Daily updates & report-out plan

When	Who	How
09:30	Family Liaison/Hospital Liaison/Family	In person/phone call
After the 09:30 call	CH1/DFMO1/LIAISON1/ LIASON2	Text

recovery steps included, in part: three surgeries in Redding, beginning in-patient rehab in Redding, a patient transfer via air ambulance from Redding to an in-patient rehab facility in Los Angeles, and ongoing treatment, rehab, and physical therapy in Los Angeles.

Along the way, it was identified that OWCP's contracts had expired with both hospitals and none of the air ambulances that could transfer Sawyer1 from Redding to Los Angeles were on contract with OWCP. While these issues were not within the control of the Forest Service, having an ASC liaison to OWCP identified these issues early and exerted pressure for OWCP to expedite processing of the contract renewals. Ultimately, arranging the air ambulance patient transfer through OWCP proved too difficult to overcome in a timeframe that would provide the best care to Sawyer1. Saywer1's sister and LIAISON1 requested assistance from the Wildland Firefighter Foundation (WFF), a non-profit wildland firefighter support group, to cover the air ambulance. The WFF arranged for and covered the flight the morning after it was requested by Sawyer1's sister.

While policy and bureaucracy still caused frustration to several people involved, it was noted by many who have dealt with OWCP in the past that the newly established processes for Federal Wildland Firefighters is an improvement from previous years. Overall, they expressed gratitude for the improvements made and the responsiveness of OWCP to Sawyer1's case management.

Not the Last Fire on the Six Rivers National Forest

The Six Rivers National Forest will continue to see wildfire. It is part of two wildfire crisis strategy landscapes and they are endeavoring to be proactive in their approach to wildfire management. Fire is a part of the landscape, both culturally and ecologically, though there are numerous values at risk that will continue to require an aggressive suppression response. Engaging in wildfire suppression anywhere in northern California, whether on the Six Rivers, the Klamath, or the Shasta-Trinity national forests is a preposition that requires thoughtful risk management.

"Terrain on the Six Rivers is unforgiving."

Assistant Fire Management Officer, Six Rivers National Forest

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"This just shows how dangerous it can be to fight fire in NorCal in the timber. Makes you wonder if we should even be out there at night."

Operations, IMT3

"This one worked out, but if the Coast Guard had been unavailable it would have been a different story. Whether you're on the Shasta, the Klamath, or the Six Rivers—you will be overextended. We know we're being put in a bad spot. The ICs know they're putting us in a bad spot. Management knows they're putting us in a bad spot."

Superintendent, IHC2

Closing

While interviewing people who experienced this incident from various perspectives, everyone expressed deep care and sympathy for Sawyer1. Everyone is hoping for his full recovery. Words cannot express the heartfelt regards that are and will continue to be extended to Sawyer1 and his family. The Six Rivers National Forest and the Hoopa Native American Nation express their immense gratitude for Sawyer1's brave work to protect lives, property, livelihood, and their way of life.

3. Lessons

Lessons Learned from the Interviewees

Interagency Hotshot Crew2 (IHC2) expressed several lessons and takeaways that surrounded the subject of training, preparedness, and configuration of equipment. The crew regularly participates in medical training beyond basic first aid. They have developed a training calendar that covers several different medical topics.

Through regular training, their response to IWIs has evolved and improved over time. Their local unit supports and provides for EMT training and continuing education. In this IWI on the Six Rivers National Forest, several items proved useful to IHC2 in their response to their injured sawyer:

- Pre-determined IWI response roles that involve everyone, though not all are involved in patient care.
- Laminated 8.5 by 11-inch copies of the Medical Incident Report make for a better writing surface in a stressful situation.
- Standard location for medical gear on vehicles made for quick assembly of equipment.
    - They are considering standardizing where medical gear is carried on individual line gear.
- Ensuring that emergency contact information and personal effects were with the first Hospital Liaison streamlined initial treatment and family notification.

The post-injury care for an employee was wrestled with by several participants. From Hospital Liaisons on the host unit and sending unit, supervision from both units, subject matter experts from Albuquerque Service Center, all parties identified several takeaways from this event as well as other similar incidents that they'd experienced in the past. Piloted on this event, the establishment of an "employee care team" proved to be beneficial in many ways:

- Having access to high-level subject matter experts allowed for timely consultation on matters like what the agency can and cannot commit to, ensuring appropriate verbiage is included in physician reports, and employee elective benefit forms allowances and filing deadlines.
- Providing support and a sounding board to employees encountering problems when trying to provide the best care to Sawyer1.
- Information was consolidated in daily calls that allowed for an aligned response and appropriate delegation of tasks as well as a central point for required reporting.
    - In delegating tasks, the care team allowed Angeles National Forest personnel to focus solely on their role as a care team member. Like an incident response, personnel assigned were team members first and they addressed their day jobs as they were able. They were not attempting to perform both roles.

- The care team allowed the Hospital/Family Liaisons to build relationships with family members and care providers while knowing they had support behind the scenes. This lessened the footprint at the hospital and also increased trust with the family.
- The group was able to build a list of people and organizations willing to support Sawyer1. With the full list, they were able to develop a timeline to sustain patient care, ensuring that help doesn't disappear when Sawyer1 and his family still need it.

Visiting the Patient in the Hospital

During Saywer1's stay at the hospital, he was visited by several high-ranking U.S. Forest Service executives. During those visits, there were some unintended outcomes that the employee care team had to reconcile. Promises were made to family members that were not possible per agency policy. Therefore, the Hospital Liaisons had to convey to the family that they were unable to honor such commitments.

In addition, while these executives took the opportunity to visit Sawyer1 in the Intensive Care Unit, they occupied the limited visitation hours constrained by the hospital. During the FLA process, interviewees expressed frustration with the way information moved through the system. They felt that, in the future, lines of communication to employees that provide care to the injured should be prioritized over lines of communication that extended up the chain of command.

Assessing and Accepting Risk

After the local fire and forest management group had time to slow down and consider all the engagements and decision making on Lone Pine Fire and the Six Rivers Lightning Complex, they were left to consider if they could have done anything different, or if their response to the Lone Pine Fire would have remained the same. Local fire managers posited that deference to decision making in the field and by those facing the risks is the norm in wildfire response.

Allowing those in the field to assess and accept the risk associated with assignments is a normal and encouraged practice. But, at what point should management insert themselves into decision-making processes and dictate strategies that reduce the relative risk to responders?

Would taking certain strategies off the table (such as direct attack) serve to better align risk to responders with values at risk?

While the timing, location, and management decision making surrounding this incident were all indirect contributors to the unintended outcome, the weight of the negative result still caused managers to pause and reflect on their direction. Continued wildfire response on the Six Rivers National Forest is a relative certainty. Improving outcomes for responders is a value to which they remain committed.

Sensemaking from the FLA Team

It is a safe assumption that wildfire response in the western United States is and will continue to be a regular occurrence. The size, scale, and location of that response will vary, but the emphasis on public and firefighter safety is a constant value expressed at all levels of the interagency wildland fire organization. Accounting for firefighter safety in an environment that is becoming more volatile, less predictable, and a workforce with notably less experience leads to speculation on the best way to approach each situation in the future.

With catastrophic events in recent memory, such as the Carr and Camp fires in California, there is a drive in the field to engage wildfires aggressively to stop the next town from burning to the ground. While there are tools and methods to refuse unsafe assignments, many are willing to accept certain risks to catch a fire when the opportunity presents itself.

The tenth firefighting order of "Fight fire aggressively, having provided for safety first" is alive and well in the wildland firefighter population. As large fire years become more frequent, there are ample opportunities for crews and personnel to engage in the gamut of response options, from the benign to incredibly hazardous.

As the number of firefighters exposed to hazards increases, so too does the likelihood of an accident that requires some sort of medical response. The ability to respond to an injured firefighter is a responsibility that District, Forest, and incident management takes seriously. This is illustrated by the investment in contracted medical responders; the establishment of medical direction for agency EMTs; medical units at ICPs; and the establishment of programs such as the short-haul helicopter programs.

Even with all of these investments, there are still locations and times when the fire response organization, whether Complex Incident Management Teams (CIMT) or District management, is ill-equipped to extract an injured firefighter while providing life-saving care. In these situations, we rely on partner entities for aid.

Partner entities that have and will continue to respond to injured firefighters range from volunteer ambulance and fire companies in rural communities, to military aircraft, to robust county search and rescue programs, to state highway patrols, to private air ambulances . . .—the list goes on. The common theme among all these entities is that somewhere in their response portfolio they agreed to, or were designated responsible parties to, execute an emergency response program for public health and life safety.

The two partner entities that responded to Sawyer1 on the Lone Pine Fire were the K'ima:w Ambulance Service and the Humboldt Bay Sector of the U.S. Coast Guard. These entities combined equipment and skillsets with IHC2 to provide Sawyer1 with ALS care and air transport to a Level 2 Trauma Center—in under three hours. This was likely one of the best responses that could have been provided, given the time of day and location where this firefighter's injuries occurred.

Despite this well-coordinated response, there is still room to improve the ways in which life-threatening injuries to firefighters are addressed, especially considering that there are numerous examples of worse outcomes and worse responses. Also worth considering is what could have happened had one of these two entities been unable to respond? A wildfire response increases the amount of medical and assist calls that existing systems are forced to respond to, on top of their pre-existing response load. When wildfires increase the demand on external medical response systems, we are relying on our partners without their consent.

Many FLA interviewees expressed concern that the wildfire organization will continue to respond in dangerous situations and that to provide care to our employees, the agency should endeavor to find ways to provide night

and hoist capable helicopters, staffed with advanced life support for the purpose of extracting and caring for injured firefighters.

Having access to a dedicated extraction capable, medical response resource would greatly simplify the medical plan on any single incident. But establishing a wide-reaching, reliably available program dedicated to extracting injured wildland firefighters would require an incredible investment, whether contracted or agency directed. Investments have already been made in allowing firefighters to refuse assignments and engage in the decision-making process around the operations assigned to them. At what point do resources refuse assignments because they do not have dedicated medical response? Or, at what point does the agency provide dedicated medical response?

To finish sensemaking done by the FLA Team, there was notably more conversation and space given to the mental health status of interviewees than in prior events examined by FLA Team members. It is a theory that increased emphasis on mental health is providing current firefighters with the tools and abilities to better equip them to process traumatic events. While individual responses to trauma vary greatly, the ability to discuss, share, and work through difficult experiences is more widely accepted and encouraged. While we do not know the ultimate outcome, it is probable that firefighters today are trending away from post-traumatic stress disorder and toward post-traumatic growth.

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4. Appendix – The PPE Performance Report

Lone Pine Fire Tree Strike

Personal Protective Equipment Performance Review

Introduction

Subject matter experts (SMEs) from the U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP) conducted a visual inspection of the helmet. NTDP was provided with additional information gathered from interviews and site visits by the Facilitated Learning Analysis team.

Background Information

A hotshot with the U.S. Forest Service was struck by a falling tree while fighting the Lone Pine Fire on the Six Rivers National Forest on Wednesday, August 16, 2023.

The firefighter was on a saw team constructing line on a spot fire when struck from behind by a falling dead tree. The tree was reported as a 20- to 30-foot-tall pine tree (candlestick) with a 20-inch DBH, the tree was rotten and on fire when it fell silently, impacting the firefighter. The firefighter was struck by the upper 1/3 of the tree (approximately the top 5 feet of the tree) as it neared the completion of its fall. Crew reports indicated that the hotshot was struck from behind by the tree and the helmet received a direct blow. The helmet was knocked off by the impact. The hotshot sustained fractures to the cervical vertebrae C4 and C5.

Helmet Nomenclature

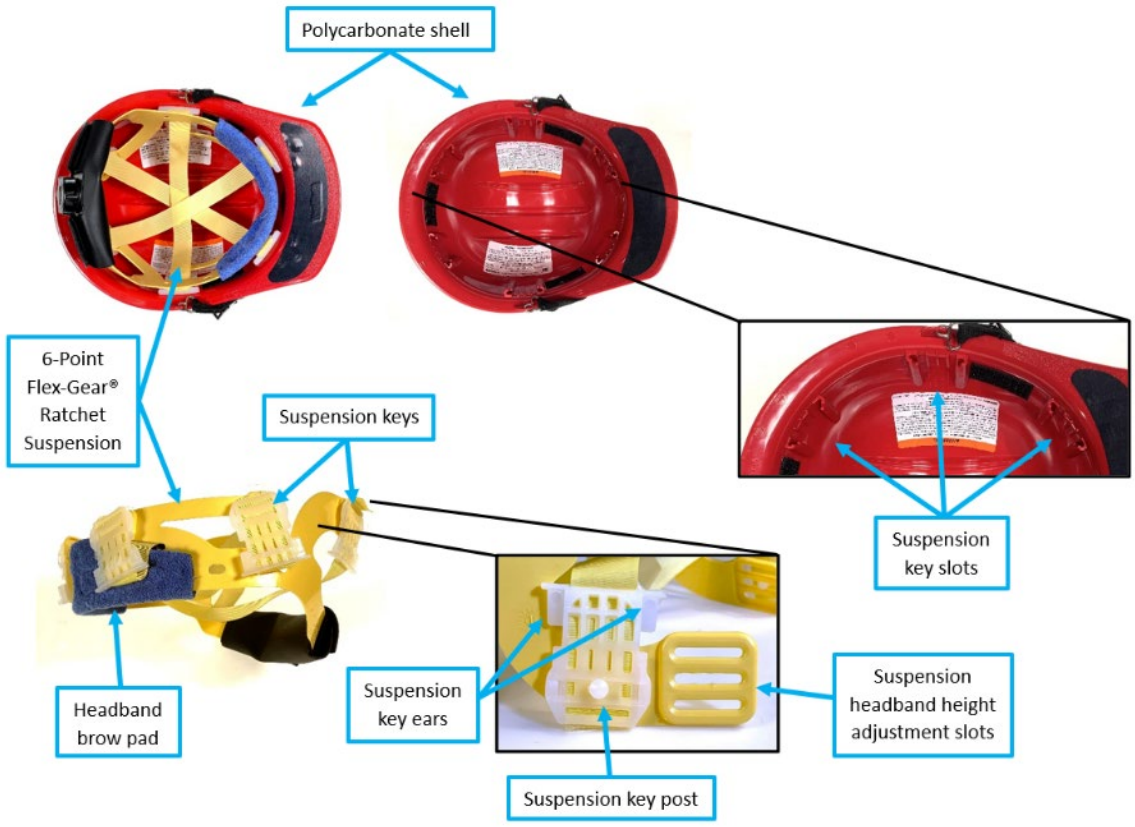

Figure 8: Helmet Nomenclature.

Helmet Evaluation

NTDP conducted a visual inspection of the helmet. The inspection only provides information on what is seen on the helmet, not when the damage occurred.

The information and locations described reference the helmet in the position worn.

Helmet material: Polycarbonate shell
Date of manufacture (shell): 03/2019
Date of manufacture (suspension): 11/2013
In-service date: 03/28/2023
Helmet certifications: National Fire Protection Association (NFPA) 1977 Standard on Protective Clothing and Equipment for Wildland Firefighting, 2016 edition; American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) Z89.1-2014, Type 1, Classes E and G.

Shell Condition, Outer Surface—Scuff Marks

Image 1: Front, back, and side images of the helmet

The factory-placed retroreflective striping are no longer present, and a customized retroreflective marking is present on the left side. There are miscellaneous scratches, scuffs, abrasions, and dark patches present throughout the external surface. These marks are consistent with normal use.

More noticeable marks were observed in the following locations:

Left-back quarter of helmet: Noticeable scuff/abrasion running in a “top to bottom” direction (see image 2). This mark is on the opposite aspect of the keys that were released from the key slots.

Left side surface: White-colored scratch running parallel to the brim of the helmet below the headlamp bracket (see image 3). *Crew noted storing helmets in vehicle racks during the season.

Image 2: Showing “top to bottom” abrasion.

Image 3: Scratches parallel to the brim.

6-Point Flex-Gear® Suspension Condition

Suspension Webbing Fibers and Suspension Key Post

The suspension headband height adjustment slot was disconnected from the right rear key post (see Image 4). That right rear key has stretched webbing fibers present where the webbing connects to the key.

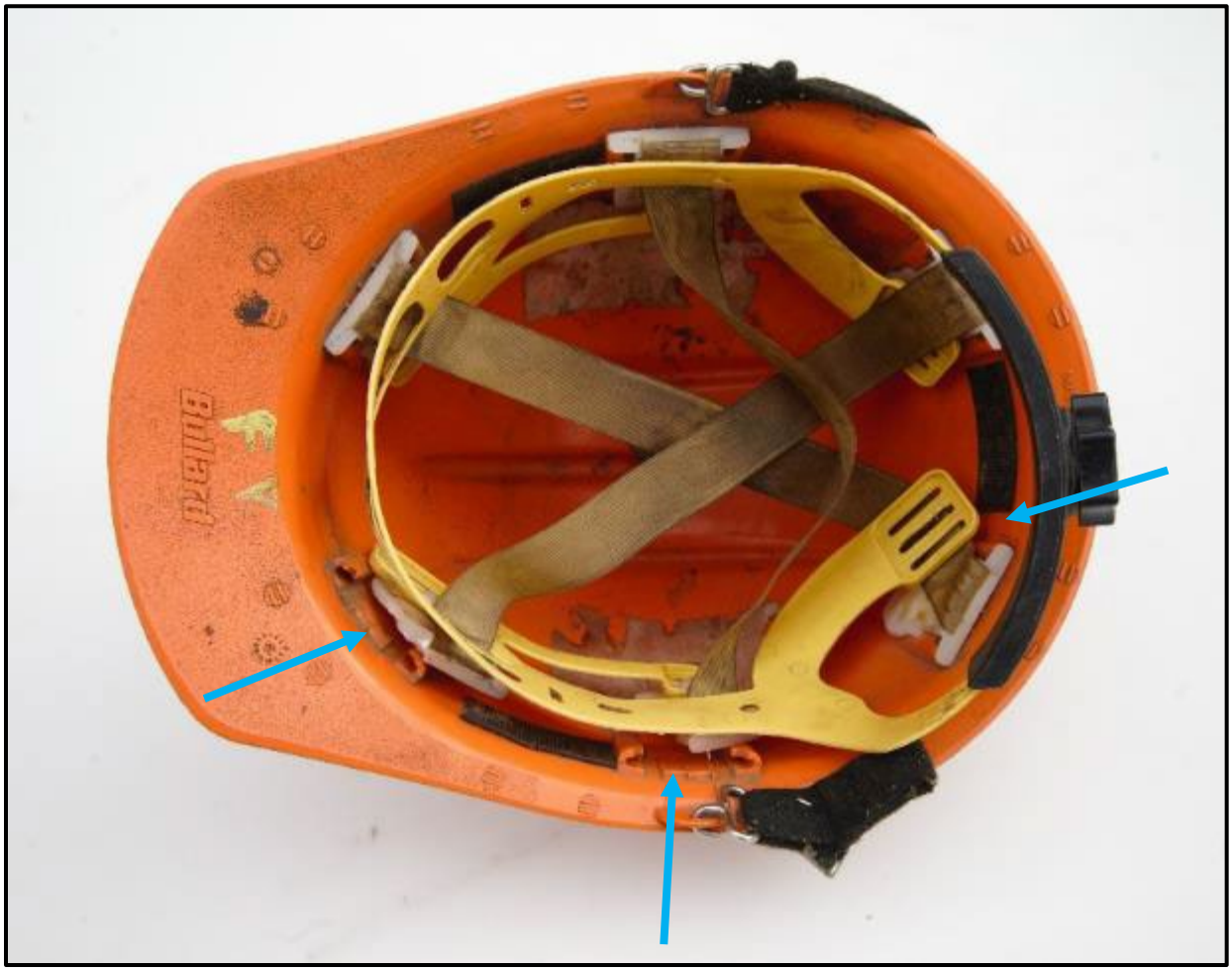

Image 4: Helmet suspension as provided to NTDP SMEs. Note the released suspension keys and disconnected height adjustment slots on the helmet's right side (identified by blue arrows).

Suspension Key Damage

The right front and right center keys were released from the key slots on the shell (see image 4). Both released keys had ear pieces that were sheared off (see Image 5). The right front key is missing the anterior ear and right center key is missing the posterior ear.

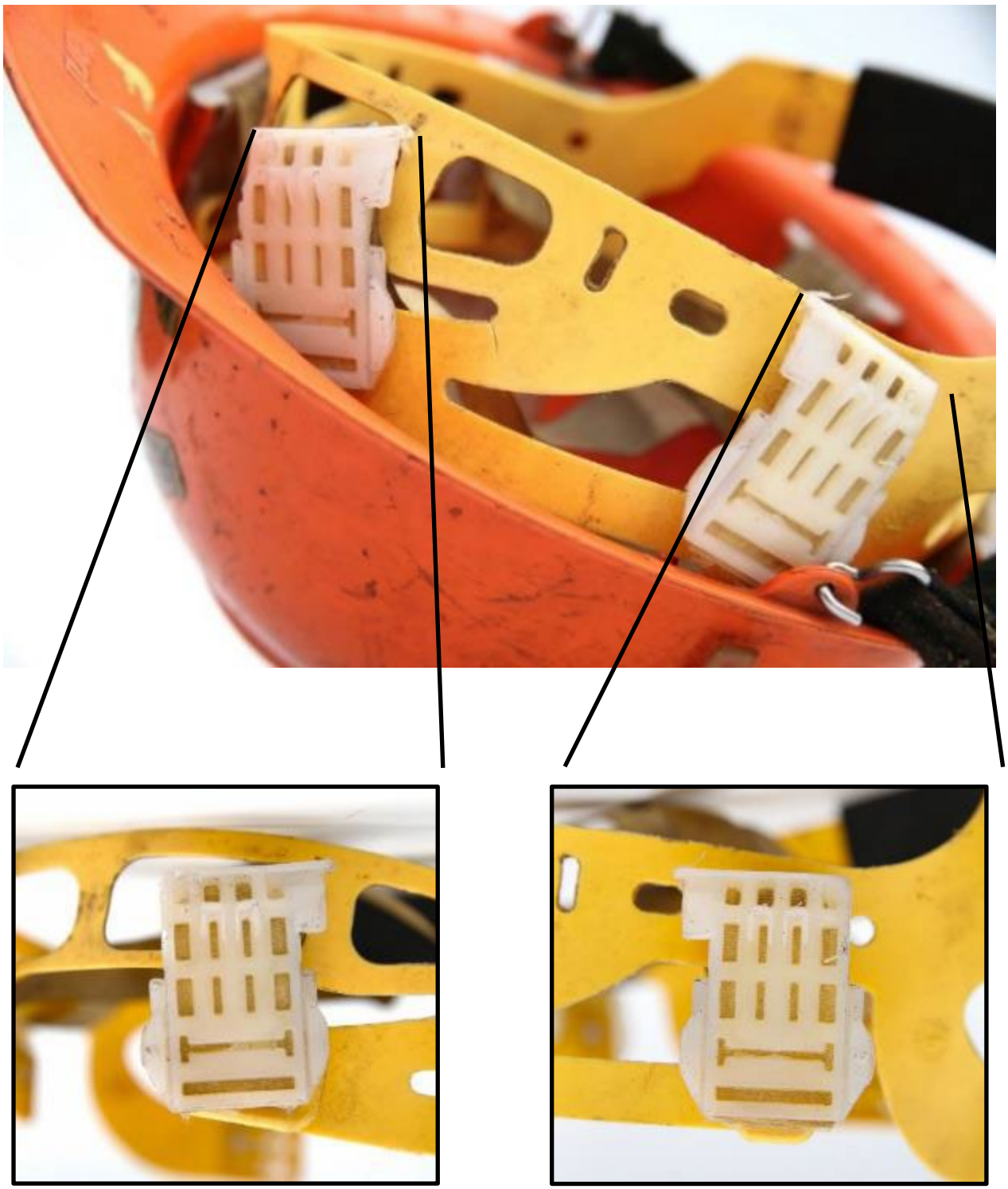

Image 5: Damage to suspension key ears.

Suspension Headband (yellow plastic)

Between the right front and right center keys, there is a tear in the yellow suspension headband (see Image 6).

Image 6: Black circle shows the tear in the headband.

Conclusions

Witness statements indicated that the hotshot received a direct impact on the back aspect of the helmet. The impact was forceful enough to release and damage suspension keys, disconnect the suspension headband adjustment slot from a key post, stretch the suspension webbing on the helmet, and result in fractures to the C4 and C5 vertebrae.

Helmets with NFPA 1977 and ANSI Z89.1 certifications pass a series of tests. Among them is the force transmission test. This top only impact test simulates the force a brick generates when falling from a height of 5 feet onto a person's head. The falling brick generates 55 joules of energy on impact with the helmet, and for the helmet to pass, the force transmitted to vertebrae cannot exceed 4450 newtons (N). Vertebral damage is more likely to occur when energy transmitted to the vertebrae exceeds 4450 N.

> Protective helmets reduce the amount of force from an impact blow but cannot provide complete head protection from severe impact and penetration.
>
> – ANSI Z89.

In collaboration with industry experts in their testing facility, NTDP equipment specialists evaluated the amount of force required for a top only strike to break suspension keys and/or damage suspension webbing. The resulting data showed that when forces exceeded 90 joules this type of damage began to occur. The testing was performed

with impacts being centered on the top of the helmet, distributing force evenly to the suspension. Lateral or off-center impacts result in uneven forces applied to the helmet suspension system with the suspension system generally seeing greater forces on the side opposing the impact location.

On the fireline, top-only impacts occur less frequently than lateral or off-center impacts. In off-center or lateral impacts, damaged or released keys are often found on the side opposing the impact location. In the Lone Pine Fire helmet strike, the force of the impact was not a top-only impact, it was a lateral (from the rear) impact. The lateral impact exceeded the design and performance requirements of this helmet.

Helmet Information

Refer to the Interagency Standards for Fire and Aviation Operations (The Red Book), Chapter 7: Safety and Risk Management for Federal wildland fire incident and agency-specific helmet requirements.

Helmet Certification

A helmet certified under NFPA 1977 meets ANSI Z89.1, Type 1, Class G. Type 1 helmets are intended to reduce the force of impact resulting from a blow to the top of the head. Class G helmets are intended to reduce the danger of contact with low-voltage electrical conductors. Compliance with NFPA 1977 ensures that head protection (helmets) used in wildland firefighting meet minimum design, performance, labeling, testing, visibility, and certification requirements.

Removal of the retroreflective striping on helmets is common amongst firefighters. The removal and/or replacement of the striping, while not affecting the impact performance protection, takes the helmet out of compliance with NFPA 1977 visibility requirements.

Reminders

- Helmets and personal protective equipment (PPE) are designed to protect the wearer and minimize the risk of severe injuries.
- Inspection of helmets and components should occur when issued and throughout the season to identify any defects or deviations from normal. Remove helmets from service if any defect is found.
- Chemicals and insect repellants may damage polycarbonate (shell) helmet materials.
- Please refer to the National Wildfire Coordinating Group (NWCG) Fire Shelter and Personal Protective Equipment Subcommittee (FSPPE) webpage for information specific to PPE. Select the helmet tab on the FSPPE webpage for more information on performing helmet inspection procedures.