

Gore Fire at 1427
Photo Credit: Emily Barker

KNOWLES FIRE 2026

SERIOUS ACCIDENT INVESTIGATION

Location: Upper Colorado River Interagency Fire Management Unit
McInnis Canyons National Conservation Area
Date: Saturday, June 27, 2026

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Serious Accident Investigation Team

Team Leader - USWFS: Chuck Russell
Assistant Director, Fire Coordination (USWFS)
Team Leader - USFS: Mark Pieper, Fire Technology Transfer Specialist, Office of Innovation and Organizational Learning (USFS)
Deputy Team Leader - USFS: Tess McCarville
Fire Leadership Development Program (USFS)
Team Safety: Mack McFarland
Wildland Fire Safety and Risk Program Specialist (USWFS)
Chief Investigator: John Petty
State Safety & Occupational Health Manager NM/OK/TX (BLM)
Subject Matter Expert - Aviation: Joe Rogan
National Helicopter Program Manager (USWFS)
Subject Matter Expert - Helicopter: Nathan Gilmore
DENA Helicopter Program Manager (USWFS)
Subject Matter Expert - Operations: Jon Teutrine
Assistant Chief of Operations, Eastern Geographic Area (USWFS)
Subject Matter Expert - Fire Behavior: Ashley Sites
Emergency Firefighter, Gallatin County, Montana
Subject Matter Expert - Dispatch Operations: Jada Altman
Central Oregon Interagency Dispatch Center Manager (USFS)
Subject Matter Expert - Equipment: David Maclay-Schulte
National Technology and Development Program (USFS)
Subject Matter Expert - Equipment: Brendan Quinn
National Technology and Development Program (USFS)
Subject Matter Expert - Communications: Vance Andersen
National Radio Operations Section Chief (USWFS)
Subject Matter Expert - Rocky Mountain GA: Ryan Sharpe
Rocky Mountain Safety Program Manager (USWFS)
Writer/Editor: Samantha Orient, Technical Specialist (AD)
Writer/Editor: Erik Apland, Field Operations Specialist, Lessons Learned Center (USFS)
Union Representative: Joshua Northrup
Fire Operations Specialist, Okanogan-Wenatchee NF (USFS)
Union Representative: Paul Dziekan, Assistant Fire Engine Operator, Grand Mesa-Uncompahgre-Gunnison NF (USFS)

Chuck Russell
Chuck Russell (Oct 18, 2026 19:48:26 MDT)

Mark Pieper

Tess McCarville
Tess McCarville (Oct 21, 2026 14:47:20 PDT)

Mack McFarland (Oct 23, 2026 14:50:35 MDT)

John Petty
John Petty (Oct 19, 2026 08:48:14 MDT)

Joe Rogan
Joe Rogan (Oct 19, 2026 07:57:13 MDT)

Nathan Gilmore
Nathan Gilmore (Oct 22, 2026 11:41:05 MDT)

Jon Teutrine (Oct 25, 2026 21:30:06 CDT)

Jada Altman
Jada Altman (Oct 19, 2026 08:03:23 PDT)

Brendan Quinn
Brendan Quinn (Oct 21, 2026 15:08:09 MDT)

Vance Andersen (Oct 21, 2026 16:09:19 MDT)

Ryan Sharpe

Samantha Orient

Erik Apland (Oct 23, 2026 13:48:00 PDT)

Joshua Northrup
Joshua Northrup (Oct 19, 2026 07:28:55 PDT)

Paul Dziekan
Paul Dziekan (Oct 27, 2026 11:58:22 MDT)

Technical Assistance

Systems Analyst: Dr. Laura Maguire, Human Performance Expert (Trace Cognitive)
Communications Analyst: James "Vance" Cornelius, Telecommunications Specialist (BLM)
Communications Analyst: Morgan Gill, DOI OCIO Telecommunications Specialist (BLM)
Communications Analyst: Clayton Terrell, Region 2 Regional Radio Manager (USFS)
Communications Analyst: Patrick Lamb, Supervisory Radio Technician (USFS)
Communications Analyst: Kajun Schmaus, Network Engineer (USFS)
Logistics Specialist: Morgan Alexander, Logistics Coordinator, NICC (USWFS)
Logistics Specialist: Esther Gruber, Budget Analyst (BLM)
Fire Modeling: Richard Stratton, Long-term Fire Analyst (USFS)
GIS Support: Benjamin Gannon, Technical Specialist (USFS)
3D Terrain Modeling: Matt Gibson, Technical Specialist (JillPoke Consulting LLC)
UAS Lead Pilot: Matt Dutton, Aviation - UAS Operations (USFWS)
UAS Pilot/Data Specialist: Adam Ridley, Remote Sensing Data Manager (BLM)
UAS Pilot: Bobby Eisele, Aviation - UAS Operations (USWFS)

Executive Summary

On June 27, 2026, at 1519, in western Colorado, five wildland firefighters on the Rifle Helitack crew were entrapped by fire and deployed their fire shelters at a helispot between two approximately 1/10-acre fires they had been working to suppress: the Knowles and Gore Fires. A separate, large fire overtook their location. It had been first observed about eight miles to the west approximately 3 ½ hours before the entrapment. From approximately 1236 until 1519, the fire ran just under 7 ½ miles over complex broken mesa and canyon topography, which was described as "shocking" and "unfathomable" by interviewees.

In the entrapment, three firefighters – Emily Barker, Nick Hutcherson, and Sydney Watson – lost their lives from airway injuries. Two firefighters initially survived the entrapment. After several attempts to access the site to rescue them, a helicopter was able to extract the two surviving firefighters from the helispot/deployment site. Both injured firefighters were transported to the Burn Center in Denver, Colorado. On July 24, 2026, crewmember Nathan Matthews passed away because of the injuries he sustained during the entrapment. One crewmember continues to recover from their injuries.

This report is based on interviews with dozens of the event's participants: the surviving firefighter and others from their crew, resources on adjacent fires, fire managers, dispatchers, and other witnesses and individuals with knowledge of the events. Additional sources of data include dispatch logs, physical evidence from the entrapment site, photos and videos from the day of the entrapment, remotely-sensed data, radio transmissions, and other sources.

The intent of this report is twofold: 1) to understand (or make sense of) this complex event by constructing its story from perspectives across the fire response system, and 2) to identify pathways to avoid similar future accidents through a robust analysis of the report's findings. The Knowles Serious Accident Investigation Team mourns those we have lost and holds the integrity of this report and a commitment to learning in paramount importance. In wildland fire, we must honor through learning.

Background

Fire Management Setting

Multiple lightning ignitions were detected in the canyons and mesas of the McInnis Canyons National Conservation Area (NCA) south of the Colorado River on both sides of the Colorado/Utah border on Saturday, June 27th. Five of these ignitions were the Snyder, Jones, Dolores, Knowles and Gore Fires. This area is a complicated landscape between the Great Basin and the Southern Rocky Mountains called the Colorado Plateau. Much of the land area is managed by the Bureau of Land Management (BLM), who also maintained fire management responsibilities until the consolidation of the Department of the Interior fire organizations into the US Wildland Fire Service (USWFS) in early 2026. The Utah/Colorado border generally separates the Great Basin Geographic Area (GBGA) from the Rocky Mountain Geographic Area (RMGA), with the exception of some Upper Colorado River Interagency Fire Management (UCR) Unit response areas extending into Utah in the Black Ridge Canyons Wilderness, a federally-designated Wilderness area inside the McInnis Canyons NCA. Access is easiest from the Colorado side of the border (see Figure 1).

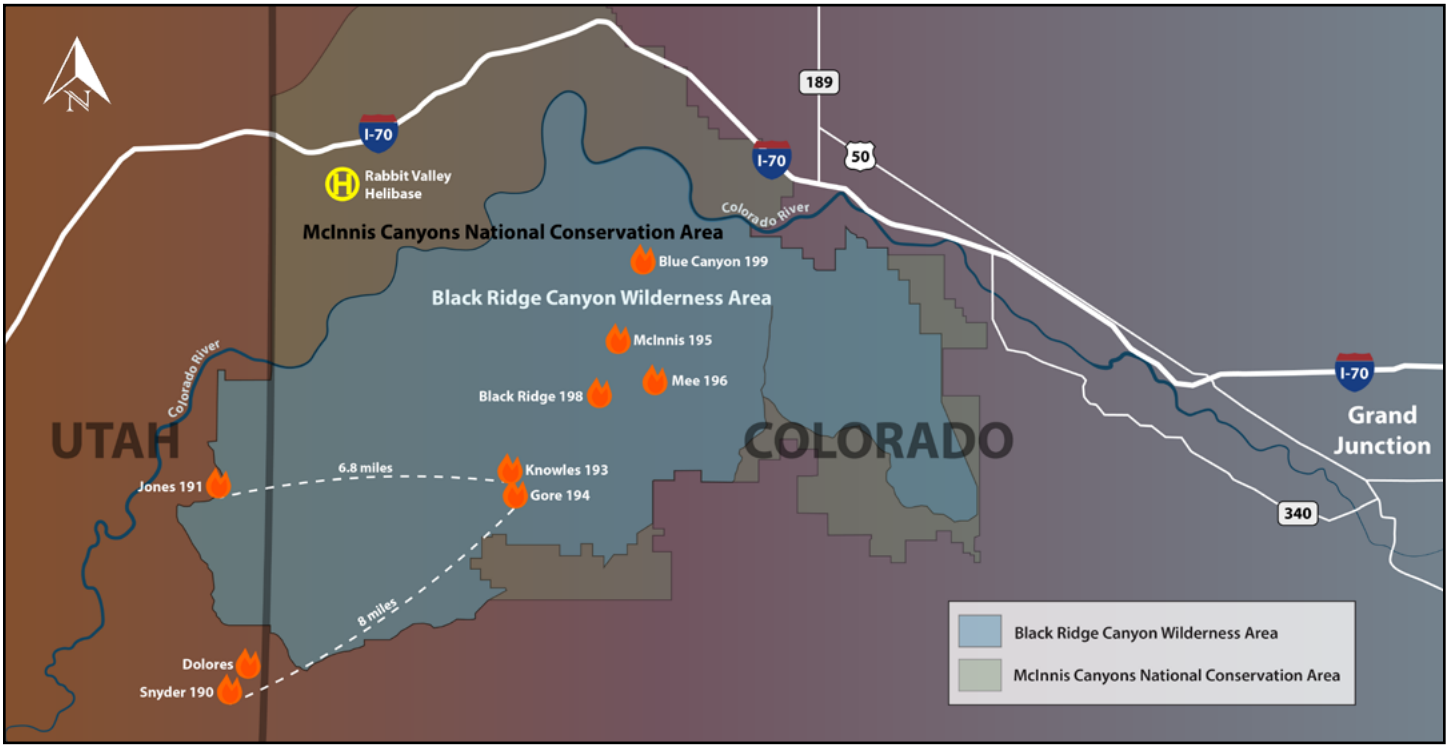


Figure 1. McInnis Canyons National Conservation Area is located near the Colorado-Utah border.

Upper Colorado River Interagency Fire Management Unit

Following the 1994 South Canyon Fire, a concerted effort was undertaken to consolidate fire resources in the Upper Colorado River area to improve interoperability, communication and efficiency. This area has operated for decades under the combined, "service first" organization[1] known as the Upper Colorado River Interagency Fire Management (UCR) Unit.

Rifle Helitack was one of the programs that arose from this period, an interagency program with both US Forest Service and Bureau of Land Management (USWFS starting in 2026) crewmembers staffing a helicopter

1 In a service first organizational model, the service provided to the public and resources is the priority, while land jurisdictional considerations are secondary.

together as one cohesive unit. The program was the successor to the Western Slope Helitack crew. Perched at 5,500 feet at Garfield County Airport, the Rifle helibase hosts a Type 1 helicopter with two managers and a Type 3 helicopter (an AS350 B3e) with a 10-person interagency helitack crew.

The push for such combined interagency programs was seen across the United States, particularly in Colorado. The 1995 Federal Wildland Fire Management Policy and Program Review states: "Increasing costs and smaller work forces require that public agencies pool their human resources to successfully deal with the ever-increasing and more complex fire management tasks." It also promotes "[f]ull collaboration among Federal agencies and between the Federal agencies and State, local, and private entities..." The success and longevity of these service first organizations has been variable across the country. In the UCR, the concept has proven resilient.

The Type 3 helicopter came on contract June 1st, and four crew members were onboarded the same week. It was an administratively heavy time period for the crew overhead, and early June was busy with training. The second week the crew was fully engaged the in fire season, with 7-10 days of IAs and lots of flight time for the Type 3 helicopter. Despite the forecasted weather, the fuels and fire progression seemed typical to the crew leadership for the time of year. Rifle Helitack has a longstanding, close relationship with Pitman Valley Helitack, based on the Kaibab National Forest in Northern Arizona. This year, as in many years past, they had several crewmembers from Pitman Valley on the crew on two-week assignments[2].

Climate

For most of western Colorado, the greatest monthly precipitation occurs in winter, while June is the driest month. Near the Utah border, however, late summer and early autumn can be the wettest time of year. While precipitation averages only 8 to 14 inches in these western valleys, localized flood-producing storms are still possible. This precipitation is associated with the North American Monsoon, when moisture from the Pacific Ocean and Gulf of California brings rainfall and thunderstorms into the Southwest, Great Basin, and Southern Rockies.

The mix of canyons and plateaus in the McInnis Canyons NCA creates microclimates due to variable shading and wind sheltering. This creates cooler, shadowed microclimates on the canyon floors, trapping moisture and causing temperature drops of 10°F to 15°F compared to the open arid environment above. In general, precipitation decreases and temperature increases approaching the Utah border to the west, though elevation and topography also play key roles in precipitation distribution.

Fuels

Burnable vegetation in the McInnis Canyons NCA is comprised of grasses, including areas of cheatgrass (Bromus tectorum) intrusion, sagebrush, and the pinyon pine and juniper association that is so common in the Intermountain West it is widely referred to simply as "PJ." Other areas in the UCR are characterized by the mixed mountain shrub fuel type.

Values at Risk : Why Fires are Suppressed

Values at Risk (VAR) (see Figure 2) are explicit priorities that drive fire management decision-making, including incident and resource prioritization. In the Wilderness locations where the Knowles, Gore, Snyder, Dolores and Jones Fires burned, a high priority for fire management decision-making was the exclusion of cheatgrass:

2 Pitman Valley and Rifle Helitack are sister crews and exchange personnel for training opportunities and to fill in crewmembers during high-activity periods.

a highly invasive, highly flammable, nonnative species. A 2023 report[3] used to guide local decision-making describes the relationship between cheatgrass and fire regimes and recommends limiting fire size as a potential management strategy. Cheatgrass readily invades burned areas and, once established, shifts the fire regime towards more frequent fires. Also, in areas of Sage Grouse Critical Habitat (which includes the McInnis Canyons NCA), preventing cheatgrass invasion is considered essential.

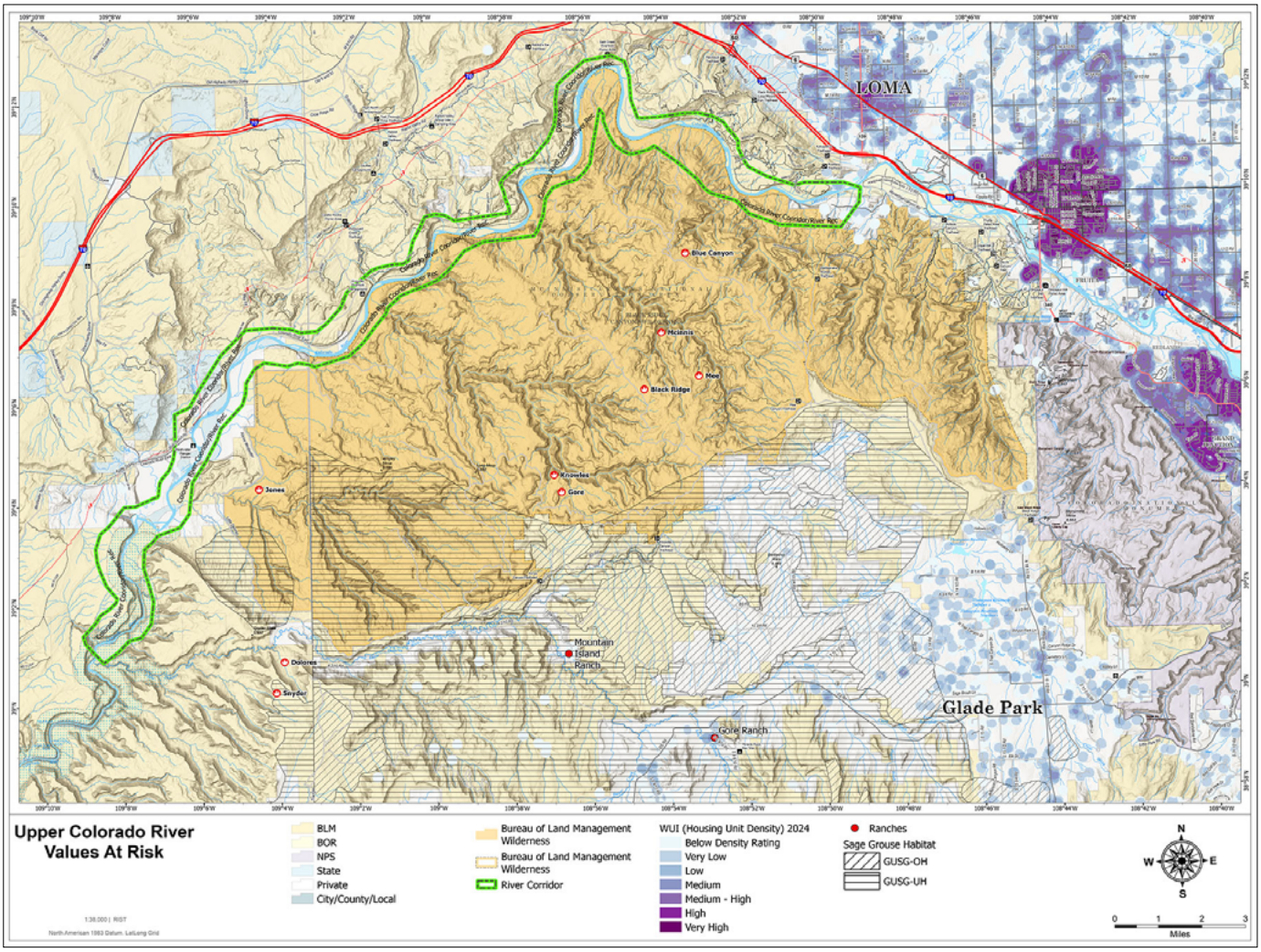


Figure 2. Values at Risk adjacent to the lightning starts discovered on June 26th and 27th.

During the summer, heavy recreation use, particularly along the Colorado River but also along hiking and mountain bike trails throughout UCR area, represents another significant VAR. Safety of recreationists is a paramount concern whenever fires are detected near recreation sites or corridors. In response to the explosive fire growth on June 27th, for example, Mesa County evacuated over 120 boaters from the Colorado River.

In more developed areas classified as Wildland-Urban Interface (WUI), or lands adjacent to WUI, protection of human infrastructure is a key driver of fire management decisions. On the UCR this infrastructure may take the form of settlements, towns and cities, scattered rural homes and ranch facilities, or oil and gas infrastructure. For fires located in the Black Ridge Canyons Wilderness, oil and gas infrastructure is not a concern. However, nearby ranch properties outside the Wilderness boundary, as well as the adjacent community of Glade Park and the private property and homes radiating out from it, are all significant WUI concerns.

3 A report titled Cheat Grass Management Strategies for the Grand Junction Field Office, commissioned in 2023, describes the relationship between cheatgrass and fire regimes and recommends limiting fire size in many instances as a potential management strategy. This document is considered by local Grand Junction wildland fire resource advisors when fire occurs in wilderness areas.

Analysis: Land management policy in the Black Ridge Canyons Wilderness prioritizes the exclusion of invasive cheatgrass and the protection of Gunnison sage-grouse critical habitat. These ecological mandates, along with protection priorities for the downwind Glade Park community, established an organizational posture to aggressively suppress new starts while small. This policy framing drove the decision to insert helitack firefighters onto small wilderness starts on a day with extreme fire weather conditions forecast. **REVIEW FINDINGS »**

Significant Fire History

Over the last 50 years, historical records show that 23 firefighters have been killed during suppression of fires in the UCR area. Twenty-one firefighters were lost in three separate entrapments, and two pilots in two 1976 air tanker crashes. Two of these entrapments are among the most well-known in the United States wildland fire system: Battlement Creek on July 17, 1976, and South Canyon on July 6, 1994. Both of these fires occurred further east in more mountainous terrain with mixed mountain shrub fuels. Among the 14 firefighters lost on the South Canyon Fire were two helitack crewmembers, Richard Tyler and Robert Browning, with the BLM Western Slope Helitack crew then based in Grand Junction, Colorado.

The fire management history of the Upper Colorado River (UCR) area is punctuated by rapid wind-driven fires in volatile fuels. In the west zone and the McInnis Canyons NCA, single tree fires are common. In recent years, there were six fires in similar terrain and fuels over 100 acres in or near the McInnis Canyons NCA, the largest of which burned 2,466 acres in 2002[4]. For local fire personnel, the expectation for size of large fires is several hundred acres.

Weather factors driving increased fire behavior (strong winds, high temperatures, low humidities, and thunderstorms) are common in the semi-arid climate of much of the western portion of the UCR. As such, firefighters on the UCR are accustomed to frequent Red Flag Warnings in Fire Weather Forecasts. Aggressively suppressing fire on Red Flag days is a necessary part of the fire management strategy of the unit.

Fire Behavior

Recent fire history analysis indicates that the UCR has experienced four days in the last five years with more than ten fire starts[5]. Taken as an average, that is fewer than one day/year (0.8 days/year) with that level of initial attack (IA) activity.

The fire behavior observed on the Snyder, Jones and Dolores Fires, however, was unusual for this area. In interviews with experienced local firefighters, there was consensus that fires in the broken and complex terrain of the McInnis Canyons NCA generally run where the wind and fuels would allow until they were contained at natural barriers: cliff-bands, washes, or canyon edges. A handcrew supervisor with local experience estimated that most extended attack fires burned between 15 and 400 acres before they were contained. This broadly agrees with fire history data. The 2025 Westwater Fire was cited by a local firefighter as a recent representative example: a 220-acre fire successfully contained after a few days of suppression operations. This fire footprint was completely reburned on June 27th.

4 Fire history data from GeoMAC and NIFC historic fire perimeter GIS sources.

5 Fire frequency analysis from FireFamilyPlus.



Figure 3. Typical topography in the McInnis NCA consists of long, flat mesas cut by canyons of several hundred feet deep. Canyons in the fire area generally run northwest to southeast.

An Air Attack with more than 30 years of experience was "shocked" at the run the Snyder, Jones and Dolores Fires made on June 27th. At 0800 the combined fire acreage was approximately 60 acres. By 1930 the fires had grown and eventually burned together, encompassing over 28,000 acres. The vast majority of this fire growth was after 1230. The fires' tendency to spot over natural barriers that day was unlike anything the fire management organization had previously experienced.

Reflecting afterwards on the fire behavior they had witnessed that day, the resources that responded to the Jones and Snyder Fires used many superlatives. For some, it was the windiest day they had ever experienced on a fire, or, indeed, at all. One experienced firefighter described it as less like normal fire spread and more "like a storm, sweeping with the wind" over the landscape.

Environmental Conditions Leading up to 2026 Fire Season

Western Colorado had experienced back-to-back La Niña winter seasons in 2024-2025 and 2025-2026, which typically means drier winters. The 2024-2025 winter was in the top 10 driest winters across western Colorado going back to 1895. Compounding the dry winter, the 2025 summer did not see the North American Monsoon develop far enough east to bring that typically wetter weather in the late summer. The 2025 autumn was not as dry as the winter and summer but was the second warmest in the last 130 years. The 2025-2026 winter was the warmest on record, creating a serious lack of snowpack that saw ski areas across the state closing early. This extended period of warmth and dryness led to the development of long-term extreme drought[6]. This drought depleted the moisture across the landscapes in western Colorado. March had been unusually windy, hot and dry. The 1,000-hour fuel moistures had reached 6% at 9,000 feet, a time of year when these fuels would typically be covered with snow.[7] With no opportunities to burn within prescription, the spring 2026 prescribed fire season was abandoned on the UCR, save for some pile burning in the Glade Park area in late March. These units had to be mopped up by firefighters two days after ignitions. As an indication of the expected conditions, the Type 1 helicopter and the Air Attack aircraft were brought on contract one month early.

Moving into the early summer, thunderstorm activity becomes more common across western Colorado when periods of increased moisture move in from the Greater Four Corners region. Typically, these monsoonal storms start out with limited rain reaching the ground as the lower levels of the atmosphere are still dry

6 Source: US Drought Monitor https://droughtmonitor.unl.edu/

7 The average moisture of this size class across the entire Lower Colorado River Plateau Predictive Service Area in late March is approximately 17% according to RMCC.

enough to evaporate the falling rain. This leads to these initial storms having more dry lightning associated with them.

Coming into the fire season, the area southwest of Grand Junction to the Utah border had been in Extreme Drought (D3) since the end of March. The Little Dolores Remote Automated Weather Station (RAWS), nearest to the area of interest in this report, recorded a total of 9.8 inches of precipitation in the entire 12 months between July 1, 2025 and June 30, 2026. Since January 2026 the total was only 4.1 inches, with two months – March and June – recording less than 0.1 inches of precipitation for the entire month. A Fire Environment Statement was issued by Predictive Services on June 2nd warning of "Early Onset of Elevated Fire Potential on DOI Lands in the West."[8] By late June, fires in Nevada and Utah had shown unexpectedly rapid rates of spread, fuel receptivity, and resistance to control. The GBGA, with its eastern edge at the Colorado border, went into Preparedness Level 3 (PL3) on June 27th, and activity was increasing. The RMGA was in PL2, with only one large fire listed: the Dry Creek Fire, south of Rifle in the UCR, was 100% contained.

Dispatch Center and Communication System

Two dispatch centers – one in Utah, the other in Colorado – played key roles in the events of June 27, 2026. The Moab Interagency Dispatch Center (UT-MFC) provides coverage over a large area of southeast Utah, from north of Price southward through Moab past Blanding in the south. During the fire season of 2025, UT-MFC was temporarily moved from Moab to co-locate with the Uintah Basin Dispatch Center (UT-UBC) in Vernal, 130 miles to the north.

The Grand Junction Interagency Dispatch Center (CO-GJC) provides dispatch services to a large area of west-central Colorado, abutting UT-MFC's coverage area across the border. UCR resources, among others, are dispatched out of CO-GJC. Both dispatch centers have endured staffing shortages and technological difficulties in recent years.

On October 23, 2025, the Utah Oversight Committee (UOC) submitted a tasking to both Board of Directors (BOD) and Fire

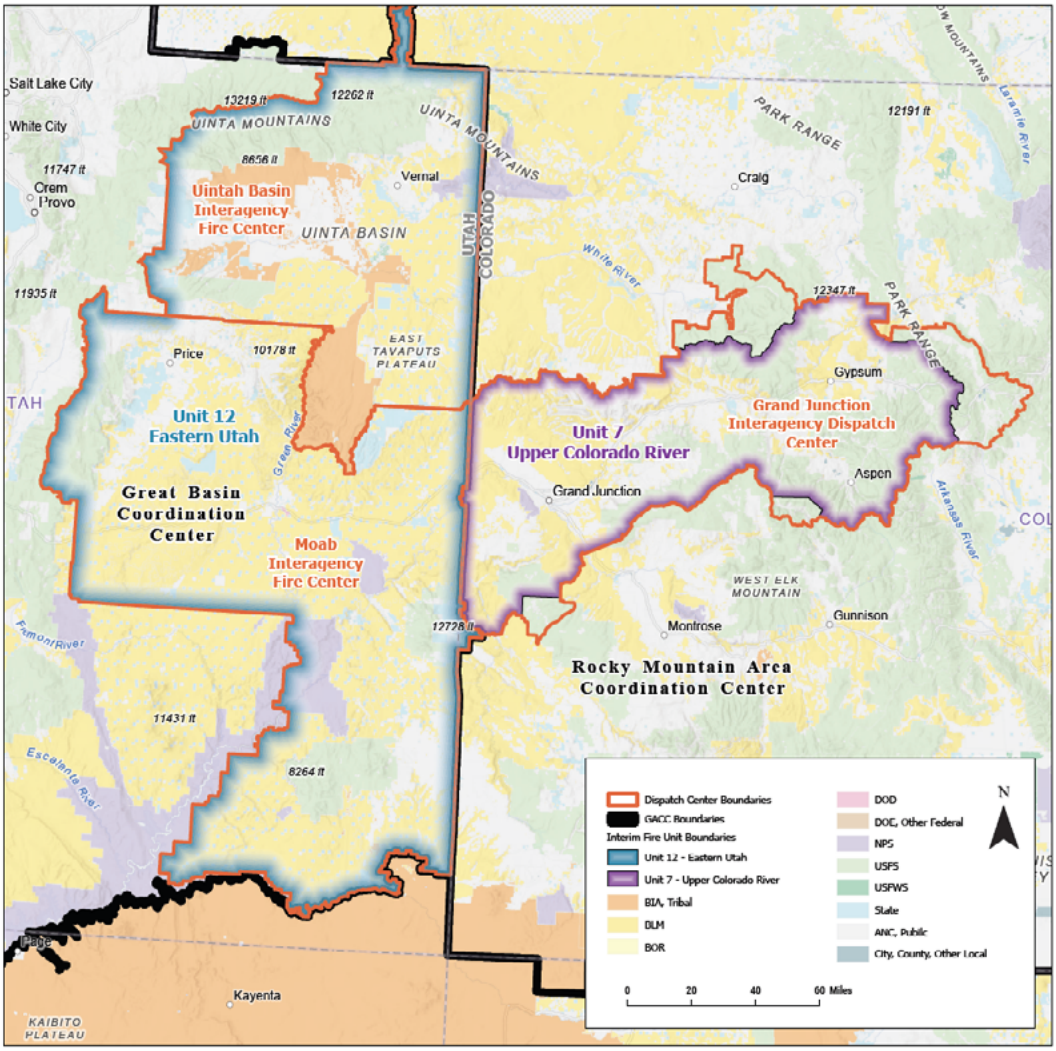


Figure 4. Map delineating boundaries of Geographic Area Coordination Centers, dispatch coverage areas, and fire management units.

8 FES_20260602_Fire-Environment-Statement_USWFS-Western-US_20260602.pdf

Management Groups (FMOG) for a consolidation analysis of the Uintah Basin and Moab Interagency Dispatch Centers. Once this analysis was received, the UOC decided that with the approaching 2026 fire season and the implementation of the U.S. Wildland Fire Service, both Uintah Basin and Moab Interagency Dispatch Centers would implement consolidated dispatch functions out of the Uintah Basin Dispatch Center located in Vernal, Utah.

Prior to the start of consolidation of UT-MFC and UT-UBC, four of five permanent positions at UT-MFC were staffed. Only three permanent positions of six were filled at UT-UBC: the Assistant Center Manager and two Lead Dispatchers. Both centers also hire two seasonal dispatchers each year. During the 2025 fire season a partial COOP plan was activated, and UT-MFC staff would come up for 21-day assignments and occupy the expanded/training room. On July 14th of 2026, dispatch operations were once again moved to Vernal, UT. Current joint staffing has dropped from 15 positions to seven positions, covering nearly 10 million acres of complex terrain and multiple jurisdictions (see Figure 4).

The Great Basin Geographic Area, as well as many others around the nation, are steadily working towards consolidation of multiple dispatch centers. The trend has been to co-locate dispatch centers for a period of time until all communication links, organizational charts, and budgets can be finalized. This transitional period has created time-consuming, duplicative processes. One dispatcher described "how clunky it is having two radio systems and having to switch profiles," noting that they demonstrated the safety risks of this setup to regional representatives.

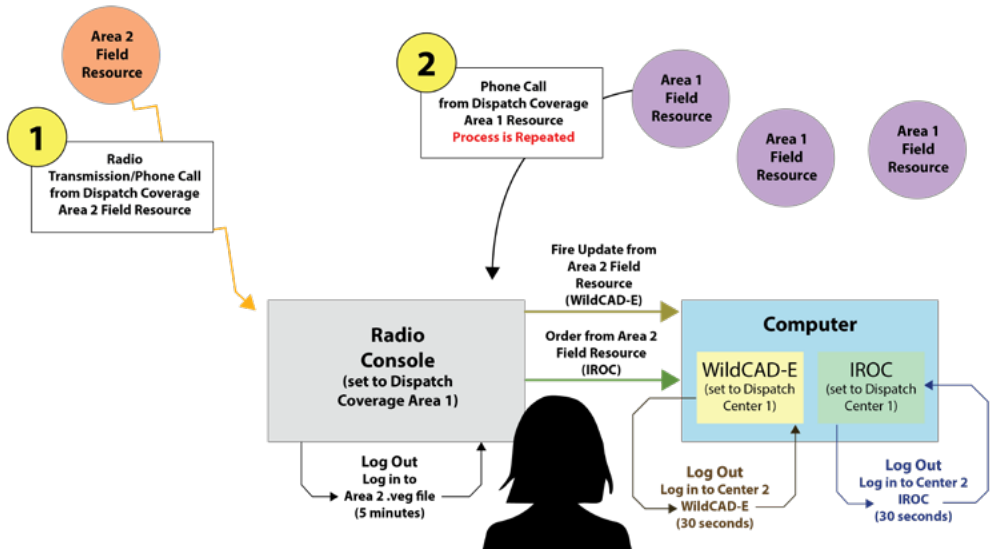


Figure 5. This diagram illustrates the process that a single dispatcher/resource goes through when transitioning from one center's responsibility to another. The process to logout of one .veg file and load another can take up to 5 minutes depending on the network capability. A dispatcher also needs to switch centers within WildCAD-E and IROC, a 30 second process.

Dispatchers must repeatedly log their radio consoles out of one center's .veg file[9] and switch to another, because there is not a combined radio system for both centers. Dispatchers must also switch their dispatch center login in WildCAD-E[10] to track resources or conduct flight following of aircraft and switch their Interagency Resource Ordering Capability (IROC) login for ordering. There is a delay as each system is switched over to ensure orders are filled through the right center or to transmit on the correct radio frequency. The dispatch center is also understaffed. While Administratively Determined[11] (AD) employees and personnel on

9 The settings for a radio console can be saved as a .veg file, enabling those settings to be transferred to a new radio console. This is commonly part of a dispatch center's COOP plan, as it allows remote dispatching.

10 WildCAD-E is a software program designed to manage incidents and dispatch and track local resources. It features Multiple Response Types (e.g. wildland fire, HAZMAT, law enforcement), automated run cards, user-defined GIS layers (e.g. response areas, transportation, recreation base map image, hazards, public land survey system, vegetation, historical fires/incidents), and resource status.

11 Abbreviated "AD", these employees are not regular agency employees but are brought on during periods of need and released from service when the need has passed.

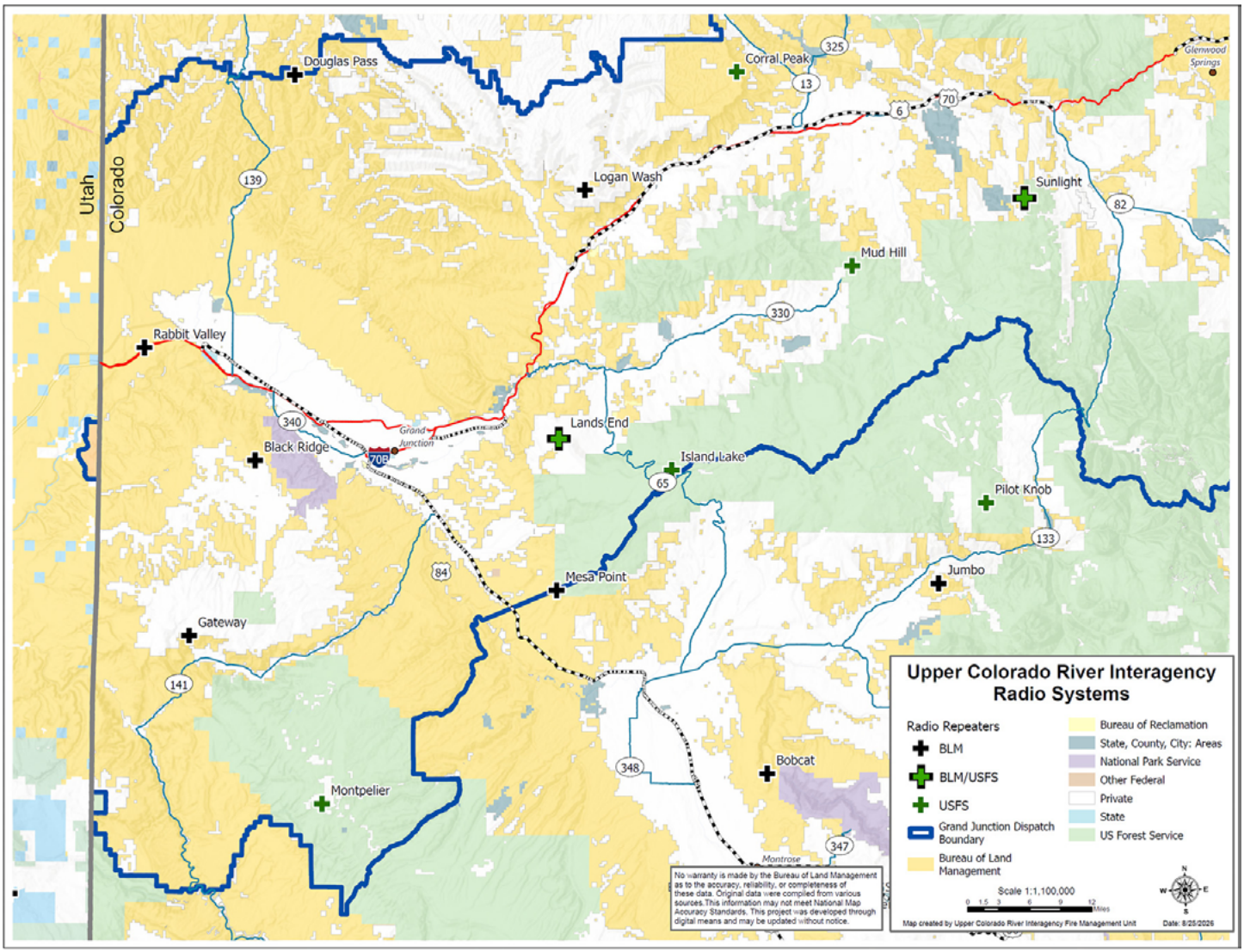


Figure 6. Upper Colorado River Interagency Radio Systems Map.

assignments from other areas have helped support the center, there aren't always enough individuals with the qualifications needed to provide coverage.

In June 2026, following the shift of UT-MFC area mountain top bases from Fortigate backhaul to microwave connectivity, intermittent radio jitter and communication disruptions began to appear. Recurring issues necessitated extensive troubleshooting and bandwidth modifications. The ongoing communication challenges, especially those experienced in June, ultimately influenced management decisions regarding fire operations.

In Grand Junction, the Center Manager (CM) position has been officially unfilled for three years, although a dispatcher has been acting in the role of CM during that time. They similarly have relied on AD employees and a rotation of personnel on assignments to keep staffing levels up. Other dispatch positions are filled, but many dispatchers are working on their Initial Attack Dispatcher (IADP) or Aircraft Dispatcher (ACDP) qualifications. As at UT-MFC, aging radio infrastructure, contract changes to the network, and intermittent software issues created barriers to smooth, prompt radio communication between dispatchers at CO-GJC and resources in the field. To maintain positive communication between resources, dispatch, and fire leadership, cell phones are commonly used, particularly in the canyon and mesa topography of the McInnis Canyons NCA.

The land mobile radio technician position for Grand Junction has been vacant since March of 2025, and during this time multiple reports have emerged of issues at the Lands End and Black Ridge communication sites. Between March and May 2026 the linked Lands End repeater, National Flight Following (NFF), and Airguard

frequencies experienced intermittent outages, culminating in a SAFECOM submission[12] on June 22nd. In mid-June, Radio over Internet Protocal (RoIP) network issues escalated and the disruptions affected fire and aviation operations across Colorado. Another SAFECOM was considered but not submitted.

The communication system supporting fire and aviation in the UCR consists of seven repeaters and a simplex channel (Black Ridge) that share a frequency pair, all converging at a single dispatch point. Use of the Black Ridge simplex channel, which lacks an indicator of transmission or 'tail', can result in radio users inadvertently transmitting over one another. Multiple initial attack fires and the varied terrain in the McInnis Canyons NCA exacerbates this issue. The Black Ridge base station also has aging infrastructure, utilizing a four-wire tone control on a copper circuit. This setup has been associated with reliability issues and is challenging to maintain.

Analysis: Aging Land Mobile Radio (LMR) infrastructure, unaddressed repeater outages, and dispatch console software crashes severely compromised official command channels during peak operations. Because the shared Black Ridge simplex channel lacked a transmission feedback audio signal, field personnel frequently stepped on one another's radio traffic without knowing their transmissions failed. To bypass these technical barriers, firefighters, helitack managers, and dispatchers defaulted to using personal cell phones, which allowed tactical tasks to proceed but created unrecorded information silos across the incident. **REVIEW FINDINGS »**

Narrative

The narrative presents perspectives from different areas involved in the fire operations on June 26th and 27th. Each perspective goes through what was occurring in their operational sphere during time periods of the morning, the afternoon and entrapment, and the response. As you read, each perspective will start and end within the time range listed in the heading. Each new perspective will start at an earlier time than the previous perspective ended. The intent is to separate the information available, actions taken, and difficulties encountered by each operational area during important time periods of this complex event.

A note about time stamps: The data collected in support of the SAI includes cell phone records, texts, WildCAD-E logs, radio transmissions, satellite imagery and interviews. While the SAIT strives for consistency, there are small discrepancies in time stamps due to when an action actually took place. For example, the photo on the front cover says 1427. The metadata shows that Emily took the photo at 1427, however later in the timeline it describes her message to Supt 1 as saying "...it's 2:30" and Supt 1 didn't actually receive the text with the photo until 1431. WildCAD-E is a manual entry log, so timestamps may show a slight delay from the time information was received. When possible, the most accurate data source was used in the narrative.

Ignitions and Initial Attack: 2330 June 26th - 1200 June 27th

Fire Management and Dispatch Perspective

Thirty minutes before midnight, the Assistant Center Manager for UT-MFC began logging reports of a fire in the remote Dolores Canyon area of the McInnis Canyons NCA. The USWFS Duty Officer in Moab, UT (Moab DO) made a plan to send an engine and smokejumpers in the morning. At 0200 Mesa County dispatched two brush trucks into the area. They spent time trying to gain access and scout. They determined there were no structures immediately threatened but remained in the area all morning.

Early in the morning on June 27th, UT-MFC and CO-GJC began establishing jurisdictional responsibilities with two neighboring smoke reports on the Utah-Colorado border. The Snyder Fire was three-quarters of a mile west of the border, putting it in the GBGA. The Jones Fire was also located in Utah but was in UCR's response area, within the RMGA.

12 Aviation Safety Communique (SAFECOM) is a system for reporting safety-related events and conditions that could cause an aircraft mishap. The SAFECOM submitted on June 22nd can be found here: https://www.safecom.gov/safecom/26-0531

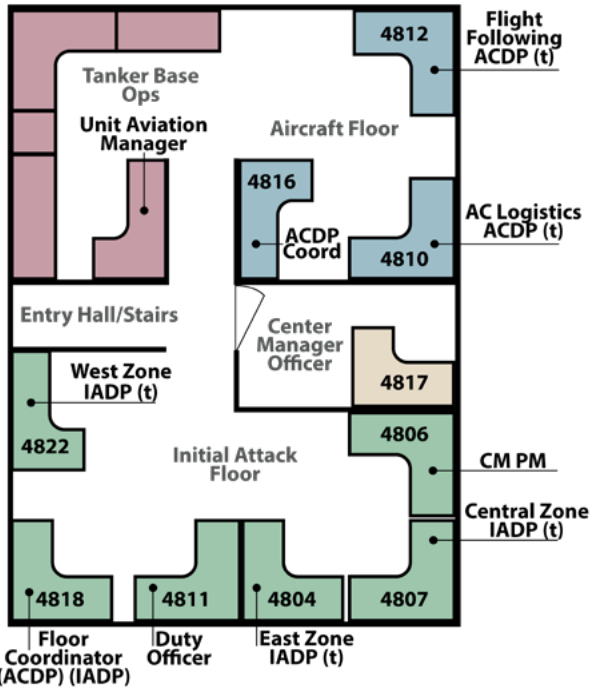


Figure 7. Diagram of the CO-GJC floor layout.

The night dispatcher at CO-GJC called the UCR Duty Officer (UCR DO) at 0445 to convey the new fire reports, and the UCR DO headed into the dispatch center. The Deputy Dispatch Center Manager[13] (DCM) arrived early at 0600. Ground resources were called in early and headed out to multiple smoke reports by 0622.

The dispatch center is co-located with many of the local air resources and personnel offices. It is divided into an initial attack floor on the south side of the building and an aircraft floor overlooking the ramp on the north side of the building. The aircraft desks are currently sharing space with the tanker base operations while a new tanker base is under construction. The DCM spent the early morning creating kneeboards[14] for aircraft orders and doing aircraft logistics.

CO-GJC and UCR DO had been coordinating with county resources, local cooperators, and concerned ranch managers in the McInnis Canyons NCA since the early morning.

Ground resources dispatched out of Grand Junction reached the Jones and Snyder Fires beginning at 0800, and aircraft were taking off enroute to the Jones and Snyder Fires around 0830. A Utah engine was dispatched by UT-MFC to the Snyder Fire at 0600 but faced a 3+ hour drive to access the fire, ultimately having to go through Colorado.

The Moab and UCR DOs, both familiar with the remote terrain, discussed CO-GJC officially taking the Snyder Fire. They were trying to manage the incident in a way that made the most operational sense. UCR had better access, far more resources, and aerial resources would be working out of the Grand Junction Airport (GJT). They also weighed each dispatch center's capacity and workload. The UCR had a lower fire load that Saturday. UT-MFC at the time was dealing with an active timber fire in the mountains west of Blanding, UT called the Babylon Fire. On the UCR side, the Dry Creek Fire was newly contained, and transitioning to a less complex organization that morning. UT-MFC's Center Manager agreed that CO-GJC should take the Snyder Fire but warned that transferring the fire could be a headache. The additional workload impacted the dispatch center. Resources were being dispatched by two centers in two different Geographic Areas. Center responsibility had to be ironed out for each task. "From the moment I walked on the floor at 0830 it felt like chaos," said an ACDP Trainee (ACDP-T). By 1000, CO-GJC was already tracking six aircraft and had five additional starts: Knowles, Gore, McInnis, Mee, and Blue Hill. They prepared to broadcast the 1000 weather but could not cut into the radio traffic safely.

"It was so busy we weren't able to break in and read the weather, which we never skip. We had to rely on WildCAD-E text and email." - IADP-T at CO-GJC

By 1030 two additional fires were reported, and one was growing rapidly with structures nearby. This fire was known as the Red Rock Fire. Soon, a dark column was visible from the dispatch office from the fire eight miles to the north.

13 Deputy Dispatch Center Manager is used in some interagency dispatch centers to align with parent agency titles and delineate additional supervisory responsibilities.

14 A kneeboard is another name for the Aircraft Dispatch Form (PMS 250). The name derives from the practice of pilots keeping important information readily accessible in a board attached to their thigh above the knee.

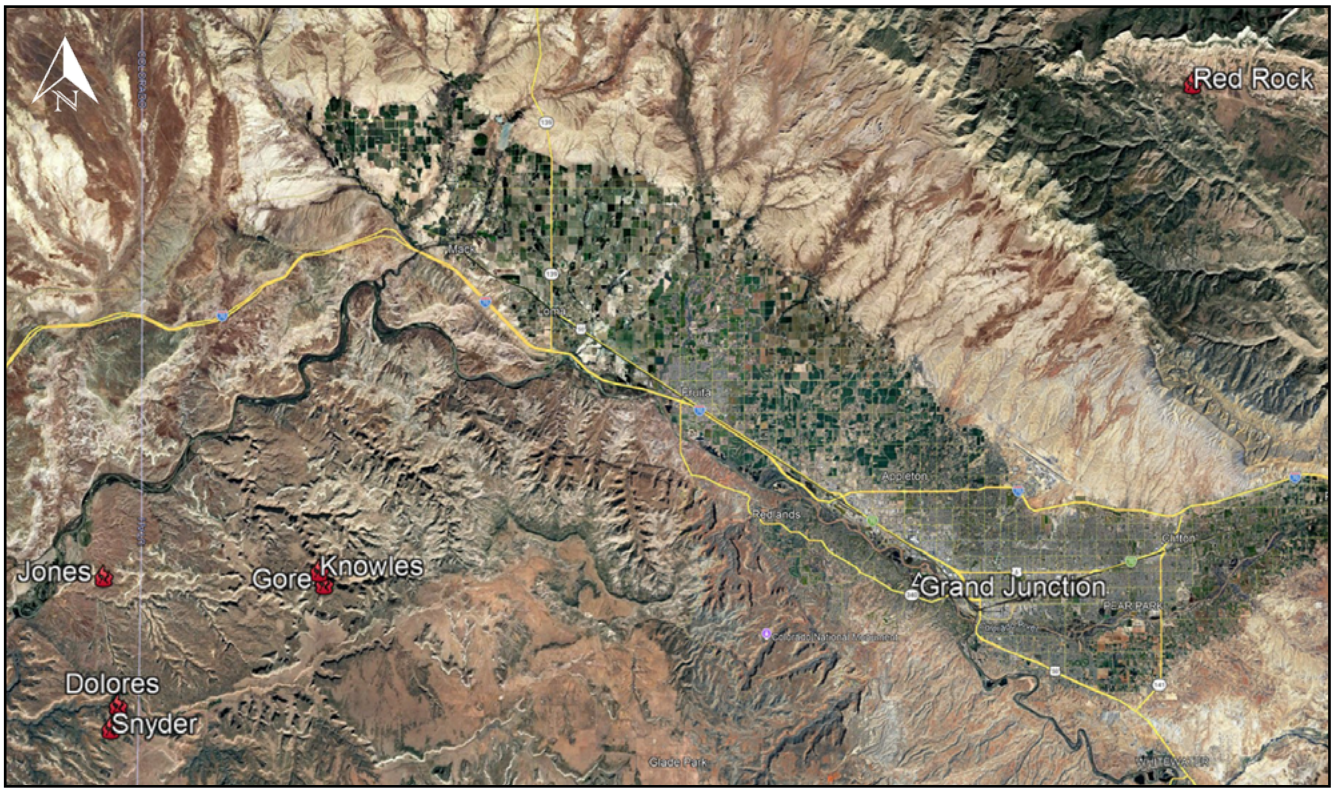


Figure 8. Location of the Red Rock Fire northeast of Grand Junction, Colorado.

Analysis: Chronic understaffing, a vacant Center Manager position, and a high proportion of trainee dispatchers left Grand Junction Interagency Dispatch Center reliant on acting personnel during an extraordinary surge in workload. Dispatchers simultaneously tracked up to 16 active aircraft, three emerging incidents, multiple new starts, county river evacuations, and non-stop media inquiries, leading to severe cognitive task saturation. Due to constant radio congestion and workload strain, dispatchers felt they were unable to transmit the mandatory scheduled 1000 Fire Weather Forecast broadcast across the zone. **REVIEW FINDINGS »**

Snyder and Jones Fires Initial Attack Resources Perspective

Many fire management personnel on the UCR noted watching the flashes of lightning on the night of June 26th. A storm with numerous downstrikes in the western part of the unit was igniting fires in their protection area.

Confirmation came in a flurry of early morning texts and calls from the UCR DO. The UCR DO started alerting module leaders that new starts were already detected and firefighters would need to start early to begin staffing them. For one Engine Captain the call came at 0445, for others it was 0500 or shortly after. The message was the same: meet at the office at 0600 to brief and receive assignments for the day. This was the first group, the initial attack units that would locate the fires on the ground, size them up, and start calling for other resources as needed.

Leading up to June 27th, the UCR had been managing the Dry Creek Type 3 Incident in Garfield County. It had been previously coordinated that both the UCR Unit Fire Chief (UFC) and the UCR DO would attend the Type 3 Team close-out, after action review, and the Type 4 transition on the morning of the 27th.

At about 0615 on that morning, the UCR DO contacted the UCR UFC to inform them of the new smoke reports

within the McInnis Canyons NCA. It was subsequently agreed that as the Agency Administrator (AA), the UCR UFC would attend the 0800 Dry Creek transition meeting and close-out in Rifle, Colorado, allowing the UCR DO to remain in the dispatch center to coordinate resource mobilization for the new incidents. The UCR UFC then planned to return to Grand Junction immediately following the meeting in Rifle, aiming to be back in CO-GJC by noon.

As firefighters started gathering at the office that morning, the UCR DO texted leadership of a UCR-based Wildland Fire Module (WFM1) to gather their seven folks for an assignment on either Snyder or Jones. WFM1 was a little later in the notification chain because they would not be part of the first resources out the door but would instead reinforce whichever fire needed them.

At the Grand Junction office, the assignments were handed out. Given the potential and the resources assigned, each fire would be managed by a qualified Incident Commander Type 4 (ICT4). Personnel from two engines (a Captain and an Assistant Fire Engine Operator) would take the Snyder Fire as ICT4 and ICT4 Trainee (ICT4-T), supported by three engines. Another Assistant Fire Engine Operator (AFEO) would take Jones as ICT4. This fire was a few miles northwest of Snyder near private land on the south side of the Colorado River. For now, Jones ICT4 would just have himself and another firefighter as resources. Both fires had been reported to CO-GJC and gotten partial size-ups early in the morning. Both were thought to be about five acres. Just after 0600, the engines and trucks started rolling.

Both of these fires were just over the state border in Utah. The Jones Fire was in a small piece of UCR fire response jurisdiction that extends over the border. The Snyder Fire, however, was about one mile into Utah and was the responsibility of Great Basin Unit 12 of the USWFS. An informal handoff had already occurred between DOs on the two units, and the Snyder Fire was given to UCR operationally due to the long travel times and resource drawdown in the Great Basin because of other large fires.

The Jones ICT4 saw the Snyder Fire as they made their way into the Jones Fire. It was south of their route along the Little Dolores Road, up on the mesa top. They called in an updated location for the fire to CO-GJC, confirmed this was the Snyder Fire, and kept going. At a large grassy flat four miles from the Jones fire, they parked the truck and backed the UTV off the trailer for the last push into the fire. The parking area seemed a safe distance from both Snyder and Jones, and surface fuels were short, sparse grass.

Jones Canyon drains part of the Black Ridge Canyons Wilderness into the Colorado River. Ten lightning strikes were detected in this area, and one started the Jones Fire. On scene at 0830, Jones ICT4 saw about 10 acres burning in grass and light brush, seemingly headed for a semi-circular sandstone cliff-band that could act as a perfect “catcher’s mitt" (see Figure 9). On the left flank was a two-track road leading to farms in the Colorado River bottom. The ICT4 identified this as the anchor and the logical flank to work with their very minimal resources. Jones ICT4 had a plan: cut off the left flank from heavier and continuous fuels to the northeast and send it into this rock cul-de-sac.



Figure 9. The sandstone cliff formed a "catcher's mitt."

Over on the Snyder Fire, just south of Snyder Mesa on an unnamed mesa overlooking the Little Dolores River, the Snyder ICT4 estimated about 20 acres of “dirty burn” in pinyon-juniper and grass. There were areas of smoldering and a more active head moving north towards the mesa rim. The smoke volume had been deceiving; the fire area was larger than they had expected. When the engines arrived around 0830 they





Figure 10. (Left) Photo of engines on the Snyder Fire engaging on the left flank. Photo Credit: WMF1
(Right) Fire activity on Snyder in morning. Photo Credit: Snyder Air Attack

engaged on the left flank. The fire was roughly kidney-shaped, with essentially two heads, left and right. The right head was more active, with occasional torching. Without air support this head would be difficult to control, and the Snyder ICT4 expressed concern about the fire spotting into the canyon. Walking the entire fire perimeter, they discovered the actual size was about 60 acres.

Both Jones and Snyder ICT4s knew an Air Tactical Group Supervisor aircraft (Air Attack or ATGS)[15] was headed their way. Like the ground resources, Air Attack 1 was contacted that morning by the DCM at CO-GJC requesting them to start early. At the time, Snyder was the priority fire for the UCR DO due to values at risk – privately-owned ranches and the community of Glade Park, a rural, unincorporated community of about 1,000 residents. The fire was also larger and was burning in heavier fuels. WFM1 had left Grand Junction to reinforce the Snyder Fire at 0800. Meanwhile Helicopter A had lifted with part of the Rifle Helitack crew. They were enroute to recon the Jones Fire and then support the Snyder Fire.

WFM1 got to the Snyder Fire at 0900. The crew engaged in line construction on the left flank. There was an area of heavier fuel concentration near the left heel of the fire which was created by a juniper-chaining operation decades before. These heavy fuels required additional work to try to exclude. Air Attack 1 arrived over the fire area at 0905 and assumed Snyder Air Attack.

On the drive into Snyder, WFM1 had noticed grass laid over along the sides of the road by strong southwest winds. Catching and holding these fires early would provide an advantage as the day grew hotter, drier and even windier. A WFM1 crewmember took out a Kestrel weather meter and noted the wind was 20 mph, gusting to 30. Hourly weather was recorded on the Snyder Fire. The weather was remarkably consistent during the burn period. Interviewees reflected that the wind was strong enough to knock the helmet off one's head if it wasn't strapped down.

Time	Temp	RH	Wind Direction	Comments
1100	82°F	15	20-25 Gust 30-35	Probability of Ignition (POI) Shaded 60/Unshaded 90
1200	85°F	13	12-20 G 35	POI Shaded 60/Unshaded 100
1300	85°F	11	25-30 G 40	POI Shaded 60/Unshaded 100
1400	85°F	11	25-30 G 40	POI Shaded 60/ Unshaded 100

Figure 11. Weather Observations from the Snyder Fire. Credit: Snyder IC

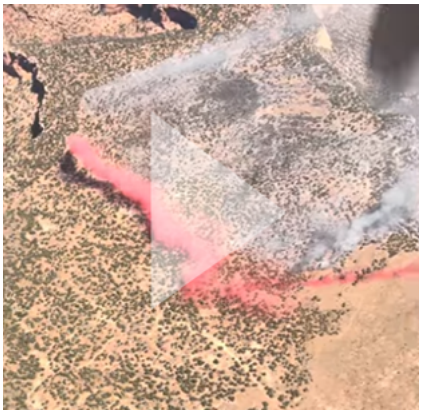
15 An Air Tactical Group Supervisor is an individual (often with a trainee) who provides aviation oversight from an orbiting aircraft. In this report, an aircraft with a ATGS personnel onboard is collectively referred to as "Air Attack."

Around 0930, single engine air tankers (SEATs) were inbound to Snyder to contain it to the mesa top with retardant supporting line construction on the ground. An additional handcrew arrived at 0942, guided in by a local fire employee acting as a Crew Representative (CREP). Minutes later, the USWFS engine dispatched at 0600 from UT-MFC also arrived on the Snyder Fire. Progress was being made, but the wind was relentless. A smokejumper aircraft from Utah (also ordered by UT-MFC) evaluated the area at 1000, but determined it was too windy to jump.



Figure 12. The Snyder Fire (foreground) and Jones Fire (background) taken sometime after 1000. The photo is looking due north. Photo Credit: Snyder Air Attack

Looking up towards the Jones Fire from Snyder, the smoke was laying over to the northeast, white and light gray in color. The Jones Fire reacted more to the wind and started a run to the northeast. Jones ICT4 was holding on to the anchor on the heel and left flank. There were no locally available handcrews, so Jones ICT4 asked instead for a smaller Suppression Module shortly after 0900. Two county engines were enroute as well, and Snyder Air Attack put in an order for a large air tanker (LAT).



Extreme Drift - Click to Play

Enroute to the Jones Fire, Rifle Helitack had located two new fires further east towards Glade Park. They would now staff the fires instead of continuing to recon the Jones Fire.

By 1015, Jones ICT4 could see that the fire had gone north around the cliff band they had hoped to trap it in. It was now burning in PJ with miles of the same fuels ahead of it. Sometime after 1100, Jones ICT4 got a surprising update from Snyder Air Attack: their fire had been mapped by the Colorado Division of Fire Prevention and Control Multi-Mission Aircraft (DFPC MMA) at 1,459 acres. Three LATs and two SEATs were overhead, but high winds limited the effectiveness of their drops. A CH-54 helitanker was also overhead. There were still only 11 people on the ground on the Jones Fire.

The ICT4s on the Snyder Fire had been feeling good about progress made to solidify the anchor point on the Snyder Fire. Just as the Jones Fire began making its run, they noticed what they believed was a spot in the canyon to the north (see Figures 13,14). This fire wasn't aligned with the surface wind direction and it was pretty far from the Snyder Fire edge – nearly 1/2 mile and 400 feet lower in elevation. The ICT4s and Snyder Air Attack couldn't tell if it was a spot from the Snyder Fire or a new fire entirely – an undetected lightning fire just now emerging.

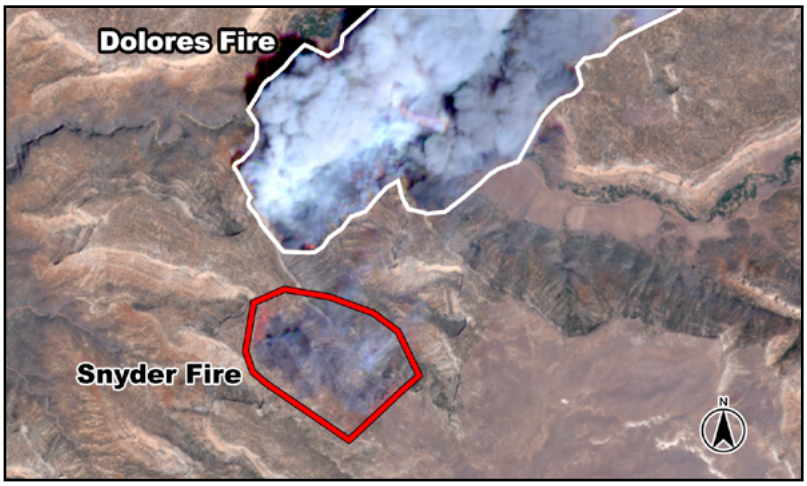


Figure 13. New start near the Snyder Fire at 1236. Source: PlanetScope

Regardless, this new fire was growing rapidly and quickly became established in a steep canyon. It was active on all flanks. Based on interviews with Snyder Fire resources, there was no safe access to start engaging it. Between radio updates called into dispatch[16] at 1158 and 1214 it burned through an average of over four acres every minute – from two acres to 80 and still growing.

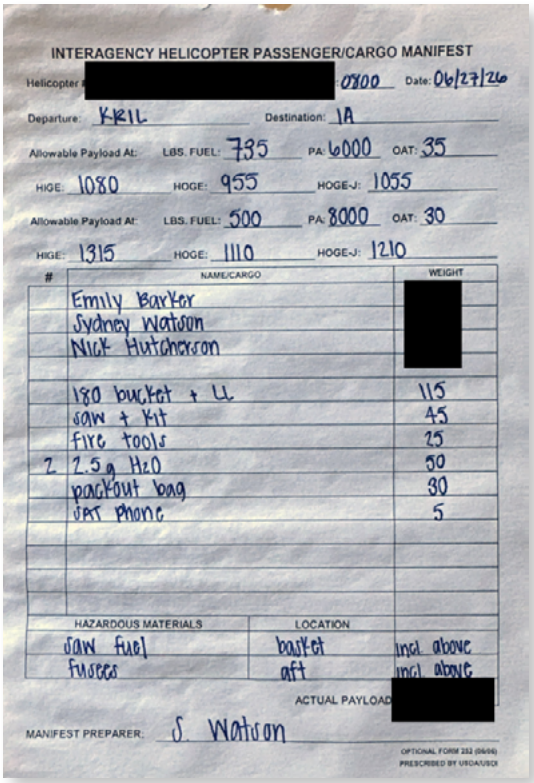


Figure 14. (left) 1213 - The new spot or fire that would be assigned as the Dolores Fire before burning into the Snyder Fire. Photo Credit: Jones ICT4-T (right) The same spot or fire location estimated in Avenza by resources in the field.

Rifle Helitack Perspective

The IA load[17] was set the day before for Saturday, June 27th. Emily Barker would be the helicopter manager. The Helitack Superintendent (Supt 1) started receiving texts at 0642. The UCR DO briefly described the situation that morning, referring specifically to the Glade Park area as the focus of fire suppression. Supt 1 messaged the pilot and fuel truck driver to come in at 0800 and had the helitack crew come in early as well. The helicopter preflight checks were completed by 0820, and everyone gathered for the morning briefing. They went through the projected staffing for the day and noted the extreme red flag conditions for their Fire Weather Zone (Zone 203).

The mission for Rifle Helitack would be to support the new starts that had been reported. Their first assignment was to recon the Jones Fire and then to support firefighters on the Snyder Fire. Those who weren't listed on an IA load that day would serve as the ground crew. The ground crew would establish a helispot at Rabbit Valley, about 90 miles west of Rifle and just off I-70. Rabbit Valley is a camping and recreation area commonly used as a helispot for the crew. The helicopter lifted at 0845 and flew west towards the McInnis Canyons NCA. Snyder Air Attack launched from Grand Junction at about the same time and was over the Jones Fire by 0905.


INTERAGENCY HELICOPTER PASSENGER/CARGO MANIFEST

Helicopter [redacted] 0800 Date: 06/27/26

Departure: KRIL Destination: IA

Allowable Payload At: LBS. FUEL: 735 PA: 6000 OAT: 35

HIGE: 1080 HOGE: 955 HOGE-J: 1055

Allowable Payload At: LBS. FUEL: 500 PA: 8000 OAT: 30

HIGE: 1315 HOGE: 1110 HOGE-J: 1210

#	NAME/CARGO	WEIGHT
	Emily Barker	[redacted]
	Sydney Watson	
	Nick Hutcherson	
	180 bucket + LL	115
	saw + kit	45
	fire tools	25
2	2.5 g H2O	50
	packout bag	30
	SAT phone	5

HAZARDOUS MATERIALS	LOCATION	
saw fuel	basket	incl above
fusees	aft	incl above

ACTUAL PAYLOAD [redacted]

MANIFEST PREPARER: S. Watson

OPTIONAL FORM 232 (06/06) PRESCRIBED BY USDA/USDI

Figure 15. Helicopter A Manifest (redacted).

The initial attack load was comprised of Emily Barker, Sydney Watson, and Nick Hutcherson. Emily Barker, a USFS employee, had been with Rifle Helitack since the summer of 2023, when she became a Squad Leader on the crew. She had been a wildland firefighter for 19 years, mostly on the White River National Forest within the UCR. She was a qualified Helicopter Manager (HMGB), ICT4, and Firing Boss. Sydney Watson had come to the Wildland Fire Service to join Rifle Helitack at the beginning of the 2026 fire season. She had started in wildland fire as an apprentice in 2023. Sydney was a qualified Helicopter Crewmember (HECM), ICT5, and Firing Boss. Nick Hutcherson was on a two-week assignment with Rifle Helitack in late June 2026. He had been a crewmember on the Pitman Valley Helitack Crew since 2023,

16 This fire was not established as a new start in WildCAD-E until 1232.

17 An IA load is a group of firefighters with a qualified incident commander and variety of tools and logistical supplies. The IA load is the first helitack firefighters to be inserted into new fire starts by the helicopter.

and a wildland firefighter for five years with the Kaibab National Forest in Arizona. He was a qualified HECM and a trainee Firefighter Type 1 (FFT1-T) and ICT5-T.

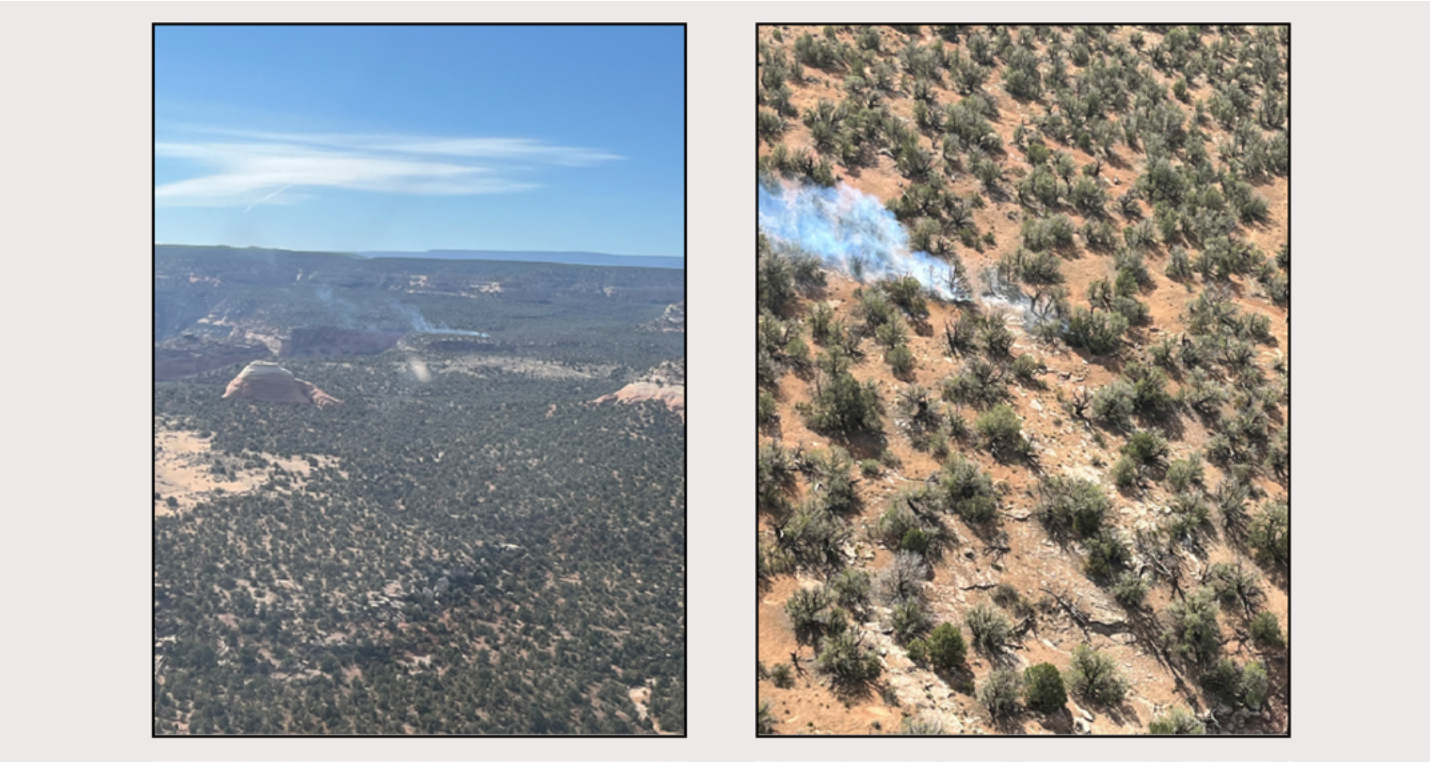


Figure 16. The Knowles Fire (left photo) and the Gore Fire (right photo). Photo credit: Emily Barker

Twenty-five minutes into the flight from Rifle, Emily spotted smoke on top of a plateau. She notified CO-GJC by radio at 0930. The new starts (initially called Knowles 1 and 2) were located about seven miles east of the Jones Fire, and eight miles northeast of the Snyder Fire. The first smoke was located on the point of a plateau, and the second smoke was ½ mile to the south on the lee side of a rocky knob. Both fires were in grass and pinyon-juniper, with moderate spread potential. Emily radioed a quick size up from the air to CO-GJC and the UCR DO directed Rifle Helitack to staff the fires. Later that morning, as she gave the full fire size up, Emily changed the name of the Knowles 2 Fire to the Gore Fire to avoid confusion between the two fires on the radio.

Due to the threat of cheat grass invasion into burn scars, new starts in the Black Ridge Canyon Wilderness are aggressively suppressed. "We have a suppression posture in that wilderness, there is a fear of cheat grass getting established and the Glade Park WUI," said the UCR DO. In the windy conditions that day, there were also values at risk downwind, such as Glade Park. While these were not imminently threatened, these fires could be a problem if left unchecked.



Gore Fire Video - Click to Play

The Knowles-Gore helispot was on the plateau midway between the two fires (see Figure 17). At 0936 the helicopter landed and the crew offloaded and hooked up the longline and bucket. Sydney was the qualified ICT5[18] on the Knowles Fire, and she and Nick quickly began working on containing the knee-high flames and six smoldering trees.

Emily took the ICT5 role on the Gore Fire, burning in the PJ fuel type with four

18 The Knowles, Gore, Black Ridge, and Blue Canyon Fires were all staffed on June 27th and managed as ICT5 fires given their low complexity and minimal resource and logistical needs.

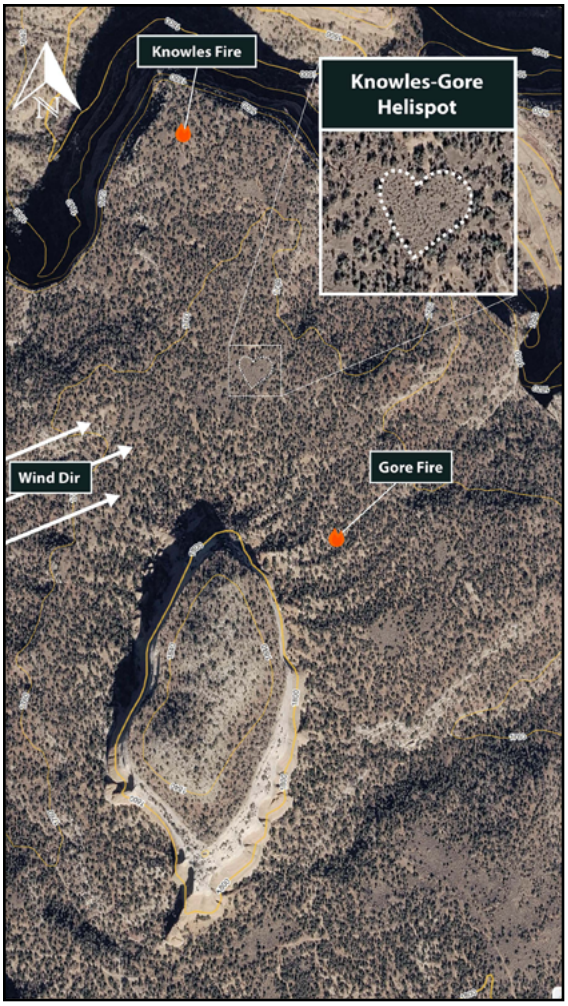


Figure 17. Knowles-Gore Helispot.

trees involved. Initially staffing the fire alone, Emily requested two additional firefighters.

While there was a link to dispatch over the Black Ridge repeater, radio traffic on the eastern initial-attack fires rapidly became congested. Positive two-way contact with CO-GJC was intermittent. Both Knowles and Gore ICs therefore defaulted to the common local workaround: cell phones for size-ups, IC transitions, and requests for additional resources.

As Helicopter A lifted from the Knowles-Gore helispot for bucket work, flying towards the Colorado River to dip, the pilot spotted additional smokes to the northeast. The pilot called in the McInnis and Mee Fires to CO-GJC just before 1000, and the Black Ridge Fire at 1015. At that same time, two Rifle Helitack vehicles arrived at Rabbit Valley with the helicopter's fuel truck and began to set up and staff the helispot.

The UCR DO discussed staffing options with Snyder Air Attack and Supt 1. The DO supported the helitack crew staffing the most active new starts. Ultimately, three smokejumpers from the group out of Utah had landed in Grand Junction and were driven out to Rabbit Valley to assist by the acting Unit Aviation Manager (UAM), departing Grand Junction at about 1130.

Just after 1000, Snyder Air Attack asked the UCR DO about incorporating the new IA fires to the east into the Snyder Fire. At the time the UCR DO responded that they preferred to keep them separate. The fires were currently outside of the fire traffic area, meaning that Helicopter A's operations on these small fires wouldn't impact the aviation operations on Snyder and Jones. Later in the day, a Temporary Flight Restriction (TFR) area would include the Knowles and Gore Fires near its eastern boundary, but this was not yet in place (see Figure 18).

Helicopter A lifted from Rabbit Valley with Supt 1 and Nate Matthews and Firefighter 5 manifested as the second IA load to the Knowles and Gore fires. Nate had joined Rifle Helitack in 2023. In addition to being a qualified HECM, he was an FFT1 and ICT5. Firefighter 5 was on a two-week assignment and was excited to work in a completely different fuel type and terrain. Along with Emily, Sydney, and Nick, these two firefighters would be staffing the Knowles and Gore Fires.

Emily met Nate and Firefighter 5 at the Knowles-Gore Helispot and briefed them. They staged their extra gear (flight bags, flight helmets, camping supplies, etc.) at the helispot. The three of them hiked over to the Gore Fire and began working to secure the line. Nate reminded Emily, "Hey, Firefighter 5 has their ICT5 task book open," and they worked on doing an IC transition to Firefighter 5 around 1200. They tried to do the transfer of command on the Rabbit Valley repeater, but due to poor radio quality, they eventually had to call on the phone. "We could hear dispatch, but they couldn't hear us very well. The radio was transmitting, but to actually pass on information we would use the phone," remembers Firefighter 5.

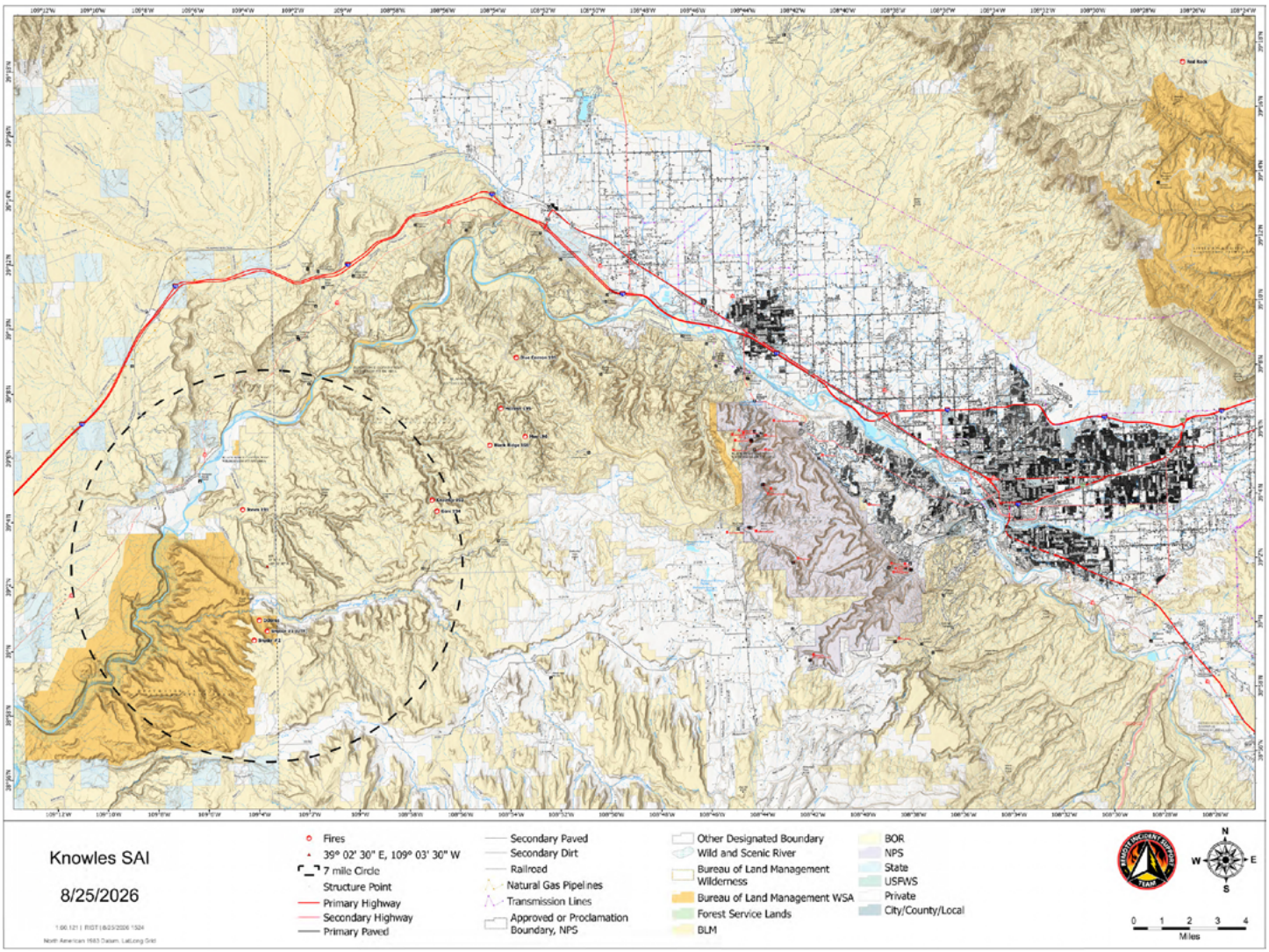


Figure 18. Jones and Snyder Fire TFR, showing the Knowles and Gore Fires just inside the northeast boundary.

Afternoon and Entrapment: 1201 - 1630

Air Attack Perspective

Snyder Air Attack, based in Grand Junction, had been the first in the sky that morning over the Snyder and Jones Fires. Due to complications in ordering resources for the Snyder Fire in a separate dispatch area, CO-GJC had decided to simplify aircraft ordering by assigning all aircraft to the Jones Fire, which was within their dispatch area. They had actively engaged both fires with both SEATs and LATs, though the flying conditions were terrible. The constant high winds challenged every aviator on June 27th, and many of them reported it was the most difficult flying of their careers. In interviews, aviators and air crews described the extreme flight conditions over portions of the UCR. One experienced ATGS called them "by far the roughest flying conditions of my career." They used the word "terrible" specifically when describing their return to the airport. "Terrible, wild landing at GJ due to crosswind." A heavy air tanker pilot described a turbulent flight where he had to jettison a load as "the scariest thing I have ever experienced." Adverse conditions were also reported by helicopter crews. A nearby helitack resource reported in their interview, "I've never fought fire in that kind of wind before."

Flying in these conditions, in addition to being very challenging, has the effect of using more fuel than normal. Snyder Air Attack had placed an order for a relief Air Attack to arrive over the Snyder/Jones area at 1220. The relief Air Attack for the Snyder/Jones Fires went by the call sign "Jones Air Attack", which correlated with their knee board[19]. As soon as Jones Air Attack received the order to relieve Snyder Air Attack, they had to expedite their departure to try to make it to the Grand Junction area on time from Wyoming. Not only were they coming from over 300 miles away, they would be flying into a 40-50 mph headwind the entire way. Snyder Air Attack began the transition with Jones Air Attack while they were still miles away. The headwind had made the travel time for Jones Air Attack so long that the two planes would have very little time actually over the fires at the same time. The radio transition briefing between outgoing Snyder Air Attack and incoming Jones Air Attack was described as “rushed but thorough,” with some of it occurring as Snyder Air Attack was returning to Grand Junction for fuel. They were still conversing as Snyder Air Attack landed and was taxiing off the runway. Starting at about 1245, Jones Air Attack assumed the role of Air Attack.

At almost the same time that Jones Air Attack was transitioning to take over as Snyder/Jones Air Attack, the Air Attack ordered for the Red Rock Fire was also arriving over their fire. Red Rock Air Attack had come from southern Colorado and arrived over the fire at 1236. The Snyder/Jones Fires were assigned A/A[20] 1 and 2, and eventually A/A 3 was assigned for the Temporary Flight Restriction[21] (TFR). The Red Rock fire was assigned A/A 2 and 3. Due to the close proximity of the fires, there was considerable radio traffic overlap on A/A frequencies.

Fire Management and Dispatch Perspective

After a busy morning, two qualified ACDP were called in to help with the growing workload at CO-GJC. ACDP 1 arrived at 1100. They had an appointment midday but stepped into the aircraft coordinator role for the next two hours. ACDP 2 arrived at 1200 and worked on aircraft logistics. Dispatch Center organizational control of the Snyder Fire management still needed to be determined, and this continued to create an extraneous workload. Fires very near Geographic Area (GA) boundaries, particularly those with potential to cross from one GA to another, require additional coordination and administrative tasks to manage correctly. TFR requests still came from CO-GJC to Rocky Mountain Area Coordination Center (RMCC), but there was an added delay as RMCC placed them to the Great Basin Coordination Center (GBCC) via the National Interagency Coordination Center (NICC).

IADP-T 1 was serving as the initial attack dispatcher for several small IA fires: Knowles, Gore, Black Ridge, McInnis, and Mee. IADP-T 1 was concerned that their fires would be overlooked in the chaos of the other, more active, fires (Snyder, Jones and Red Rock). On top of that, Rabbit Valley and Black Ridge were the main repeaters for their fires, and they were having some issues. IADP-T 1 was struggling with radio interference and transmissions overriding each other, and couldn’t hear initial radio calls come through on their console. At one point they had to restart the computer, relying on the nearby consoles to overhear the radio traffic. The repeaters were extremely busy with both ground resource and aerial resource traffic, so communication from their fires was mostly coming in over the phone. At 1224 IADP-T 1 received an update from the Snyder ICT4-T via phone. They reported that the new fire in the canyon they had first observed about 30 minutes before had quickly tripled in size. They also ordered additional aircraft and a Type 3 Incident Commander (ICT3) for Snyder.

An IADP-T on assignment to CO-GJC, remembers, “If resources couldn’t reach dispatch, they would call on the phone. It seems to be a very common practice in Grand Junction.”

19 CO-GJC did not have ownership of the Snyder Fire, so when possible aircraft ordering and tracking was done using the Jones Fire, which they 'owned' in WildCAD-E and IROC.

20 A/A refers to Air to Air frequencies, which are reserved for communication between aircraft. Ground resources do not commonly monitor this specialized frequency range.

21 A Temporary Flight Restriction is a closure area established in the air in a defined area for a defined amount of time. It restricts access to airspace in an area that is defined both by geographical area and by altitude. TFRs are used on wildland fires to eliminate conflicts between fire aviation traffic and other aircraft.

As the new fire reports poured in, the UCR DO had to consider giving the Snyder Fire back to UT-MFC. One reason for taking the fire in the first place was the relatively lighter fire activity on the UCR. This was no longer the case. As reports came into both dispatch centers about the new fire near the Snyder Fire, both centers responded. The Moab DO provided the location to UT-MFC, and at 1233 a Utah-based USWFS helitack crew was launched to the Dolores Fire, the name assigned when UT-MFC logged the fire one minute earlier. The Utah USWFS helitack crew, like Rifle Helitack, utilized a Type 3 helicopter (an AS-350-B3) – Helicopter C – with a similar sized crew.

CO-GJC confirmed that it was a new start and UT-MFC should manage it, but by the time Helicopter C arrived in the sky over the area they reported to UT-MFC that all starts in the area were being called, collectively, the Snyder Fire. From the operational perspective of the Air Attack, they had to merge the fires, but the DOs had other inputs to consider: dispatch center capacity/staffing, radio system reliability in the area, fire load on both units, and administrative complexities. In real time, these starts were creating logistics and administrative challenges.

Between 0924 and 1352, there was no official coordination between the Geographic Area Coordination Centers (GACCs) and dispatch centers to transfer the Snyder Fire to CO-GJC in IROC and WildCAD-E. GBCC called UT-MFC as the complexity of the Snyder Fire evolved and asked them about taking the fire back. Activity on the Babylon Fire was picking up, and it would more than double in size that day.[22] The UT-MFC floor coordinator finally told them, "Look, I'm past my span of control with this. We have all trainees in this center except for the Center Manager, Assistant Center Manager, and me, and my last work day here is the 30th [i.e. in 3 days]. We would need help to come in." It was decided that UT-MFC would not take Snyder back from CO-GJC.

Dolores Fire Naming Confusion

The Dolores Fire was first observed and its presence called in to CO-GJC as a new start or spot fire by Snyder Fire ICT4-T at 1158. As it was within their dispatch area, UT-MFC created a new incident and called the fire the Dolores Fire. On the ground, the UCR initial attack resources never heard the new start called Dolores Fire. By about 1300, the Dolores Fire had backed into control features on the Snyder Fire. Thereafter, **this combined fire was called the Snyder Fire** by all parties.

The delay in officially transferring the Snyder Fire to CO-GJC resulted in a multi-layered extra workload. There was confusion over which center was taking aircraft tracking and ordering. CO-GJC would receive an order to send resources to the incident from the field, then would transfer that information to a General Message form and send the General Message to UT-MFC. UT-MFC would then create the order in the IROC and transfer it to CO-GJC. Only then could CO-GJC fill the order. All questions and clarifications required an additional phone call or a computer instant message.

Analysis: Managing initial attack incidents along Geographic Area and dispatch boundaries created significant administrative friction that delayed resource mobilization and overburdened dispatchers. Many dispatchers were forced to repeatedly switch logins between different radio console and WildCAD-E profiles and IROC databases. When operational authority for the Snyder Fire transferred to Grand Junction, resource orders had to be manually transcribed onto paper General Message forms and routed through Moab dispatch before being filled, consuming critical time during initial attack. **Review Findings »**

At 1231 a Type 1 helicopter dropping water on the Snyder Fire reported a vehicle and trailer in the path of the fire. Information trickled into CO-GJC about the location and ownership of the vehicle, ranging from basic information to unsubstantiated reports of a vehicle entrapment. There was considerable unease until the details could be verified. Creating more work in CO-GJC were the repeated telephone calls from the news

22 The Babylon Fire on the Manti-La Sal National Forest had started June 26th. By the end of June 27th it was 300 acres. It was contained August 12 at a final size of 107,189 acres.

media requesting information. Around 1300, Moab DO had a conversation with UCR DO about anticipating the fires growing together. They got on a video conference call with the UCR UFC and USWFS Moab UFC to discuss ordering a Complex Incident Management Team (CIMT).

Snyder Air Attack had landed at 1241 and the ATGS from that flight came into the dispatch center. They wanted to pass on two messages. First, they reported radio transmission problems for the last thirty minutes of their flight. Second, they were concerned that the Snyder, Dolores and Jones Fires were going to eventually burn into each other. Based on this fire activity, they were concerned about the town of Loma, located 10 miles to the northeast of the fire.

At 1352 the Center Manager at the GBCC received a call from the UCR UFC. The UCR UFC told them that the Jones and Snyder Fires were going to merge, and it made sense to them to support the fires out of CO-GJC. This scenario created complicated administrative issues. The USWFS Assistant Chief of Operations for the RMGA set up a video conference call with both dispatch centers and duty officers for 1430. On the call were representatives from UT-MFC, the USWFS RMGA Assistant Chief of Operations, USWFS GBGA Deputy Fire Chief, Unit 12 acting Deputy Unit Fire Chief, UCR Unit Fire Chief, Grand Junction BLM Assistant Field Manager, Acting District Manager for Canyon Country District BLM, USWFS RMGA DO, UCR DO, NICC Center Manager, CO-GJC Acting Center Manager, and GBCC Center Manager. The primary focus of the 1430 call was to discuss the management of the Snyder Fire based on incident business policies, system capabilities, dispatch capacity, and activity in the GBGA and the RMGA. They finished the call a few minutes late at 1503. Immediately after, a more in-depth meeting took place with the fire management staff, both dispatch centers, and representatives from RMCC, GBCC, and NICC, as well as an incident business representative. During this meeting the dispatch centers were able to agree with the requested plan initiated by fire leadership to have CO-GJC manage resource ordering for the Snyder Fire. UT-MFC would grant them managing center access in IROC.

CO-GJC CM came back upstairs into the dispatch center after the meetings and logged in to a console on the IA floor to work on ordering a CIMT. They weren't covering any fires at this time but had an ear to the traffic on the IA floor. The Blue Canyon Fire ICT5-T was trying to establish radio contact with dispatch, and a forecaster with the National Weather Service was calling with a Fire Weather Watch for Monday. Mesa County was coordinating a major evacuation of boaters along a section of the Colorado River, creating a demand on the phone system from information requests.

At 1516, the USWFS RMGA DO requested a Simple 6[23] from the UCR DO, and it arrived in their inbox at 1535. Of note was the comment, clarifying the checkmark "yes" for "Life or Property Threatened?": "Several vehicles entrapped, and ranchers sheltering in place or entrapped."

At 1527, Supt 1 called the UCR DO on the phone to tell them they had lost contact with the Knowles and Gore Fires for roughly 15 minutes. Immediately upon hearing of the loss of contact, the IA Floor Coordinator began calling Knowles and Gore Fire personnel on the repeaters whenever there was a break in radio traffic. They also looked up the phone numbers of both ICs and called them. None of these calls were picked up. Supt 1 called back on the phone and stressed the urgency of the situation. The IA Floor Coordinator let the UCR DO know, and they began calling each member of the crew, one by one, waiting for someone to pick up.

Analysis: High-level multi-agency video coordination calls regarding administrative policies, CIMT mobilization, and database permissions occupied key fire leadership during the peak window of fire growth. These mandatory conference calls required significant time and cognitive bandwidth from unit fire chiefs, duty officers, and center managers. This administrative demand occupied key leadership during a critical operational window when the main fires were advancing towards the location of remote initial attack resources. **Review Findings »**

23 A Simple 6, distinct from a Quick 6, is brief fire status update provided by unit fire management personnel to fire management personnel at the GA level.

Snyder and Jones Fires Initial Attack Resources Perspective

The Snyder ICT4-T radioed dispatch at 1214 with immediate needs for the new fire: two handcrews, two engines, a dozer, and whatever aircraft are available – at least two LATs. Less than 10 minutes later they called back – the incident was scaling up from a Type 4 to a Type 3. At 1300, Snyder ICT4 called both the UCR DO and Mesa County to notify them about the need for evacuations in the path of the growing Dolores Fire.



Figure 19. Snyder fire resources disengaging on the left flank at 1153.

At this point even the fire on the mesa top was becoming more active, backing into the wind and threatening to compromise their anchor point. In a phone call with the UCR DO, Snyder ICT4-T discussed the rapidly growing Dolores Fire in the canyon below. The UCR DO recommended they treat this new fire as a separate initial attack incident. Based on its location on the Utah side of the border, it should be run through UT-MFC. UT-MFC had named it the Dolores Fire and dispatched resources.

Just as the request for an ICT3 was called in, the Jones Air Attack decided the wind and turbulence was simply too much for fixed wing operations to effectively and safely continue. All air tankers were transitioned out of the Jones and Snyder Fire areas at 1224. In the meantime, the emerging Red Rock Fire, eight miles away from Grand Junction, was taking the tankers diverted from Jones and Snyder. Ground resources, already scarce in the area, were getting assigned to the Red Rock Fire too. Around 1230, Jones ICT4's prior request for a suppression module was finally filled, but it was a resource a four-hour drive away.

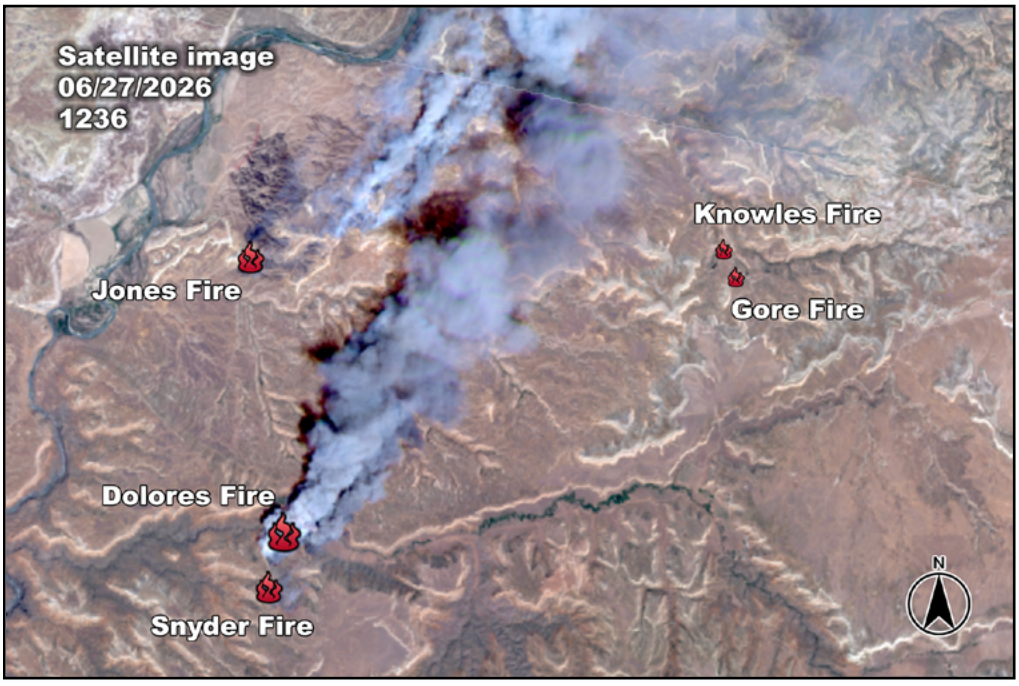


Figure 20. Satellite image of the Dolores fire head moving east at 1236.

By midday the Jones Fire had now grown enough that the parking area utilized by Jones ICT4 that morning was in danger of being impacted by fire. Mesa County had also utilized the parking area, meaning that multiple vehicles were potentially in danger of burning. At approximately 1230, Jones ICT4 requested Mesa County firefighters make their way towards the parking area to shuttle the trucks back to a safer location. However, the mission had to be called off. The Mesa County firefighters were uncertain of the fire's location, and the chance of

becoming entrapped was simply too great.

After fulfilling their crew representative duties and delivering the contract crew to the Snyder Fire, the CREP started to do some scouting to see exactly what the Dolores Fire was doing and what risk it posed to the private property in its path. The head of the fire was moving east, hiding somewhere under a pall of smoke (see Figure 20).

For many on the ground at both Snyder and Jones, time began to blur. Both the Jones Fire and the Dolores Fire were rapidly growing. At 1303, a new report on conditions to dispatch from Snyder put the Dolores Fire's size at over 150 acres. It had roughly doubled in size in the last 45 minutes or so. The Jones Fire was still running, but its size hadn't been updated since late morning.

Analysis: An absence of inter-incident resource tracking created an operational silo between the expanding main fires and newly inserted wilderness initial attack resources. Incident commanders on the Snyder and Jones fires were unclear of the location of firefighters on the Knowles and Gore fires 7 to 8 miles to the east. Because no operational role was assigned to continuously map personnel location against the emerging fires' trajectories, overhead did not recognize that firefighters were positioned directly in the fire's line of advance. **REVIEW FINDINGS »**

The Dolores Fire had made a run into the wind, up the mesa side, and had merged with the Snyder Fire. Around 1345 the Snyder ICT4 and trainee, plus experienced leadership from the WFM1, met to discuss the next steps for the Snyder Fire. They held their discussion in one of WFM1's vehicles to escape the constant wind. With the complexity of the situation greatly increasing, the assistant leader of WFM1 offered to assume the role of Operations (Ops) to reduce the Snyder ICT4 and trainee's span of control. It was clear that the two fires in this area, now merged, needed a new plan and a larger organization beyond the ICT4 organization currently running the Snyder Fire.

A DFPC S-70 helicopter (Helicopter B) with crew had been ordered to the Jones Fire shortly after 1100 and was now over the fire area. They did not see ground resources on the Jones Fire while flying overhead. They were assessing where they could make a positive impact on the growing fires, and talking to the ICT4s and ICT4-T on A/G. They determined that the most logical place to drop off their three relatively-inexperienced helitack crewmembers was on the Snyder Fire, near the heel, where there was an obvious anchor point and resources visible from the air. The helicopter had some difficulty communicating with the busy ground resources, and difficulty breaking in on the very congested A/G frequency.

On the Jones Fire, the vehicles left at the open, grassy parking area by Jones ICT4 and the county engines were weighing on their mind. They had read the recent report of the complete loss of three handcrew pickups on the Cottonwood Fire in Nebraska and had images of burning vehicles in their mind.

Jones ICT4 attempted again at 1400 to make their way towards the vehicles to check their status. They approached the parking area and saw black smoke rising from that direction, blocked from sight by pinyon and juniper trees. It was either the trucks burning or trees torching. They turned around.[24]

On the right flank of the Snyder Fire[25], the CREP ran into an active flank moving in a diagonal line across a mesa side. It was 1328. Dense smoke filled the valley ahead. This was three and a half miles from the fire's ignition point.



Fire Behavior at 1328 - Click to Play

24 The Jones Fire reached the vehicles parked in the low grass shortly after 1230 and burned underneath and around them, causing no damage.

25 Jones Air Attack radioed CO-GJC at 1255 informing them that going forward the Snyder and Dolores Fire would simply be called the Snyder Fire. Utah Helitack Crew told their dispatch, UT-MFC, the same information at 1332. In this narrative, the Dolores Fire ceases to exist as a separate entity at 1332.

They took a short video showing the impressive fire behavior and left the area, headed to a privately-owned ranch property to assist in evacuations and structure protection preparation.

Conditions and available resources were making effective suppression on Snyder or Jones impossible. Jones resources consolidated on the far-left flank where retardant and a two track had largely held the fire. As they did what they could to hold this anchor, four helitack crewmembers from the Utah USWFS helitack crew walked up to Jones ICT4. They'd been ordered to the Dolores Fire by UT-MFC. Jones ICT4 had no idea they were coming; they just appeared. As they walked up to Jones ICT4 they inquired, "This is Snyder, right?" Jones ICT4 informed them that they were on the Jones Fire. There were now a total of 15 firefighters on the Jones Fire.

At 1350, Snyder ICT4s pulled their resources back to their staging area. Snyder ICT4-T again requested a qualified ICT3. They were informed that there was a group of smokejumpers from Nevada at Grand Junction, and among this group is a qualified ICT3 who will take command as Snyder IC. These smokejumpers, like the ones from Utah, had been winded out from jumping earlier in the day.

"When we landed in Moab for fuel we saw the smoke from the fires. It was one of the most windy days of my life." Smokejumper ICT3

Once the Snyder Fire resources repositioned back to their staging area, they completely changed their strategy. Rather than attempt direct suppression on the fire, they began to engage in structure protection preparation and ensure that ranchers and any other members of the public were evacuated. As Snyder ICT4 got into the cab of their truck, they savored the break from the constant high winds. They "blinked mud out of [their] eyes" from the dust blowing in their face all day.

At 1446 Jones ICT4 got a view from between the heels of the Jones and Snyder Fires (see Figure 21). It appeared to them that the fires had grown together or were about to. (Later analysis and imagery indicate the merge occurred around 1925.)



Figure 21. The Snyder and Jones Fires appearing to merge at 1446. Photo Credit: Jones ICT4

Jones Air Attack had to return to GJT for fuel at 1430. They had requested that Snyder Air Attack return to the fire to relieve them, but Snyder Air Attack could not take off from Grand Junction. Snyder Air Attack had taxied out to the runway behind a LAT. After lining up on the runway, the LAT had to decline the takeoff due to high crosswinds. As the LAT returned to the ramp, Snyder Air Attack lined up, hoping they could still take off. Like the LAT in front of them, they declined the takeoff. Jones Air Attack returned to Grand Junction and made a challenging landing. The Snyder/Jones Fires now had no Air Attack coverage.

Analysis: Severe turbulence and 40–50 mph crosswinds caused a two-hour gap in Air Attack coverage over the Snyder and Jones fires from 1430 to 1629. Outgoing Air Attack needed to land early for fuel, and a relief aircraft lined up at Grand Junction Airport declined takeoff due to severe crosswinds. Ground firefighters, helitack leadership, and Helicopter A pilot unknowingly operated under the false mental model that Air Attack was actively monitoring the main fire and would warn them if it posed an imminent threat. **REVIEW FINDINGS »**

Resources on the Snyder Fire moved again, this time headed to a new staging area farther away from the fire, on a major road to the south. There was a large fuel-free parking area there, and it was not in the direction of fire spread. Word was passed to the incoming ICT3 to meet Snyder ICT4, ICT4-T, and Ops there to complete the IC transition. It was during the transition from ICT4 to ICT3, at 1539, when Snyder Ops received a phone call from the UCR DO. There was a possible entrapment on the Knowles and Gore Fires, eight miles east of the Snyder Fire origin.

Rifle Helitack Perspective

Through the late morning, Emily on Gore, and Nick and Sydney on Knowles, were piling chunks of wood to burn down cleanly and utilizing Helicopter A for water drops. They checked Avenza[26] and Watch Duty[27] to gain situational awareness. They knew the Snyder and Jones Fires were seven and eight miles away, respectively, but decided to keep an eye on them as the quantity of smoke visibly increased. Historical fire behavior data and experience indicated to the local crew members that the fires weren't likely to grow large enough to be a threat to their location. At 1044, Emily requested two additional firefighters be flown in – they would be Nate and Firefighter 5.

Before launching with Nate and Firefighter 5 at 1130, Snyder Air Attack called the Helicopter A pilot (Pilot 1) on A/A and informed them of a frequency change for air-to-ground (A/G). The Snyder and Jones Fires were using A/G 49 as their primary A/G frequency, and it was busy with traffic. To have a clearer and less congested frequency, the IAs being managed out of Rabbit Valley would switch to A/G 9. A/G 9 was also the A/G frequency assigned to the Red Rock Fire 30 miles to the north, but at the time there were few aircraft assigned on that fire. Neither Red Rock Air Attack nor Snyder Air Attack were aware of this frequency sharing. Personnel on Knowles and Gore and Pilot 1 were informed of this change and made the switch to the new A/G frequency.

Analysis: Inadequate regional frequency deconfliction led to the use of the same Air-to-Ground frequency on both the Rabbit Valley initial attack fires and the Red Rock Fire, 30 miles north. Because high-altitude Air Attack platforms receive signals across broad geographic areas, urgent transmissions from Helicopter A regarding missing ground firefighters were picked up by Red Rock Air Attack. Operating in a separate, high-tempo airspace, Red Rock Air Attack acknowledged the calls but did not realize the missing crew was located 30 miles away inside a different TFR. **REVIEW FINDINGS »**

After inserting Nate and Firefighter 5 at the Knowles/Gore helispot at 1203, Pilot 1 and Supt 1 did a recon of the Black Ridge and Mee fires to assess their current size and activity and then returned to the Rabbit Valley helispot. They reconfigured for bucket work and the helicopter did five bucket drops on the Knowles Fire as requested by Sydney, the Knowles ICT5. After that cycle of buckets, Sydney requested Helicopter A return for more bucket drops.

As they returned to Rabbit Valley helispot to refuel, the pilot noticed an increase in smoke from the west. While Helicopter A was doing bucket work, three smokejumpers had arrived at Rabbit Valley around 1215. HECM 1 and Supt 1 began working on manifesting and organizing the Utah jumpers into two separate loads to staff the Black Ridge and Mee Fires. Supt 1 provided an updated briefing to the jumpers and HECM 1 on the

26 A navigation app using Georeferenced PDF maps. Commonly used by wildland firefighters for years.

27 A publicly-available map-based app used to disseminate fire information, including satellite heat detection data and evacuation information.

fires, communications, weather, and maps. At 1320 Helicopter A had noticed another fire – Blue Canyon – the furthest one to the northeast.

At 1335, Helicopter A returned to Rabbit Valley for fuel with the intent of flying back to the Knowles Fire afterward to continue bucket work. However, the plan changed with the arrival of the smokejumpers and after a conversation with the UCR DO, Helicopter A would instead begin crew shuttles to the small unstaffed fires with Supt 1 on board as manager. At this time, Supt 1 and the UCR DO were operating with the mental model that the Snyder and Jones Fires were no factor to where they intended to insert personnel. With the mindset of continuing to staff fires on a high activity day with values at risk, their goal was to suppress as many fires as possible with their available resources. Helicopter A lifted and inserted two smokejumpers into the Black Ridge Fire at 1410. On the flight, Supt 1 noticed an increase in smoke and a change in its orientation – it was now coming more out of the west, with less of a southern component.

Winds on this side of the McInnis Canyons NCA had been lighter than those experienced on the Snyder and Jones Fire. Around 1400 the winds on Gore were estimated at 10-15 mph, but occasionally a 30 mph gust would come through and "throw some ash around." The increasing gusts caused containment concerns for the two fires. The Gore fire was approximately 500 feet from a 200-foot-tall rock feature which completely obstructed their view to the west and southwest. Firefighter 5 stated the rock formation "was kind of blocking our vision. We could see the [smoke] column, but that was about it." The rock feature seemed to contribute to the squirrelly winds. There was rolling topography that further impacted their view to the northwest.



Site Visit Video - Click to Play

In terms of aerial supervision, at 1430 Jones Air Attack notified CO-GJC they were out of fuel and were enroute to the GJT. They notified the staffed initial attack fires and Helicopter A as they left the incident. Unknown to Jones Air Attack, Supt 1, or Pilot 1, a relief Air Attack had declined the mission because of crosswind runway conditions at GJT just minutes earlier at 1422. Notably, when Jones Air Attack left the area, it ended Air Attack coverage for Jones and Snyder until 1629. One heavy helicopter remained on each of the larger fires, and Helicopter A continued to work out of Rabbit Valley.

Firefighter 5 volunteered to hike over from the Gore Fire and climb the rock formation to gain more situational awareness on the larger fires. Sydney had a better view to the west from the Knowles Fire, and she had relayed to Firefigher 5 that she had picked out a certain ridge as a trigger point for when they needed to get out. As Firefigher 5 peeked around the corner of the rock formation to see which ridge she meant, they had to put their chinstrap on due to winds. The smoke was thick enough that they would lose sight of Sydney and Nick on the Knowles Fire intermittently from this vantage point on the rock formation.

Helicopter A with Supt 1 onboard returned to Rabbit Valley again to pick up a smokejumper plus a helitack firefighter (HECM 1). Originally the plan was to drop them at the Mee Fire, but they determined the Blue Canyon Fire to the north was more active than Mee and it became their priority for suppression. "It's got quite a bit of fire on it right now. It's 1/10 acre but we want to get it knocked down and get it staffed before it becomes a problem," Supt 1 radioed to CO-GJC.

HECM 1 would take the ICT5-T role on this IA. As they flew over, Supt 1 asked if they felt okay about being inserted into the Blue Canyon Fire. The smokejumper replied, "Yes," but HECM 1 didn't feel great about the spot. "There were multiple fires behind me, I didn't know where the flame front was, wasn't sure about LCES. I didn't know where the other resources were," HECM 1 later reflected. The smokejumper and HECM 1 staffed the Blue Canyon Fire at 1429 as ICT5 and ICT5-T, respectively. The fire was on a rock slope, among big boulders, and was showing open flame with potential to spot. When HECM 1 tried to do the initial size up for dispatch, they couldn't make positive contact with CO-GJC on the radio. In an effort to try to get out on the radio, they

hiked up to a knob and but had no luck. The smokejumper came up as well and both experienced issues trying to get a transmission out. The repeater that worked in this area is usually Rabbit Valley. They texted Supt 1 at 1456 to verify the repeaters, and Supt 1 replied at 1457 with "Black Ridge, Douglas, Lands End" as alternative repeaters. The smokejumper eventually connected to a repeater, and HECM 1's Quick 6 size up was logged at CO-GJC at 1507.

The two fires staffed by helitack and smokejumpers in the afternoon, Black Ridge and Blue Canyon, were significantly farther from the Snyder and Jones Fires than Knowles and Gore were. From the ignition point of the Snyder Fire (the coordinates of which were available to all firefighters) the Black Ridge Fire was 10.5 miles away, while Blue Canyon was over 13 miles. From the Jones Fire ignition coordinates, they were 9.2 and 11.2 miles away, respectively.



Figure 22. Conditions on the Gore Fire at 1427. Photo Credit: Emily Barker

The visibility was beginning to deteriorate on the Gore and Knowles Fires. Smoke from Snyder and Jones rapidly changed the color of the sky over the plateau. While Supt 1 and Helicopter A were inserting firefighters on the Blue Canyon Fire, Emily had sent a photo and a text message to Supt 1 from the Gore Fire: "It looks like a sunset but it's 2:30 in the afternoon."

After the crew shuttle, Helicopter A flew back over the Mee Fire, which was showing light smoke and minimal fire activity. Then they flew toward Knowles and Gore around 1439. Supt 1 made contact with Emily to gauge her comfort level and ask if they were ready to leave their fire. "We're working our way into you guys, how are you feeling right now?" Emily replied they had more work to do and felt comfortable. Supt 1 then contacted the Knowles ICT5, Sydney. Sydney responded that they felt good and she wanted to keep working on the fire with buckets to secure it because of some hotspots. Expressing some concern, Supt 1 told the Knowles Fire

ICT5, "We're trying to see how far the Snyder fire is from you guys…but not trying to impact their operations." Supt 1 was comforted by their calm demeanors and measured tones as they continued to orbit the area in an attempt to gain situational awareness regarding the location of the other, larger fires. They flew the ridge to the west of the Knowles and Gore fires and could not determine the location of the fire edge because of the dense smoke and their perception that there were heavy air operations continuing on the Jones and Snyder fires. They did not want to venture further to the west and create conflicts with aircraft flying there. They did not know that there were no significant aerial operations on either Snyder or Jones at this time.

At 1443, while enroute to Rabbit Valley, Supt 1 reached out to repeat a communication they had previously tried to pass on to the Air Attack, sharing the location of the firefighters out east of the Snyder and Jones Fires.

"Tried to keep from bugging you there but wanted to give you some coordinates where we've got firefighters on a separate initial attack fire. We've got five firefighters there and then four more on separate ones further east... And they're in pretty heavy smoke and they can't get any S[ituational] A[wareness]."

They described the fires as being about a mile inside the TFR. Because Jones Air Attack had returned to Grand Junction and had not been replaced, and the overlapping use of A/A 3 in the Jones TFR and the Red Rock Fire, this message was picked up by Red Rock Air Attack. Red Rock Air Attack acknowledged but was not aware of Helicopter A's operations and IA fires (Knowles, Gore, Mee, Black Ridge, Blue Canyon and McInnis) because they were far outside the Red Rock FTA. Red Rock Air Attack was working with 4 LATs, 2 SEATs, and 2 helicopters within the Red Rock FTA. As aircraft were being diverted from the Snyder and Jones Fires due to lack of aerial supervision and unsafe flying conditions, Red Rock Air Attack was putting them to work. The air over the Red Rock Fire was flyable, but the drops were still difficult and some required multiple approaches. This required intense focus by Red Rock Air Attack to make sure tanker operations remained safe and drops were on target.

Following the Supt 1's conversation with Red Rock Air Attack, Pilot 1 expressed their primary concern to Supt 1: decreasing visibility. They suggested that if the helitack on Knowles and Gore wanted to be extracted by helicopter, they should pick up them sooner rather than later. Supt 1, hearing Pilot 1's concern, suggested they continue with the plan for Helicopter A to return and continue bucket work. This way, Helicopter A would be in the area to quickly disconnect the bucket and extract the firefighters if needed, but able to meet Knowles ICT5's objectives if the need for extraction wasn't imminent.

At 1451, Helicopter A landed at Rabbit Valley, shut down (which takes about one minute), and started to take on fuel. Supt 1 exited the aircraft and began to connect the bucket directly to the belly hook while Pilot 1 interacted with the helicopter mechanic. Supt 1 then walked around the nose of the helicopter and up to Pilot 1, where they asked how Pilot 1 felt about getting the firefighters on Knowles and Gore. Without hesitation, Pilot 1 said yes, we should get them right now. Immediately after, at 1456, Supt 1 called Emily on the phone to let her know the helicopter would be coming in empty to extract all of the firefighters on Knowles and Gore. They instructed her to leave all their gear due to weight constraints in trying to get everyone out in one flight. "Just get in," Supt 1 said. Their next call was to the UCR DO to let them know the plan at 1457. At 1458, Supt 1 called Emily back to confirm the plan.

On the plateau, Emily got off the phone with Supt 1 and passed the message, "We're gonna leave." Firefighter 5 hiked down from the rock feature to meet them at the Gore Fire, and they worked a little longer to make sure the lines were secure. Nick called dispatch via phone to give a fire update, but the dispatcher handed the phone to the UCR DO who said, "You don't need to update us, just get out of there."

Helicopter A quickly added some fuel and spooled up at 1502, and by 1508 they let Air Attack know,

"Helicopter A is back up. I'll be heading [to] the Knowles fire to pick up... crewmembers then to the northeast to another fire and then will bring them back to the trucks." Again, they were unknowingly talking to Red Rock Air Attack, 30 miles away. Helicopter A then called the Knowles Fire a few miles out to let them know the helicopter was inbound. Nick picked up the transmission and told Pilot 1, "I'm not sure if you can land where you landed before."

Emily called Supt 1 on her cell at 1509.[28] At the end of their short conversation she said, "Oh, we got a spot fire. I gotta go."

Nick, Sydney, Emily, Firefighter 5 and Nate had quickly made their way towards the helispot where they had stashed their gear. They had to pull out a GPS for navigation because it was so difficult to find the helispot with the reduced visibility from heavy smoke and the uniform appearance of the pinyon-juniper woodland. Based on the nature of the smoke they now saw, they knew that fire was on the plateau with them. Firefighter 5 explained, "At some point we saw smoke that had a different shape, or texture, not like the smoke that had been present all afternoon." Nick and Sydney could see it too. Unable to find the original helispot, Emily had Nate start to prepare a new helispot for the extraction. Just as Nate was beginning to cut trees out of the way with a chainsaw, they located the original helispot about 50 feet away.

Pilot 1 was trying to find a path through the smoke but it was thick and obscured the ground. A few minutes later, Emily radioed Pilot 1 and told them, "I think you can still land." Pilot 1 asked if she could hear the helicopter, and she said that she could. Helicopter A was flying slow and low, keeping an eye on the rock formations. Everything was white or gray and brown, which made it very difficult to see through the smoke. The canyon between the fire and the helicopter was full of smoke, and Pilot 1 was unable to see in front or below. Pilot 1 did a U-turn and told the crew on the ground they would try to find a different way in from the east.

Now at the Knowles-Gore helispot, Firefighter 5 was at the gear pile, trying to get organized for their flight. "If you stood up tall and looked, you could see flames." Emily told the group they would be leaving all their gear and just loading up on the helicopter. Firefighter 5 recalled Emily telling him, "We're leaving it. We'll leave packs and everything." Firefighter 5 had never been in this situation before and sensed the urgency and thought, "we're in near-miss territory already!" Firefighter 5 was confused about what to bring and what to leave. "Do we leave gear, but bring expensive stuff like radios, flight helmets?" Firefighter 5 took off their wildland fire helmet to put on their flight helmet but decided to leave it off so they could listen for the helicopter. Sydney asked Firefighter 5 to grab her wallet from her flight bag. They found it and handed it to her and started moving some stuff from their own flight bag into their pockets. Firefighter 5 recalled, "the winds were squirrely. You could feel the heat [from the fire] all of a sudden, but not enough to be painful yet." Emily was on the radio with Pilot 1, letting them know they were at the original helispot and that they had strobes out.

9 Seconds to Transition

Only 9 seconds elapsed from a radio transmission at 1519 communicating, "Oh, I don't think you can land here anymore..." to another radio transmission in which a female voice is heard saying "...deploying shelters."

The rapid nature of the transition between the idea of being picked up by a helicopter to deploying fire shelters is exceptionally noteworthy.

At 1519, Emily told Pilot 1, "Okay, I think you can still land," followed quickly by "You can't land where we're at anymore." Pilot 1 then lost communication with the firefighters on Knowles and Gore. Pilot 1 made several attempts to call Emily, but there was no answer.

On the ground, Firefighter 5 looked up from the gear pile and heard Emily say, "That's it. We gotta pull

28 Change in timeline from SAI Team Update #1 publication is due to additional call log information and follow up interview with Supt 1.

shelters!”

Having flown into the helispot earlier in the day, the firefighters on Knowles and Gore knew that a rapid escape on foot to a safety zone was impossible. They were surrounded by PJ, grasses and dead and down fuels in all directions, with no openings as large as the helispot. While on the Gore Fire, Firefighter 5 had identified the rocky, sandy slope leading up to the rock formation as a potential safety zone. But even if that was a safer location it was too far now – the fire was only seconds away.

Four of the helitack crew pulled their shelters out quickly, but Firefighter 5 was struggling to free theirs from its sleeve on the bottom of the fireline pack. Using the shelter's pull strap to remove the shelter from the pack's sleeve only opened the flap about 80%, but the hook-and-loop enclosure of the flap was holding on more than they expected it would. Emily was right there, standing over Firefighter 5. Initially, they didn’t know who she was talking to when she said, “Here, take mine.”

“I thought she was talking about radios, but she was offering me her shelter.”

Within seconds however, Firefighter 5 got the case open, pulled out their fire shelter and moved away from the gear to deploy it. Firefighter 5 had the impression the others were nearby, but was focused on the mechanics of deploying the fire shelter. Emily was yelling: “Stay together, put your feet towards the fire!” exactly as taught in fire shelter training. Without the directions, Firefighter 5 said they might not have remembered those important deployment instructions in the moment. “I was fuzzy, it all felt like a dream.” At this point, visibility at the helispot was extremely bad.

They deployed their shelters in a grouping along the edge of the helispot, with Firefighter 5 being closest to the gear. Firefighter 5 recalled stepping into the shelter, tucking and rolling. Though originally standing with their back directly to the fire, this rolling movement changed their body position, and their right side angled slightly towards the fire as they lay under the shelter. The flaming front hit them within seconds of deployment and it was extremely hot and windy. Firefighter 5 dug a small depression in the dirt, as deep as they could, to breathe into. Small embers were blowing in on their right side and the winds were so intense, Firefighter 5 thought the wind might carry their shelter away. Firefighter 5 estimated they were about 10 steps from the gear pile and could hear the small bottles of chainsaw fuel exploding. While Firefighter 5 did have their radio in the shelter, they did not have their helmet (due to the transition to the flight helmet) or gloves.

Inside the fire shelter, Firefighter 5 struggled to hold the shelter against the ground. The deployment sequence had been so rapid, they didn’t have time to don gloves, roll down their sleeves, or put their helmet back on. Firefighter 5 did not want to risk moving their shelter location because of superheated air and strong winds. Sometimes the wind would press the fire shelter material against Firefighter 5’s body, and it was “hot as hell.” They remembered in fire shelter training that survivors reported feeling the urge to get out of the shelter because the conditions seemed unbearable. Firefighter 5 concluded that that urge “is very real.” But with everything they had, they held the shelter down and stayed put.

At 1523, Red Rock Air Attack was managing a high-tempo airspace with ongoing SEAT operations when Pilot 1 repeatedly reached out to "Air Attack" for assistance. Red Rock Air Attack asked Pilot 1 if they had been able to make contact with the crew. Pilot 1 replied, “No I haven’t. I can see the flames now coming over... I’m hoping they ran away...” Red Rock Air Attack responded that they would try to wrap up operations and come over and assist. In the cockpit of Red Rock Air Attack, the ATGS and ATGS-T conferred about Helicopter A and the helitack crew, looking for that particular Type 3 helicopter in their system. They knew that this helicopter was not assigned to them, and didn’t believe it was in the Red Rock TFR. However, they couldn’t figure out where Helicopter A or their crew were.

Supt 1 was at Rabbit Valley helispot, listening apprehensively to the one-sided traffic on A/G 9. Supt 1 called Emily’s phone at 1514 and 1526, and Sydney’s phone at 1529, all calls went unanswered. In between attempts, Supt 1 called the UCR DO at 1527 and told them they had lost contact with Knowles.

Analysis: The helitack crew anchored their safety assessment on early data indicating the Snyder and Jones fires were 7 to 8 miles away, a distance historically considered a safe buffer. Furthermore, a 200-foot rock dome and adjacent cliff bands completely blocked their visual line of sight to the west, preventing them from observing the approaching fire front. As smoke rapidly degraded visibility and the fire accelerated across the plateau, the crew's decision window closed, leaving helicopter extraction impossible and forcing an immediate shelter deployment. **REVIEW FINDINGS »**

Search and Rescue Operations: 1530 - 1802

Rifle Helitack Perspective

Pilot 1's attempts to talk to the firefighters on the ground at the Knowles-Gore Helispot continued. Red Rock Air Attack, still the only Air Attack aircraft close enough to hear the traffic, radioed CO-GJC to tell them Helicopter A had lost contact with the crew on the Knowles Fire and asking if they had contact with them.

At this point, Supt 1, still on the ground at Rabbit Valley helispot, called CO-GJC dispatch on the phone at 1533 and told them they were trying to get in contact with the firefighters on the Knowles Fire and that they had heard there was a spot fire near their helispot, to their west. They requested that dispatch contact them to tell them to contact Helicopter A to get them out. Over the course of the next five minutes, CO-GJC made several attempts to reach them with no success.

As this was going on, Pilot 1 made another attempt to request Red Rock Air Attack assist in the search for Rifle Helitack. The SEATs had finally dropped their retardant on the Red Rock Fire, and Red Rock Air Attack could turn their attention fully to the missing helitack crew. They confirmed the coordinates of the Knowles Fire with Pilot 1 and plugged them into their GPS. Only then, at 1541, did Red Rock Air Attack understand that the Knowles Fire and Helicopter A were nowhere near the Red Rock TFR. They quickly realize "...that's out there like 30 miles...towards the smoke, under the smoke...that's why he can't get there..." and located the coordinates in the Jones TFR. There was another discussion in the cockpit about the TFR frequency and they called CO-GJC for some clarity. They asked CO-GJC if Jones had an Air Attack up and they respond with, "Negative."

Supt 1's first successful contact with the entrapped firefighters was with Nate, from under his shelter, at 1544 via cell phone. Nate told Supt 1 there had been a deployment and he didn't have accountability for the other firefighters. Immediately following this call, the UCR DO also called Nate. Between these two calls, Nate was able to shout back and forth with Firefighter 5, although it was still difficult to hear or see. At 1546, Nate told the UCR DO that two firefighters (himself and Firefighter 5) are in shelters and he doesn't know about the others. At 1547, Supt 1 and UCR DO talked about pulling the other firefighters off the fires to the east – Black Ridge and Blue Canyon.

> ***The UCR DO reflected, "It was the longest 2-2.5 hours of my life trying to get those guys out of there. Kept talking to Supt 1, realized we needed to get the people on the other fires out of there. We tried ground access. I called the fire department and asked for their best paramedics to go to Rabbit Valley Helibase."***

On the Blue Canyon Fire, HECM 1 kept returning to the high point to check for positive radio communication. When HECM 1 was up there, exposed to the wind, they had to use their chinstrap to keep their helmet on and felt the wind actually pushing their body back. From broken traffic on A/G 9 they could hear Pilot 1 urgently trying to call Emily, and they heard the Black Ridge Fire IC request an extraction by helicopter. HECM 1 told the smokejumper that it sounded like a deployment had happened. "At that point I started bawling," they said. "I

hugged the smokejumper, and we just sat by these rocks for a long time, just listening to the broken traffic." The wind speed started to increase.

The two Utah smokejumpers on the Black Ridge Fire could hear some of the communications on A/G 9 as Pilot 1 tried to talk to Rifle Helitack. Based on the smoke blowing at them from the west, and the concerning radio traffic, "it looked like with the winds and the terrain, the fire could get to us. We wanted off ASAP."

Under the shelter in the Knowles-Gore Helispot, Firefighter 5 could hear Pilot 1 calling them on the radio. They had been judging the relative intensity of the fire outside the shelter by the amount of light visible through the seams. As the light and heat in the shelter decreased, Firefighter 5 realized that they might actually survive the deployment. At that point they looked at their watch: it was 1607. Forty-eight minutes had elapsed since Emily made the command decision to deploy fire shelters. After a bit more time, they decided to peek out of the shelter. Firefighter 5 was hit with a hot blast of air and immediately pulled it back down.

Firefighter 5 made several attempts to use the radio inside the shelter but they couldn't make positive contact with anyone. They eventually snaked their antenna out to try and get better reception, but this didn't help. Finally, the conditions outside the shelter had moderated enough that they were able to stand the radio up outside the shelter. At long last Firefighter 5 was able to get someone on the radio to respond. They pulled their upper body out to get closer to the radio and heard Snyder Air Attack, now back overhead, giving them various call signs for helicopters working their way in to help. "I forgot them immediately," they recalled. "I could hear rotors, but it was too smokey to see them." They retreated partially back into the shelter. Snyder Air Attack asked for their coordinates, and Firefighter 5 opened the Avenza app and called out the coordinates over the radio. The radio transmission to Snyder Air Attack was extremely garbled. They had a strobe and a flashlight out.

Firefighter 5 tried shouting again to communicate with the crew. Eventually the noise died down enough to shout back and forth with Nate.

Aviation Resources

With word of the entrapment incident-within-an-incident (IWI) spreading throughout CO-GJC and the Grand Junction Air Center, numerous resources were called to attempt to help. The first of two Careflight helicopters was requested by CO-GJC by the DCM immediately after the shelter deployment was confirmed, at 1546. This critical piece of aviation could treat and transport any injured firefighters rescued from the entrapment site. The UAM and Snyder Air Attack drew on their knowledge of previous medicals on wildland fires, and they assigned a separate A/A frequency and selected a landing zone outside of the TFR at a known location for local emergency responders (Rabbit Valley). This would keep the fire traffic and the medical traffic from conflicting in the air.

The helicopters assigned to the Red Rock Fire were diverted from their missions one by one and redirected to assist with the IWI. CO-GJC also pulled Helicopter B, a DFPC Sikorsky S-70 Firehawk, from water drops on the Snyder Fire and directed them to the entrapment site at the time the shelter deployment was confirmed. A little bit earlier, Helicoper B had overheard the coordinates read out by Helicopter A to Red Rock Air Attack and decided to plug them in. They had been paying attention to the developing potential entrapment before they were actually called to assist.

They headed towards the coordinates, but couldn't get through the smoke column. They came around the other side of the column in communication with Helicopter A. Pilot 1 was still trying to get into the site, and asked Helicopter B to get water to try to cool it down. Helicopter B flew to the Colorado River and loaded to 60% of their water-carrying capacity to keep performance high. They came back towards the entrapment site and set down on a nearby flat area, and the manager called CO-GJC from a satellite phone and gave them an update. They waited for Helicopter A to direct their water drop and then had to leave to refuel. On the ground



Figure 23. Helicopter B DFPC Sikorsky S-70 Firehawk.

at Grand Junction, Helicopter B's two pilots and manager discussed "what risk we were willing to take as a flight crew." "We were willing to go all in."

At CO-GJC, it was unknown whether the entrapment site was inaccessible due to fire activity or terrain. A flurry of calls went out from the UAM for aircraft with specialized capabilities. If the site was safe for rescue insertion from a fire behavior perspective, one of these resources should be able to do it.

The first order was to the Utah USWFS helitack crew with Helicopter C, which was on standby in Cisco, Utah after inserting firefighters into the Jones Fire earlier in the day. This crew is trained in Single-Skid, Toe-In, and Hover Exit/Entry Procedures (STEP) Operations. They were called in case a complete landing at the deployment site wasn't possible, they could use their STEP capability to put EMTs on the ground and bring all the firefighters out.

Next, a Colorado-based USWFS short-haul helicopter was ordered to Grand Junction from Southern Colorado.[29] An Idaho-based US Forest Service Rappel crew was supporting the Red Rock Fire and was also requested for the IWI. The CO-GJC Center Manager called the High Altitude Army National Guard Aviation Training Site (HAATS) initially to request a helicopter with hoist capabilities.

The UAM had a rapid conversation with the Snyder Air Attack crew and pilot, who were on the ground at Grand Junction due to high crosswinds. He explained the situation and requested they return to assist with the IWI if possible. They launched from Grand Junction by 1630.

With Snyder Air Attack coming back to the Jones TFR, Red Rock Air Attack spoke with them directly, giving them access to all helicopters assigned to the Red Rock Fire and turning over the frequencies to Snyder Air Attack. Red Rock Air Attack needed to depart the area because they needed to get fuel, and they informed CO-GJC they were out of the area at 1642.

The amount of radio traffic on the fires made it difficult to contact aircraft. ACDP-T tried using National Flight Follow (NFF) to divert a helicopter to the IWI, but the channel has been having issues all year due to the configuration of NFF, Airguard, and Lands End repeater.

Sometime after 1630, Snyder Air Attack was over the Knowles and Gore area. At 1645, they reported to CO-GJC that they had made positive contact with Nate and Firefighter 5. This conversation confirmed the names of the firefighters involved in the entrapment.

Helicopter D, a Type 2 (Bell 205) operated by DFPC, had lifted from the GJT headed for the Red Rock Fire. As they approached the fire, they called Red Rock Air Attack, but Red Rock Air Attack had already departed the area. Snyder Air Attack responded to them instead and asked them to switch frequencies. Snyder Air Attack told them there was an entrapment and asked them to take down some coordinates.

29 Short haul involves lowering personnel or equipment on a longline from a hovering helicopter to a target area, allowing access to locations too small for a helicopter to land.

“It was so windy it was tough to get coordinates in [to the iPad],” remembers Helicopter D's pilot. After receiving the go-ahead to make their way into the Knowles-Gore area, Helicopter D faced a ferocious headwind trying to get to the site. It is a tanked helicopter and was flying with a snorkel hanging from the belly, adding even more surface area for the wind to push against. Snyder Air Attack also asked Helicopter D to grab a load of water from the Colorado River to drop on the way in to better access the area.

Helicopter A was now out of fuel, still unable to pierce the smoke and reach their entrapped crew on the ground. They went to refuel and were requested for another mission. The other fires in the area – Black Ridge and Blue Canyon – needed to have their firefighters extracted. As difficult as it was to leave the rescue of their crew to others, transporting personnel off all fires to the east of Snyder and Jones was critical.

Helicopter D was next up with a tank of water. They were circling overhead but couldn’t see through the smoke. They would see the ground for a brief moment and then everything was white again. The smoke came in waves, there was no way to simply fly through it. Visibility was about 1/8 mile, or less than 700 feet. Eventually, while in a right turn about 500 feet above the ground, Helicopter D’s pilot saw a strobe light. There was an arm peeking out of a fire shelter, and the strobe light was held palm up by Firefighter 5. “When I saw the strobe I thought ‘Oh good, they’re fine,’” recalled Helicopter D’s pilot.

Helicopter D’s pilot asked Snyder Air Attack if they could pick up the firefighters. They jettisoned their load of water and lined up to land. Coming into the entrapment site, they saw the shelters all together in a clearing. The rotor wash and wind at the entrapment site created a total brownout. They used a burnt shrub as a reference point so they could keep their bearings in the blowing dust, smoke and ash. The snorkel was deployed, and the pilot laid it down on the blackened ground. Helicopter D was perched on a slight slope, and to keep the helicopter from settling backwards and impacting the ground with its tail rotor, the pilot had to keep power up.



Figure 24. Helicopter D DFPC Bell 205.

At first there was no movement from the deployment area. Finally, Firefighter 5 came out of their shelter and opened the helicopter door. Helicopter D had two headsets in the back, and Firefighter 5 plugged one in and tried to talk to the pilot but the headset wasn’t transmitting. The only seats in the back of the helicopter were rear-facing, so Firefighter 5 was right behind the pilot, facing away. Nate bear-crawled to the helicopter, and Firefighter 5 pulled him inside.

The two firefighters in the back seemed to be in shock. The doors were still open, and Helicopter D perched at the helispot for 4-5 minutes. The pilot waited for more movement, for someone else to emerge from a fire shelter and approach the helicopter, but no one else emerged. At one point during this wait on the ground, the pilot glimpsed what they knew immediately was a deceased firefighter not covered by a fire shelter. This was the first indication that not everyone had survived.

Finally, Firefighter 5 closed the door. Helicopter D lifted off the helispot and were directed to Rabbit Valley. They told Snyder Air Attack they had taken two firefighters out of the entrapment site, but believed the others might be deceased. The time was now 1756. It was over 2.5 hours since the entrapment had begun.

Helicopter B was circling just outside of the smoke column. Helicopter D confirmed with Helicopter B that the larger helicopter could land at the site. Helicopter D's pilot felt relieved that another helicopter was coming in immediately after them with personnel on board. Helicopter B's crew had medical training, and they would be able to exit the aircraft and assist.

Helicopter B followed the land from high point to high point and finally they were able to land at the deployment site. They saw the shelters from about 150 feet out and came in on a steep descent. They landed at 1802. The winds were blowing about 35 miles per hour, and a reddish light filtered through the heavy smoke. There were waist high remnants of trees, but absolutely no other vegetation. The manager and one pilot exited the aircraft and approached the shelters. The visibility was only 20-30 feet in the smoke, and they were pelted with sand. The manager's flight helmet had so much sand embedded in the cracks that they couldn't move their visor. Between the two pilots on Helicopter B, they had a combined five combat tours overseas flying the UH-60 helicopter (military version of the S-70), and thousands of hours of flight time. They agreed that this mission was the most difficult flying they had ever done.

They did a thorough assessment of the three firefighters at the site and informed Snyder Air Attack of the tragic news: there were no survivors remaining.

Helicopter D landed at Rabbit Valley helispot with the two entrapment survivors at about 1804. One firefighter got out on their own, but the second firefighter had to be carried out of the helicopter. Firefighter 5 and Nate were both transported to the hospital by air ambulance.

Snyder and Jones Fires Initial Attack Resources Perspective

After 1600 and the news of the entrapment, what followed for most of the Snyder and Jones resources was an hours-long period of "helpless" waiting for additional information. The leadership of both fires: Jones ICT4, outgoing Snyder ICT4 and ICT4-T, as well as Snyder Ops, were never consciously aware of the locations of the staffed IA fires – Knowles, Gore, Black Ridge and Blue Canyon – east of their fires. Summary information was texted by dispatch to their phones for each new fire start, but in the tumult of the hectic initial attack of the three fires – Snyder, Jones and Dolores – they didn't have time to assess the spatial relation of the IAs to their own fires.

The IC transition of the Snyder Fire from ICT4 to ICT3 took place in the chaotic atmosphere of the emerging entrapment and search and rescue (SAR). When the transition was complete, the group received a request from the UCR DO. Snyder Ops and the ICT3, along with two other smokejumpers, agreed to undertake a ground search for the deployment site. At 1632, CO-GJC broadcasted a message to all fires in the Unit to disengage and pull back to a safe location to reevaluate.

> ***The message read, "Attention all units. All resources that are currently on active fire here in the UCR, per the Unit Fire Chief, he would like all ground suppression resources to disengage from fire suppression actions, ensure firefighter safety, and reassess conditions and let Grand Junction Dispatch know when you feel comfortable re-engaging."***

Many on the ground reported that this message came in garbled and broken over the repeater system. Some heard enough of the message to understand roughly what was being transmitted. Others could barely understand it at all. The Red Rock IC was the first to reply, and the dispatchers reached out to all ICs to confirm they had heard the transmission and were in a safety zone.

With the resources now at a safe location in a large parking area far from the fires, the SAR party embarked at 1617 in two UTVs towards the Knowles and Gore Fires. At 1700 they arrived at a locked gate at the Black Ridge Canyons Wilderness boundary. Along the way they had kept track of the fire to their left (northwest), paralleling their direction of travel. At the Wilderness gate the flank turned towards them. They had to pull back but planned to attempt the route again once the fire front has passed.

Air evacuation attempts were already underway. Before they could make another attempt past the Wilderness gate in the UTVs, a helicopter had successfully landed at the deployment site, bringing out two injured firefighters. Covering all bases, Snyder Air Attack was coordinating with Helicopter A to land and pick up EMTs and trauma gear from the SAR party.

The SAR party drove out to an open area southeast of the Wilderness gate and met Helicopter A as they landed at about 1800. Supt 1 jumped out of the aircraft with the rotors still turning and loaded the trauma gear into the external cargo basket. The EMT with the SAR party and the ICT3 loaded into the helicopter. The rest of the ground crew waited for them to lift.

It was during this hold on the ground that Helicopter B landed at the deployment site and assessed the three firefighters. Confirmation came over the radio that all three were deceased. Pilot 1 and Supt 1 heard the terrible news.

After minutes of waiting, with the helicopter's rotors spinning, the ICT3 finally got out and walked back to the SAR party's UTVs where Snyder Ops and another smokejumper were waiting.

The ICT3 went up to Snyder Ops. "I'm sorry," was all they said.

Fire Management – Grand Junction Perspective

At 1545 the USWFS RMGA DO heard the first news of an entrapment, and arranged an emergency video conference call with USWFS Unit 7 Supervisory Fire Management Specialist, USWFS Assistant Chief of Operations for RMGA, UCR DO and other GA leadership for 1601. Early in the meeting it was confirmed that five firefighters had deployed.

UCR UFC went into dispatch and with CO-GJC DCM drafted a message for a tactical pause on all the fires. It was broadcast at 1632.

A second Careflight helicopter was ordered at 1647. The firefighters at Black Ridge and Blue Canyon were pulled off their fires between 1720 and 1740 by Helicopter A, leaving all gear behind. At 1803, Snyder Air Attack notified the dispatch center that two individuals had been extracted from the deployment site and taken to Rabbit Valley helispot. Both firefighters were transported via Careflight to St. Mary's hospital in Grand Junction. At 1812 the HAATS hoist ship was cancelled, and at 1818 the short-haul helicopter was told to stand down.

Conflicting information was coming in from Rabbit Valley helispot about the number of survivors. The dispatch floor did not hear a transmission confirming the fatalities. They heard two came off, then four. The DCM said, "Careflight called at 1855 and asked if they needed to return to Rabbit Valley. I looked at the acting UAM, and they said no, there was no longer a need." Still the definitive word of the fatalities, and how many fatalities, was not yet shared with dispatchers. The DCM still held out some hope that Careflight wasn't needed because no one else had been injured in the entrapment. Sometime that evening, though, while the DCM was away from the other dispatchers, the UCR DO confirmed that three Rifle Helitack crewmembers had lost their lives. The DCM decided not to share the news for now: the dispatchers still had several hours ahead of them until they finished their shift. Finally, sometime after 2300, the CO-GJC staff gathered and received the bad news from their CM and DCM.

Post-Accident Response

Dispatch

Within the Grand Junction Interagency Dispatch Center, IWI response went smoothly. The CM and DCM were working together closely along with the UCR DO and UAM to make notifications, get emergency response initiated and backup personnel in place. They rapidly arranged for multiple Careflight air ambulances and Mesa County ground ambulances to stage at the Rabbit Valley helispot. STEP and Short Haul were on order. "All my people think they dropped the ball, but I was so proud," said the Center Manager.

The response to provide help from the dispatch community was substantial. Locally, the GACCs and the NICC all started working on finding relief and coverage for Grand Junction and also support to the struggling dispatch centers within Great Basin, Rocky Mountain and the Southwest. The NICC put a stop on dispatcher name requests from other units until there was enough support to the centers that were overwhelmed. They put out a call for highly qualified dispatchers who were willing to take a potentially challenging assignment.

The CM recalled arriving at the office the next morning to find there had been a rapid response for help, and dispatchers from outside the unit were continuously showing up. He wasn't sure who had directed them to come in but he was grateful. This allowed the local dispatch staff to disengage and take time off to process the event.

SIOF Implementation

The Knowles Serious Incident or Fatality (SIOF) meeting was held virtually on June 27th at 2030. The SIOF team then maintained daily calls at 1300 and 1600, one hour each. These calls were in-person with a virtual option to capture those not in Grand Junction. This team is made up of: SIOF Team Lead, the Agency Administrator, Hospital and Family Liaisons, Crew Liaisons, Employee Liaisons, Honor Guard Liaison, and SMEs (Human Resources, Public Affairs Officer, Non-Governmental Organization, Critical Incident Stress Management, Serious Accident Investigation Team, Finance and Logistics.) Their mission is to coordinate all aspects of a critical event.

Coordinated Response Protocol Activation

A Coordinated Response Protocol (CRP) Lead arrived in Grand Junction on June 29th to ensure coordination among the various groups involved in the incident. The purpose of the CRP is to coordinate the collection of information while both minimizing additional impacts on and building trust with those involved in the incident. The CRP Lead coordinated employee interactions between the Serious Accident Investigation Team, Law Enforcement and Investigations unit, Critical Incident Peer Support group, USDA Office of Inspector General, Occupational Safety and Health Administration, SIOF Team, Honor Guard, media and agency leadership. The CRP Lead was tasked with ensuring that employees affected by traumatic stress resulting from the incident and/or subsequent interviews were provided opportunities for critical stress management intervention and that such intervention was appropriately timed to facilitate employee resiliency either prior to or immediately after the interview process, as needed. The CRP Lead also informed and educated employees who were likely to be involved in post-incident interviews as to policies, organizational relationships, and contextual expectations. The CRP Lead received a signed letter of delegation from the Designated Agency Safety and Health Officials for both the Department of the Interior, USWFS and the USFS and served in an interagency role throughout the incident.

Recovery

The events of June 27, 2026, required an extraordinary level of coordination among federal, state, county, municipal, and private-sector partners across western Mesa County and into Utah. As multiple wildfires rapidly expanded along the Colorado-Utah border, responders were simultaneously managing an escalating wildland fire emergency, threats to the public, and the evacuation of public from remote areas.

Following the burnover, ground personnel initially focused on the rescue and medical evacuation of the involved personnel. As the situation developed and it was officially verified that three firefighters had died at the scene while two sustained injuries, the nature of the response changed immediately. Coordination between the UCR UFC and the Mesa County Emergency Services Director and Colorado DFPC became critical in transitioning from the initial emergency response to both a medical evacuation and a coordinated fatality recovery operation.

Confirmation of the fatalities initiated coordination with the Mesa County Sheriff's Office and Mesa County Coroner's Office and required the integration of local authorities with the federal wildland fire response. At the same time, efforts continued to evacuate and provide medical care to the two surviving firefighters. The remote location, rapidly changing fire behavior, extreme winds, limited access, and continued fire activity made recovery of the fallen and injured firefighters exceptionally difficult.

Multiple recovery strategies were evaluated and attempted during the early afternoon, evening and into the overnight hours with a final attempt of recovery using an air ambulance out of Moab, Utah at approximately 2300 hours on the evening of June 27th. This final attempt at recovery was aborted due to the winds on the site and inability for the pilot to safely land and the UCR UFC was notified of the failed attempt at 2323. The operation required close coordination among fire personnel, law enforcement, emergency management, aviation resources, and other supporting agencies. The State of Colorado ultimately authorized state resources, including support from the Colorado National Guard HAATS, to assist with recovery efforts beginning at 0600 hours on June 28th. The three fallen firefighters were subsequently transported by helicopter to Grand Junction Regional Airport, where their flag-draped remains were transferred to vehicles from the Mesa County Coroner's Office. Firefighters who had participated in the recovery stood in silence as their fallen colleagues were transferred, after which fire, rescue, and law-enforcement vehicles accompanied them to the Coroner's Office.

The response demonstrated the importance of established relationships between federal wildland fire leadership, Mesa County Sheriffs Office and the Colorado DFPC. The UCR UFC, Mesa County Emergency Services Director, and the BLM served as key coordinating links between the wildland fire organization and the county's emergency-response system at a time when the incident had expanded well beyond the scope of a traditional initial-attack wildfire. Their coordination helped connect the incident with law enforcement, the Coroner's Office, emergency



Figure 25. HAATS hoist-capable helicopter.

management, transportation resources, and other county and state partners while ensuring that the recovery of the fallen firefighters was conducted with dignity and respect.

Hospital Liaisons

The two injured firefighters were initially taken to St. Mary's Hospital in Grand Junction, CO for evaluation. Helitack crew members and unit overhead arrived at the hospital close to 1740, and hospital liaisons were already in place. In the early morning hours of June 28th the two injured firefighters were transferred to the UC Health Burn and Frostbite Center in Denver. Two hospital liaisons, one for USFS and one for USWFS, were assigned to be with them and were given a proper handoff from the original hospital liaisons from Grand Junction. The hospital liaisons established and maintained communication with the SIOF and CARES teams to provide timely and pertinent updates.

Conclusion

The Knowles Serious Accident Investigation Team offers this report in the spirit of learning from tragedy. The deaths of Emily Barker, Nicholas Hutcherson, Sydney Watson, and Nathan Matthews, and the injuries sustained by the surviving crewmember, demand that the wildland fire community examine how a combination of extreme fire behavior, strained communications infrastructure, fragmented airspace awareness, jurisdictional complexity, local expectations of fire spread, and incomplete situational awareness regarding the overall fire operational complexities within the McInnis Canyons NCA led to the tragic and fatal outcome on June 27th.

No single decision or system failure fully explains the outcome. Instead, the events reveal the cumulative effects of known limitations operating under extraordinary tempo and conditions. By documenting and analyzing these interactions with care and honesty, the team seeks to equip firefighters, managers, dispatchers, and aviation personnel with clearer insight so that similar sequences may be recognized and interrupted in the future. In wildland fire, we honor those we have lost by learning.

Knowles Fire Investigation Process

On the evening of Saturday June 27, 2026, in response to the fatalities and injuries on the Knowles Fire, the United States Forest Service (USFS) and the United States Wildland Fire Service (USWFS) assembled a Serious Accident Investigation Team (SAIT). The team reported to Grand Junction on Monday June 29, 2026.

The affected employees on the Knowles Fire worked for Rifle Helitack, an interagency crew comprised of both USFS and USWFS wildland firefighters, or were on assignment from sister crew Pitman Valley Helitack. This interagency employee composition triggered a joint Delegation of Authority (DoA). A joint DoA was issued to conduct a Serious Accident Investigation (SAI) from the USWFS Designated Health and Safety Officer (DASHO), Chris Wilcox, and the USFS DASHO, Robert Velasco, to Charles Russell of the USWFS and Mark Pieper of the USFS.

This SAI product meets the mutual USWFS and USFS requirements for a Factual Report and Wildland Fire Serious Accident Investigation while applying organizational learning objectives such as determining key events, actions, conditions, risk factors and safety system issues that contributed to the accident. To achieve these objectives, experienced accident review practitioners and a group of subject matter experts (SMEs) from the two agencies worked together to produce this SAI report.

This review intends to understand a complex event from multiple perspectives in order to explain what happened. Additionally, the information presented in this report aims to inform recommendations that may reduce the chance of a similar entrapment event in the future by improving the system of work across organizational levels.

Findings

Statement on Findings & Systemic Context:

In reviewing the findings generated under the Serious Accident Investigation framework, our objective is to move beyond identifying simple individual non-compliance or isolated errors. We recognize that human performance does not happen in a vacuum; rather, it is shaped by interconnected organizational pressures, environmental variables, and evolving operational conditions.

Therefore, the SAIT sees these findings not as evidence of a broken component or a worker who 'failed to follow rules,' but as an entry point to analyze our complex system. Our focus is to map the systemic conditions—such as resource constraints, competing goals, and communication channels—that influenced real-time decision-making. True prevention relies on modifying these underlying system dynamics rather than merely enforcing rigid compliance or assigning blame.

Positive Findings

- Personnel Qualifications & Work/Rest Standards: All Rifle Helitack personnel met or exceeded position qualifications, and mandatory work/rest standards were fully maintained.
- Emergency Medical Response: Medical response execution by dispatch center staff, the Unit Aviation Manager, the Duty Officer, and the field operators was rapid, coordinated, and thorough.
- Post-Deployment Emergency Tools: Surviving firefighters effectively utilized handheld strobes, personal cell phones, and saved Avenza map coordinates to communicate from the deployment site once conditions allowed.
- Notification Streamlining: Updated and accessible emergency contact records significantly streamlined family notifications and agency coordination.
- Audio Data Preservation: The Trainee Air Tactical Group Supervisor (ATGS-T) maintained personal audio recordings during the mission, providing critical radio data that established timelines and documented key communications before, during, and after the entrapment.

Pre-Accident: Systemic and Environmental Context

Finding 1: Extreme Fuel and Weather Conditions (Material / Environmental)

- Extremely low fuel moistures combined with severe weather produced unexpected fire behavior.

Finding 2: Dispatch Staffing, Qualifications, and Layout (Material / Human)

- Dispatcher positions staffed predominantly by trainees and the physical separation of CO-GJC initial attack and aircraft functions slowed information flow and prioritization during simultaneous ignitions. Staffing vacancies as well as the lack of highly trained employees in the dispatch center also contributed to communication issues.

Finding 3: Multi-Jurisdictional Dispatch Consolidation Friction (Material / Administrative)

- Dispatchers in Utah (UT-MFC, UT-UBC) were forced to repeatedly log in and out of separate radio configuration files (.veg), WildCAD-E profiles, and IROC databases to track resources and process orders, effectively doubling the workload for a reduced staff.

Finding 4: Land Mobile Radio Infrastructure and Technical Maintenance (Material)

- Aging radio infrastructure, network saturation, and a vacant telecommunications position produced unreliable radio coverage, missed weather broadcasts, and forced heavy reliance on personal cell phones.

Finding 5: Helitack Organization and Staffing Depth (Human / Organizational)

- Staffing vacancies within Rifle Helitack reduced operational depth and flexibility during multi-ignition initial attack days.

Accident Sequence: Operations, Situational Awareness, and Fire Behavior

Finding 6: Resource Tracking and Common Operating Picture (Material / Human)

- A lack of real-time centralized resource tracking prevented leadership and initial attack crews from maintaining a shared common operating picture across adjacent incidents.
- Snyder/Jones resources were unaware of the position of the firefighters on the Knowles/Gore Fires in relation to the Snyder and Jones Fires.

Finding 7: Limitations of Trigger Points (Environmental / Cognitive)

- Trigger point did not account for actual fire conditions. Terrain features and dense smoke prevented ground crews and aerial supervision from visually observing the rapid progression of the Snyder Fire flaming front.

Finding 8: Ingress/Egress Planning for Aerially Delivered Resources (Material / Human)

- Firefighters were inserted into small remote fires with reliance on being removed by a helicopter.

Finding 9: Limitations of Field Situational Awareness Applications (Human / Technological)

- Ground firefighters relied on commercial mobile applications that lacked real-time spatial updating, while mobile accessibility is difficult with government situational awareness tools.

Finding 10: Frequency Allocation, Call-Sign Discipline, and Airspace Perception (Human / Material)

- Overlapping frequency assignments and generic call-sign use created confusion regarding airspace activity and aerial supervision presence. Helicopter A assumed Air Attack was active overhead when the aircraft was actually working on the Red Rock Fire 30 miles away.

Finding 11: Aerial Supervision Coverage Gaps and Uncoordinated Incidents (Human / Environmental)

- There was a gap in Air Attack coverage over the Snyder and Jones Fires from 1430 to 1630.

Finding 12: Fire and Aviation Management Cognitive Task Saturation (Human / Cognitive)

- Fire personnel, including Dispatchers, Duty Officers, Unit Aviation Managers, Fire Chiefs, and Incident Commanders, experienced severe task saturation and cognitive overload during a multi-ignition, high fire load day.

Personal Protective Equipment, Shelter Deployment, Evidence Preservation, and Post-Accident Rescue

Finding 13: Handheld Radio Scan Feature (Technological)

- The settings were analyzed on a surviving BK 5000 handheld radio. The radio was set to A/G 49, high power, zone scan on. There were 53 channels selected to scan across 6 zones, with many commonly used channels duplicated (28). Recent analysis revealed zone scan configuration issues that could impact effective scanning and lead to missed calls. Zone Scan should be used judiciously, with caution to avoid scanning too many channels. It is recommended that a max of 16 channels should be scanned.

Finding 13: Personal Protective Equipment (Material)

- Personal protective equipment (PPE) garments not certified to National Fire Protection Association (NFPA) 1977 Standard on Protective Clothing and Equipment for Wildland Firefighting and Urban Interface Firefighting were used by several individuals.

Finding 14: Shelter Deployment Environment and Micro-Site Survivability (Material / Human)

- Fire shelter deployment occurred under rapid, emergency conditions. Micro-site selection and proximity to heavy fuels directly determined survivability of each shelter deployment site. Nowhere within the entrapment area was survivable without a deployed fire shelter.

Finding 15: Post-Accident Emergency Communications and Extraction (Material / Tactical)

- Standard handheld radios had insufficient range from inside fire shelters, but handheld strobes and cell phones enabled helicopters to locate and rescue the two survivors in heavy smoke conditions.

Finding 16: Serious Accident Investigation Evidence Preservation (Material / Operational)

- Failure to follow standard evidence preservation procedures resulted in the contamination and loss of deployed fire shelters.

Enterprise Level

Finding 17. Radio Infrastructure Modernization & Sanctioned Digital Redundancy

- Aging infrastructure, repeater outages, network connectivity, and console instability forced personnel to rely on unrecorded personal cell phones.

Finding 18. Unified Cross-Boundary Dispatch Databases & Automatic Authority Handoffs

- Border fires created severe administrative friction through duplicative ordering processes and utilization of paper-based ordering workflows between neighboring centers.

Finding 19. Automated Geo-Fenced Frequency Management & Emergency Traffic Protocols

- Cross-zone assignment of identical Air-to-Ground frequencies (A/G 9) led to emergency messages being picked up by distant Air Attack platforms.

SAI Team Investigation Process

Learning in the Wildland Fire Organization

At the Knowles and Gore Fires, a tragic and unintended outcome emerged from latent conditions and several contributory factors. Our analysis on the SAI has found that firefighters on the Upper Colorado River Interagency Fire Management (UCR) Unit work within a dynamic wildland fire system, with multiple complexities. While similar factors exist on other fires, the outcomes have been very different. There is a deep need after any fatality event to understand what happened so that everything possible can be done to prevent another occurrence. Prevention is not what people should or should not have done at a specific incident. Instead, modifying future practice requires a thorough examination of the systems that put people in positions where they felt that their actions were the best option.

An organizational learning methodology was applied to this incident evaluation. It humbly approaches this serious accident with the premise that our people are well-intended and are doing the best they can in terms of their decisions and actions in a complex work environment. What are often seen as mistakes and errors in hindsight were actually decisions, actions, and judgements made with incomplete information in extremely dynamic environments. They are only deemed as “errors” when there is an unacceptable outcome. In reviewing the findings generated under the Serious Accident Investigation framework, our objective is to move beyond identifying simple individual non-compliance or isolated errors.

This SAI is designed to facilitate learning as much as possible from the event and to reveal the influences or context that shape actions and decisions and importantly, why the actions and decisions made sense to those involved. It is also designed to look beyond the incident and to compare what occurred to what we might consider ‘normal work’ so we can begin to understand the systemic influences on actions and decisions.

In order to improve the wildland fire response system, the fire community must take the time to reflect upon and learn from this tragic event. Accidents are much more than problems to be solved. The process being utilized on the Knowles SAI is not designed to judge individual actions or decisions as good or bad. Instead, it is specifically designed to learn everything possible from the event by looking at it through multiple lenses, or perspectives, to determine if the observed interactions are widespread in everyday work. This examination may result in small changes to process or equipment, or it could lead to an agency-wide review and change, such as a shift in organizational culture. In order to create relevant cultural change, we have to start by recognizing opportunities and encouraging dialogue and sensemaking across organizational levels.

The SAI Team and Our Process

The Knowles SAI Team functioned under the Coordinated Response Protocol (CRP). The CRP synchronized all internal agency response groups, including the SAI Team, Peer Support/Critical Incident Stress Management, Law Enforcement and Investigations, Union, Communications, Human Resource Management, UCR Serious Incident or Fatality (SIOF) and external investigations (ex. Occupational Safety and Health Administration (OSHA) and Office of Inspector General). The CRP process also included the coordination of family and hospital liaisons, as well as Honor Guard for the memorial services. While the SAI Team has a distinct purpose, the team has been in constant coordination with all functions within the CRP organization to ensure continuity and to reduce impact on primary affected personnel and/or the local unit.

The Knowles SAI Team is rostered with advanced DOI SAI and FS Learning Review practitioners with experience leading complex reviews and investigations. The team also has a number of highly experienced SMEs across multiple disciplines (ex. Dispatch, fire equipment specialists, fire behavior, field operations, aviation, organizational learning, human factors, Union designees and writers). Individuals on the team are not only experienced in the process (i.e. interviewing, site visit requirements, etc.) but they also have considerable experience in human dimensions, just culture and organizational learning theory – as well as fire management

across the levels of the system.

The SAI Team also incorporated specialists from academic and professional organizations outside the fire suppression community. Outsiders bring fresh eyes and a different perspective on how our system works. These perspectives helped to question assumptions, reveal learning, and examine conclusions formed during internal deliberation.

The SAI is inclusive of several critical elements such as the executive summary, narrative, timeline, investigation process, findings, maps/photos/illustrations, appendices and records. Of note, this particular SAI utilizes a complex factual narrative created by capturing the stories that surrounded the accident from perspectives across the event's system. To achieve a comprehensive narrative, the SAI Team started with a site visit, which occurred immediately after the event. Next, the team interviewed over 60 individuals who were working within the UCR wildland fire theater that day. Using interviews, WildCAD-E logs, cell phone data, radio transmissions, site visit information, satellite imagery, a timeline emerged. Using the timeline and individual interview notes, the team began to synthesize the progression of events and key personnel and a basic narrative of what occurred was constructed. Upon the completion of the draft narrative, the team invited individuals whose interviews provided context to the narrative to participate in a large group read back session. The purpose of the read back was to allow individuals who provided context to the narrative to validate how their information is presented in the report and ensure accuracy. The other purpose of the large group read back is to create an opportunity for group sensemaking around the event. Finally, the SAI Team met again to synthesize all elements of the report and identify key actions and decisions, which commonly represent learning moments. The SAI Team acknowledges that to learn from actions and decisions, we (collectively) have to understand their context.

The process utilized by the SAI Team:



Figure 26. SAI process flow.

The learning and process methodology used in the Knowles SAI recognizes that safety is created in multiple places and through multiple methods in any organization. In other words, there are many contributors to the creation and maintenance of a safe work environment, not just operators on the ground. For this reason, our organizational response to incidents and accidents includes multiple learning products designed for a range of audiences from the field to top leadership. It is the SAI Team's intent to create not only a traditional written

report to be posted on the Wildland Fire Lessons Learned Center (WFLLC) website, but compliment with an audio version of the report as well as a dynamic and interactive online learning tool (i.e. StoryMap).

SAI Team Perspective

All of us in the wildland fire community want to understand and make sense of what happened on the Knowles and Gore fires on June 27, 2026. We want to know what the members of our wildland fire family experienced that day, and most importantly, we want to learn from the tragic events so that we can prevent a similar event from occurring in the future. Unfortunately, the story behind the events is not an easy one to tell. How and why Emily Barker, Nick Hutcherson, Sydney Watson, Nathan Matthews and many other people found themselves in the position they did is incredibly complex.

We invite you as the reader to engage in this report using tactical empathy and a learning mindset.

Honoring the Fallen

Emily Barker began her career as a teacher, shaping young lives and building a foundation rooted in her love of learning, leadership, and helping others grow. Those qualities followed her into wildland fire, where she became a deeply respected leader, mentor, and trailblazer. Emily loved the outdoors with fierce and contagious joy. She was a snowboarder, dirt biker, hiker, traveler, and adventurer. She was once named Snowmaker of the Year at Vail Resorts, bringing the same determination and excellence to everything she took on. She didn't simply live and work in wild places, she cared deeply about them and about the people alongside her. While pursuing her degree in Ski Area Management, Emily began volunteering with the Ironwood Township Fire Department in Michigan and fell in love with fire. In 2009, she joined the Northwest Colorado BLM District, and two years later moved to the Upper Colorado River District, working across the Dillon, Minturn, and Eagle stations. In 2018, she moved to Idaho Falls, where she served as a BLM Engine Captain before returning to her beloved Colorado in 2023. She spent her final three seasons as a squad leader on Rifle Helitack. Over nearly two decades in fire, Emily became a leader others trusted when things were difficult. She was also a trailblazer in every sense of the word—from cutting trail in Idaho Falls while instructing an S-130/190 class to quietly making the path wider for the women who followed her into wildland fire. But Emily also understood that strong crews are built in the small moments. On Rifle Helitack, she became famous for keeping everyone accountable to their 4 o'clock chocolate breaks. Underneath the chocolate, pranks, and laughter, she was building trust and connection.



Her friend and Rifle Helitack colleague Alex Voshell remembered: *"She brought people together. She made long days a little lighter and stressful moments a little easier to carry. I truly believe that over her nearly 20 years in fire, she made the path a little easier for the women who came after her. She showed that there was a place for them in this profession—not by talking about it, but by living it every day. She led by example, proved what was possible, and helped create an environment where more women could see themselves succeeding in wildland fire. She was strong, courageous, compassionate, and truly prioritized lifting up those around her."*

Emily was a cornerstone of both the Upper Colorado River District and Rifle Helitack, the kind of leader whose influence will continue through the firefighters she taught, encouraged, challenged, and believed in.

Nicholas "Nick" Hutcherson was a man who met challenge with optimism, humility, curiosity, and an unmistakable smile. He proudly served his country in the U.S. Navy, including a tour in Guam, and later began working toward his Doctor of Physical Therapy. Even in his own ambitions, Nick was drawn toward service and toward making life better for the people around him. He was also an active member of the Northern Arizona Deaf and American Sign Language community. His connection to public lands and service continued through wildland fire. Nick began his firefighting career in July 2021 on the Kaibab National Forest, serving five seasons in a variety of roles. One day, while working on an engine, he saw the Pitman Valley Helitack crew and asked the superintendent a simple question: "How do I do that?" He figured it out. In 2023, Nick joined Pitman Valley Helitack, where he found a place for his determination, athleticism, humor, and willingness to take on hard things. He was later supplementing Rifle Helitack, a crew with a close relationship to Pitman Valley. Those who knew Nick knew his favorite phrase: "Easy day." Not because the work was easy and not because the challenges were small, but because Nick possessed an uncommon ability to meet difficult things with confidence and a smile. He was always up for the challenge.



Travis Nichols, former crew superintendent of Rifle Helitack, remembered Nick's legendary workout sessions on the heavy bag—and the story that Nick had asked to drive up to Rifle for the assignment so he could bring more of his MMA gear with him. There was even an unconfirmed report involving nunchucks. Travis ended his remembrance simply: *"You were ahead of your time, Hutch. I will miss seeing that smile around. All easy days from here, my friend."*

Nick's life was one of service, ambition, humor, and an eagerness to take on whatever came next. He leaves behind a reminder that hard things don't always have to harden us—and that sometimes the best way forward is with determination, a little humor, and the belief that somehow, it's going to be an easy day.

Sydney Watson lived with a remarkable sense of independence, curiosity, and purpose. From the time she was young, she knew she wanted to be a firefighter. She dreamed of one day becoming a burn boss and wanted to see more women on the fireline. Through the way she lived and worked, she showed others what was possible. Sydney loved wild places and wanted to experience as much of the world as life would allow. She was a true adventurer - independent, capable, and completely herself. Her coworkers looked forward to hearing stories from her solo backpacking trips, and those who knew her understood that Sydney didn't need to talk much about who she was. She simply lived it. She began her federal wildland fire career in November 2023 as an apprentice on the Prescott National Forest, assigned to Engine 331 on the Bradshaw and Chino Valley Ranger Districts. She also supported Engine 330, Engine 633, Crew 2, and the Prescott Interagency Dispatch Center. During the 2025 fire season, she worked with Pitman Valley Helitack on the Kaibab National Forest. In January 2026, she accepted a permanent appointment as a senior firefighter with Prescott Helitack before joining Rifle Helitack on May 31. Sydney stepped into every role asked of her with strength, grace, and commitment. She was always learning, always exploring, and always moving toward the firefighter and leader she intended to become. But the Sydney her friends remember cannot be captured by a list of positions or qualifications.



Once asked what she thought her reputation was, Sydney replied: *"Someone who tries to avoid people, takes naps in the sun, loves water and really likes fruit, veggies and pancakes."* It was perfectly Sydney. She was the person who climbed into the back of a brand-new Subaru at the dealership to make sure she could comfortably car camp in it. She was the person who tackled Rim-to-Rim-to-Rim in the Grand Canyon with little more than a pocket full of pancakes. She could be quiet and independent but completely present in her own way. And her friends knew they had really succeeded when a joke was ridiculous enough to break through her side-eye and earn one of her grins.

Sydney lived with confidence—not the loud kind, but the kind that comes from knowing yourself and being willing to follow your own path. She was adventurous, capable, curious, and entirely true to herself. Her career was only beginning, but the life she packed into those years and the impression she left on the people around her were anything but small. She showed us what it looks like to move through the world with courage, curiosity, and confidence—and to leave your own trail behind.

Nathan "Nate" Matthews built his life around wild places, new experiences, and the people willing to share an adventure with him. He began his outdoor career as a park maintenance supervisor at Pioneers State Park and Nature Conservancy Education Center in Lincoln, Nebraska, before finding his way into wildland fire. Nate began fighting fire with Grayback Forestry in Oregon and later worked for the Oregon Department of Forestry and as a contractor before earning a spot with Rifle Helitack in 2023. In all, he served eleven seasons in wildland fire. His qualifications reflected both his experience and his constant desire to learn. Nate was a Basic Faller, Firefighter Type 1, Fixed Wing Parking Tender, Incident Commander Type 5, and UTV Operator. But one qualification was particularly meaningful to him: Helicopter Crewmember. He was immensely proud of his work and of the connections he built with his crew. His family was just as proud of him. Outside of fire, Nate was a rock climber, adventurer, traveler, camp-coffee maker, and mocktail creator. He brought enthusiasm to new experiences and wasn't afraid to have strong opinions about how something could be done better.



His friend and Rifle Helitack colleague Megan Spencer remembered: *"Nate's passion and determination to teach others, his stoke for new experiences, and his confidence can inspire you in fire or wherever your life takes you. If you've ever worked with Nate, you know how strong headed he could be. I like to think of those qualities as coming from a place that challenged others around him to think differently and improve. He still had immense courage and that scrappy tenacity we could all use a little more of. He showed me how much crew bonds and support really matter, and how to find a little humor even in the hardest moments."* That combination of confidence, stubborn determination, humor, and genuine care for his crew was Nate. He challenged people because he cared. He taught because he wanted others to succeed. He sought out new experiences because he wanted to live fully.

Nate's family hopes his life reminds people to recognize the bravery, sacrifice, and resilience of wildland firefighters—and the extraordinary people behind the job.

Emily, Nick, Sydney, and Nate each came to wildland fire by a different path and each left their own unmistakable mark. Emily taught us to lift others up. Nick taught us how to meet hard things with a smile. Sydney taught us to move through life with confidence and curiosity. Nate taught us to challenge ourselves and one another to keep growing.

Their careers mattered. Their service mattered. But even more than the positions they held or the qualifications they earned, they mattered because of the people they were and the people they changed along the way.

They will forever remain part of the crews, communities, families, and wild places they loved.

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Appendix B. Weather and Fire Behavior Analysis

Ashley Sites, Fire Behavior Analyst, Gallatin County, MT

On Monday the 22nd of June, the National Weather Service began to look at a closed low pressure system dropping into the Pacific Northwest. They began to see an increase in fire weather concerns for the coming weekend, especially Saturday the 27th. On Thursday the 25th, the first Red Flag Warning was issued for gusty winds, low humidity and dry fuel. The NWS continued to emphasize Red Flag Warnings throughout the week, culminating with a Particularly Dangerous Situation notice on Sunday the 28th.

As they headed out the door in the morning on June 27th, the resources expected a busy day of initial attack. These days are not common, nor are they rare, on the Upper Colorado River Interagency Fire Management Unit. Although the Fire Weather Forecast had a Red Flag Warning for high winds, it was still early and the wind wasn't abnormal just yet. Even if a fire tried to go big, the canyons were expected to limit growth to a few hundred acres.



Figure B-1. Fuel near the Knowles fire. Photo credit: SAI Team FBAN

The Snyder fire was reported twice, once the night before and then again early on the day of the entrapment. Immediately after the second report, the Jones fire was reported. The Knowles and Gore fires were reported mid-morning and began staffing right away. The last fire to be located was the Dolores fire, which was first reported just before noon on the day of the entrapment. The Dolores Fire backed into the holding features of the Snyder Fire and burned over the Knowles fire helispot before combining with the Jones fire that evening.

Drought was classified as severe to extreme in the fire area. After a high value near 73 percent in November of 2025, snowpack at the end of May was effectively zero. This was the low point of two years of below average snowpack. Fuel moisture was exceptionally low. Live woody fuel averaged ~75%, live herbaceous averaged ~150% and 1,000-hour fuel averaged 9%. Fuel in the Jones fire area was fairly uniform grass fuel. The Snyder

fire was mostly pinyon-juniper, best described as fire behavior fuel model 6. Fuel in the Knowles and Gore fire area was old pinyon-juniper with similar understory with heavy dead and down fuel loading.

As resources approached the Jones and Snyder fires, the wind made itself known. Upon arrival at the Snyder fire, winds were measured at 20 to 30 miles per hour out of the west southwest. Pilots early on reported extremely difficult flying conditions. The smoke was flat on the ground and fire activity on the Snyder fire was moderate with little to no torching. A LAT had to jettison a load for the first time in his career, he was afraid he would crash.

Several new fires were spotted by Helicopter A, nearly 8 miles to the east of the larger fires. Helitack started staffing these fires around 0930 when they put three on the Knowles fire. These were all small fires in the pinyon-juniper with minimal fire activity, just a few burned trees, despite the wind. Noon found two helitack inserted into the Gore fire.



Figure B-2. Gore fire, 0921 6/27/26. Photo credit: Emily Barker

It was about this time that a new fire entered the picture, Dolores. Dolores was very near the Snyder fire but in different fuel and had much better alignment with slope and wind, since it started at the bottom of the canyon. Within one half hour, Dolores had grown to about 80 acres and showed no signs of slowing down.

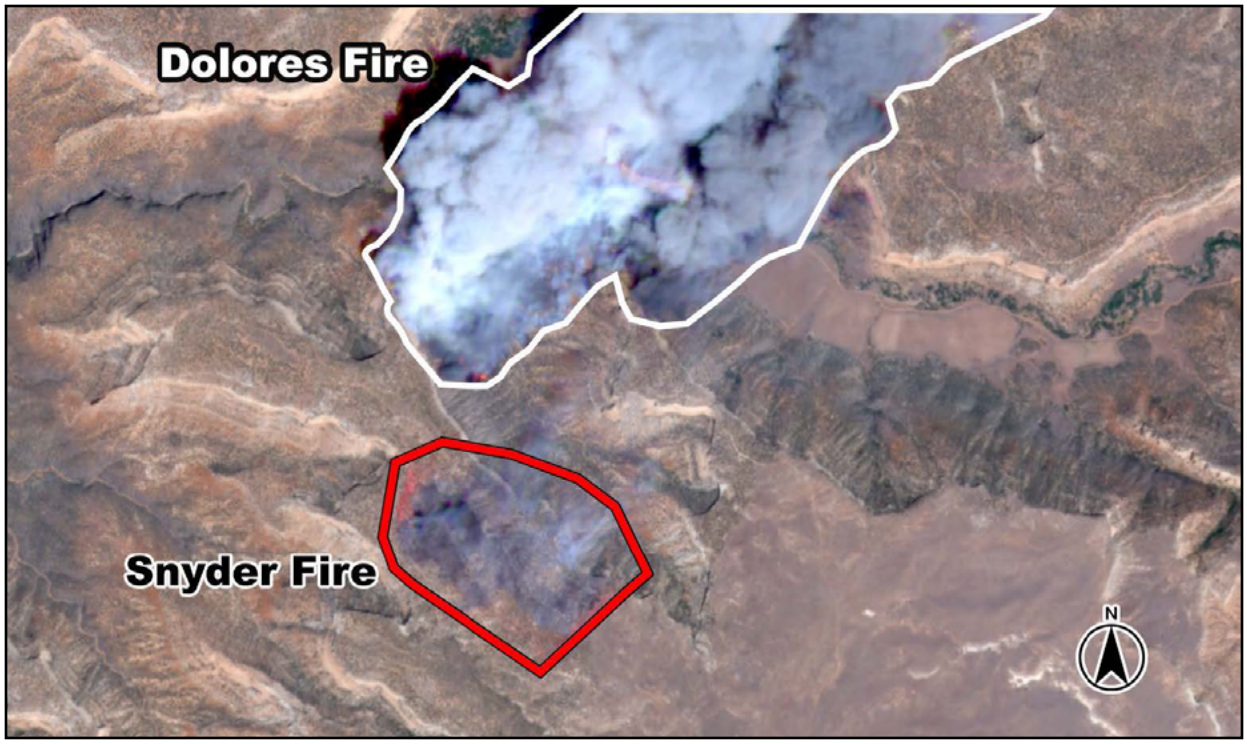


Figure B-3. Planet Scope image 1236 6/27/26.

In the first hour and a half, merged with the Snyder fire, the fires moved 3.5 miles to the east. South-southwest winds from 25 to 30 miles per hour, and gusting to near 40 miles per hour, carried the smoke to the north, out of sight of those staffing the fires to the east. Winds continued to increase throughout the day with gusts reaching as high as 47 miles per hour at the Little Dolores remote weather station (RAWS). Winds like these had not been recorded at Little Dolores in the last twenty years.

Analysis: Record-low 1,000-hour fuel moistures of 6% to 9% and multi-year extreme drought created unprecedented fuel receptivity across western Colorado. Historically, cliff bands, washes and canyon edges confined fires in the McInnis Canyon NCA to a few hundred acres. Driven by 40–50 mph surface winds, the combined Snyder/Dolores fire spotted across deep canyons and ran 7.3 miles in under three hours, catching experienced personnel completely by surprise. **Review Findings »**



Figure B-4. Fire activity at Kings Canyon, 1328 6/27/26. Photo credit: CREP

Driven by wind gusting over 40 miles per hour, the fire moved another three miles east in the next hour. Around 1400 the wind turned more to the west and laid the smoke column over the cluster of fires including the Knowles and Gore fires. Firefighters staffing the cluster of small fires started to take notice.



Figure B-5. Gore fire, 1427 6/27/26. Photo credit: Emily Barker

All the necessary conditions for large fire growth combined on the canyon rim above Dolores Canyon. There was continuous pinyon-juniper fuel with little interruption from canyons to the north and it was fully exposed to the high wind. For two and a half hours, the fire moved between 2 ½ and 3 miles per hour. It spread ½ mile every 12 minutes.

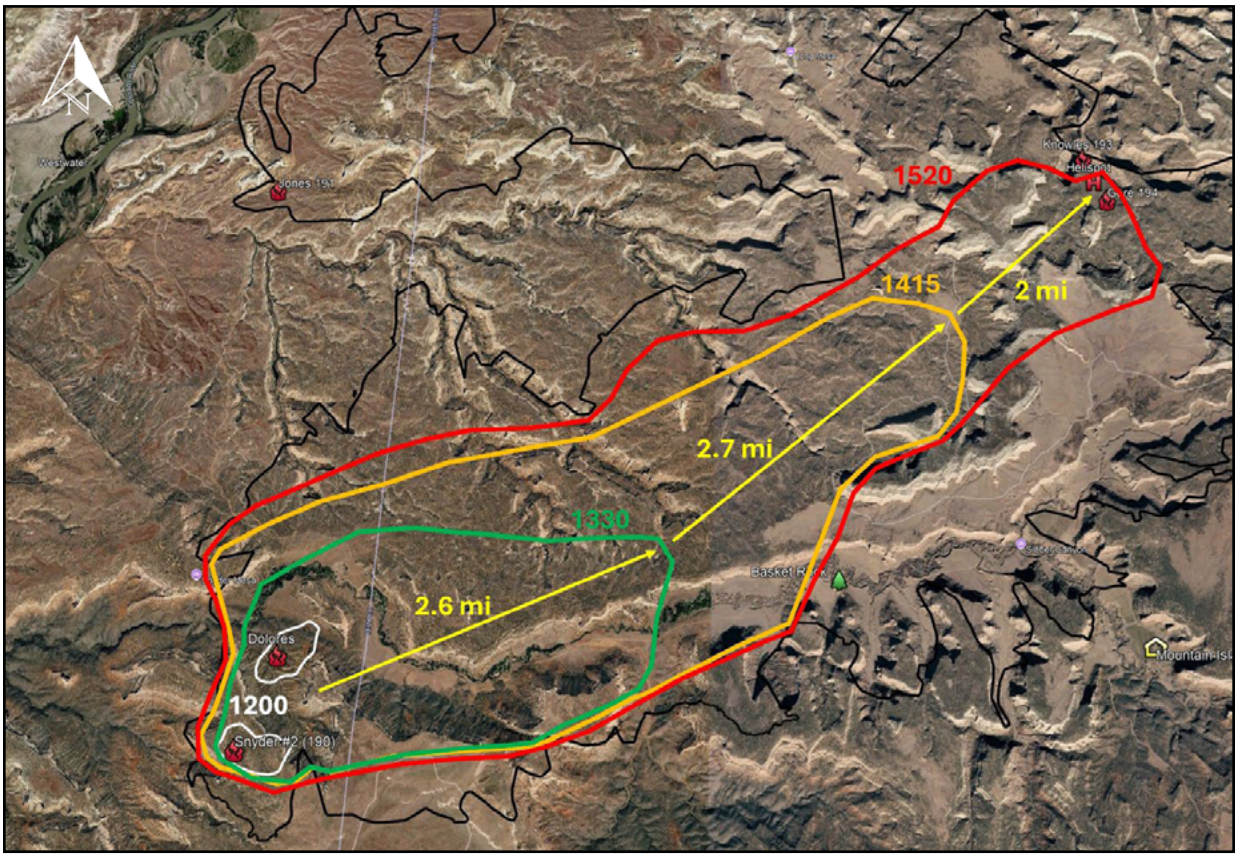


Figure B-6. Fire progression map based on field observations and remote sensing.

As the fire reached the head of Jones Canyon and Long Mesa it was nearing 1500. The fire swirled in a pocket that formed a notch in the cliffs southwest of the Knowles helispot. At the same time, rising topography caused the fire to speed up on the mesa top ½ mile from the Knowles fire, where the crew had set a trigger point to disengage from their fire. From here, it spotted down to the bench below the Knowles fire and burned toward the Knowles fire from the west. This was most likely the first fire the firefighters could have seen from the helispot at 1509. During this time the fire swirling by the notch found its way through and, with a strong wind being channeled through the notch, ran toward the helispot. When the fire hit the helispot from the southwest at approximately 1519 it was a running crown fire. As the firefighters struggled to hold their shelters in place, fire came at them again from the southeast due to the central mesa splitting the wind. The Snyder fire had now covered approximately 7.3 miles in just under 3 hours. It had grown at an average rate of 2.7 miles per hour.

As fast as the fire was moving, the smoke was moving ahead faster and at ground level, due to the strong wind. The amount of fuel burning in the stand replacing fire created a tremendous amount of dense smoke. From above, or from a distance, it was not possible to discern the location of the actual flaming front. When the Knowles/Gore firefighters first became aware of the smoke, it blocked the sun and darkened their environment. When the fire reached the plateau that they were on, it took on a different texture. It would have been thick with ash and even embers as it approached the helispot. Sight distance would be very short at this point. From the time they could see flames, there would not be much time to react to a fire travelling nearly three miles per hour.

References:

Sites, A. July 19, 2026. Knowles Fire Entrapment Fire Behavior.

Stratton, R; Gannon, B. July 14, 2026. Snyder and Jones Fire Modeling Narrative in Support of the Knowles Fire SAI.

Appendix C. National Technology and Development Program Equipment Evaluation and Use Report

Introduction

At 1519 on June 27, 2026, five firefighters were involved in a fire shelter deployment and subsequent burnover while responding to the Knowles and Gore fires in the Upper Colorado River Interagency Fire Management Unit. Emily Barker, Nicholas Hutcherson, and Sydney Watson did not survive the burnover. Two firefighters were evacuated from the deployment site at approximately 1750 the same day. One of those firefighters, Nathan Matthews, remained in medical care until he passed away July 24, 2026 from injuries sustained during the burnover event. The fifth firefighter has been released from medical care and is continuing their recovery.

Intent and Scope

The equipment report documents the performance, and post-incident condition of the equipment used during the accident, and presents findings derived from site visits, interviews, and equipment analysis. This report aims to translate those findings into meaningful insights for anyone using this equipment in the field.

The equipment report utilizes information from interviews with surviving firefighters, accident site visits, examination of photographs of the site taken by the Mesa County Sheriff's Department, Mesa County Coroner, and the Serious Accident Investigation Team (SAIT), and inspections of the recovered personal protective equipment (PPE) and items from the deployment site.

Some equipment used in the entrapment is absent from this report because it was not available for inspection by SAIT subject matter experts (SMEs) upon their arrival. Notable equipment not available for analysis includes the fire shelters used by Sydney Watson, Nathan Matthews, and the surviving firefighter.

Equipment Findings Outline

This section provides an overview of the findings drawn from analysis of the equipment used in the deployment site.

All five firefighters deployed their fire shelters just prior to the initial fire impact.

- Equipment condition, location, and interviews indicate a rapid deployment in poor visibility, with minimal time for site preparation and personal protective equipment preparation, indicated by:
  - Four firefighters were not wearing gloves inside their shelters, one was wearing a single glove.
  - Four of the firefighters had shirt sleeves that were rolled up their forearms.
- Site evidence indicates there was a lack of time to prepare and assess deployments sites:
  - Damage to the inner shell and floor of the two fire shelters shows that available ground fuels were present in areas of the deployment site during the deployment.
  - Three of the firefighters deployed immediately adjacent to the pinyon-juniper fuel type on the east side of the deployment site.

Convective and radiant heat produced temperatures that varied across the deployment site. Conditions on the southeast side, particularly adjacent to the pinyon and juniper fuels, exceeded the protective capabilities of three fire shelters.

- Fire shelters located on the southeast side of the deployment site, adjacent to the pinyon pines, contain markers indicating temperatures exceeding 1,200°F, and ground level heat exceeding 600°F.
- Equipment located near the center of the deployment site, not under

fire shelters, indicate ground level temperatures near 400 °F.

- Equipment known to be under deployed fire shelters located near the center of the site exhibited minimal heat indicators, consistent with conditions within the range of human survivability.

Operational Takeaways

Operational takeaways are derived from interviews, equipment findings, and site conditions documented during the investigation. They are intended to reinforce key practices, emphasize certain areas of training, and generate discussion amongst personnel operating with this equipment in the field.

Fire Shelter Utilization

A fire shelter deployment is often thought of as a process containing elements such as site selection, site preparation and wearing the appropriate PPE. The fire shelter has long been considered a tool of last resort. It is one of the only pieces of equipment a firefighter trains with, but at the same time, expects to never use. Do not hesitate to use your fire shelter if your situation is uncertain and you think it can be improved by using it.

Site Selection

The time for site selection was compressed at the Knowles-Gore Helispot, as indicated by survivor interviews and audio timestamps.

- Be prepared for conditions to deteriorate rapidly, significantly impairing vision. It may be difficult to identify nearby fuels or acceptable deployment surfaces.
- Wind conditions during deployment were beyond what most firefighters expect from training. High winds made deployment difficult and may have caused the loss of some PPE items.

Protect Your Airway

A contributing factor to the deaths of the four deceased firefighters on the Knowles burnover event was determined to be damage to the airway.

- According to NWCG Standards for M-2002 Fire Shelters, PMS 411, “In entrapment situations, most firefighters are killed because of heat-damaged airways and lungs, not external burns. Protect your airways and lungs at all costs by keeping your face close to the ground and staying in your shelter.”
- While shouting may be necessary to provide direction during initial deployment, once deployed, communication between shelters should become secondary to airway protection, especially during the peak intensity of the burnover.
- Airway protection can be aided by digging a small hole for your nose and mouth, which the surviving firefighter did in the Knowles burnover.

Radio Communication

During this deployment, entrapped firefighters were unable to communicate using handheld radios from within their shelter. Cell phones were utilized to make and receive calls. Testing conducted at the National Technology and Development Program in Missoula, MT shows that radio transmissions are limited by fire shelter materials and handheld radio use inside a fire shelter has an approximate range of 2,000 feet. The range between two radios in shelters is approximately 100 feet.

- Line-of-sight transmission distances from inside the shelter were limited to 2000 feet for both send and receive mode.
- Shelter-to-shelter communications were limited to approximately 100 feet.
- Avoid contacting the ground or the shelter with your antenna

because both will reduce your radio's range.

PPE

- All PPE was NFPA certified, but some FR shirts were certified to NFPA 2112, not NFPA 1977 or NFPA 1950 (1977).
- Use PPE certified to NFPA 1977 or NFPA 1950 (1977). This standard ensures PPE meets minimum design, performance, labeling, testing, and certification requirements for use in the wildland fire environment. Garments certified to NFPA standards other than NFPA 1977 or NFPA 1950 (1977) may use flame resistant (FR) fabrics but are not designed or tested for the hazards of the wildland fire environment.

Handheld Strobes

- Both Rifle and Pitman Valley helitack crews are issued and carry handheld strobes. While not required equipment, strobes are invaluable for identifying your position to aviation resources. Unlike a signal mirror, strobes maintain effectiveness in low light and smokey conditions.
- Firefighter 5 had a strobe in their pocket when they deployed and used it as soon as rotors could be heard over the deployment site. Despite the smokey conditions, Helicopter D was able to quickly identify the deployment site because of the strobe.

Note: The following contains graphic information. Reader discretion is advised.

Shelter Deployment and Site Summary

At 1456, Supt 1 of Helicopter A notified Emily Barker that Helicopter A will be utilized to pull the five firefighters off the Knowles and Gore fires. All five moved to the helispot, where they stacked their tools, line gear, and saw fuel in the southeast corner of the spot, along a small ridge. As the group waited at the gear pile, conditions deteriorated rapidly, making a helicopter landing and extraction no longer feasible. At 1519, when it becomes apparent Helicopter A could no longer land, it is only 9 seconds later when a voice can be heard on audio recording saying "…deploying shelters".

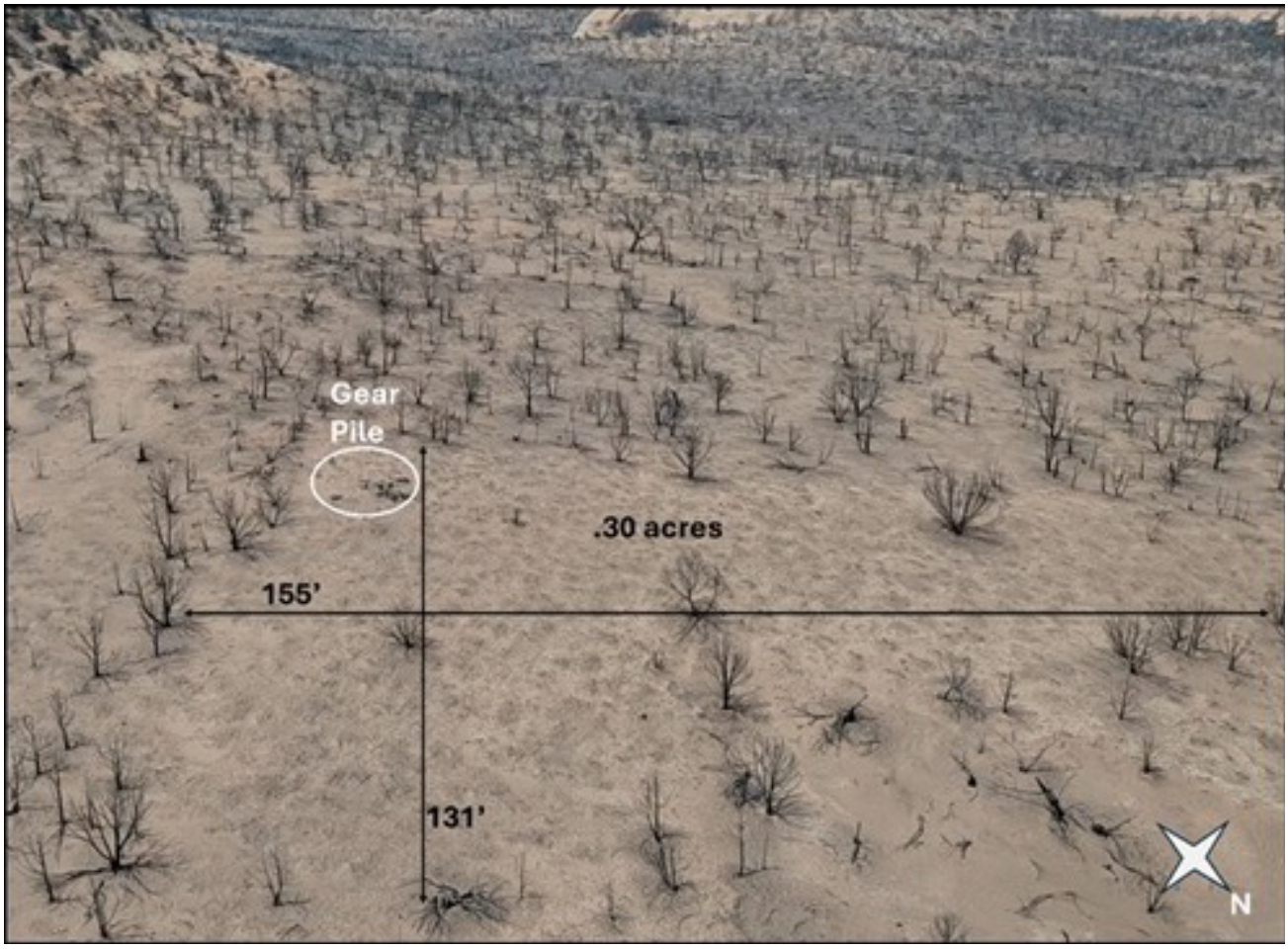


Figure C-1. Deployment site overview.

The firefighters moved downslope and northeast from the gear pile, with all five deploying their fire shelters with their feet towards the general direction of the advancing flame front. Firefighter 5's interview indicates that the flame front impacted the group within seconds of deploying.

The fire made multiple runs at the deployment site over the course of the next 48 minutes, burning hot enough to consume all ground fuel within the site. The two firefighters who were rescued spent a total of 2.5 hours inside their shelters, occasionally coming out to communicate via handheld radio.

There were no indications of vegetation removal at the site in preparation for deployment and witness interviews report an immediate operational shift from aerial extraction to deploying shelters. The shelter deployment was hectic with heavy smoke obscuring visibility, resulting in firefighters deploying on top of and in close proximity to available fuels. Shelter locations within the deployment site played a significant role in the outcome of individual firefighters. The focus of the firefighters was on extraction rather than a possible deployment.

Deployment Site Conditions Summary

Needle freeze on intact trees to the northeast of the deployment site indicate that fire initially impacted the group from the southwest, aligning with statements from the surviving crewmember. The firefighter's movement to the northeast, into the deployment zone, would have put them on the leeward side of the small ridge where they had stashed their gear.

Equipment provided to and collected by SAIT SMEs indicates both convective and radiant heat exposures at the deployment site. Temperatures at the gear pile exceeded the ignition point for nylon (750°F – 980°F). The ignition of the gear pile was most likely influenced by the presence of fusees, isobutane-propane fuel canisters, and aluminum fuel bottles.

The equipment found near fire shelters shows ground level temperatures exceeding 400°F in the middle of the deployment zone, to above 600°F near the pinyon pines on the southeast and east side of the deployment site. General indications of heat on the two available fire shelters showed temperatures in the 500°F to 800°F range with peaks exceeding 1200°F.

The fire burned intensely enough to completely consume almost all ground fuels at the deployment site.

FR Clothing and Protective Equipment Analysis

Mesa County Coroner personnel were required to handle and manipulate the deployed fire shelters at the site. Some of the shelter damage (e.g material damage, delamination, tears) likely happened during this time. Environmental conditions at the site during and after the deployment, and the impact from helicopter rotor wash on the site may have resulted in additional damage to both the shelters and PPE.

Only PPE and equipment that was physically evaluated or had sufficient imagery for accurate condition analysis are documented in this report.

If PPE items are not listed with the firefighter, the items were not recovered, or the ownership could not be identified.

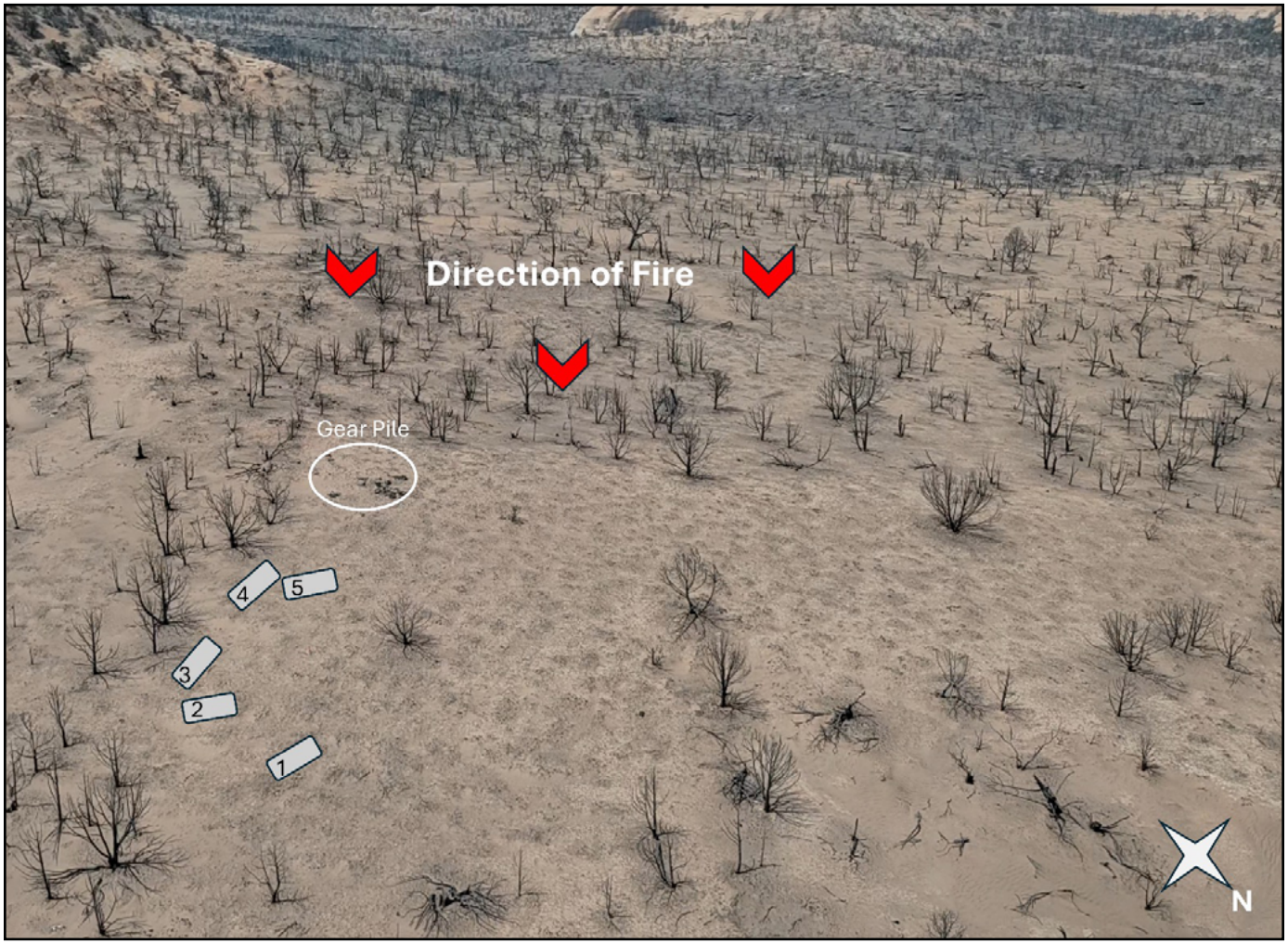


Figure C-2. Estimated fire shelter locations in the deployment site. Number indicates head end.

1. Nathan Matthews
2. Emily Barker
3. Nicholas Hutcherson
4. Sydney Watson
5. Firefighter 5



Figure C-3. Side of recovered shelter facing adjacent pinyon-juniper fuels.

Firefighter 5's Fire Shelter Story

Through interviews and site visits, it is believed that Firefighter 5 moved approximately 55' northeast from the gear pile before deploying. Firefighter 5 was one of the last to leave the gear pile due to a delay in accessing their fire shelter. When Emily first instructed the group to deploy shelters, Firefighter 5 grabbed the shelter pull strap routed out of the shelter sleeve pocket flap on their pack and pulled but was unable to release enough flap Velcro to remove the shelter. To gain access, they let go of the pull strap and peeled open the shelter sleeve pocket flap to remove their shelter from the pack's shelter sleeve.

Firefighter 5 deployed their shelter with their feet not directly in line with the oncoming flame front, leaving their right side more exposed. Within seconds of getting into their shelter, the flaming front impacted the deployment site with force. Firefighter 5 did not want to move, or even reposition, due to concern of their shelter being blown away from them. Embers and smoke blew under the shelter floor, and the shelter side would collapse during gusts contacting their body, then pop back out after the gust eased. Shelter material contacting Firefighter 5's body was painful with noticeable relief when the wind subsided, allowing the shelter to pop back out. Firefighter 5 remembers putting a lot of pressure on the right side of their shelter with their feet and arms, sustaining burn injuries in the process, especially to their forearms where the sleeves were rolled up. Firefighter 5 endured 48 minutes of this during their deployment, with multiple pulses of heat coming from different directions. It got so hot inside their shelter that Firefighter 5's memory flashed back to their training. They recalled that during a deployment it may get so hot inside that you want to get up and leave your shelter, later reflecting, "the urge to get out...that's pretty real."

<u>Fire Shelter</u>

Not available for analysis

<u>Personal Protective Equipment</u>

FR Shirt: Nomex (93% meta-aramid, 5% para-aramid, 2% other fiber) material certified to NFPA 2112-unknown

edition.

- Areas of sublimation on front and back of shirt, char present in right front pocket.

FR Pants: Specification Nomex pants certified to NFPA 1977-2011 edition.

- Small area of sublimation on right lateral leg, several ember marks on front and back.

Flight gloves: In pants cargo pocket.

- No visible damage.

PPE Information and Definitions

Fire Shelter Materials, Construction and Specification

The fire shelter is made from three different laminate materials, the outer shell, inner shell, and floor. The outer shell is silica cloth laminated to aluminum foil, the inner shell is fiberglass cloth laminated to aluminum foil, and the floor is silica cloth laminated to aluminum foil. The laminate materials are sewn together using quartz thread and fiberglass thread. Shake handles are sewn to one side of the shelter. The folded shelter is sealed into a polyvinyl (PVC) bag and protected in a hard plastic case for carrying on the fireline. See figures C-4 and C-5 for labeled descriptions of the packaged fire shelter and deployed fire shelter.

Federal firefighters and all firefighters on federally managed fires are required to carry fire shelters that meet the US Forest Service Specification 5100-606 Shelter, Fire, M-2002. This specification sets the performance, material, design, and testing requirements for fire shelters acceptable for carry on the fireline.

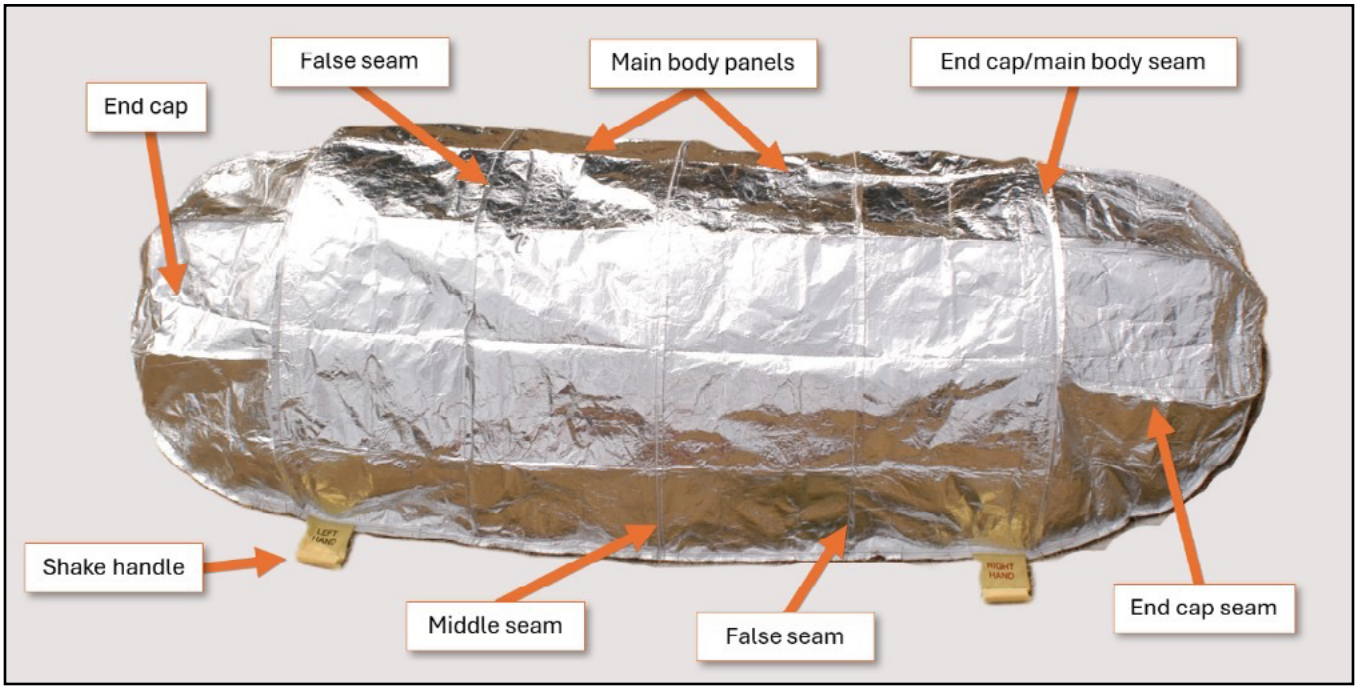


Figure C-4. Fire shelter part identification.

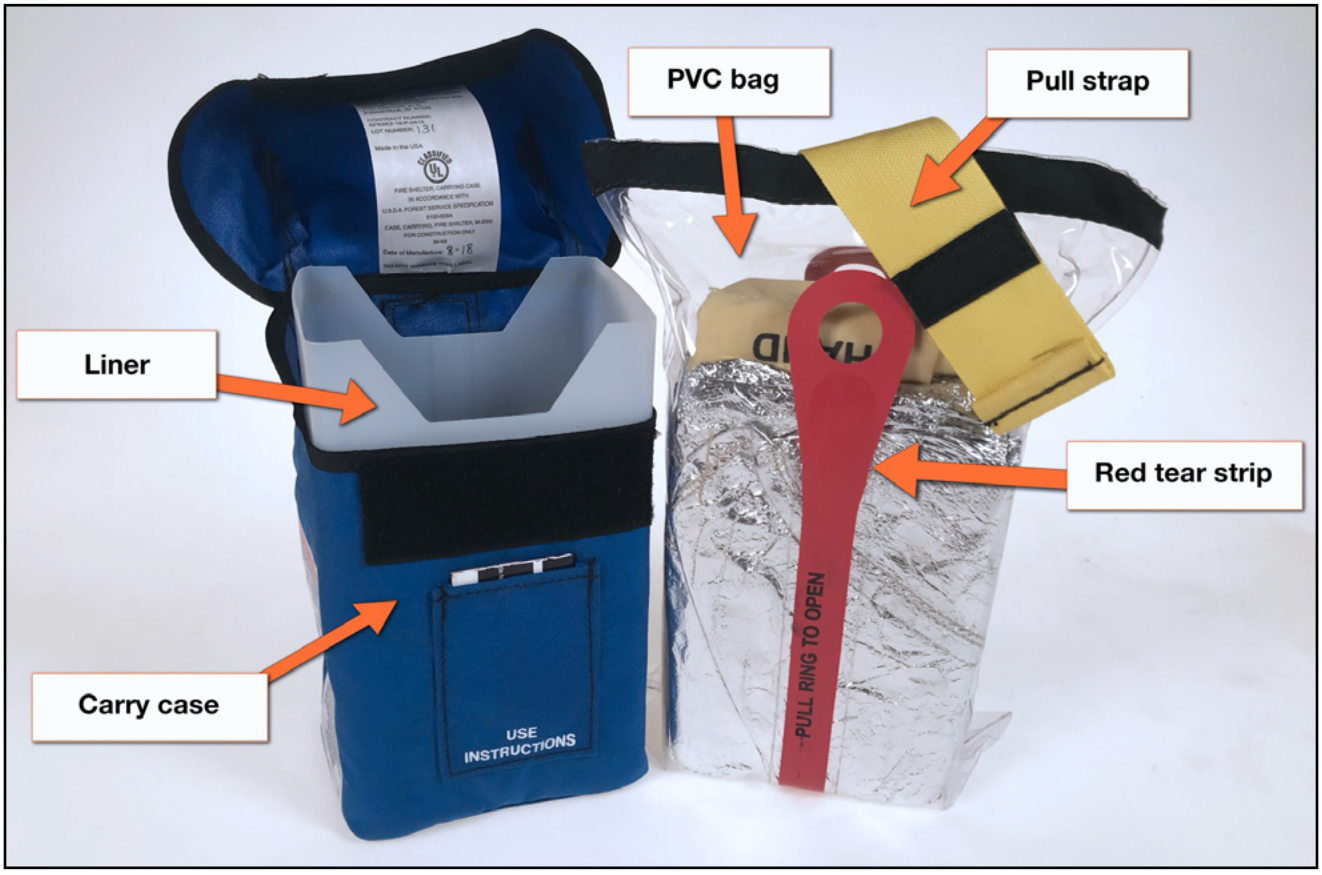


Figure C-5. Packaged fire shelter part identification.

PPE Certifications

The National Fire Protection Association (NFPA) 1977 Standard on Wildland and Urban Interface Firefighting was consolidated into the NFPA 1950 Standard on Personal Protective Equipment for Technical Rescue Incidents, Emergency Medical Operations, and Wildland and Urban Interface Firefighting in 2025. NFPA 1977, now NFPA 1950 (1977) establish minimum performance, design, testing, and certification requirements for personal protective equipment (PPE) used by wildland firefighters. All federal and National Wildfire Coordinating Group (NWCG) member agency firefighters are required to wear PPE certified to NFPA 1977 if manufactured before 2025, or NFPA 1950 (1977) if manufactured in 2025 or later. PPE that must meet NFPA 1950 (1977) certification includes FR clothing, helmet, gloves, chainsaw chaps, and the face and neck shrouds.

Definitions and Descriptions

FR Clothing

Dye sublimation: This occurs when heat "bakes" the dye out of the fabric, causing the color to change in the fabric where it was exposed to heat.

Stiffening: When fabric is exposed to heat high enough, fabric fibers soften and expand. Once removed from the heat and allowed to cool, the fibers harden creating stiff areas in the fabric.

Charring: This occurs when fabric is exposed to heat high enough to break down the fabric structure. The material darkens from brown to black, becomes brittle, and with continued heat exposure, eventually disintegrates and burns away.

Fire Shelter

Laminate material: The term for fire shelter material that has aluminum foil attached to a base cloth with an adhesive. There are three different fire shelter laminate materials: the outer shell, inner shell, and floor.

Delamination: In the context of this document, delamination is the separation of aluminum foil from the base cloth of a fire shelter laminate by heat exposure that results in the laminate material reaching or exceeding 500ºF. This means that exposure of laminate materials to 500°F temperatures may not result in delamination, the laminate material itself needs to reach 500°F before delamination can occur.

Main body: Two rectangular panels that make up the middle portion of the fire shelter. There is an outer shell and inner shell for the main body that are sewn together at the seams. There are two main body panels per shelter.

End cap: Panels on each end of the fire shelter sewn to a main body panel. An outer shell and inner shell composite are sewn into a 1/4 sphere that gives the end of the shelter its shape.

Floor: A one-piece laminate material with an opening in the middle that is sewn to the main body panels and end cap panels.

End cap seam: Seams that when sewn together provide the 1/4 sphere shape of the end cap. There are three per end cap.

Shake handle: Kevlar cloth with PVC pipe inserts sewn to floor and main body seam used for deploying the shelter. They are stenciled with RIGHT HAND and LEFT HAND and are attached to only one side of the shelter.

False seam: A 1/2-inch seam that runs the width of the middle of the main body panel. There is one per main body panel.

Radiant heat: Travels in a straight line through space without heating the space itself. It turns into heat when it contacts a cooler surface. When you stand close to a campfire, radiant heat warms you. No air movement is required for the transfer of radiant heat.

Convective heat: Requires air movement. Think of it as a blast of hot air. When flames or hot gases move past a surface, the hot air molecules transfer their heat to that surface. The hotter the air and the faster the air movement, the greater the convective heating.

Appendix D. Human & Cognitive Factors Analysis

Dr. Laura Maguire – Trace Cognitive Engineering

It can be extraordinarily challenging for those involved in a fast-moving event that involves a lot of different parties spread out across different locations to keep track of how the situation is evolving. This analysis will review the activities on June 27th to lay out the knowledge, mindset, and goals of different participants (when known), alongside important context about the work environment to review the Knowles entrapment from a human & cognitive factors perspective.

The Start of The Incident

> *At approximately 0645 on June 27, 2026 the Rifle Helitack Crew, an interagency wildland fire crew based out of Colorado, received texts from their Duty Officer to come in early to help with two fires (Snyder and Jones) that had started overnight from lightning strikes just over the state border in Utah. Multiple fire engines and chase trucks had already been deployed to the fires to do initial assessments. The mission for Rifle Helitack would be to support them in suppressing these fires to prevent the spread of cheat grass - a highly invasive, highly flammable, nonnative species that grows readily in burn scars in the Upper Colorado River area - which increases the risk of more frequent fires.*

Two starts overnight made for an early start to the day but did not cause concern for the initial attack crews who were brought in early to prevent growth on the fires.

> *For the dispatch center, it was unusual - but not unheard of - to have crews mobilized and preparing to fly aircraft so early in the day. There was a higher than usual number of phone calls to coordinate with county resources, local cooperators, and concerned ranch managers, ongoing since the early morning. Looking to be proactive, the night dispatch called in the Duty Officer (DO) and DCM (Deputy Center Manager) who arrived at 0500 and 0600 respectively. Addressing the fires early in the day would enable them to minimize fire growth and be better prepared to handle any additional fires.*
>
> *The DO and DCM began working to order aircraft and handle aircraft logistics. The workload was high as the additional dispatch staff arrived between 0700-0830. The staff on duty that day was a mix of experienced and junior dispatchers. For the trainee dispatchers, all of whom were new to their roles, the pace was unusually high as soon as they arrived. Dispatchers at this level build their skills through mentorship by qualified supervisors. CO-GJC had vacant roles that were being filled through rotational staff giving them limited access to experienced supervisors but the short rotations meant longer term working relationships were not established.*

Maintaining a Common Operating Picture

Research in other high hazard domains has shown that effective coordination relies on having established ‘common ground’ or a Common Operating Picture with others. It’s useful to think about common ground as ‘being on the same page’ with the people you are working with. Common ground is not a ‘set and forget’ practice. Instead, it requires ongoing work to continually stay aligned as the day or event progresses. Some members of the group will have access to information others do not. When there are differences in the information known about a situation, people will have different mental models of the situation.

Mental Models in Action

A mental model is an individual’s understanding of how something works or of what is happening around them. Mental models are always partial understandings. An event like wildland fire changes too quickly for any one person to have a completely accurate picture. Some are working from offices or dispatch, some are assigned to different fires, and some are attacking the same fire from different vantage points (e.g. air attack

versus ground crews). No one person is able to know it all. There is a continuous need to compare and contrast mental models to have a comprehensive view of the current state of the situation. Consider the parable of the blind men and the elephant, each one is touching a different part of the animal. The one touching the trunk says “an elephant is a snake”, the one touching the leg says “an elephant is a tree”, the one touching the ear will think “an elephant is a fan” and the one touching the tail thinks “an elephant is a rope”. None are wrong but only by sharing their perspectives will they be able to fully understand what a complete elephant is actually like. A challenge on large, distributed fire operations is on maintaining a coherent understanding of the “whole elephant” which constantly integrates all the different perspectives as conditions are changing quickly.

At 0845, three members of Rifle Helitack and their helicopter pilot lifted off from Rifle, CO enroute to Snyder and Jones as the first Initial Attack (IA) load. Their first assignment was to do reconnaissance on the Jones Fire and then support Snyder. The remaining four members of the Rifle Helitack crew were dispatched to Rabbit Valley, 90 miles west of Rifle, where they would establish a helispot, taking two trucks and a fuel truck for the helicopter.

Twenty-five minutes into the flight, while enroute to Snyder and Jones, the Rifle Helitack IA load spotted smoke from two new starts on top of a plateau (Knowles and Gore fires), increasing the fire count from two to four. They determined that these fires were approximately seven miles northeast of the Jones fire and a ½ mile apart from each other. They contacted CO-GJC to report the new starts and give a quick size up from the air. The UCR Duty Officer reassigned them to staff the new fires.



Figure D-1. Snyder fire (left) and Jones fire (right) taken by Nick Hutcherson while enroute to be inserted to the Knowles fire (Screenshot of Snapchat video).

From the air, the 3 members of the Rifle Helitack crew could see the Snyder and Jones fires in the distance. At 0930, Jones was showing more smoke than Snyder but both were relatively small fires. At about 0935, the helicopter (Helicopter A) landed on the plateau midway between the Knowles and Gore fires. The crew offloaded and hooked up the longline bucket. Sydney Watson and Nick Hutcherson began working on the Knowles fire, aiming to contain the knee-high flames and six smoldering pinyon juniper trees (PJs). Emily Barker began working on the Gore fire. Emily & Sydney checked Avenza and Watch Duty and determined that Jones and Snyder were about 8 miles away. Under typical conditions, this would have not been cause for concern and the team got to work on suppression.

Challenges to Mental Model Updating

On the ground, topography made it difficult to orient to the surrounding fires. The Gore fire was approximately 0.1 miles from a 200 ft tall rock feature referred to as the dome which completely blocked their view to the west and southwest. There was rolling topography that further impacted their view to the northwest. They would have been able to see the sky to the northwest but could not see the Snyder and Jones Fires. Approximately 0.5 miles west of Knowles, Gore and the eventual entrapment site there was another cliff band that rises between 200-280 feet. This further reduced site lines to the south, southwest and west. The Knowles fire crew could not see over this cliff band. The view was restricted to approx. 0.5 miles west and up to 1 mile to the southwest.

Their lack of a visual reference means two things: 1) they will not be able to have a continuously updated mental model of the fire because they cannot monitor it directly and 2) this means they would need to rely on others to provide them information on changing conditions.



Figure D-2. View depicting the dome that obscured the view towards the Snyder and Jones fires. Looking west from the Gore fire.



Figure D-3. View depicting the cliffs that obscured the view towards the Snyder and Jones fires. Looking southwest from Knowles fire.

> *While the Gore and Knowles crews were being inserted, dispatch was kept busy coordinating the resource orders for ground crews, aircraft, and initial attack and monitoring the radio traffic. Between 0959 and 1015, four additional fires were reported (McInnis, Mee, Black Ridge, and Red Rock), three of which were spotted by Helicopter A while doing bucket work to support Knowles and Gore. McInnis, Mee, and Black Ridge were single tree fires. Red Rock, however, was growing rapidly, requiring dispatch to spread the scarce ground and air resources thinner. Radio channels were so busy that they weren't able to break in for the routine 1000 weather broadcast. At 1019, Sydney calls dispatch by phone and provides a Quick 6 for the Knowles fire. She assumes command as IC. At 1044, Emily calls dispatch by phone and provides a Quick 6 for Gore fire. She assumes command as the IC. She requests 1-2 more firefighters because she's the only person on the fire. Given the constant radio traffic, both Emily and Sydney used their phones to give their fire size up to dispatch, a common practice in the area.*

Managing this volume of activity, dispatch and the center staff were also spread thin, trying to triage and manage the now eight active fires, three of which were emerging incidents.

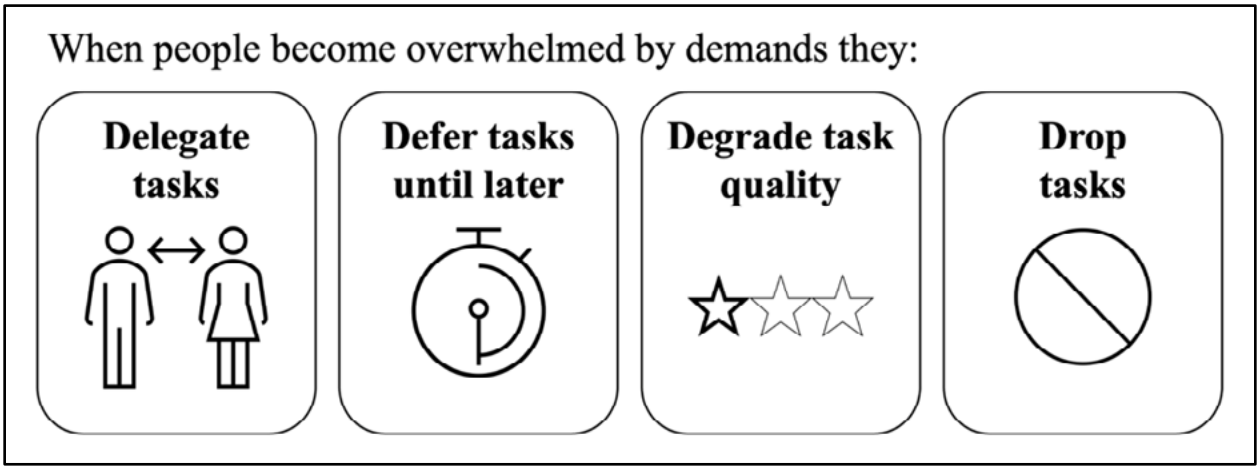
Task Saturation

Dispatchers manage incoming information from radio traffic from crews and aircraft in the field as well as take phone calls from other agencies, landowners, and the reporting public. In addition, they are coordinating the resource orders and logistics for the fire operations set by the Duty Officer. Dispatchers use a software program called WildCAD-E to log incoming information for fire activity. In addition, they use IROC to complete their resource orders. The Duty Officer: serves as the unit's primary contact with Dispatch for both on and off-unit assignments; coordinates and sets priorities for unit suppression actions and resource allocation; monitors unit incident activity for compliance with wildland fire risk management practices; keeps Agency Administrators, suppression resources, and information officers informed of the current and expected situation; plans for and implements actions required for future needs and documents key decisions and actions.

Tracking crew and aircraft activities on a busy fire is cognitively demanding work, requiring effort to listen and interpret sometimes difficult to discern radio transmissions, logging the volume of radio traffic, juggling competing priorities, and task switching all while under time pressure and stress. Deploying multiple small

initial attack teams to manage the numerous fires means tracking more firefighters, more air resources, and more resource orders simultaneously. A rapid escalation of demands can override any one individual's ability to manage their activities, leading to task saturation and overload. Saturation occurs when there is not enough time, attention, or resources to do all the tasks needed to be completed.

Strategies to deal with saturation include: deferring a task in time, delegating it to someone else, degrading the quality of the task (choosing speed over accuracy and doing it less well), or dropping it entirely. Issues can arise when someone responds in this way without letting those around them know. Signaling to others you are working with that you are reducing attention or effort gives them a chance to adjust their own actions or effort accordingly. For example, if someone says they didn't sleep well the night before and are feeling tired, you might offer to drive or spend more attention talking to them during the trip to monitor if they are safe to be behind the wheel.



Coordination Breakdowns

During the period of 1000-1200 there are signs that saturation was beginning to occur across multiple parts of the fire response teams pushing the capabilities of staff across the organization. Roles in fire operations are structured according to qualification standards outlining the span of control for different jobs and the transitions to higher levels of oversight. Two Type 4 ICs had been dispatched to the Snyder and Jones fires. Both fires grew rapidly and, within a short time, created a situation that exceeded their scope of qualifications. When the fire progresses beyond the capabilities of a Type 4 commander, a ICT3 (a more qualified role) is requested to take over responsibilities for the fire to handle the increased complexity. In slower moving fires, the Type 4 IC is likely to recognize the escalation, make the request for a higher qualified replacement but maintain operational control until the handoff can take place. Ordering a ICT3 signaled a growing escalation. Considerations began for transferring command of the fire and engage a Complex Incident Management Team (CIMT) – responsibilities held by the Duty Officer in collaboration with leadership and coordinators in other agencies. Determining jurisdictional ownership is a coordinatively intense activity that takes time and effort, slowing the ordering of resources for the fire.

A coordination breakdown is when a team starts functioning less effectively together due to a lack of, or a delay in, communication, mutual monitoring, or shared understanding and agreement among team members. As a situation escalates and time pressure increases, individual parties may be less likely to accept the increased cognitive costs associated with the coordination. Cognitive costs of coordination are the extra mental effort and activities needed to: communicate about status, ask for help, adjust the speed or scope of activities etc. When costs of coordination rises, people can revert to role retreat. Role retreat is when an individual or organization limits their participation in shared activities to those explicitly required by a job description or established agreement in an effort to protect themselves from reaching saturation. It's not always an active

choice, sometimes it's a coping mechanism.

> *In the span of only 45 minutes, an aircraft mapping of the Jones fire placed the fire at 1459 acres - a substantial challenge for a ICT4. Many aircraft attempted to help from above (e.g. 3 large air tankers , 2 single engine air tankers, smoke jumpers, CH-54 helitanker, etc.) but it was too windy to be effective and shortly afterwards, wind and turbulence transitioned out the air support. Also around 1200, when the Jones fire began taking off, the Snyder IC noticed what they expected to be a new spot in the canyon to their north (Dolores), at least a half a mile from the Snyder Fire edge. The Snyder IC and ATGS were unsure if this was a new fire (Dolores - the 9th fire of the day) from undetected lightning or a spot from the Snyder fire. Within 16 minutes, the new fire had spread 80 acres, chewing through over four acres a minute.*

Rapid progression of an event often creates time pressure and minimizes the opportunities for action. This is known as the time wedge in the wildland fire decision making cycle. The earlier a problem is detected and you realize what it might mean for you and your crew if things get worse, the greater the time you have to assess options for changing your plan without a high degree of stress. Fast-moving situations are more likely to surprise you, meaning you have to make decisions and take action under pressure. Lastly, as you start to run out of time, you often run out of options. Early detection and action maintains your margin for maneuver - resulting in less stress and smoother operations.

> *Meanwhile, firefighters on Knowles and Gore were keeping an eye on the visible smoke column throughout the shift. It was believed the smoke column they were able to see was from the Jones fire. Smoke was visible passing north of the Knowles fire (1159 Sentinel image and 1238 PlanetScope image).*

While we can retrospectively use these images to see how the fire might pose a risk to the Knowles and Gore firefighters, this vantage point was not available to them at the time and they remained unaware that the movement on the Snyder and Jones fires, fueled by the winds, now placed them in a high risk location. At this point, there were different understandings of risk across the mental models of those involved – the ICs and firefighters, the supervisor, the pilot, dispatchers, the Duty Officer, and other Air Attack resources. While each held some pieces of information about the escalating risk and may have had private concerns, at that moment in time, there were not definitive enough signals to any one person that risk was dangerously increasing to act differently than they were.

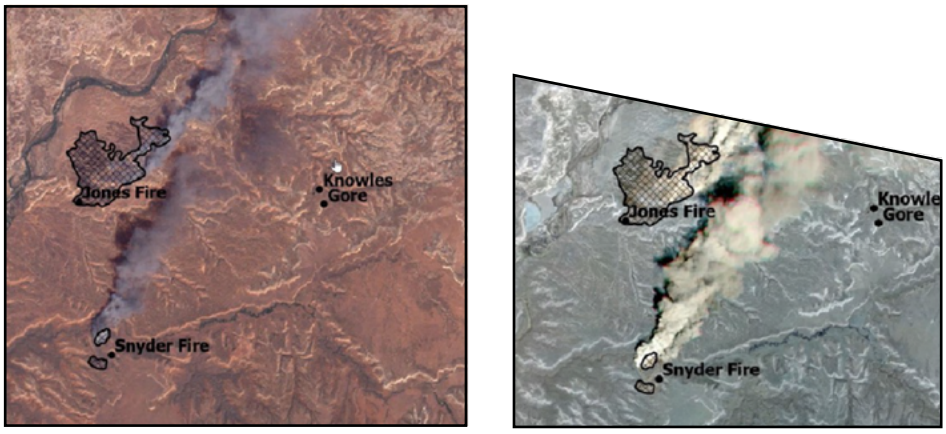


Figure D-4. 1159 Sentinel satellite image (left) and 1238 PlanetScope satellite image (right).

During this time, all parties in the operation are facing some forms of overload from the cognitive and coordinative demands. Firefighters are working hard to slow the progress of the fire. ICs are managing rapidly progressing fire activity, monitoring heavy radio traffic, and incurring additional coordinative demands as they try to recruit and assign additional resources to help. Pilots are facing challenging flying conditions

in congested airspace with reduced visibility. Crew Supervisors are managing multiple crews spread out across the landscape and experiencing challenges communicating with them and others due to poor radio transmissions. Dispatchers are managing theextensive radio traffic, increasing calls from media and the public, and intermittent software issues with their consoles. The Duty Officer is monitoring a rapidly shifting landscape of new ignitions, air and ground resources and fire progression, while trying to carry out the administrative functions needed to bring in additional trained resources. These conditions were exacerbated by the heavy radio traffic, poor transmission, and intermittent radio outages. Communication and coordination challenges make it difficult for those involved to share relevant information about their perspective so a coherent integration to be able to recognize the bigger picture and to see the 'whole elephant' does not happen. Instead, each party has only a partial understanding of the threat as it continues to grow, largely unaware of their limited perspective on the fire progression.

Fire Name	Location	Lightning Strike Time	Time Reported
Snyder 1 (UTF)	39.007969, -109.059265	2252 6/26	2310 6/26 (UT-MFC)
Snyder (2)	39.003383, -109.068083	2252 6/26	0325 6/27
Jones	39.071217, -109.073833	2253 6/26	0332
Knowles	39.073920, -108.947752	2300 6/26	0930
Gore	39.068200, -108.944700	2300 6/26	0932
McInnis	39.1205, -108.900667	2307 6/26	0958
Mee	39.105833, -108.885	2307 6/26	0959
Red Rocks	39.290917, - 108.44085	Unknown	1014
Black Ridge	39.10175, -108.908467	2302 6/26	1015
Dolores	39.014871, -109.069668	2252 6/26	1158* 1232
Blue Canyon	39.14675, -108.889717	2307 6/26	1322
*This was initially called in as a spot fire but an incident was not created until 1232			

Figure D-5. The rapid escalation in the number of fires on June 27th managed by CO-GJC.

At approximately 1300, Emily called Supt 1 to obtain an update on the fire activity for the Snyder Fire and Jones Fire. Supt 1 said they would fly near the large fires to attempt a reconnaissance. Sometime between 1400-1430 the smoke began to shift over them. The 1349 VIIRS satellite pass depicts a shift in spread direction to more easterly. Sometime after 1400, Firefighter 5 attempted to climb part way up the dome to get a better view to the west. Smoke was rolling in at this point. The wind was so strong that they had to put their chin strap on and could only peek around the corner of the rock dome. The smoke was getting so thick they were intermittently losing sight of the Knowles fire.

At 1428, Emily sent a text and image to Supt 1 saying "It looks like sunset but it's 2:30 in the afternoon."



Figure D-6. Emily Barker photo from Gore fire depicting degrading visibility.

Surprise

Feeling a sense of surprise is an indication that your mental model of a situation is not an accurate reflection of the actual conditions. Emily's photo and text indicates she found the color of the sky unusual, and perhaps somewhat surprising. Researchers have noted that surprises "come from the limits of people's knowledge and understanding of their environment and themselves...Some surprises are caused by difficulties in acquiring the growing amount of information needed for effective control of the environment and by limitations in our ability to judge that information once it is at hand." They point out two kinds of surprises: situational and fundamental. Situational surprises are unexpected but likely whereas fundamental surprises disrupt a deeper sense of how you thought things work or would play out. Feeling an astonished sense of surprise points to a fundamental mismatch in the underlying knowledge needed to understand the situation. Getting surprised can be dangerous when the surprise is that your understanding of the risks you face are wrong.

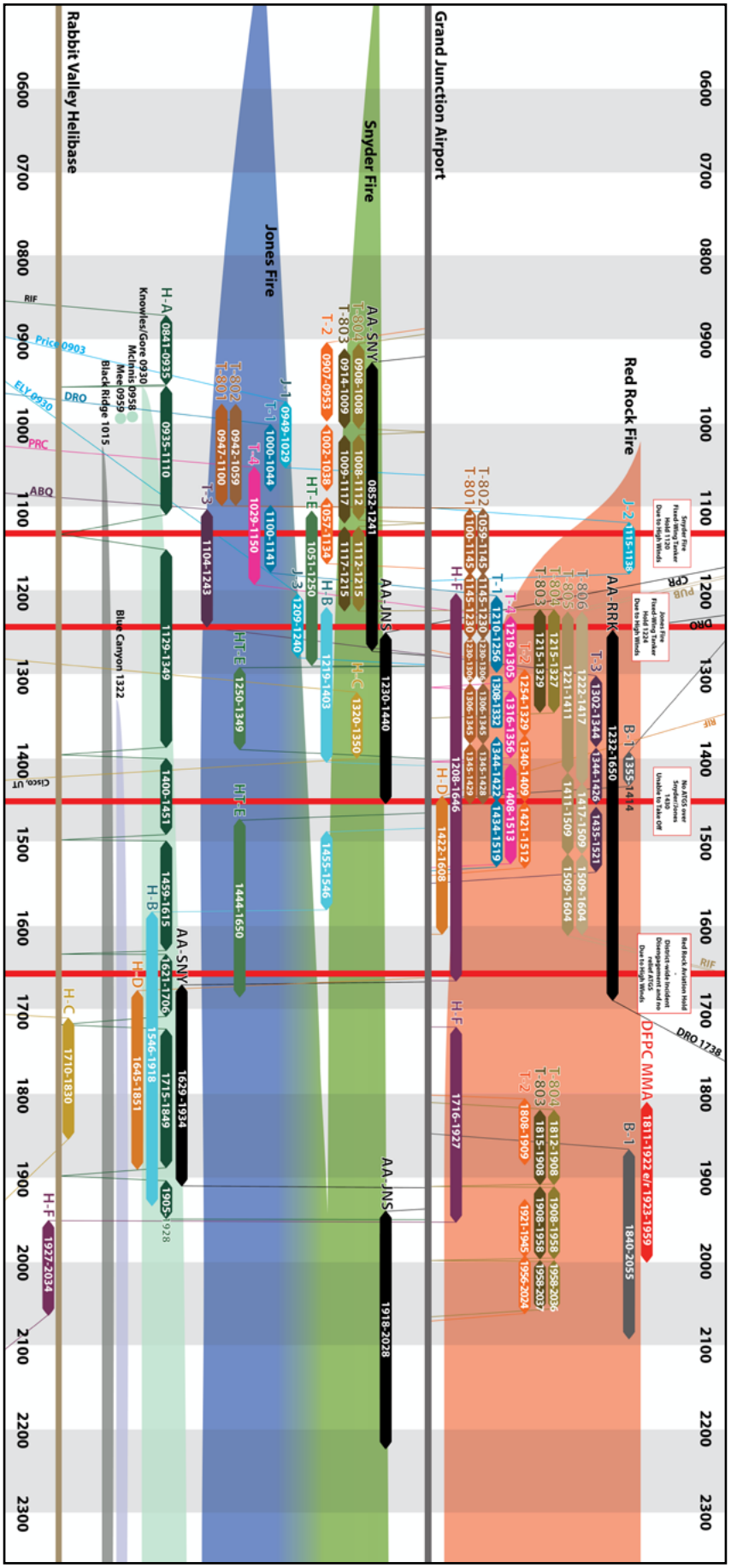


Figure D-7. The fires and air resources being managed over time represented substantial cognitive effort.

Looking at the air operations and fire progressions, it is clear to see the cognitive load. However, it was difficult in this event for any one person to form the bigger picture to "see" how challenging the situation had become.

> *Over at the Knowles and Gore fires, the five Rifle Helitack crew members continued to work their fires. The rock formations around them blocked any direct line of sight toward the Snyder and Jones fires, but they could see the smoke column overhead. They tried to stay up to date by checking WatchDuty and Avenza, listening to the radios, and physically climbing up a nearby rock formation to get a better view. However, the Snyder and Jones fires were using a different air-to-ground radio frequency (A/G 49) than the fires managed out of Rabbit Valley (A/G 9). This decision had been made earlier in the day because the Snyder and Jones frequency was so congested. The response to the Red Rock fire, 30 miles to the north, was also assigned to A/G 9 earlier in the day when few aircraft were assigned to it.*
>
> *Between 1400 and 1430, the smoke from Snyder and Dolores shifted over the Knowles and Gore site, further limiting their visibility. They expected that this smoke was coming from Jones because it had been producing more smoke the last they saw, and they had heard that Snyder "had been caught" earlier in the day.*
>
> *The smoke also limited visibility for helicopters like Helicopter A. They could not determine the fire edge because of the dense smoke and heavy air operations continuing on Snyder and Jones. Helicopter A and Supt 1 reached out to Knowles and Gore at 1439 to see how they were feeling. Unaware of the spread of the Snyder, Jones, and Dolores fires, both Sydney and Emily wanted to continue working on their fires.*
>
> *Supt 1 also tried multiple times to communicate the location of his crew to the Snyder and Jones Air Attack, and their inability to "get any S[ituational] A[wareness]." However, with overlapping radio frequencies and shift changes for the Jones Air Attack this message was instead acknowledged by Red Rock Air Attack (30 miles away), who was unaware of Helicopter A, the Knowles and Gore fires, and all Rabbit Valley operations.*

Degrading conditions from the smoke limited the ability of both those on the ground and in the air to see where the actual front of the fire was. This meant their mental models were not accurate and their assessment was miscalibrated with regard to the risks they faced and the speed at which the situation could deteriorate for some of the crews.

> *Meanwhile, time on the ground at Snyder and Jones began to blur. The fires were growing rapidly. Conditions and available resources were making it difficult to effectively suppress the fires. Jones consolidated their resources to the far-left flank. Snyder pulled back to the staging area to adjust their strategy to focus on structure defense. Around 1445, the Jones IC got a view of the fires from between the heels of the Jones and Snyder fires and expected they had grown together. They did not know how quickly the fire was spreading, and with the different radio frequencies being used, they didn't know about the Rifle Helitack teams at the Knowles and Gore site, seven to eight miles east of them.*

Incomplete information about the true status of the fire and the location of the other firefighters, difficulties providing updates to dispatch and the Duty Officer, along with the inaccurate mental models of the Knowles and Gore firefighters and the speed of the approaching fire meant the Rifle helitack crew was about to get surprised by a fire they had not anticipated would have reached them at that moment in time.

Summary

In well defended systems, one person's actions, inactions, or decisions do not cause an accident. Accidents are a result of multiple contributing factors that come together in unexpected ways. This human factors analysis was written to provide some insights into how the event unfolded for those involved to help firefighters improve their ability to recognize key factors of: the need for common grounding, how coordination

breakdowns occur, how escalations increase cognitive demands, the effects of saturation, the need for mental model updating and re-framing, and to help identify early signs of surprise.

Cognitive Factors Glossary

Common ground: Common ground is the knowledge, beliefs, and assumptions about a situation that is shared across the group. You maintain common ground by listening for indications that knowledge, beliefs, and assumptions about the situation may be different and taking steps to identify and 'repair' any differences so you maintain accurate common ground.

Tactics to establish and maintain common ground in new groups:

- When working with new people, develop the habit of stating your assumptions and verifying others' assumptions. For example, saying "Sure, I can meet you up the road in 10 minutes. I'm assuming you want me to pack up my gear and bring it with me because I am moving from this spot. Is that right?"
- Clarify any uncertainties in communications as they arise. What seems like something that may become clear later or isn't important enough to take the time to clarify can become an issue if the misunderstanding persists over time and new plans are built on the original misunderstanding.
- Try to include additional information that may help others understand your mental model so they can listen for, and correct, any inaccurate understandings.

Additional reading:

- Klein, G., Feltovich, P. J., Bradshaw, J. M., & Woods, D. D. (2005). Common Ground and Coordination in Joint Activity. In W. B. Rouse & K. R. Boff (Eds.), Organizational Simulation (pp. 139–184). John Wiley & Sons, Inc. https://doi.org/10.1002/0471739448.ch6
- Salas, E., Burke, C. S., & Cannon-Bowers, J. A. (2000). Teamwork: Emerging principles. International Journal of Management Reviews, 2(4), 339–356. https://doi.org/10.1111/1468-2370.00046
- Taynor, J., Klein, G. A., & Thordsen, M. L. (1990). Distributed decision making in wildland firefighting (No. KATR858A04F).

Mental models: A mental model is your understanding of how something works or of what is happening around them. Mental models are simplified explanations and therefore always partial. They help us to be able to navigate new situations. For example, you might not know the physics of how a microwave works but you know how to operate one and your mental model of how to use it allows you to use most new microwaves you come across.

Tactics to improve mental models:

- Listen for inaccurate knowledge in yours or other's discussions about the tasks you carry out in your work or the hazards you manage. When you hear something that doesn't seem right, get curious and ask! If someone questions your knowledge, don't become defensive. Even highly experienced professionals are continuously learning and refining their knowledge.
- Keep learning about the world of firefighting. Knowledge about fire behavior, how your radio works (or fails!), or what hydration strategies help you maintain optimal performance can all help you improve your ability to anticipate and adjust at early signs that something is unexpected.

Additional reading:

- Klein, G., Pliske, R., Crandall, B., & Woods, D. D. (2005). Problem detection. Cognition, Technology & Work, 7(1), 14-28.
- McLennan, J., Elliot, G., & Holgate, A. (2009). Anticipatory thinking and managing complex tasks: Wildfire fighting safety and effectiveness. In Proceedings of

the Industrial & Organisational Psychology Conference (pp. 90-95).
- Klein, G. A. (1997). Making decisions in natural environments (Vol. 31). US Army Research Institute for the Behavioral and Social Sciences Research and Advanced Concepts Office.

Escalations: An escalation is an increase in demands that can override any one individual's ability to manage their activities, leading to task saturation and overload. Escalations can happen slowly or rapidly. In rapid escalations surprises can be challenging to recover from.

Tactics to navigate escalations:

- Consider what signals of increasing operational tempo mean for your work
- Consider whether your plan includes realistic tactical objectives – ask yourself "do we have enough time to finish what we are doing or is safer to keep an extra few minutes available in case we run into unexpected difficulties or need to respond to something unexpectedly?"

Additional reading:

- Cook, R. I. (2000). How complex systems fail. University of Chicago: Cognitive technologies Laboratory. https://www.adaptivecapacitylabs.com/HowComplexSystemsFail.pdf
- Woods, D. D. (2019). Essentials of resilience, revisited. In M. Ruth & S. Goessling-Reisemann, Handbook on Resilience of Socio-Technical Systems (pp. 52–65). Edward Elgar Publishing. https://doi.org/10.4337/9781786439376.00009
- Klein, G. A., Calderwood, R., & Clinton-Cirocco, A. (1986, September). Rapid decision making on the fire ground. In Proceedings of the human factors society annual meeting (Vol. 30, No. 6, pp. 576-580). Sage CA: Los Angeles, CA: Sage Publications.

Saturation: A state where the mental demands of a situation become too much to handle and you may no longer act in predictable ways. Saturation can also occur at a system level when multiple units become overloaded and unable to handle task demands.

Tactics to recognize saturation in yourself and others:

- Practice noticing the signals of saturation in your own thinking. Common signs that you are becoming overwhelmed include: losing or misplacing things, feeling irritated or stressed, narrowing your focus, getting confused, reverting to comfortable past behaviors, communicating less often or using one-word answers to respond.
- Ask yourself, am I avoiding something because I feel overwhelmed? Have I put off starting a task repeatedly? Am I asking others to do things for me more than I usually do? Have I given up on doing something I was supposed to do?
- Indications you are experiencing saturation means shifting tactics to account for potentially diminished capacity. Consider if you can get help and/or what the implications may be if you do something later or do it less well. Communicate the change in your approach to those who need to know.

Additional reading:

- Woods, D. D., Dekker, S., Cook, R., Johannesen, L., Sarter, N. (2010). Behind human error. Ashgate Publishing, Ltd.
- Klein, G. A. (1993). A recognition-primed decision (RPD) model of rapid decision making. Decision making in action: Models and methods, 5(4), 138-147.
- Klein, G., & Crandall, B. (1996). Recognition-Primed Decision Strategies (No. ARIRN9636).

Coordination breakdowns: result from a lack of communication, mutual monitoring, or shared understanding among team members that temporarily stops them from functioning effectively together. They happen from unexpected communication gaps, unfamiliarity with teammates' roles, conflicting plans, or time pressure in high-stakes environments.

Tactics to avoid coordination breakdowns:

- Call it out when you notice yourself or someone else decreasing their communication or expected behaviors. For example, saying "I haven't heard from you in a while, do you need some help over there?" or "I'm starting to feel a bit saturated, so you might not hear from me for a few minutes."
- Don't wait to communicate. Early signaling to others that your status may be changing means they can monitor your activities more closely to step in if needed without you needing to ask for help. In addition, they may be able to make smaller adjustments to their own activities than they may have to if they were unaware of your saturation potential.

Additional reading:

- Patterson, E.S., Woods, D.D., Cook, R.I., & Render, M.L. (2007). Collaborative cross-checking to enhance resilience. Cognition, Technology & Work, 9(3), 155-162.
- Woods, D. D., & Hollnagel, E. (2006). Joint cognitive systems: Patterns in cognitive systems engineering. CRC Press.

Surprise: Getting caught off guard by a situation.

Tactics to avoid fundamental surprise:

- Pay attention to weak signals that something is "off." You can get a fresh perspective on the situation by asking someone for their point of view. It helps to be specific. For example, instead of saying "Does this seem right to you that the wind has shifted directions as suddenly as it has?" Instead state your assumption or belief and then ask for clarification by saying, "The weather forecast this morning called for winds from the east today but this feels like it's coming from the south. Does this seem right to you?"

Additional reading:

- Dekker, S. (2006). The Field Guide to Understanding 'Human Error' (1st ed.). Routledge.
- Woods, D. D., & Shattuck, L. G. (2000). Distant Supervision–Local Action Given the Potential for Surprise. Cognition, Technology & Work, 2(4), 242–245. https://doi.org/10.1007/PL00011516
- Woods, D. D., & Sarter, N. B. (2000). Learning from automation surprises and going sour accidents. *Cognitive engineering in the aviation domain*, 327-353.

Reframing: A way of questioning your mental model to see if it is accurate for the situation.

Tactics to improve reframing:

- Get a second opinion if you feel uncertainty. New perspectives can add new information or insights.
- Try mentally switching perspectives. For example, what do I think is happening on the other side of this ridge? What are the implications if I am wrong? How might I adjust my plan to allow for the uncertainty I am feeling right now?

Additional reading:

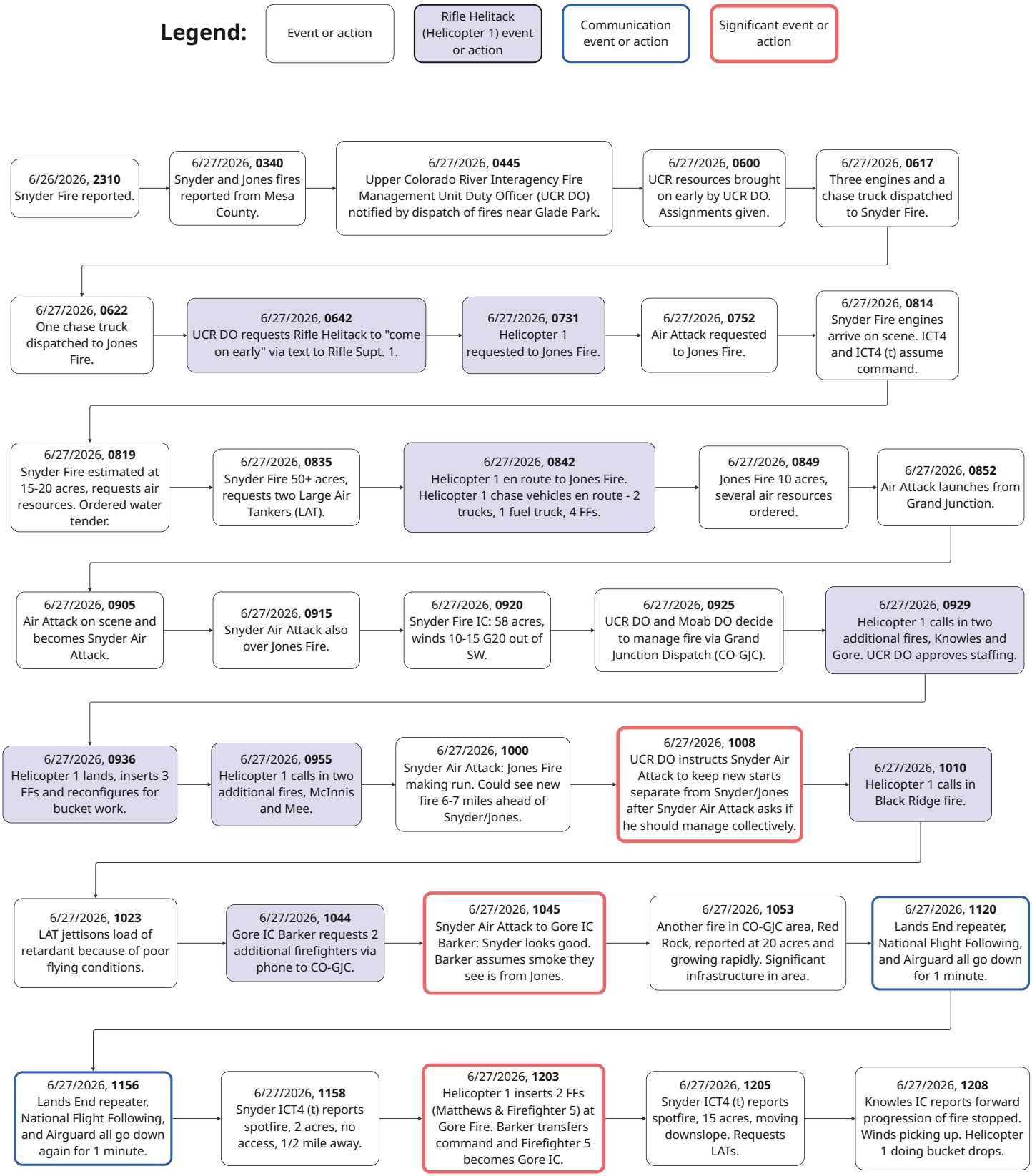
- Woods, D. D., Dekker, S., Cook, R., Johannesen, L., Sarter, N. (2010). Behind human error. Ashgate Publishing, Ltd..
- Rasmussen, J. (1997). Risk management in a dynamic society: a modelling problem. Safety

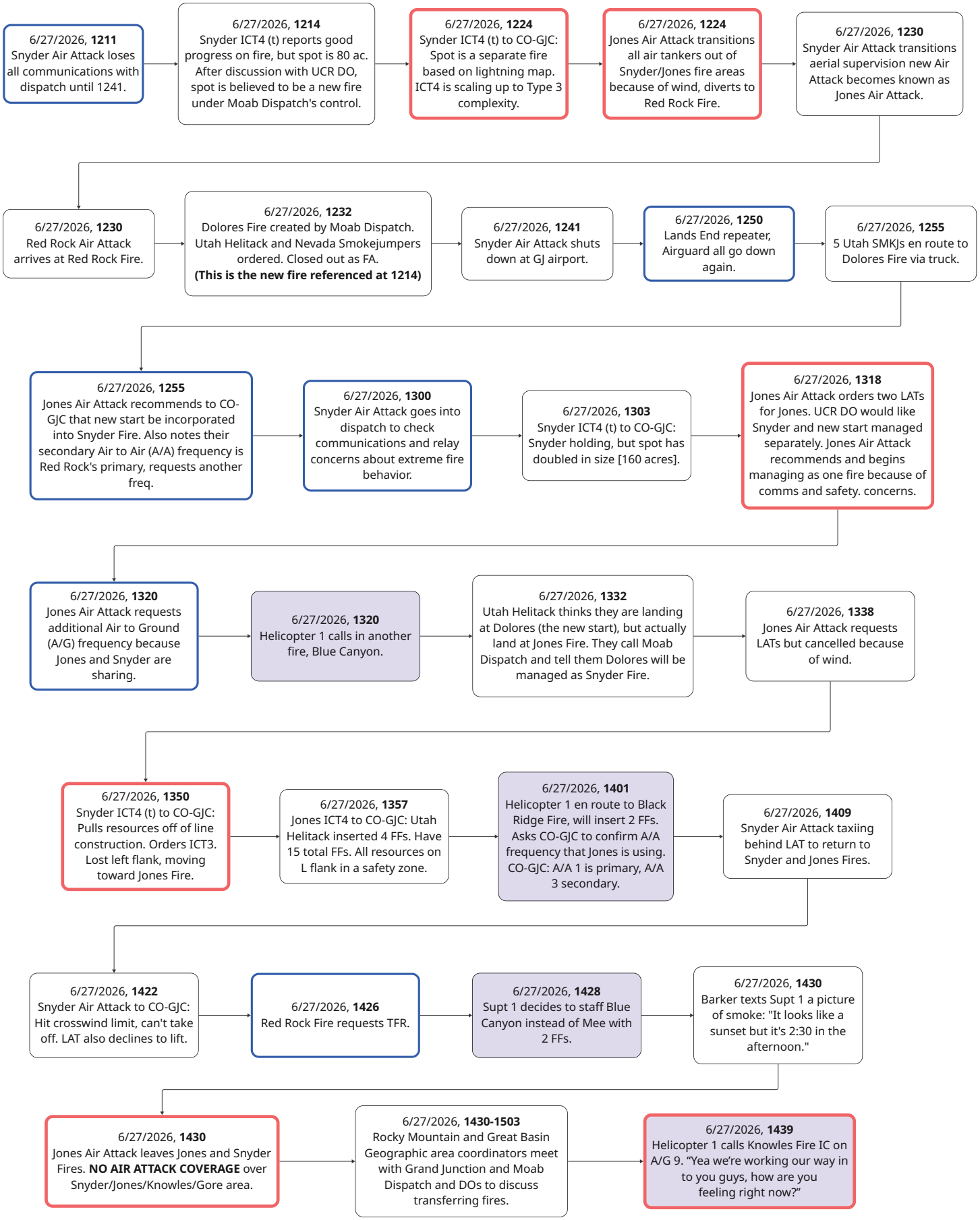
science, 27(2-3), 183-213. https://orbit.dtu.dk/files/158016663/SAFESCI.PDF

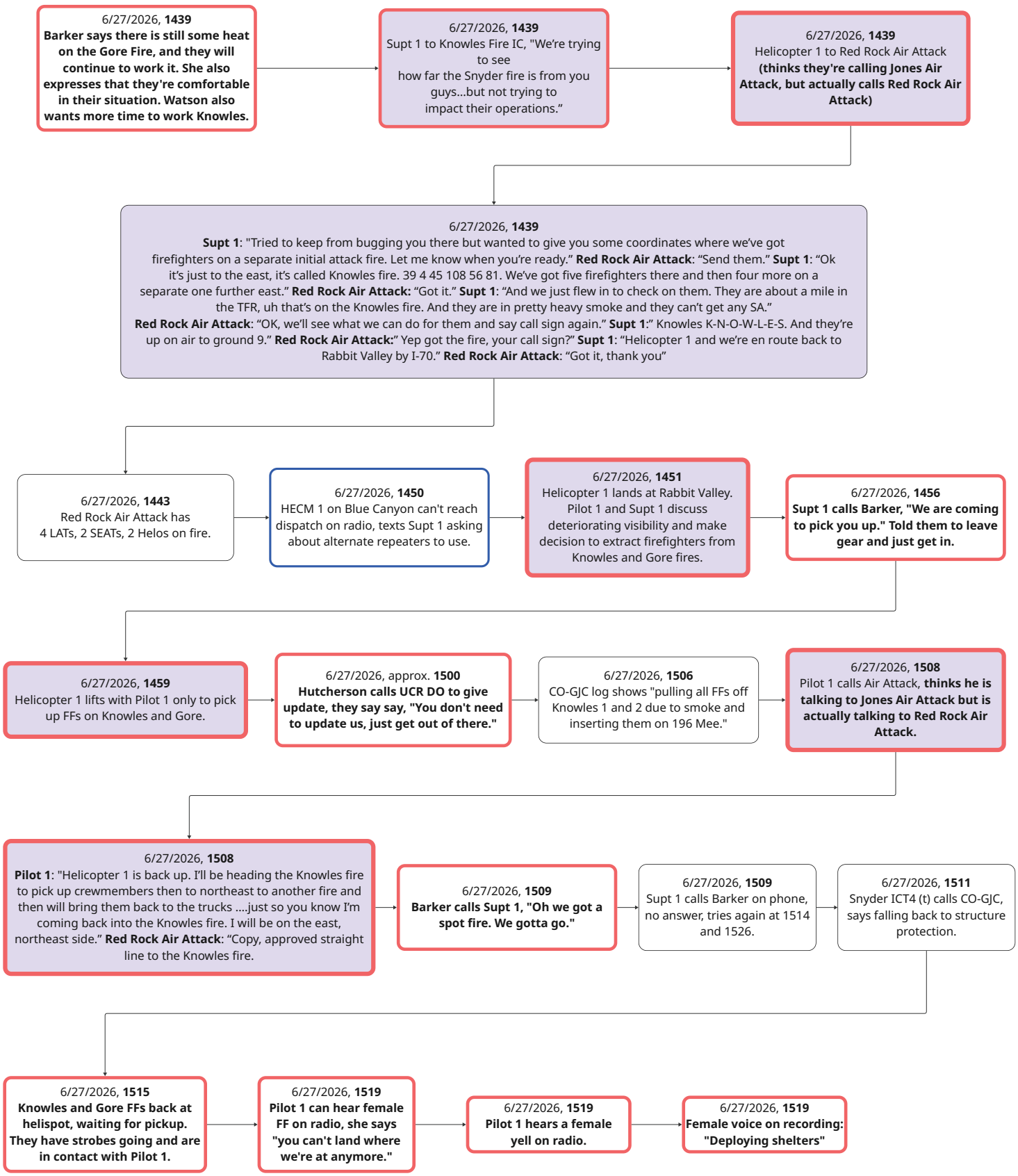
Methodology

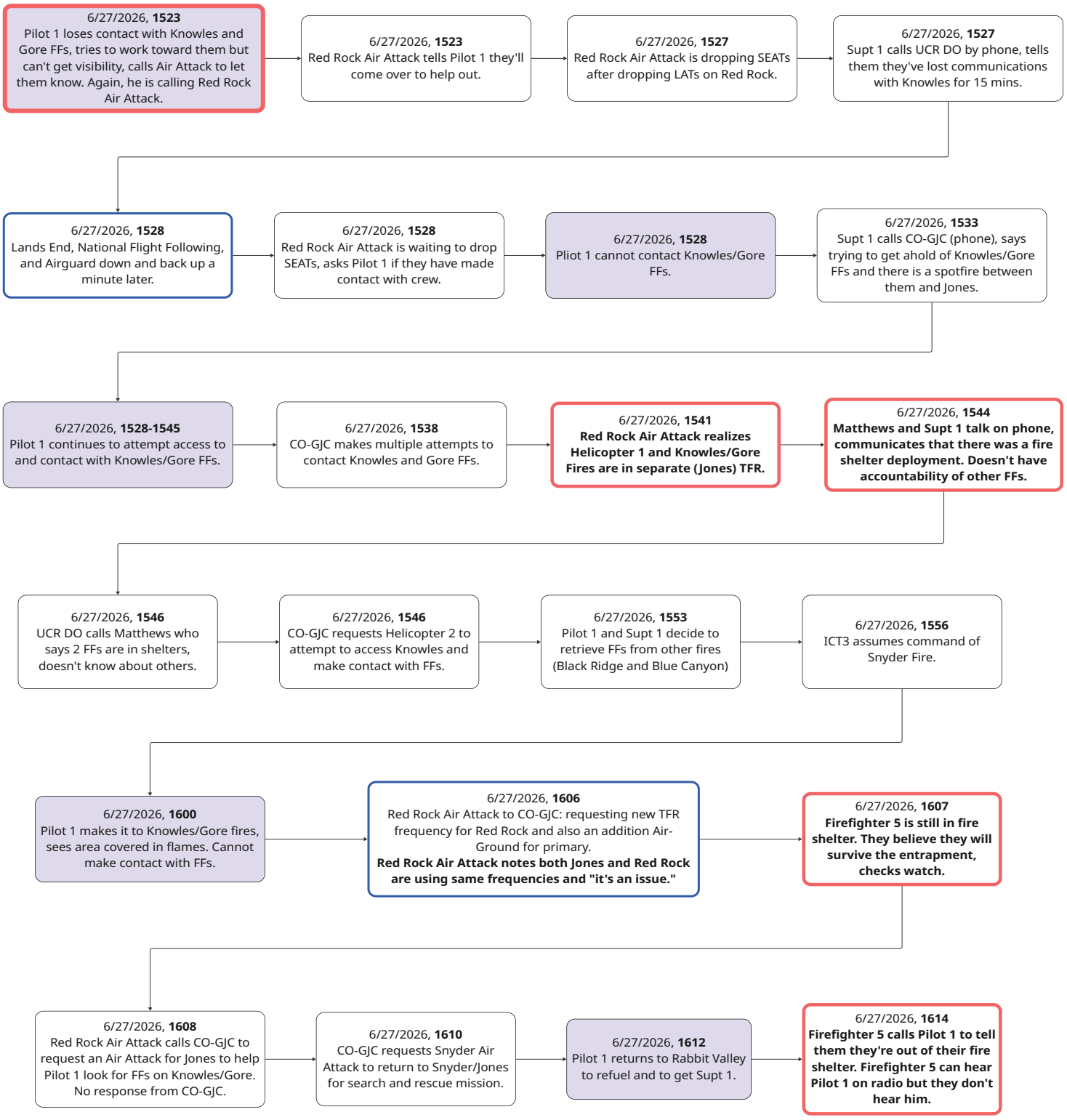
For this analysis, the SAI Team provided access to the supporting documentation collected in the investigation process, the draft accident investigation report, and artifacts created by the investigation team to aid in their sensemaking (timelines and actor maps). From the review of these documents, several core conceptual frameworks were assessed and selected for their utility in the analysis. The relevant literature was reviewed in cognitive systems engineering, resilience engineering, human factors, naturalistic decision making, and systems engineering. An analysis completed through a process tracing to map knowledge, mindset, and goals (where possible) and several artifacts were created to help visualize the complex interactions. The draft was then circulated to Dr. Morgan Reynolds, Dr. David Woods, and the SAI Team for review and feedback. Their insights and expertise were greatly appreciated.

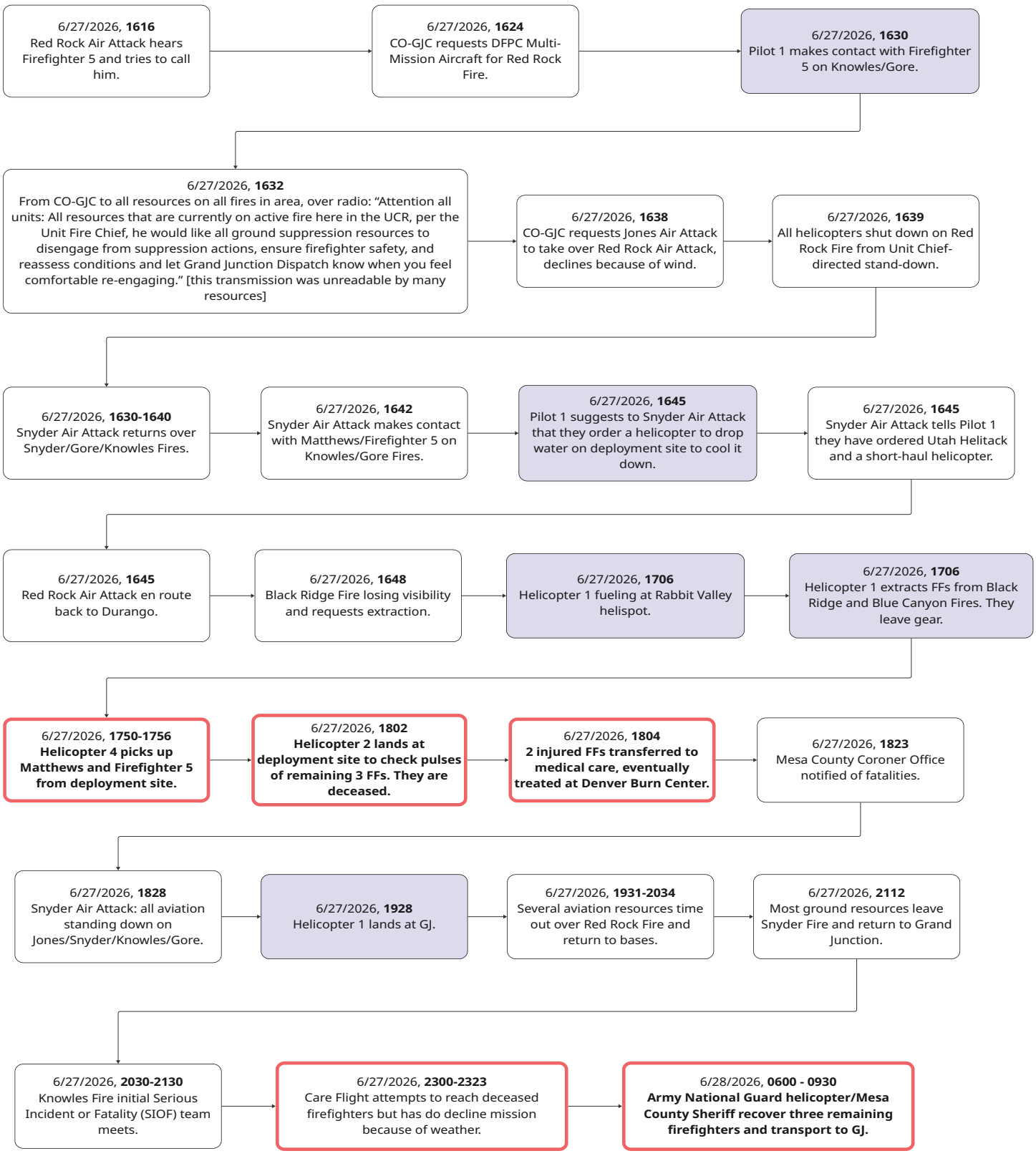
Appendix E. Timeline




6/27/2026, 1211
Snyder Air Attack loses all communications with dispatch until 1241.
6/27/2026, 1214
Snyder ICT4 (t) reports good progress on fire, but spot is 80 ac. After discussion with UCR DO, spot is believed to be a new fire under Moab Dispatch's control.
6/27/2026, 1224
Synder ICT4 (t) to CO-GJC: Spot is a separate fire based on lightning map. ICT4 is scaling up to Type 3 complexity.
6/27/2026, 1224
Jones Air Attack transitions all air tankers out of Snyder/Jones fire areas because of wind, diverts to Red Rock Fire.
6/27/2026, 1230
Snyder Air Attack transitions aerial supervision new Air Attack becomes known as Jones Air Attack.
6/27/2026, 1230
Red Rock Air Attack arrives at Red Rock Fire.
6/27/2026, 1232
Dolores Fire created by Moab Dispatch. Utah Helitack and Nevada Smokejumpers ordered. Closed out as FA.
(This is the new fire referenced at 1214)
6/27/2026, 1241
Snyder Air Attack shuts down at GJ airport.
6/27/2026, 1250
Lands End repeater, Airguard all go down again.
6/27/2026, 1255
5 Utah SMKJs en route to Dolores Fire via truck.
6/27/2026, 1255
Jones Air Attack recommends to CO-GJC that new start be incorporated into Snyder Fire. Also notes their secondary Air to Air (A/A) frequency is Red Rock's primary, requests another freq.
6/27/2026, 1300
Snyder Air Attack goes into dispatch to check communications and relay concerns about extreme fire behavior.
6/27/2026, 1303
Snyder ICT4 (t) to CO-GJC: Snyder holding, but spot has doubled in size [160 acres].
6/27/2026, 1318
Jones Air Attack orders two LATs for Jones. UCR DO would like Snyder and new start managed separately. Jones Air Attack recommends and begins managing as one fire because of comms and safety. concerns.
6/27/2026, 1320
Jones Air Attack requests additional Air to Ground (A/G) frequency because Jones and Snyder are sharing.
6/27/2026, 1320
Helicopter 1 calls in another fire, Blue Canyon.
6/27/2026, 1332
Utah Helitack thinks they are landing at Dolores (the new start), but actually land at Jones Fire. They call Moab Dispatch and tell them Dolores will be managed as Snyder Fire.
6/27/2026, 1338
Jones Air Attack requests LATs but cancelled because of wind.
6/27/2026, 1350
Snyder ICT4 (t) to CO-GJC: Pulls resources off of line construction. Orders ICT3. Lost left flank, moving toward Jones Fire.
6/27/2026, 1357
Jones ICT4 to CO-GJC: Utah Helitack inserted 4 FFs. Have 15 total FFs. All resources on L flank in a safety zone.
6/27/2026, 1401
Helicopter 1 en route to Black Ridge Fire, will insert 2 FFs. Asks CO-GJC to confirm A/A frequency that Jones is using. CO-GJC: A/A 1 is primary, A/A 3 secondary.
6/27/2026, 1409
Snyder Air Attack taxiing behind LAT to return to Snyder and Jones Fires.
6/27/2026, 1422
Snyder Air Attack to CO-GJC: Hit crosswind limit, can't take off. LAT also declines to lift.
6/27/2026, 1426
Red Rock Fire requests TFR.
6/27/2026, 1428
Supt 1 decides to staff Blue Canyon instead of Mee with 2 FFs.
6/27/2026, 1430
Barker texts Supt 1 a picture of smoke: "It looks like a sunset but it's 2:30 in the afternoon."
6/27/2026, 1430
Jones Air Attack leaves Jones and Snyder Fires. NO AIR ATTACK COVERAGE over Snyder/Jones/Knowles/Gore area.
6/27/2026, 1430-1503
Rocky Mountain and Great Basin Geographic area coordinators meet with Grand Junction and Moab Dispatch and DOs to discuss transferring fires.
6/27/2026, 1439
Helicopter 1 calls Knowles Fire IC on A/G 9. “Yea we’re working our way in to you guys, how are you feeling right now?”


6/27/2026, **1439**
Barker says there is still some heat on the Gore Fire, and they will continue to work it. She also expresses that they're comfortable in their situation. Watson also wants more time to work Knowles.
6/27/2026, **1439**
Supt 1 to Knowles Fire IC, "We're trying to see how far the Snyder fire is from you guys...but not trying to impact their operations."
6/27/2026, **1439**
Helicopter 1 to Red Rock Air Attack **(thinks they're calling Jones Air Attack, but actually calls Red Rock Air Attack)**
6/27/2026, **1439**
Supt 1: "Tried to keep from bugging you there but wanted to give you some coordinates where we've got firefighters on a separate initial attack fire. Let me know when you're ready." **Red Rock Air Attack**: "Send them." **Supt 1**: "Ok it's just to the east, it's called Knowles fire. 39 4 45 108 56 81. We've got five firefighters there and then four more on a separate one further east." **Red Rock Air Attack:** "Got it." **Supt 1**: "And we just flew in to check on them. They are about a mile in the TFR, uh that's on the Knowles fire. And they are in pretty heavy smoke and they can't get any SA." **Red Rock Air Attack**: "OK, we'll see what we can do for them and say call sign again." **Supt 1**:" Knowles K-N-O-W-L-E-S. And they're up on air to ground 9." **Red Rock Air Attack:**" Yep got the fire, your call sign?" **Supt 1**: "Helicopter 1 and we're en route back to Rabbit Valley by I-70." **Red Rock Air Attack**: "Got it, thank you"
6/27/2026, **1443**
Red Rock Air Attack has 4 LATs, 2 SEATs, 2 Helos on fire.
6/27/2026, **1450**
HECM 1 on Blue Canyon can't reach dispatch on radio, texts Supt 1 asking about alternate repeaters to use.
6/27/2026, **1451**
Helicopter 1 lands at Rabbit Valley. Pilot 1 and Supt 1 discuss deteriorating visibility and make decision to extract firefighters from Knowles and Gore fires.
6/27/2026, **1456**
Supt 1 calls Barker, "We are coming to pick you up." Told them to leave gear and just get in.
6/27/2026, **1459**
Helicopter 1 lifts with Pilot 1 only to pick up FFs on Knowles and Gore.
6/27/2026, approx. **1500**
Hutcherson calls UCR DO to give update, they say say, "You don't need to update us, just get out of there."
6/27/2026, **1506**
CO-GJC log shows "pulling all FFs off Knowles 1 and 2 due to smoke and inserting them on 196 Mee."
6/27/2026, **1508**
Pilot 1 calls Air Attack, **thinks he is talking to Jones Air Attack but is actually talking to Red Rock Air Attack.**
6/27/2026, **1508**
Pilot 1: "Helicopter 1 is back up. I'll be heading the Knowles fire to pick up crewmembers then to northeast to another fire and then will bring them back to the trucks ....just so you know I'm coming back into the Knowles fire. I will be on the east, northeast side." **Red Rock Air Attack**: "Copy, approved straight line to the Knowles fire.
6/27/2026, **1509**
Barker calls Supt 1, "Oh we got a spot fire. We gotta go."
6/27/2026, **1509**
Supt 1 calls Barker on phone, no answer, tries again at 1514 and 1526.
6/27/2026, **1511**
Snyder ICT4 (t) calls CO-GJC, says falling back to structure protection.
6/27/2026, **1515**
Knowles and Gore FFs back at helispot, waiting for pickup. They have strobes going and are in contact with Pilot 1.
6/27/2026, **1519**
Pilot 1 can hear female FF on radio, she says "you can't land where we're at anymore."
6/27/2026, **1519**
Pilot 1 hears a female yell on radio.
6/27/2026, **1519**
Female voice on recording: "Deploying shelters"


6/27/2026, **1523**
Pilot 1 loses contact with Knowles and Gore FFs, tries to work toward them but can't get visibility, calls Air Attack to let them know. Again, he is calling Red Rock Air Attack.
6/27/2026, **1523**
Red Rock Air Attack tells Pilot 1 they'll come over to help out.
6/27/2026, **1527**
Red Rock Air Attack is dropping SEATs after dropping LATs on Red Rock.
6/27/2026, **1527**
Supt 1 calls UCR DO by phone, tells them they've lost communications with Knowles for 15 mins.
6/27/2026, **1528**
Lands End, National Flight Following, and Airguard down and back up a minute later.
6/27/2026, **1528**
Red Rock Air Attack is waiting to drop SEATs, asks Pilot 1 if they have made contact with crew.
6/27/2026, **1528**
Pliot 1 cannot contact Knowles/Gore FFs.
6/27/2026, **1533**
Supt 1 calls CO-GJC (phone), says trying to get ahold of Knowles/Gore FFs and there is a spotfire between them and Jones.
6/27/2026, **1528-1545**
Pilot 1 continues to attempt access to and contact with Knowles/Gore FFs.
6/27/2026, **1538**
CO-GJC makes multiple attempts to contact Knowles and Gore FFs.
6/27/2026, **1541**
Red Rock Air Attack realizes Helicopter 1 and Knowles/Gore Fires are in separate (Jones) TFR.
6/27/2026, **1544**
Matthews and Supt 1 talk on phone, communicates that there was a fire shelter deployment. Doesn't have accountability of other FFs.
6/27/2026, **1546**
UCR DO calls Matthews who says 2 FFs are in shelters, doesn't know about others.
6/27/2026, **1546**
CO-GJC requests Helicopter 2 to attempt to access Knowles and make contact with FFs.
6/27/2026, **1553**
Pilot 1 and Supt 1 decide to retrieve FFs from other fires (Black Ridge and Blue Canyon)
6/27/2026, **1556**
ICT3 assumes command of Snyder Fire.
6/27/2026, **1600**
Pilot 1 makes it to Knowles/Gore fires, sees area covered in flames. Cannot make contact with FFs.
6/27/2026, **1606**
Red Rock Air Attack to CO-GJC: requesting new TFR frequency for Red Rock and also an addition Air-Ground for primary.
Red Rock Air Attack notes both Jones and Red Rock are using same frequencies and "it's an issue."
6/27/2026, **1607**
Firefighter 5 is still in fire shelter. They believe they will survive the entrapment, checks watch.
6/27/2026, **1608**
Red Rock Air Attack calls CO-GJC to request an Air Attack for Jones to help Pilot 1 look for FFs on Knowles/Gore. No response from CO-GJC.
6/27/2026, **1610**
CO-GJC requests Snyder Air Attack to return to Snyder/Jones for search and rescue mission.
6/27/2026, **1612**
Pilot 1 returns to Rabbit Valley to refuel and to get Supt 1.
6/27/2026, **1614**
Firefighter 5 calls Pilot 1 to tell them they're out of their fire shelter. Firefighter 5 can hear Pilot 1 on radio but they don't hear him.

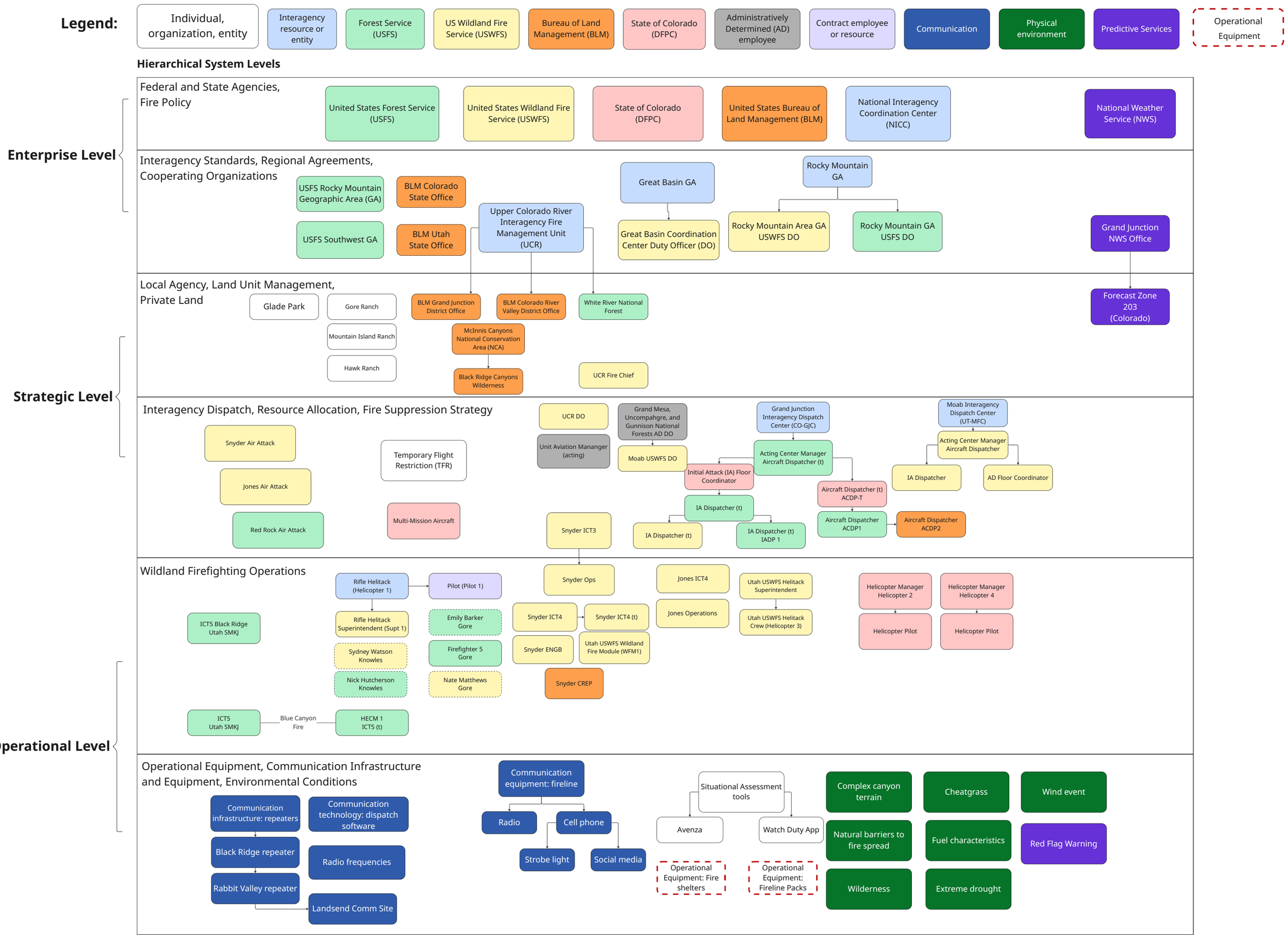

6/27/2026, **1616**
Red Rock Air Attack hears Firefighter 5 and tries to call him.
6/27/2026, **1624**
CO-GJC requests DFPC Multi-Mission Aircraft for Red Rock Fire.
6/27/2026, **1630**
Pilot 1 makes contact with Firefighter 5 on Knowles/Gore.
6/27/2026, **1632**
From CO-GJC to all resources on all fires in area, over radio: "Attention all units: All resources that are currently on active fire here in the UCR, per the Unit Fire Chief, he would like all ground suppression resources to disengage from suppression actions, ensure firefighter safety, and reassess conditions and let Grand Junction Dispatch know when you feel comfortable re-engaging." [this transmission was unreadable by many resources]
6/27/2026, **1638**
CO-GJC requests Jones Air Attack to take over Red Rock Air Attack, declines because of wind.
6/27/2026, **1639**
All helicopters shut down on Red Rock Fire from Unit Chief-directed stand-down.
6/27/2026, **1630-1640**
Snyder Air Attack returns over Snyder/Gore/Knowles Fires.
6/27/2026, **1642**
Snyder Air Attack makes contact with Matthews/Firefighter 5 on Knowles/Gore Fires.
6/27/2026, **1645**
Pilot 1 suggests to Snyder Air Attack that they order a helicopter to drop water on deployment site to cool it down.
6/27/2026, **1645**
Snyder Air Attack tells Pilot 1 they have ordered Utah Helitack and a short-haul helicopter.
6/27/2026, **1645**
Red Rock Air Attack en route back to Durango.
6/27/2026, **1648**
Black Ridge Fire losing visibility and requests extraction.
6/27/2026, **1706**
Helicopter 1 fueling at Rabbit Valley helispot.
6/27/2026, **1706**
Helicopter 1 extracts FFs from Black Ridge and Blue Canyon Fires. They leave gear.
6/27/2026, **1750-1756**
Helicopter 4 picks up Matthews and Firefighter 5 from deployment site.
6/27/2026, **1802**
Helicopter 2 lands at deployment site to check pulses of remaining 3 FFs. They are deceased.
6/27/2026, **1804**
2 injured FFs transferred to medical care, eventually treated at Denver Burn Center.
6/27/2026, **1823**
Mesa County Coroner Office notified of fatalities.
6/27/2026, **1828**
Snyder Air Attack: all aviation standing down on Jones/Snyder/Knowles/Gore.
6/27/2026, **1928**
Helicopter 1 lands at GJ.
6/27/2026, **1931-2034**
Several aviation resources time out over Red Rock Fire and return to bases.
6/27/2026, **2112**
Most ground resources leave Snyder Fire and return to Grand Junction.
6/27/2026, **2030-2130**
Knowles Fire initial Serious Incident or Fatality (SIOF) team meets.
6/27/2026, **2300-2323**
Care Flight attempts to reach deceased firefighters but has do decline mission because of weather.
6/28/2026, **0600 - 0930**
Army National Guard helicopter/Mesa County Sheriff recover three remaining firefighters and transport to GJ.

Appendix F. Actor Map

Understanding and Reading the Actor Map

The Actor Map is an analytical tool for representing a portion of the stakeholders, or "actors," in a system of work. A systems approach in the Knowles burnover context is a recognition of interacting and interdependent organizational levels: enterprise (federal and state agencies, geographic area management), strategic (management of land areas, interagency dispatch), and operational ('boots on the ground,' tactical fire operations, equipment and environment). For the purpose of the Knowles SAI, this visual representation is based in the view that relevant actors have a shared responsibility for safety in the system being represented.

The Knowles Actor Map is meant to visually represent the complexity of the system by illustrating individuals, organizations, or entities in the system levels. By showing the system's structure, the map becomes a tool for dialogue and sensemaking among those in the fire response framework because decisions and actions at one system level can affect actors at other levels in unforeseen ways. Also, the Actor Map shows inanimate objects like equipment, infrastructure, and environment, which are contributory factors to accidents.



Appendix G. Abbreviations and Acronyms

A/A – Air-to-Air radio frequency

AD – Administratively Determined temporary employee

A/G – Air-to-Ground radio frequency

AS 350B3e – Astar 350B3e helicopter (also called Airbus H125)

ATGS – Air Tactical Group Supervisor

ACDP – Aircraft Dispatcher

BLM – Bureau of Land Management

CH-54 – Cargo Helicopter Model 54, military designation of Sikorsky S-64 Skycrane

CM – Center Manager

CO-GJC – Grand Junction Dispatch Center (Colorado)

CRP – Coordinated Response Protocol

DCM – Deputy Center Manager

DFPC – Division of Fire Prevention and Control (State of Colorado)

DO – Duty Officer

DOI – Department of the Interior

EMT – Emergency Medical Technician

FFT1 – Firefighter Type 1. Squad boss

FMO – Fire Management Officer

FTA – Fire Traffic Area

GA – Geographic Area

GBGA – Great Basin Geographic Area

GBCC – Great Basin Coordination Center

HAATS – High Altitude Army National Guard Aviation Training Site

HECM – Helicopter Crewmember

HMGB – Helicopter Manager

IA – Initial Attack

IADP – Initial Attack Dispatcher

IC – Incident Commander

ICT5 – Incident Commander Type 5. Lowest complexity initial attack incident commander.

ICT4 – Incident Commander Type 4. Higher complexity initial attack incident commander.

ICT3 – Incident Commander Type 3. Lowest complexity extended attack incident commander.

IROC – Interagency Resource Ordering Capability

IWI – Incident-Within-an-Incident

LAT – Large Air Tanker

LCES – Lookouts, Communications, Escape Routes, Safety Zones

NCA – National Conservation Area

NFF – National Flight Following

NICC – National Interagency Coordination Center

Ops - Operations

RMGA – Rocky Mountain Geographic Area

RMCC – Rocky Mountain Area Coordination Center

SA – Situational Awareness

SAFECOM – Aviation Safety Communique

SAR – Search and Rescue

SAIT – Serious Accident Investigation Team

SEAT – Single Engine Air Tanker

SME – Subject Matter Expert

SIOF – Serious Incident or Fatality

STEP – Single-Skid, Toe-In, and Hover Exit/Entry Procedures

Supt – Superintendent

-T – When following a position title, indicates a trainee

TFR – Temporary Flight Restriction

UAM – Unit Aviation Manager

UCR – Shortening of Upper Colorado River Interagency Fire Management Unit

UCRIFMU – Upper Colorado River Interagency Fire Management Unit

UFC – Unit Fire Chief

USFS – United States Forest Service

USWFS – United States Wildland Fire Service

UT-UBC – Uintah Basin Dispatch Center (Utah)

UT-MFC – Moab Interagency Dispatch Center (Utah)

UTV – Utility Task Vehicle or Utility Terrain Vehicle

VAR – Values at Risk

WFM – Wildland Fire Module

WildCAD-E – Wildland Fire Computed-Aided Dispatch

WUI – Wildland Urban Interface