

Sam Houston Helicopter Accident Facilitated Learning Analysis

Incident Date: March 27, 2019

"I think I got knocked out. The last thing I remember, I was thinking of my daughter."

Hailei, Helicopter Crash Survivor



"We got in line and Daniel was brought out wrapped in an American flag. It was something to see."

**Bob, Assistant Fire Manager Officer
Angelina/Sabine National Forests**

Contents

1. Tribute to Daniel Laird.....	3
2. Executive Summary.....	4
3. The Facilitated Learning Analysis Process.....	5
4. The Accident Story.....	6
A. Background on the National Forests and Grasslands in Texas.....	6
B. The Events of March 27.....	8
C. Mayday – The On-Site Response.....	13
D. The Off-Site Response.....	21
5. Lessons Learned by the Participants.....	24
6. Lessons Shared from the Participants.....	25
7. Conclusions.....	28
8. Appendices	
A. The Facilitated Learning Analysis Team.....	31
B. Acknowledgments.....	31
D. Timeline for Wednesday, March 27.....	32

1. Tribute to Daniel Laird



"This was the third year we brought Daniel back. Not everyone gets invited back. But when I would see his name on the order, I felt very comfortable and knew I didn't have to worry about his quality of work or work ethic."

Hailei, Firing Boss, co-worker, and friend of Daniel's

"Dan was one of us. I always had the highest confidence in his abilities. He worked hard and he was great to be around."

John Kendall, Fire Management Officer,
Sam Houston National Forest

The people the FLA Team interviewed during this FLA process who worked closely with Daniel Laird remember him as an extremely dependable worker and a friendly person. Daniel, was born August 30, 1977 in Yuba City, California, the youngest of four siblings.

Daniel went to school at Grace Christian Academy, then on to Bridge Street School, and graduated from Yuba City High School in 1995. He joined the U.S. Forest Service after high school and worked his way up through the ranks to the position of Helitack Captain on the Tahoe National Forest. Daniel had served 23 years with the Forest Service.

Daniel was an avid fisherman, a staunch supporter of the Sacramento Kings, and a competitive golfer. He was also a Yuba City skateboarding icon. His greatest love and highest priority was always for his family.

To read Daniel's complete obituary:

<https://www.legacy.com/obituaries/appealdemocrat/obituary.aspx?n=daniel-joseph-laird&pid=192090364&fhid=7528>

To see a video of how Daniel was honored with a remarkable procession from Conroe, Texas to the George Bush Intercontinental Airport in Houston: Click [Here](#).



2. Executive Summary

On Wednesday March 27, 2019 the National Forests and Grasslands in Texas (NFGT) was conducting a series of aerial ignition prescribed burns across the Forest. At approximately 1410, the AS-350B3 (A-Star) helicopter conducting aerial ignition operations for the Compartment 9 prescribed fire on the Sam Houston National Forest (SHNF) crashed, killing U.S. Forest Service employee Daniel Laird and injuring another Forest Service employee and the contract pilot. District personnel trained and rehearsed for an “Incident Within an Incident,” which prepared them to respond to the needs of those involved in this accident, and to secure the crash site.

Immediately following the emergency response, the National Transportation and Safety Board (NTSB) responded and took the lead role in investigating the crash. In the following months, the US Forest Service conducted this Facilitated Learning Analysis around the *circumstances of this prescribed fire* and the *response* to the helicopter crash.

The NTSB will produce a separate report to be released upon conclusion of their investigation. The NTSB report will cover the helicopter operations (flight and crash), whereas the FLA report covers the plan for the day, practices and procedures for working with a helicopter, and the initial emergency response once a crash occurs.

Being able to locate the downed aircraft quickly was the absolute most important part of this response. Ground personnel were able to locate the crash site within minutes of the distress call because a commercially available GPS unit had been placed on board the helicopter and was being monitored by two tracking receivers. The use of this device and the close working relationship between the District personnel and county first responders enabled Emergency Medical Services (EMS) to arrive in a very short time.

Ground personnel were able to locate the crash site within minutes of the distress call because a GPS unit had been placed on board the helicopter and was being monitored by two tracking receivers.

Because of the rapid discovery of the aircraft and the swift action of the ground personnel, the crash site and the downed helicopter were able to be protected from the quickly approaching fire. The preservation of the accident site greatly facilitated the investigators’ efforts and provided a much better chance of learning from this accident.

Part of the reason the GPS tracking device played such a crucial role in the response to this accident is because, like much of the southern terrain, this forest is extremely dense. However, even in a forest with more open conditions, a helicopter can travel a long way in a short amount of time—making it hard to locate if it goes down.

3. The Facilitated Learning Analysis Process

The Facilitated Learning Analysis (FLA) process is meant to facilitate learning from unintended outcomes by interviewing people who were involved in an event and sharing a collective story of their experiences. In this FLA, the FLA Team also offers “Lessons Learned by the Participants” and “Lessons Shared from the Participants” sections. By this, we mean that some lessons were learned by the participants as the incident unfolded and will likely influence future actions if something similar were to occur again.

In addition, there are other types of lessons worth sharing. The people of the National Forests and Grasslands in Texas also share lessons that reflect the “standard” practices they had in place that made a significant difference in the response to this accident.

Scope of This FLA

The scope of this FLA was to focus on three main areas:

1. Physical response to the crash site; time of response and use of tracking devices.
2. Emergency Medical Service response.
3. The use of firing platforms other than helicopters.

It is **not** an objective of this FLA to attempt to reveal the cause or causes for the helicopter crash.

It **is** an objective of this FLA to share the experiences of the 36 individuals that the FLA Team interviewed, comprised of: Law Enforcement, Forest Supervisor, Aerial Firing Boss, Dozer Operator, Front Desk Employee, Weather Observer, Prescribed Fire Crew Member, District Assistant Fire Management Officer, Prescribed Fire Burn Boss Type 2, Acting District Ranger, Forest Risk Management Specialist, Helicopter Manager, Fire Staff Officer, Dispatchers, Incident Commander of the Incident Within an Incident, District Ranger, Back-up District Rangers from other Districts, Forest Patrol Captain, and Hospital Liaisons, among others. These people share specific lessons and highlight persistent issues that this particular Forest faces, including Forest management strategies, challenges related to the wildland-urban interface, aerial ignition practices, alternative firing platforms, and challenges associated with aerial tracking.

***“The quick thinking and committed efforts
of the U.S. Forest Service resources
may have saved more lives.”***

**Rusty, Chief
Montgomery Fire Department**

The FLA Team was also fortunate to be invited to a presentation given by several members of the Montgomery Fire Department, Station #51, who had completed a comprehensive AAR and generously shared their lessons learned. Their presentation reflected that they had thought about the incident with the intent to learn from it, and they had significant beneficial lessons to share. Some of these lessons are included in this FLA.

We would like to especially recognize the quick and efficient response of the Montgomery Fire Department to the accident itself. On the day of the accident, they were running a disaster drill, which included not being able to use their iPads, electronic devices, or radios. In addition, the Chief’s truck was broken down, they were managing a grass fire, and left the scene of a motor vehicle accident before responding directly to the helicopter accident. In the face of all of these challenges, they were professional and calm and had a profound effect on the quality of the emergency medical response.

4. The Accident Story

"The Sam Houston is no better than any other District on the Forest, but it is 100 percent different than any other District on the Forest."

John Kendall, Fire Management Officer,
Sam Houston National Forest

A. Background on the National Forests and Grasslands in Texas

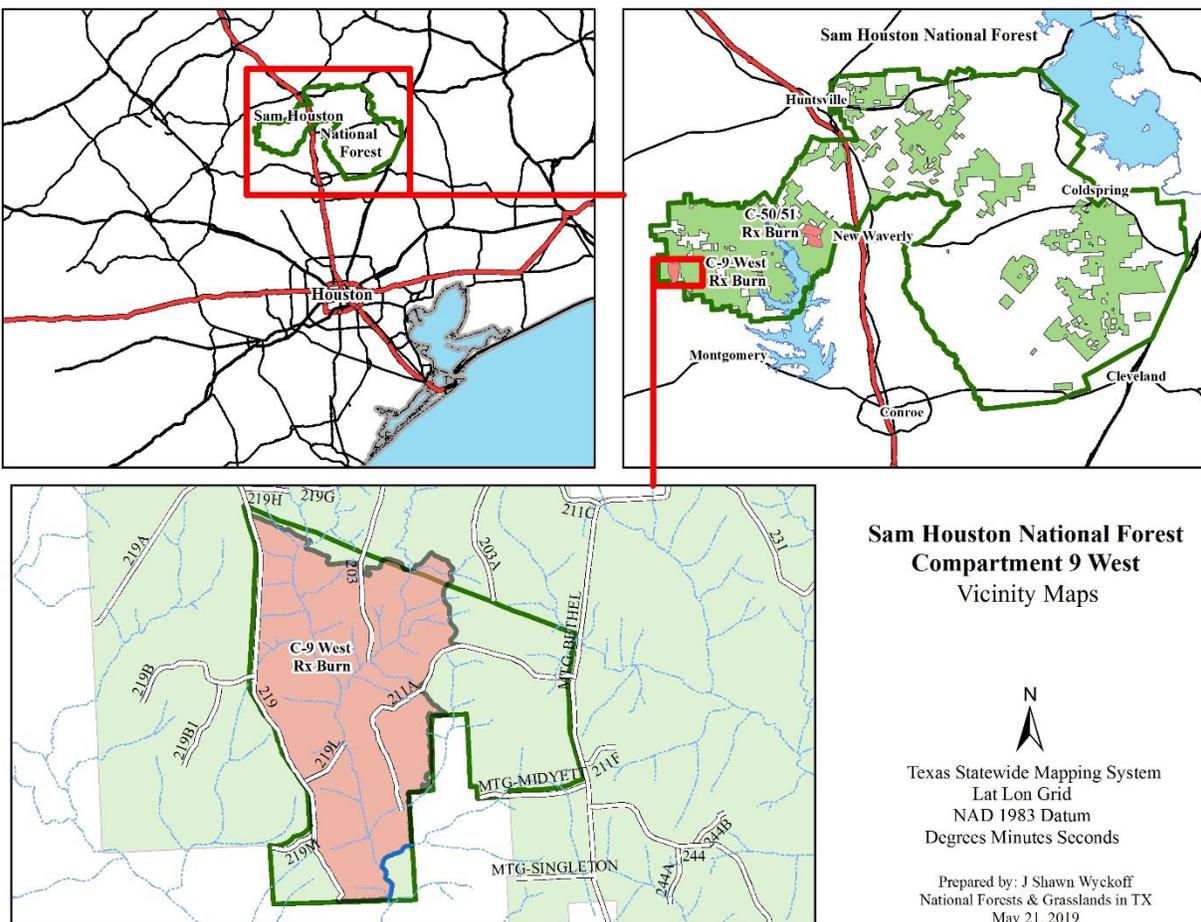


Figure 2: Sam Houston National Forest Vicinity

Prescribed Burning and Aerial Ignition

The 675,815-acre National Forests and Grasslands in Texas (NFGT) uses prescribed fire to manage fuels and maintain suitable habitat conditions on approximately 540,000 acres of fire-maintained ecosystems. The NFGT strives to prescribe burn approximately 135,000 acres/year with a corresponding average fire return interval of two to three years. The NFGT has two exclusive-use helicopters on contract each year from mid-January to the end of May. During this time, the NFGT conducts the majority of its prescribed burning, with additional smaller hand-ignition burns conducted outside the helicopter-contracted dates.

The Sam Houston National Forest (SHNF) comprises 166,000 acres of the NFGT. It is located 40 miles north of Houston, Texas, which presents numerous challenges for the use of prescribed fire. The SHNF is located within a non-attainment area, which means there are strict guidelines from the Texas Commission on Environmental Quality for when burning can occur because the Geographical Area has been identified as having diminished air quality throughout the year. The number of days with suitable weather conditions for prescribed burning averages 50 days per year within the approximate 100-day burning season. However, this is just when the bulk of the burning occurs based on the availability of the

helicopter. When factoring in the air quality restrictions associated with the non-attainment area, the number of suitable prescribed fire days drops to approximately 30 days.

Aerial ignition has become a very common tool for accomplishing prescribed burning. It is a quick, efficient method for burning a large number of acres in the limited windows of opportunity that are available. The National Forests and Grasslands in Texas flies approximately 200 hours every year for aerial ignition operations. This is common across the Southern Region. Despite the high number of hours flown, there have been relatively few accidents. The Southern Region has had four crashes involving fatalities (eight lives lost) in the past 16 years. During that same time period, there were 49 helicopter “mishaps” on fires reported nationally. These mishaps include everything from near misses and minor incidents up to the Iron 44 crash which resulted in nine fatalities.

In addition to the non-attainment challenges, the number of people living in close proximity to the SHNF continues to increase each year as the Houston metroplex grows. This creates the typical urban interface issues associated with heavy recreational use and bedroom communities adjacent to the SHNF. Many nearby residents are unaware of the role of fire in the ecosystem. And those who are aware, are often unsympathetic to the role of fire and are intolerant to nuisance smoke. Given these challenges, aerial ignition presents the only practical method for burning the acreage necessary to meet fuels reduction and ecosystem management goals within the short burning season while operating within smoke management restrictions.

Current Forest Conditions

The forest vegetation on the Sam Houston National Forest is extremely dense. Employees on the Forest express concern regarding their ability to restore and maintain suitable conditions. Alternatives to prescribed burning such as mechanical removal and herbicide use also present their own problems. The use of herbicides for vegetation management other than the treatment of nonnative invasive species is not a common practice on most national forests, at least in part due to lack of public support. However, herbicide use on state-managed lands and private property is a common practice in the South and helps to manage the workload. Both herbicides and the use of mechanical removal of hardwoods and brush are expensive. The forest vegetation began to change after the cattle grazing program on the SHNF ended. That program had helped to maintain open forest conditions. However, the program was suspended due to issues associated with excessive soil erosion and degraded water quality. As a result, the current forest is thick, dense, and hard to traverse. Prescribed fire, therefore, remains the only effective tool for forest management.¹

Approaching the Burn Date

During the second week of November 2018, employees who attended the fire refresher reviewed the [2015 Leg Injury FLA](#) that occurred on the SHNF. They used this FLA to start a conversation about responding to an Incident Within an Incident (IWI). The refresher asked the attendees to think about what would happen if key leadership were involved in the incident or were otherwise not available. How would employees respond? This made employees start thinking. What would happen if the FMO had to spend time between the two Districts? What if the FMO was in the accident? On this particular District, the FMO played a key role not only in connecting Forest Service employees across the District, but also within the community, creating a very strong social network. The FMO’s connections on the Forest and among the other Districts, as well as his connections in the community, enabled him to be of great service. His centrality to the overall network also introduced vulnerability into the network. He knew that. And that’s why they focused on this potential situation in the refresher.

¹ Using Unmanned Aircraft Systems (UAS) for the delivery of aerial ignition devices has the ability to reduce the number of personnel needed to fly over dense canopy and inaccessible terrain. At the time of this incident, the UAS program was being developed but not currently in use on the Sam Houston (See the “Conclusions” section in this FLA for more information on UAS use.)

Additionally, the 35-day “furlough” hit at the end of December and, for various reasons, caused great anxiety among employees. The FMO would come to the office during this time to listen to their concerns, which helped build unity with employees and create a supportive atmosphere. It was a difficult period. The furlough finally ended on January 25. It was time to start resuming plans where they last left off more than a month before on December 22.

The SHNF started planning burns based on their helicopter availability and other factors. While they had their equipment and the necessary supplies ready, it was quite wet due to excessive rainfall. Furthermore, it takes a narrow set of conditions to burn because most units don’t have a lot of fine fuels.

Zone Concept

The National Forests and Grasslands of Texas’ fire program is managed under a zone concept. The Forest is split into three zones: the North Zone that covers the Caddo-LBJ National Grasslands in northern Texas; The East Zone that covers the Angelina/Sabine National Forests; and the West Zone covering the Sam Houston and Davy Crockett National Forests.

They normally start burning around January 15 when the helicopter becomes available. But due to the furlough, this year they weren’t able to start burning until the end of February. Once they resumed work, even though things had been going well, they realized it would be difficult to accomplish their normal goals for prescribed burning acres. They therefore prioritized burns and dropped some units out of consideration. There was a significant amount of burning being accomplished on the Forest. In fact, they burned every day from March 15 through March 24 and then again on March 26 and 27.

The day before the fatal helicopter incident, they burned on the Angelina National Forest (1,347 acres), the Davy Crockett National Forest (1,192 acres), and the Sam Houston National Forest (1,585). They were also happy for the potential to conduct three prescribed fires with two different helicopters on the West Zone on March 27.

B. The Events of March 27

“In the afternoon on March 27 we found ourselves in the middle of a great tragedy and a true miracle.”

Melissa, Previous Acting District Ranger

The Morning of the Accident

People started arriving at the office at different times. Some got there early to check the weather at 0630, some came in closer to 0800 to touch base with coworkers. The East Zone was out of prescription, so that prescribed fire was called off for the day. The resource order for an off-Forest helicopter was cancelled and the East Zone resources were made available to the West Zone.

They prioritized resources and began the “horse trading” of resources (people, dozers, transports, UTVs, Hotshots, jumpers, etc.) between the two Forests based on qualifications and experience levels. An overall plan for the day was agreed upon. The West Zone would conduct three prescribed fires, using two helicopters. One burn would be conducted on the Davy Crockett and two burns would be conducted on the Sam Houston. The helicopter stationed in Lufkin was assigned to the burn on the Davy Crockett and the helicopter stationed in Huntsville was assigned to the Sam Houston for both burns.

At 0815, Hailei, the Firing Boss, and Daniel, the Plastic Sphere Dispenser Operator², attend an ignitions operations briefing with the Compartment 50/51 and Compartment 9 Burn Bosses prior to the main briefing.

² The PSD is a device that is installed on the helicopter, but it is jettisonable. The device injects glycol into a plastic sphere containing potassium permanganate, which is then expelled from the machine and aircraft. This produces an exothermic reaction resulting in ignition of fuels on the ground for prescribed or wildland fire applications. The PSD operator is the person who initiates the injection and expulsion process.

At this ignitions operations briefing, they discussed flight times, ignition patterns, and desired fire behavior. After the briefing, Hailei sent a text message to Matthew, the Helicopter pilot, and told him what he needed to know to prepare the helicopter for the day, including manifest and load calculations.

At 0900, they had one large briefing for both prescribed burns on the Sam Houston in the weight room because it had a large screen TV capable of displaying maps from phones using current technology. Simon, the Type 2 Prescribed Fire Burn Boss Trainee for Compartment 50/51, led this combined briefing. He announced that they would be burning Compartment 50/51 (1,500 acres) and Compartment 9 (970 acres) on the Sam Houston. In the combined briefing, they discussed items that were common to both burns, including weather and fire behavior. Following this briefing, each Burn Boss held a break-out for their specific units.

At 1000, Hailei got the GPS tracker³ and the iPad and proceeded to go to the Huntsville airport with Daniel. When they arrived at the airport they saw pilot Matthew and Jacob, the fuel service vehicle driver, prepping the aircraft for aerial ignition. At 1030, Hailei conducted a briefing with Matthew, Daniel, and Jacob to cover flight operations, ignition plans, and safety procedures. She used the project aviation safety plan and Plastic Sphere Dispenser (PSD) *go-no-go* checklist. Hailei recalled thinking about the constraints of the flight due to the abundance of wildland-urban interface lands. She later explained, *“We start early to get the smoke up and out and go home.”* She and Matthew talked about the *“What If’s,”* around wind and possible landing zones.

At 1036, they had the baseline prepped on Compartment 50/51 and initiated a test fire. At about the same time, personnel on the Compartment 9 fire initiated a test fire and began hand ignitions. The baseline was fully lit on Compartment 50/51 by 1117. Everything was going well. Right before calling for the helicopter to launch, there was a report of a wildfire that caused a short delay until it was revealed that this fire was on private property.

Once they knew they didn’t need to respond to the wildfire, the Type 2 Prescribed Fire Burn Boss Trainee on Compartment 50/51 called for the helicopter to launch and come to the Compartment 50/51 burn. At 1150, they were in the air. They called Lufkin Dispatch on the radio to inform that they were in route to Compartment 50/51.

They Finish Compartment 50/51 Burn, Fly to Compartment 9

During firing operations over Compartment 50/51, Hailei recalled thinking that they didn’t have to drop too many of the PSD balls to get this fire to burn. Because they were working above 80-foot trees, they flew at approximately 120 feet above ground level (AGL). Hailei explained, *“If you are too high, you cause the balls to drift. If you are too low it’s a safety concern. You have to stay where the pilot and passengers are comfortable. We were flying in clear air and could see the lines we were igniting.”*

As the helicopter left Compartment 50/51, Hailei recalled looking back at the smoke column and thinking to herself in humble reflection, *“I get paid to do this!”* As she often did, she took a second and offered up a short prayer. At 1321, she called Lufkin Dispatch and said they were headed to the Compartment 9 burn. Then, she switched back to Air-to-Ground and called John Kendall, Fire Management Officer on the Sam Houston National Forest, to check in.

On the way to the Compartment 9 burn, Hailei and Matthew had a conversation about fuel and decided that 40 pounds of fuel was the *“turn back level.”* They were well above that and felt safe to go directly to the next burn. Once they were over Compartment 9, Hailei gave their location to Lufkin Dispatch. She informed them she would be *“flight following”*⁴ locally and started the recon at 1328.

³ At the time of this crash, Aircraft Flight Following (AFF) only updated on a 2-minute cycle, which is better than reliance on 15-minute radio flight following, but it was still lacking. As a result, GPS tracking devices that give real-time tracking information were being used for better accuracy. An Avionics Inspector for Region 8 recently explained that it is up to the Pilot in Command to allow or disallow any electronic devices, including GPS trackers.

⁴ *“Flight following”* is the method and process through which an aircraft is tracked from departure point to destination. Flight following is the knowledge of the aircraft location and condition at regular intervals with a reasonable degree of certainty such that, in the event of mishap, those on board may be rescued.

Sam, the designated Incident Within an Incident (IWI) Incident Commander for both burns, left the Compartment 50/51 burn and drove to Compartment 9. As he arrived at Compartment 9, he called Hailei on the Air-to-Ground frequency to inform her he had her *“positive on the GPS tracker.”*⁵

Downwind of the Compartment 9 burn was black from a previous burn in March but was greening up. A portion of the Lone Start Hiking Trail cuts through the northeast portion of the Compartment 9 burn unit. During previous burn operations, signs and flagging were in place to warn the public to stay out of the area. Even with signs and flagging in place on these previous operations, some members of the public ignored the signs, went around the flagging and entered the burn area. Therefore, on this burn, for the safety of the public and to ensure they would stay out of the area, Prescribed Fire Crew Member Alex was assigned to burn an area, by hand, between the trail and the control lines before the helicopter arrived. Jack, a firefighter who was serving as weather observer and “trail guard,” was placed at the Lone Start Hiking Trail trailhead to ensure that the public stayed out of the burn area.

‘Operations Normal’

The plan was to fly in a north-south pattern beginning on the west side of the unit. At 1340, they started aerial ignitions on a line from Drop Point A to Drop Point R to reinforce the existing baseline. At the same time, Prescribed Fire Crew Member, Robbie, dropped fellow crew member, Brody at Drop Point L⁶. Brody started firing toward Drop Point J.

Robbie drove the UTV down the line to Drop Point J, where he staged the UTV for Brody and started firing toward Drop Point H. At 1355, as Brody arrived at Drop Point J, Hailei reported *“operations were normal”*.

The fire behavior was meeting the objectives laid out in the prescription specifications and, thus, they were able to fly a little faster. Because the helicopter was firing in the area of Drop Point J, Brody took the UTV back up the line toward Drop Point L to patrol for spots.

At 1401, Hailei again reported *“operations normal”* and FMO John Kendall jokingly replied, *“Don’t get balls over the creek”*. Then Robbie jumped in with *“and don’t burn up my transport!”* When the helicopter approached Drop Point C, Hailei again reported *“operations normal”*.

⁵ Even with GPS tracker providing real-time tracking to those with the hand-held receivers, it is still the standard on the NFGT for the helicopter to “flight follow” locally while doing recon and PSD operations over a burn unit. The standard procedure is for the Firing Boss to announce the location of the helicopter as the ship is making any major direction change, turning at the end of each pass across the unit, or passing an identifiable landmark or map drop-point. An example of this: *“At Drop Point A turning south towards Drop Point R”*. The heading and location would be called out over the Air-to-Ground frequency to allow all resources on the burn unit to know the location and direction that the helicopter is traveling.

⁶ Both Robbie and Brody are qualified equipment operators, which ends up being important because either one could step in and operate the dozer.

Sam Houston National Forest Compartment 9 West Prescribed Burn Overview

Legend

- Burn Unit (969 Acres)
- Prior Rx Burn
- A** Drop Points
- No UTV Crossing
- Dozer Line
- Roads
- Lone Star Hiking Trail
- FS
- Private

N

0 1,500 3,000
Feet

Texas Statewide Mapping System
Lat Lon Grid
NAD 1983 Datum
Degrees Minutes Seconds

Prepared by: J Shawn Wyckoff
National Forests & Grasslands in TX
May 28, 2019

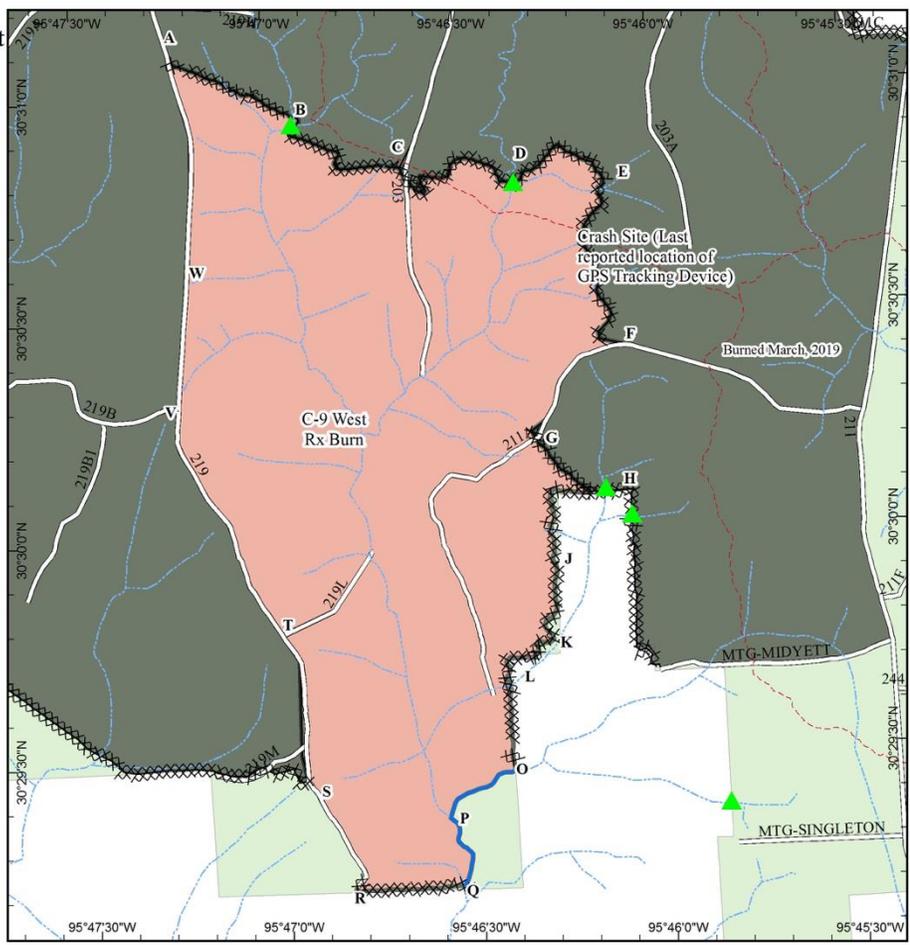
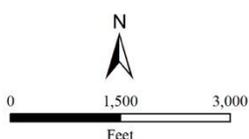


Figure 3: This map shows the size and shape of compartment 9 and the surrounding lands (prior Rx burn, private land, etc.) along with the crash site, drop points, and dozer lines.

8MC GNSS Tracking Compartment 9 West

Prescribed Burn
March 27, 2019

- Legend**
- 8MC GPS Tracking Device
 - - - 8MC GPS Tracking Device
 - Burn Unit (969 Acres)
 - ▲ No UTV Crossing
 - Dozer Line
 - Roads
 - FS
 - Private



Texas Statewide Mapping System
Lat Lon Grid
NAD 1983 Datum
Degrees Minutes Seconds

Prepared by: J Shawn Wyckoff
National Forests & Grasslands in TX
May 28, 2019

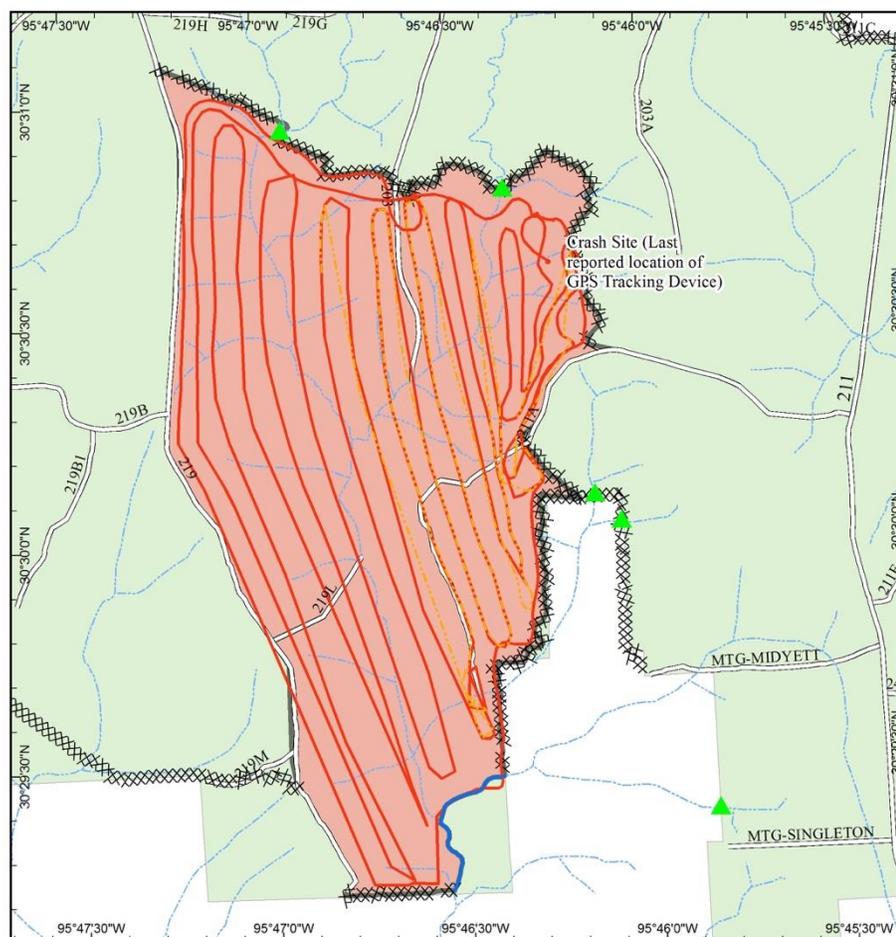


Figure 4: This map shows flight tracking of the helicopter from the GPS tracker and the accident site.

Helicopter pilot Matthew and Hailei had another conversation about wind conditions and fuel levels. Everything checked out. Hailei talked to Daniel and told him to get ready to turn off the Plastic Sphere Dispenser machine after they made the next turn. They were about to button the whole thing up. *“We had one little piece we needed to do. We were 99.9 percent done. As soon as we made the turn, that’s when everything just stopped, and went silent,”* Hailei recalls.

Hailei continues⁷, *“I looked at Matthew but I wish I would have looked back at Dan, too.”* Matthew was fighting with the controls. She doesn’t remember doing it at the time, but Hailei asked Matthew, *“What is happening?”* He was busy with the controls. Hailei had the “push-to-talk” in her right hand. She keyed the mic and tried to say: *“Kendall, we are going down.”* But the only thing they heard on the radio was: *“Kendall, we are going d . . .”*⁸

⁷ It is rare to be able to include the words of people who survive events like these. As such, the FLA Team chose to integrate quotes from the post-accident interviews into the unfolding story to honor the voices of those involved.

⁸ Many of the people working that day recall hearing that “Mayday”. Most recall not being able to make out the exact words but that it was a female voice, who seemed in distress, and everyone knew something wasn’t right. At the moment of the Mayday, people started taking immediate action all over the Forest and local community to respond directly to the scene and behind the scenes through administrative maneuvers. For instance, Burn Boss Simon sent both of the jumper modules (Alaska and Boise) from Compartment 50/51 burn to Compartment 9. James, the FFMO and Bob, the AFMO on the Angelina/Sabine, left the Angelina/Sabine and drove to the Texas Interagency Coordination Center (TICC), gathered information, and then drove to the Sam Houston. The Lufkin Dispatch employees assigned one person to take notes, one person to answer phones, and one person to be on the radio, and a variety of activities began in the Supervisor’s Office. (For more details, see the “Off-Site Response” section in this FLA.)

C. Mayday – The On-Site Response

The following events, from the time of the Mayday until the injured being transported to the hospital, occurred within an extremely short amount of time, from 1409 to 1517. Those injured were actually receiving professional medical care on scene within 15 minutes of the Mayday.

FMO John was at Drop Point A when he heard the radio transmission and the “thud” from the impact of the helicopter hitting the ground. Immediately, at 1410, he called 9-1-1. John then ran to the truck, looked at GPS tracking device and could see the coordinates for the location of the helicopter. The 9-1-1 Operator who John spoke with was knowledgeable as well as calming, because she was a familiar voice to him.

The 9-1-1 Operator pinged John’s phone and knew exactly where he was. The 9-1-1 Dispatch Center keyed in Fire Com, which proved to be useful while communicating with the responding Montgomery County Fire Department resources.

John then called Sam, the designated Incident Within an Incident IC, on the radio and told him to head to Drop Point R. He also called Lufkin Dispatch to alert them of the accident and told them to clear the radio for emergency use only. John requested all Compartment 9 resources respond to Forest Service Road 211 and 211A. He headed that way himself.

Along the way, John found a closer location to the crash site off of Forest Service Road 211A (Drop Point F on the map). He provided the updated location to 9-1-1 Dispatch and Forest Service resources on Comp 9. By this time, John’s cell phone started “blowing up”. Even so, he tried to focus on the task and ignore most of the calls. He took one call from the Montgomery County Fire Chief, who had called John’s cell to ask him for additional details and assure his support.



Figure 5: You are looking up at where the helicopter came down through the canopy. There is virtually no tree damage. One of the people assigned to this incident said: *“It was like the tree canopy opened up, the helicopter fell in, and the canopy just closed back up.”*

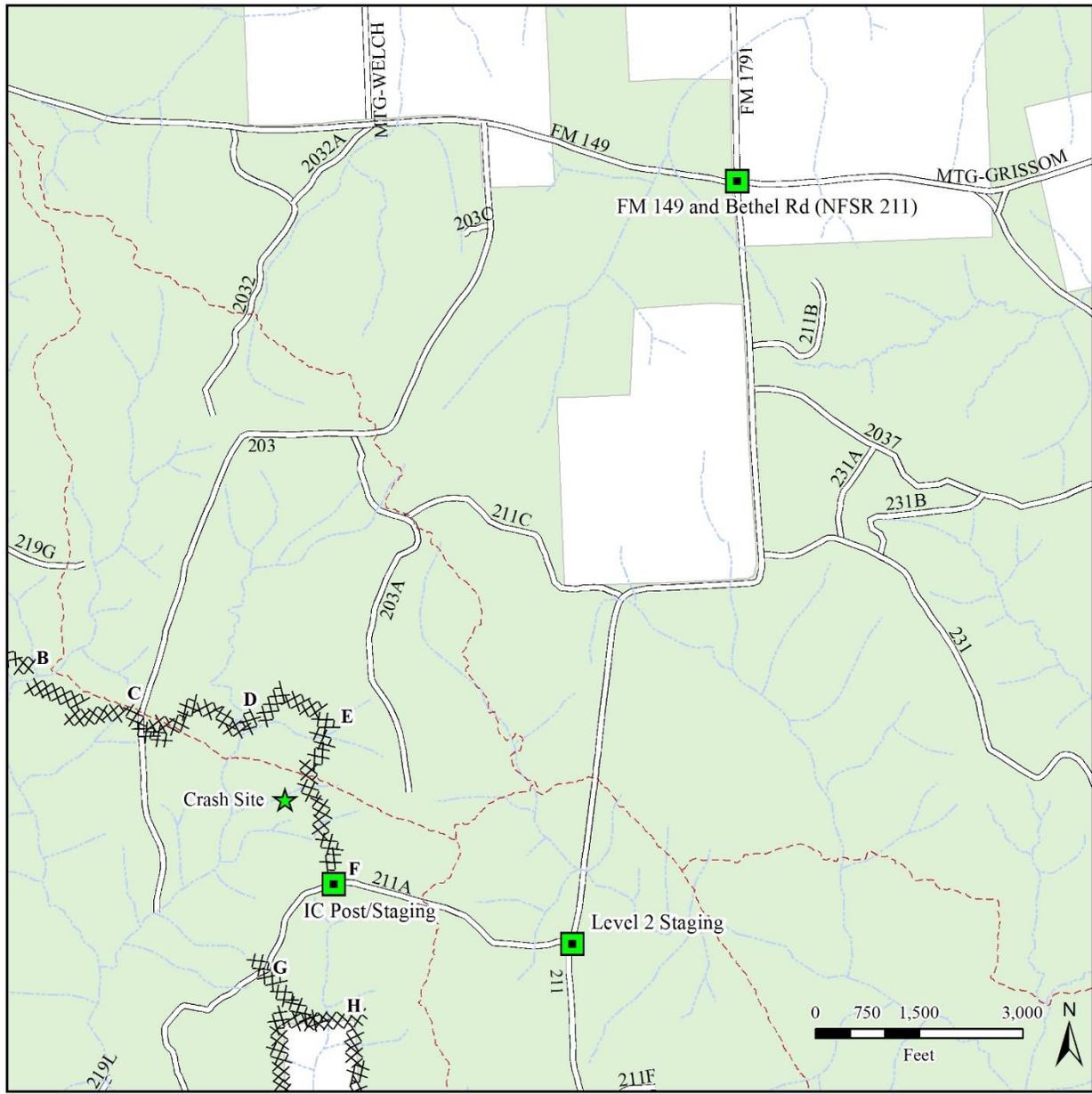


Figure 6: This map shows the crash site location and both of the staging

“I thought about my training and remembered that fire extinguishers on board the aircraft are for people—not the aircraft. So I found the extinguisher and gave it to Matthew and said: ‘I have to go get help.’”

Hailei

After the Crash – at the Helicopter

Hailei remembers hitting the tops of pine trees and then coming to. She later recalled, *“I think I got knocked out. The last thing I remember, I was thinking of my daughter.”*

Hailei said, *“We [the helicopter] slid 50 feet down a live pine tree and rolled over onto our right side. I realized I was alive and then the pain hit. I undid my seatbelt and looked at [pilot] Matthew and saw a tree had come through between his leg and across his chest. I remember standing there and realized Matthew was alive because he was talking. He looked like he was hugging the pine tree. His head was*

Hailei recalls:

“We [the helicopter] slid 50 feet down a live pine tree and rolled over onto our right side. I realized I was alive and then the pain hit. I undid my seatbelt and looked at [pilot] Matthew and saw a tree had come through between his leg and across his chest.”

laying on the PSD sphere bag. He said, ‘Help me move this bag.’ It seemed like forever to get the bag loose. As his seatbelt was unbuckled he fell out of the seat, but his foot was lodged. I had to crawl back in and twist his foot to get him loose.”

Hailei told Matthew: *“We’ve got to go.”*

She recalled seeing fire around them. She explained, *“I wanted Matthew to get up but he couldn’t. I wanted him to get up so I could help him walk out. I wanted to get the fire shelters. I started thinking where the fire shelters were and started looking but couldn’t get to them.”*⁹

Hailei continues, *“I remember seeing Dan’s legs and thought ‘Please move your foot.’ But that never happened. I knew in my heart, he was gone. I thought about my training and remembered that fire extinguishers on board the aircraft are for people—not the aircraft. So I found the extinguisher and gave it to Matthew and said: ‘I have to go get help.’ The entire scene was very quiet for what had just happened.”*

Hailei wanted her phone so she could call for help but couldn’t find it. Matthew was able to reach in the console and hand her his phone and she called FMO John. At that moment, John sees a Portland, Oregon phone number calling his phone. He remembered thinking that he didn’t recognize the number and he was trying to limit the time he was on the phone, but for some reason, he answered it.

It was Hailei on Matthew’s phone.

Hailei screamed for John to come get her. Hailei kept saying that she could not get the fire shelters from the helicopter. John told Hailei to move east away from the fire, but Hailei was unsure of where she was. Fire was spreading all around them. She told John, *“We can’t get out of here.”* Upon hearing this plural pronoun, John surmised that there must be at least two alive.

Right then, Hailei looked down and her phone was lying in the grass in front of her. She quickly hung-up with John and put the pilot’s cell phone in her pocket. She called her boyfriend with her phone and told him: *“My helicopter crashed, I think one of my crew members is dead, please call my daughter. I don’t want her to find out about this on social media or the news.”*

“I thought I was going to have to walk through fire but a path opened up.”

Hailei

⁹ The fire shelters were on board and secured under the back seat. However, due to the helicopter lying on its side, the fire shelters were not accessible from the front seats.

The First Help Arrives

Meanwhile, Prescribed Fire Crew Member Robbie radioed fellow crew member Brody and said *“Bring the UTV because the helicopter went down.”* Brody made his way down the line and picked up Robbie with the UTV between Drop Point H and J and they followed a trail of newly lit PSD balls. They believed that they were on the correct track to find the helicopter.

At 1411, Cynthia, a Law Enforcement Officer who had been working smoke patrol to keep the public out of the burn area on the Compartment 50/51 burn, heard a bunch of broken static on her radio and knew something was wrong. She responded to the Compartment 9 burn.

Alex, the Prescribed Fire Crew Member who had been firing around Drop Point O on Compartment 9, heard the helicopter Mayday and began moving that way. He fired some unsecured line on his way up the line around Drop Point H.

Hailei ends the call with her boyfriend, calls John back on her phone, and tells him that she could hear the UTV. He told her to hang up and call Robbie because he was closer to her.

She called Robbie from her cell phone. Robbie picked up the call. Hailei told him she heard the UTV drive past her. She told them to turn around, drive back, and pick her up.

Hailei remembers: *“I thought I was going to have to walk through fire but a path opened up.”* Robbie recalled seeing her through the fire. She was in an unburned pocket within the burn unit. Hailei recalls: *“I got to Robbie who picked me up and carried me to the UTV where I had a meltdown. I then asked Robbie to stay with me.”*

Prescribed Fire Crew Member, Brody, ran by. Hailei told him to hurry because fire was coming and she pointed toward the crashed helicopter. He headed that way and was first on scene at the helicopter. Then Jack, the firefighter who was serving as trail guard and weather observer, responded quickly. Robbie told him, *“You need to grab a hand tool.”*¹⁰ Jack grabbed a hand tool from the UTV and headed into the crash site following Brody’s path.

“I knew the only way to help was to keep fire away. I helped the pilot up. I knew there was likely to be fuel everywhere, so I went out away from there and began to dig line.”

Brody

FMO John Brings the Dozer

When Brody found the helicopter he saw pilot Matthew on his hands and knees under the ship. He recalled, *“I asked if he was okay and he said ‘yes.’ I asked about Daniel, and the pilot didn’t know his condition. I ran around and looked and noticed the position of Daniel’s body and knew he was pinned. I knew the only way to help was to keep fire away. I helped the pilot up. I knew there was likely to be fuel everywhere, so I went out away from there and began to dig line.”*

At about 1421, Jack met up with Brody at the helicopter as Brody was putting in a handline. Jack saw that Matthew was up and walking around. Jack asked Matthew if he could walk out. Matthew didn’t exactly answer his question, but explained that he didn’t have a fire shelter. Jack gave Matthew his fire shelter and said: *“If we need to evacuate, I will open-up the fire shelter and we will leave together.”*

Jack asked Matthew to *“Show me the location of the PSD Operator so I can check him for signs of life.”* Matthew pointed in the general direction and replied: *“I don’t believe he made it.”* He also informed,

¹⁰ Jack didn’t have a hand tool because he was on light duty that day.

"You can't get to him." Jack walked in that direction and quickly determined that, because of the helicopter's position, he couldn't get to Daniel.¹¹

Jack started helping Brody finish the handline and they started lighting a backfire with lighters. Jack was working on the fireline while having an ongoing conversation with Matthew.

As they were digging line, Brody called FMO John and told him that they needed the dozer.

Robbie called John shortly after and informed that he had Hailei. John was on his way to the crash site, but with this information and the request for the dozer, he turned around and headed to the dozer transport.

Once John got there, he jumped in and tried to back the dozer off the transport. But something wasn't working right. John hit the start button on the John Deere 650 K series dozer. He pulled up the brake handle and threw it into reverse. Nothing. He put it in park, idled it down, and tried again. Nothing!

After that attempt, John told himself to calm down and think. He took off his hard hat. He took a deep breath, and then it hit him. There are two emergency brakes and he had only disengaged one of them. He put his hard hat back on,

Brody called John back and stressed that he needed to get the dozer there as quickly as possible. John told Brody to stay at the crash site and he would be there shortly with the dozer. Once John arrived at the tree line, John told Brody to come out and meet him. Brody started walking toward John.

During that walk, Brody recalled thinking about having to navigate the fire. He said, *"When I got close to the flames, they laid down and I was able just to step over them."* Brody stepped into a wind row between trees. He realized that this would be a good route for bringing the dozer in.

Sam Takes Over the Incident Within an Incident; Robbie Transports Hailei Out in UTV

Once John had given the dozer to Brody, he headed back out to the road on foot to tie-in with Sam, who was identified in the emergency plan as the Incident Within an Incident, Incident Commander (IWI-IC). John told Sam: *"This is your incident. Make sure that Leader's Intent is clear. I'm here for anything you need. I'll keep the burn."* Sam replied, *"This is mine."* John said, *"Yes, it is."* Sam shifted into functioning as IWI-IC, and, per protocol, John called the District Ranger's office to notify them of the accident.

Brody pushed over five or six trees to get to the wind row. Brody recalls, *"It took time but I got them out of the way and the fire was right there. I made it into the wind row. I started pushing trees and the pilot just appeared in front of the dozer. I yelled at Jack to get the pilot out of the way. The pilot must have heard because he moved. I started pushing and made it around to the handline and tied into the black off of the handline. The jumpers from the Compartment 50/51 fire showed up with Kevin, another Prescribed Fire Crew Member, and burned out the dozer line."*

After he put in the dozer line, Brody found a wider spot on the new dozer line and parked the dozer there. He left it running until he determined it was no longer needed to put in line, and it was safe to turn it off.

Robbie started driving—very carefully—Hailei out on the UTV. She asked, *"Where are we going?"* Robbie replied, *"I want to get you a little better help."* She said, *"Well, you can go a little faster."*

It took them about 10 minutes to get to the ambulance. While on the UTV, Robbie gently told Hailei that once he got her to the ambulance he would need to go back to help at the crash site. However, at 1426,

¹¹ It is important to note that while they were waiting on the paramedics to arrive, everyone worked according to their medical background and training level to exhaust all efforts to get to Daniel and ensure that the scene was managed safely and securely.

once they made it out to the ambulance, FMO John told Robbie to stay with Hailei because there were enough people at the scene and he wanted Hailei to know that she was supported.

Robbie gave Hailei a few minutes to calm down. Hailei called her supervisor, Toby, the Helicopter Program Manager, at 1430. He didn't know the crash had happened and answered in a calm laidback voice, *"What's going on?"* Hailei explained that the helicopter went down. She reported that she was fine and Matthew was fine but that she wasn't sure about Daniel. She then handed the phone to Robbie. Toby asked Robbie about Daniel. Robbie informed that Daniel was still unconscious. Toby cancelled the scheduled post-burn recon for the Davy Crockett burn, had a conversation with his pilot, and both agreed to fly back to the Angelina airport. Toby then began to make his way to the hospital in Conroe.

EMS Arrives; Daniel is Deceased

At approximately this same time, Law Enforcement Officer Cynthia was calling out. She saw Kendall's truck. Cynthia walked in and could hear people but could not see anybody. She came back out to find a better way in. She didn't have fire gear but knew she had to get to the site. Cynthia heard on the radio that Robbie and Hailei were out. She went back in to help.

Cynthia reached Daniel and concluded that he was deceased and she began to secure the scene. The Richards Volunteer Fire Department Fire Chief, Court, was the first on scene. A 911 Emergency Medical Services EMT also arrived on scene at this time and began an assessment of Matthew.

A few minutes later, Medics from the Montgomery Fire Department Station #51 arrived at Drop Point F. These structural firefighters had been briefed on the hazards related to the crash site: an unstable helicopter, possible fuel on the ground, and ignition devices.¹² They got on their UTV and made their way to where they thought the dozer line leading to the crash site was located. At first, they drove past it, but quickly figured out where the site was and drove back.

At Drop Point F, Montgomery Fire Chief Rusty saw Robbie taking Hailei out on the UTV to meet the ambulance, which had just arrived at Drop Point F. Recognizing that Hailei was being taken care of, he drove past them and went in to the crash site to assess the other patients. Arriving at the crash site, he ties in with the Richards Fire Chief, Court. He reassessed Matthew and determined that he was ambulatory. While a cervical collar (C-collar) was necessary, Matthew didn't need to be placed on a back board. Meanwhile, another firefighter from the Montgomery Fire Department carefully worked his way to Daniel.

"I was mad because they cut my favorite pair of Nomex off me. I told them not to cut off my boots but to unlace them and tuck my socks in them!"

Hailei

Entire Prescribed Fire Burn Unit is Secure; Hailei is In Route to Hospital

Because the structure firefighters had originally driven past the dozer line leading to the crash site off the 211A Road, Alex decided to go back out and flag the route and began to direct people in and out of the crash site. Then he went to Drop Point F. Seeing all the resources there, he decided to take the engine and two of the jumpers to check the burn unit's western boundary. After checking all the control lines, Jon and Alex tied-in with John at the crash site to inform him that the entire burn was secure.

At 1457, John requested an off-District prescribed Fire Burn Boss Type Two (RXB2), Richard, to relieve him. However, John was told that it was going to take a while for Richard to respond.

At around 1507, Sam called Dispatch to say Hailei was in route to the hospital. Hailei recalls that Robbie rode in the front of the ambulance and it made her feel better to know that he was going with her. She also recalls that the Medic in the back of the ambulance also made her feel calm. She said, *"I was mad because they cut my favorite pair of Nomex off me. I told them not to cut off my boots but to unlace*

¹² Although the ignition spheres are inert until injected with the liquid compound via the PSD machine, the structural firefighters didn't know that and approached the unmarked bags of spheres with extreme caution.

them and tuck my socks in them! After all I went through, my concern at the time was that I didn't want to get stuck by a needle. The Medic said, 'You won't even know'—and I didn't. I was so impressed."

While on the way to the hospital, the Medic was answering Hailei's phone calls and responding to texts for her. One of these phone calls was from Hailei's dad. The Medic was able to reassure and calm him about Hailei's condition.

There were so many media helicopters that the responders working the accident site reported it was difficult to hear one another.

At this point, the mission was to hold the scene until the Justice of Peace arrived and to show Daniel respect at every step in the process.

News Media Helicopters Swarm Accident Site; Posts Crash Photo on Social Media

Within minutes, helicopters from the news media were flying overhead. A local level first responder from a cooperating agency took a picture of the crash site and posted it to social media. By 1514, the media was calling this a "fatality event."

There were so many media helicopters that the responders working the accident site reported it was difficult to hear one another. FMO John called Lufkin Dispatch and asked for a Temporary Flight Restriction (TFR). He was told it could be up to four hours before one would be put in place. At that point, the DPS helicopter that was part of the initial 911 response, was able to get the news media helicopters out of the area.

About ten minutes later, at roughly 1517, Matthew was also being transported in the second ambulance to the Conroe Regional Medical Center.

At 1533, Law Enforcement Officer Cynthia called Lufkin Dispatch to say that Daniel was deceased. At this point, the mission was to hold the scene until the Justice of Peace arrived and to show Daniel respect at every step in the process.

At approximately 1552, David assumed the role as Burn Boss (RXB2), which allowed FMO John to provide additional support to the helicopter crash incident.

Honoring Daniel with the Utmost Respect and Dignity

The Montgomery Fire Department stabilized the helicopter with lifts that they had carried in. (See Figure 3.) Based on their experiences, they had packed in quite a bit of stabilizing equipment. But because of the position of the helicopter, they only needed a few pieces of equipment to secure it.

While waiting for the Justice of the Peace to arrive, they decided that they would not remove Daniel until they were able to honor him with the utmost respect and dignity. A member of the Montgomery Fire Department requested an American flag be brought to the scene. At 1622, the Justice of the Peace confirmed that Daniel had expired.

The goal of the on-scene AAR was to care for each other, to make sure everyone was safe to drive back to the Ranger District office—or wherever they were headed—and to show appreciation for everyone's efforts.

Bob, the Angelina/Sabine Assistant Fire Management Officer (AFMO), recalls pulling up to the scene when everyone was waiting for Daniel to be brought out. He said, "*We got in line and Daniel was brought out wrapped in an American flag. It was something to see.*"

Bob went on to say, "*Everything was cold in regards to the fire. We walked into the site and it hit me once I saw the aircraft. It was surreal, seeing all that: the aircraft, the flight helmets lying around, and*

the flight helmet bags. Two of the helmet bags were sitting there and a phone started going off in one of the bags. It was Daniel's. We couldn't touch it or do anything. It didn't hit me for a few minutes."

Bob, Forest FMO James, FMO John, Burn Boss Richard, and several Law Enforcement Officers (LEO) exited the helicopter site and got back to the road. Within 15 minutes, the Federal Aviation Administration (FAA) showed up and the LEOs led them back to the site.

At 1756, those who were still on the scene conducted a brief After Action Review. The goal of this AAR was not to examine what went right or what went wrong. Instead, the goal was to care for each other, to make sure everyone was safe to drive back to the District Ranger's office—or wherever they were headed—and to show appreciation for everyone's efforts.

Immediate Follow-Up Activities

Between 2000 and 2100, everyone left the scene other than Law Enforcement. Kyle, Patrol Captain for the National Forests and Grasslands in Texas, identified additional Law Enforcement Officers who would secure both the accident site and the fuel truck at the airport overnight. The U.S. Forest Service employees arrived back at the Sam Houston National Forest office and lined out what else needed to happen that night. They did another "check-in" with the remaining employees. FMO John told them to *"drive home safely, stay off social media, and write down your notes from the event."*

The New Waverly Fire Department volunteered to take any fire or smoke-related calls for the Sam Houston National Forest that night. It was decided that AFMO Bob would get the necessary maps and be in charge of checking the burns that had been conducted over the last few days.

The Texas A&M Forest Service had contacted Forest FMO James at the Texas Interagency Coordination Center (TICC) within 30 minutes of the helicopter accident to say they would help out in any way they could. The following day, they sent personnel with a UTV, a Type 6 Engine with two personnel, and a dozer with an operator. While going out and checking the burns the next day was simple and routine, of course everyone had their minds on the accident.

Although they were fielding calls quickly and relaying information the best they could, it was difficult to stay ahead of social media.

AFMO Bob recalled thinking that they needed to be thoughtful about logistics: “I didn’t want someone else out there getting hurt and adding to the incident.”

D. The Off-Site Response

From the field, the Forest Supervisor’s Office, the District Ranger’s Office, and the Hospital

Forest FMO James called Forest Risk Management Specialist Evan, who was teaching the Annual Fire Refresher (RT-130) at the Supervisor’s Office, and told him to head south toward the District, knowing that he was closer to the scene than James was.

Once they heard about how many people were on scene and because they heard radio traffic about patients being transported from the helicopter crash to Conroe Regional Hospital, Evan made the decision to divert to the hospital to meet Hailei. James returned to Lufkin Dispatch to wait for more details. As they were driving, both James and Evan were getting multiple calls from multiple sources. James was also making the appropriate notification calls. Bob, the Angelina/Sabine Assistant Fire Management Officer (AFMO), texted the fire crews on his zone who were doing burn prep work and asked them to report back to the office.

Meanwhile, at the Sam Houston Ranger District, at about 1455, Susan was working at the front desk waiting on four different customers. She heard on the radio that the ship had gone down. George, a Program Manager who was working in the Ranger District office, came in, asked her to finish-up with the customers, and clear the office. They put up the closed sign and locked the door.

Susan and George were fielding calls from a variety of personnel on the Forest who were seeking information, as well as several calls from the media, and many concerned family members. They pulled out the emergency response call list and brought Safety Officer William up to the front desk to assist. Although they were fielding calls quickly and relaying information the best they could, it was difficult to stay ahead of social media. The Supervisor’s Office (SO) had to act quickly concerning communication issues because the Public Affairs Officer was off that day.¹³

AFMO Bob recalled thinking that they needed to be thoughtful about logistics. *“I didn’t want someone else out there getting hurt and adding to the incident,”* he said.

At 1514 Bob received a text from Justin, an Assistant Fire Management Officer on the Kisatchie National Forest, who asked what was going on. Bob replied that he couldn’t go into detail but they were dealing with something. He asked if folks were okay and Bob said, *“Two yes; one no.”* Justin then informed Bob that he saw the news and they were already reporting it as a fatality—even though it was still being reported by EMS to Dispatch as “Critical”.

Bob updated his fire crew on the Angelina/Sabine National Forests about what was happening and said that he would be going to the Sam Houston National Forest and wasn’t sure how long he would be there. He ensured that they had no—or minimal—fire activity on both compartments.

At the SO, Ethan, the Forest Supervisor was in a meeting and received a call from the NFGT, Fire and Timber, Staff Officer Lowell, who initially reported that there was a crash on the Davy Crockett. Ethan recalls that Lowell didn’t even have to explain what had happened because his experience told him *“there is only one thing that would make a voice that shaky.”*

¹³ They contacted Shannon, the Communication Director from the Regional Office, and the Mississippi National Forests Public Affairs Officer who arrived the following day.

Immediately, Ethan called Saul, the Acting Deputy Regional Forester, at the Regional Office and notified him of the accident. Saul offered a variety of resources, including a Peer Support Team, a Coordinated Response Protocol Team, a CARE Team to assist with benefits and services, and additional local resources. Most importantly, he offered his complete support.

Ethan recalls that strong leadership support from Diane, Staff Assistant for Fire and Aviation and Law Enforcement at the Washington Office, was extremely useful at that particular time. In fact, Ethan mentioned that he knew the appropriate steps to take during this incident was because Diane had helped him through a similar incident in the past. He said, *“If you ever have to go through something like this, you want Diane sitting on your shoulder.”*

Lowell and Ethan met up in Ethan’s office and made the difficult but important decision to stay at the SO because the Sam Houston National Forest was a two-hour drive away and crucial decisions would need to be made during that time. Not only would this have been a safety issue, several sections of that drive would be without cell service, which would have created an even worse communication void. They quickly identified Melody to be the Hospital Liaison for Hailei, and Josh as the Hospital Liaison for Matthew. They realized the main thing they needed to do was get the right personnel into place quickly. As they were taking these initial steps, Lowell and Ethan started working through the [Region 8 Unplanned Event Job Aid](#).

They sent Kent, the District Ranger from the Angelina/Sabine, to the Sam Houston to provide immediate support to the Sam Houston District Ranger. They also identified off-Forest support that they would need over the next few days—maybe even weeks—such as fire support, logistics staff, technical specialists, etc.¹⁴

Activities and Responsibilities at the Hospital

Because of the work that was immediately put into motion by the Supervisor’s Office and the District, both coworkers and pertinent OWCP case number information were waiting at the hospital when the ambulance arrived. As soon as Hailei arrived at the Emergency Room (ER), she saw her daughter through the windows of the ambulance doors hugging Robbie and was overcome with emotion and the gravity of the situation. Forest Risk Management Specialist Evan and Safety Officer William showed up shortly after Hailei arrived to check on Hailei and Matthew and help with paperwork. Hospital Liaisons Melody and James were en route.

When Melody arrived at the hospital, the media were everywhere. Reporters were beginning to set up cameras outside of the ER. Melody informed Evan and he worked with hospital security to have all media removed from the property. Melody transitioned into Hospital Liaison for Hailei and Evan shifted to the position of Family Liaison for Hailei’s family, who were arriving at the hospital. Working with the hospital staff, a private waiting area was established for Hailei’s family and coworkers away from the ER waiting room because it was filling up with members of the public. Melody was able to focus on Hailei’s case with the hospital staff, while Evan took care of Matthew and Hailei’s family.

¹⁴ They identified Della, Forest FMO from Florida, to come down and support John and James because she had previously worked on the National Forests in Texas, she knew most of the employees and knew her way around. Diane originally ordered the U.S. Forest Service Honor Guard, but Della coordinated with the Forest and the Family Liaison from Region 5. Della also identified a new location for the detailers, helped organize getting the aircraft out of the woods, and cleaning up the crash site. In addition, she provided information for the “talking points” for the daily conference calls and email updates for the employees, and organized peoples’ time so that they could focus on interviews and peer support. Della recalls how difficult it was to secure the correct paperwork to show documentation about the [Line of Duty Death](#). (For additional information about these benefits, [click here](#).) Fin, the Catahoula District Ranger, came over from the Kisatchie National Forest to support the Forest Supervisor at the SO. He drove Ethan, the Forest Supervisor, where he needed to go so Ethan could make and answer phone calls and text messages. And he helped advise Ethan on “Leader’s Intent” for the incident and helped with the fuel spill at the crash site. Rick, the District Ranger from the LBJ and Caddo Grasslands, went down to provide long-term support on the Sam Houston as a Line Officer for the incident.

During the next few hours, Melody and Evan both checked-in with Matthew and Hailei. Due to the number of people wanting to speak with Matthew and Hailei, Melody and Evan ran interference to limit the number of visitors and allow them rest. As soon as Toby, Hailei's direct supervisor, the Helicopter Program Manager, arrived, Melody immediately escorted him to Hailei's room. Surprisingly, Hailei was released within three hours of arriving at the hospital. Evan continued to stay with Matthew until James arrived late that night.

Acting District Ranger Changes Departure Plans—Stays to Help

Melissa, who was previously the acting District Ranger for the Sam Houston, had packed up her car and was ready to head home from the District Office, where she had been detailed for approximately six months. However, once she heard what was happening, she knew that she needed to stay.

Melissa printed out the Unplanned Event Job Aid and began to go through it. Although most of the decisions generated from the guide were being made at the Supervisor's Office, she wanted to be ready to act. She quickly received the information that Hailei and Matthew the pilot were okay, but that Daniel was not.

She received a call from the Forest Supervisor, Ethan, asking her to find out who was taking pictures on the scene and to get them to stop. She also got a list of people in the field and made sure they all got back. The first wave of people started arriving back around 1730. Most everyone had made it back by 1830. Ethan stressed to Melissa to be sure not to let anyone drive who seemed exhausted or emotionally compromised. George stayed at the office for the rest of the night until around 2330 to make sure someone was at the office in case anything else came up that night.¹⁵

From a communications standpoint, the main priority was to notify Daniel's family in California before they found out about the accident on social media. Once this communication priority was achieved, Ethan began thinking about the longer-term needs of the Forest.

The next day, Thursday, an all-employee conference call was held on the Sam Houston. This call was intended to help the employees understand what happened, the condition of those involved, and what would transpire over the next several days. Ethan also sent out email updates about the ongoing investigation process and the memorial service, which he would continue to do throughout the next few weeks.

Living a Sand Table Exercise

On April 13, two weeks after the helicopter tragedy, several tornados hit the Davy Crockett District of the National Forests and Grasslands in Texas. Then, just 11 days later, another tornado hit the Forest's Sabine District.

Lowell, the NFGT, Fire and Timber, Staff Officer recalled: *"It's like we were living a sand table exercise."*

¹⁵ Ethan decided to send Kent, the District Ranger on the Angelina-Sabine, to support Melissa at the Ranger District office and ordered up Rick, a District Ranger on the Caddo/LBJ Grasslands, who arrived the next morning and stayed for the long term.

5. Lessons Learned BY the Participants

Accidents often reveal opportunities to change, adapt, or modify existing practices: “lessons learned by the participants.” Accidents can also shed light on the practices that contributed to positive outcomes that are also worth sharing: “lessons shared from the participants.” We offer both here in this FLA. First, the “lessons learned by the participants”.

A. Don't wait until the unplanned event to become familiar with the “Unplanned Event Job Aid”.

The [Unplanned Event Job Aid](#) is a Region 8 document that is intended to help us prepare for and appropriately respond to unplanned events. It supports the agency's priority: the physical and mental wellbeing of our employees. This job aid includes information on timelines, contacts, and task lists. It serves as a guide to help those affected by an event, particularly Line Officers, to ensure that they are covering all the bases.

In this helicopter incident, the job aid was used by personnel at the SO, Lufkin Dispatch, and the District Office to ensure that all the proper steps were being taken. While participants used the aid successfully during this process, they also suggested that it be tailored to local needs by adding phone numbers and other local contact information. If the job aid itself is not tailored for local needs, a list of your emergency contacts should accompany it for quick reference.

B. Know when to use a driver.

During this incident, several people had to make careful decisions about if and how to travel the distance to the Sam Houston. For example, Ethan, the Forest Supervisor made the difficult decision to stay at the SO instead of traveling to the Sam Houston because he would have been on the road for the first two hours after the accident occurred. This would have meant that he would have been limited in his ability to communicate critical decisions.

Forest Risk Management Specialist Evan responded to the incident without a driver and found it very difficult to drive, negotiate traffic, listen to the radio, keep a unit log, and answer his phone. Forest FMO James said that it was advantageous that he and Assistant Fire Management Officer Bob were already traveling together so that he could make necessary calls. However, he also shared that he personally learned in the future he would always get a driver for that purpose.

C. We need to help our partners help us.

The Montgomery Fire Department suggested that our Incident Commanders for Incidents Within Incidents wear something that designates them as the IC. It will require further discussions about how this will happen, but it is worth the effort to make this small change that might have a big impact.

***“We need more localized CISM/Peer Support Teams
for quicker response.”***

Ethan, the NFGT Forest Supervisor

D. Peer support needs to expand in the Region.

Although the peer support that aided the Forest was well done, it took a while to get in place. One peer supporter was local and arrived at the District the following day (Thursday) and was able to make contact with many of the employees involved. The rest of the Peer Support Team traveled from out of Region and arrived over the weekend. Most of the District employees were given the weekend off. Therefore, it was Monday before they were available to meet with the Peer Support Team.

E. A Temporary Flight Restriction (TFR) may take a while to get in place.

Media learned of the Incident Within an Incident minutes after the crash and began requesting information from the Forest. Due to the proximity to Houston, several media helicopters were over the site during the response. The Burn Boss requested a TFR through Lufkin Dispatch, but it took several hours for the TFR to get in place. The lesson here is to get the TFR in place as soon as possible.

6. Lessons Shared FROM the Participants

***“Key players being in place made the response successful.
The fact that they caught the fire, blew my mind.”***

Richard, Heavy Equipment Operator and the Off-District Burn Boss

1. Training

A. Never underestimate the importance of training and cross-training.

On this incident, multiple personnel were qualified as Equipment Operator, which facilitated the moving of the dozer, and as Type 2 Burn Boss, which enabled that role to be handed off. The FMO, John, was qualified as a Dozer Operator. This meant that he was able to move the dozer in a timely manner, which prevented fire from reaching the crash site.

The Sam Houston FMO made a concerted effort to get his employees cross-trained. Training and cross-training provides the opportunity to develop skill-sets and allows personnel to become more familiar with the other positions on the prescribed fire. This helps the employees understand the complexity that exists during an assignment and enables a smoother transition into a different role if another person is rendered unable or needed elsewhere.

“It was one of the calmest operations that I’ve seen.”

Todd, Montgomery County, Emergency Services District, #2 Captain

B. Train and retrain for the fundamentals.

At key points during this incident, fundamental firefighting tactics were responsible for a successful response. For example, Hailei gave Matthew the fire extinguisher from the aircraft. As she did so, she thought about something she learned in her early training: *“The fire extinguisher on board the aircraft is for people, not the aircraft.”*

Personnel also maintained a calm and task-oriented demeanor during the emergency response. They focused on finding the crash site, assisting the occupants, protecting the aircraft, and coordinating with local responders. For example, Brody and Jack acted quickly to put a handline around the helicopter. Sam seamlessly transitioned to the Incident Commander for this Incident Within an Incident, and Brody carefully checked the fireline as he moved toward the accident site.

C. Expand training and planning discussions to informal settings.

Throughout the day of the event, Hailei had multiple conversations with Matthew about safety issues, including: where to store the fire shelters; if there were any wind concerns; how they were doing on fuel. She said that one thing you can expect from her is that she will talk about safety beyond what is discussed in the briefing. In other words, it’s not enough to talk about safety in formal briefings. Integrating these topics into casual, interpersonal conversations, both builds trust and gets people on the same page about what they might do in the case of an event.

For example, it's a good idea to have a clear conversation about the location of on board fire shelters. We know that fire shelters for each occupant must be carried in the aircraft and be accessible during flight missions that occur over active fires. Matthew and Hailei had a specific conversation about where the fire shelters should be located for them to be accessible. In the case of an accident, they knew that if the shelters were located in the cargo compartment they would have been inaccessible. They also discussed having them underneath the occupant's seats. But Matthew explained that would prevent the seat from being able to "give" as designed in case of an accident.

Knowing that they needed to be properly secured and could not be loose in the cabin, they opted to secure the shelters under the bench seat in the back of the helicopter. With as much thought as they put into proper placement, they were still unable to locate the shelters after the accident.

This is a complex issue. Although there isn't a clear answer that would ensure access to the shelters in every situation, having a conversation about them—and knowing where and how they will be stored—is an important safety discussion to have. To give yourself the best chance of finding your fire shelters, communicate their location to everyone on board ahead of time.

2. Planning

A. Incident Within an Incident (IWI) planning is crucial.

During every prescribed fire briefing, resources are instructed on what actions to take if the helicopter goes down during the operation. An Incident Commander is identified who will take over the IWI if one occurs. This portion of the briefing also describes the actions that all resources will take to support efforts to locate the ship and assist the survivors, among other activities.

B. Pre-incident communication with partners is critical.

The cooperation and trust between all the participating agencies made for a nearly seamless response to this incident. Having these relationships and trust levels in place BEFORE the major incident occurred was especially important to ensure operations went smoothly.

Pre-incident planning can include items such as sharing frequencies and communication plans with local resources, ensuring compatibility, becoming familiar with cooperators' equipment, etc. For example, as part of their annual pre-season planning, members of the National Forests and Grasslands in Texas (NFGT) visits the Montgomery County Fire Department and other local Fire Departments and 9-1-1 Dispatch Centers to share prescribed fire information (locations, maps, etc.). They also send emails directly prior to the prescribed fire that includes the location of the burn, when it will happen, the size of the burn, how it will be ignited and downloadable Avenza maps.

This has also proven to be an opportunity to inform local resources about specific firing techniques that may not be common to everyone. For example, in this incident, members of the Montgomery Fire Department reported they did not know if the PSD balls were dangerous because the bags aren't marked. During pre-season planning this type of information can be cleared up.

C. Long-term relationship building is crucial to build trust and enable clear communication.

NFGT has done a considerable amount of work with local, state, and federal partners to build a robust wildland fire program. The NFGT is invited to attend the state hosted academies as both instructors and students. The county and city departments are invited to participate in the Texas Intrastate Fire and Mutual Aid System (TIFMAS).

Additionally, for this particular accident, strong relationships with local Fire Departments and EMS personnel as well as the proximity of wildland-urban interface communities to the District, the Fire & EMS, ensured a quick interagency response.

Immediately after this accident, several cooperating agencies (Texas A&M Forest Service, local Fire Departments, Texas Parks and Wildlife, etc.) offered to assist with management/coordination of

daily tasks such as suppression of wildfires. This allowed the District to focus on the employees. This type of support is a result of building relationships before incidents occur.

“My biggest concern with all of this is with my employees and helping them get through this.”

Ethan, NFGT Forest Supervisor

3. Response

A. The administrative response is both “in-the-moment” and “forward thinking.”

After initial reports of the helicopter crash, the administrative response began. The Supervisor’s Office worked to notify the Regional Office, coordinated the incoming resources, sent hospital Liaisons, and ordered additional support such as a CISM/Peer Support, a Public Affairs Officer, and the U.S. Forest Service Honor Guard.

Administrative staff at the District Ranger’s office immediately began working on the worker’s compensation paperwork to streamline the medical authorization process.

The Honor Guard arrived the day after the accident and assisted the Forest with planning and coordination of the procession. The procession included several cooperators and required a great deal of coordination with federal, state, and city agencies. The Honor Guard played an instrumental role in making the process go smoothly.

B. Protecting the “scene” may include locations BEYOND the scene itself.

The U.S. Forest Service and local law enforcement agencies secured the scene from the public and media throughout the incident. Based on lessons learned from a previous incident, law enforcement also knew to secure the fuel truck at the airport to be able to test for fuel contamination.

C. Documenting the event (safely and wisely) is extremely important.

From the on-scene personnel to the administrative and supervisory staff, documentation of this incident was excellent. The personnel on-scene kept detailed unit logs and this helped organize thoughts and events of the day, which has allowed for a more accurate understanding of the event, as well as better learning opportunities.

The IC (IWI) directed each person to write notes as soon as possible when they got home, and to avoid posting information onto social media, which was helpful for both individual sensemaking purposes, and for preparing for the investigations and learning analyses that would follow.

Partners and responding agencies may not be as aware of the sensitivity of the incident. Incoming resources should be briefed on the incident and the proper release of information. It is important to note that phones/cameras may be initially detained.

“We had lots of information the days following the incident and that was positive.”

Rachel, Lufkin Dispatch

D. Incident information sharing is critical throughout the entire incident.

Following the incident, the Forest held daily informational calls and sent daily emails to brief Forest and Regional Office employees. Although some of the information that was presented in these daily briefings was already known to those directly involved, employees who were not directly involved or who were on neighboring Forests appreciated this information. Those who were directly involved appreciated not having to relay that information to everyone who wanted to know.

“They didn’t have to tell me where to find things.”

Della, Forest FMO from Florida

Della provided support to this incident response. Because she had previously worked on the NFTG, she knew most of the employees and knew her way around.

E. Know your employee “Alumni” list.

The National Forests and Grasslands in Texas is fortunate to have several tenured/experienced individuals who have experience with serious IWI situations who were available and nearby (refer to footnote #14 on page 22 for details). Being able to bring in people who already have an understanding of the area and the people is extremely valuable.

7. Conclusions

4 Crashes

16 Years

8 Lives Lost

The helicopter crash on March 27 that claimed Daniel Laird’s life has opened up old wounds from previous helicopter crashes, including: the 2003 space shuttle support crash (two fatalities, Charles Krenek and Buzz Miller); the 2005 Sabine National Forest crash (three fatalities, Jon Greeno, Charles Edger, and Jack Gonzalez); and the 2015 De Soto National Forest crash (two fatalities, Steve Cobb and Brandon Ricks).

There have also been numerous helicopter near-misses that have left a lasting impression on those involved. Some qualified personnel on the National Forests and Grasslands in Texas no longer want to be included in helicopter operations. These realizations have left employees asking large-scale questions about the nature of their work.

Five Additional “Big Picture” Concerns Shared By the Participants

1. Prescribed fire is an important tool, but is it enough?

The abundance of rain and warm temperatures lead to longer growing seasons for forest ecosystems in the southern area. This rapid growth of understory vegetation coupled with overstocked, unmanaged forests creates conditions in which the forest becomes unhealthy and susceptible to insects, disease and wildfire.

Prescribed fire is a very useful tool to keep the understory under control and benefits Threatened and Endangered Species (such as the red-cockaded woodpecker) as well as reducing the potential for damaging wildfires.

The number of acres which need to be treated with prescribed fire is far greater than the agency’s capacity. To be most effective, prescribed fire should be used in conjunction with other management tools, such as chemical and mechanical fuel reduction.

With the ever-increasing encroachment of the urban-interface into our forests, the risk of prescribed burning (escape, smoke, etc.) are also increasing, which leads to prescribed fire not being an option in more and more locations. We have to look at other tools as an option. This needs to be a larger issue supported by the Regional and National offices.

In 2011, there were 25 “Red Carded”—moderate and arduous qualified—personnel on the Sam Houston National Forest. In 2019 there were only 17.

2. UTVs might not be the right tool for everything, but they are the right tool for some things.

Since 2005, the use of UTVs in Region 8 has been prohibited as a ground ignition platform. Before this prohibition, UTVs were not typically used on the Sam Houston National Forest for burning within the interior of a unit due to the thick nature of the vegetation (yaupon and sweetgum midstory).

However, Forest employees reported that UTVs could be used to more quickly establish the baseline and fire perimeter than by using handheld torches alone. The utilization of UTVs would also allow for a more efficient use of the limited “Red Carded” personnel and lessen the Forest’s dependence on detailers. This would also allow the burn unit to be ready for aerial ignition by the helicopter earlier in the day, allowing more time for smoke dispersal and, subsequently, less smoke management issues.

The use of UTVs combined with aerial ignition could also reduce the amount of time the helicopter would need to fly “low and slow” over the burn. At low altitudes the pilot has very little reaction time if something happens—especially over a canopy forest. Plastic spheres by their nature, are impacted by ambient winds and can be blown off course. The higher the altitude the spheres are released from the Plastic Sphere Dispenser, the greater the influence the prevailing winds will have on their flight path. Consequently, aerial ignition operations are often performed at low altitudes (120 feet) to ensure accurate placement of the spheres within the burn perimeter. UTV use along the perimeter may allow for higher flight altitudes, which would reduce risk.

The employees’ perceptions seem to be in line with the direction the U.S. Forest Service is currently taking. At the time of this FLA, the UTV program was still being discussed but was approved in August, 2019.

3. Participants look forward to a robust Unmanned Aerial System (UAS) program.¹⁶

Many of the participants interviewed strongly believe aerial ignition via unmanned aerial systems should continue to be explored in the region. Employees also recognize the limitations of the current UAS technology for the application of prescribed fire. Payload limitations (approximately 100 pounds) limit their use to relatively small burning units unless multiple UAS’s are employed sequentially.¹⁷ In addition, current policy restricts UAS use to line-of-sight operations. However, some state agencies use GPS programmable UAS’s to conduct smaller prescribed burns. The Caddo/LBJ Grasslands unit on the National Forests and Grasslands in Texas may present a unique opportunity for the Forest Service to test a GPS programmable UAS for a small prescribed burn while still maintaining line-of-site on the UAS. Efforts are underway to fully integrate the UAS program and this FLA can serve as support for those continued efforts.

4. “Do you know how freaking far a helicopter can go in two minutes?” (The Use of Tracking Devices)

Several employees working with helicopter operations chose to use GPS trackers and hand-held receivers to monitor and record the helicopter’s flight path. The GPS tracker is typically placed in the helicopter and monitored by two hand-held receivers with the ground crew.

¹⁶ The Interagency Unmanned Aircraft Systems (UAS) Program is providing a series of training in 2019/2020. A-450 is the first phase of training for those desiring the qualification to operate (federally approved) agency UAS. Details for this training can be [found here](#).

¹⁷ For images of what the Plastic Sphere Dispenser Operator (PLDO) machine looks like mounted on a UAS, see the document [linked here](#).

It is highly likely that the outcome of this helicopter crash on the Sam Houston National Forest, as tragic as it was, would have been much worse had it not been for the use of the GPS tracker and receivers. There is no doubt that the use of the tracker led to the timely discovery of the crash site, enabling the responders to quickly locate the crash, and protect the helicopter and its occupants from fire. The trackers are a relatively inexpensive and extremely rugged method of providing “real-time” tracking.¹⁸

5. How can we improve the OWCP process?

There were many challenges related to the Forest Service’s Occupational Worker’s Compensation Program (OWCP) that surfaced post-incident. However, this incident is not alone in that way. It is difficult to share the specific lessons because of the sensitive nature of the information, but the concerns are being taken up by the U.S. Forest Service’s Risk Management Council to help identify employee solutions to the problem.

It is important to recognize that when employees are injured, the nature of the system requires that they have to deal with both OWCP and their physical or emotional injury at the same time, leading to stress, loss of information, and ultimately no individual employee oversight into quality assurance over their claim.

Liaison positions, mentorship opportunities, expanded employee and supervisor OWCP training could lead to an improved understanding of the process, and may be needed to ultimately identify the myriad of problems.

¹⁸ Improvements have been made to flight tracking in Region 8, which will decrease dependence on commercially available GPS tracking units. However, if there are places where flight tracking still involves a lag, this could be an important lesson shared.

8. Appendices

A. The Facilitated Learning Analysis Team

Carl Petrick

Forest Supervisor, National Forests in Mississippi
U.S. Forest Service

Danny Bryant

Staff Officer: Fire, Lands and Minerals, Kisatchie National Forest
U.S. Forest Service

James Matthews

Timber Assistant Resource Specialist/Region 8 Emergency Management Services (EMS) Coordinator
U.S. Forest Service

Jared Karns

Chief Response Training Coordinator
Texas A&M Forest Service

Rebekah Fox

Associate Professor, Communication Studies Department
Texas State University

B. Acknowledgements

The members of the FLA Team would like to thank the National Forests and Grasslands in Texas for their extensive work in preparing for our arrival. Their efforts enabled us to interview a wide variety of employees in a short amount of time. It was remarkable.

In addition, our interviewees graciously gave their time to us. We truly appreciate their openness and helpfulness. It is evident that this Forest is dedicated to learning and wants to contribute to an evolving safety culture.

C. Timeline for Wednesday, March 27

Other events occurring on the National Forests and Grasslands in Texas on this day:

- RT-130 Annual Fire Refresher at the Supervisor's Office
- Compartment 37 Prescribed Fire on the Davy Crockett National Forest
- Upland Island Wilderness prescribed burn being scouted on Angelina National Forest for burning the next day

0600 Day begins

0700 "Horse trading" between the two Forests (prioritizing resources and prescriptions). Resources included: people, dozers, transports, UTVs, Hotshots, jumpers, etc.

0730 Daniel bench tested the Plastic Sphere Dispenser Operator (PLDO) machine. (This process involves testing the machine on a bench, not in the helicopter, to make sure the machine is working properly, injecting the correct amount of glycol for the correct delay in ignition, checking the pump pressure, etc.)¹⁹

0900 Overall briefing occurs on which Compartments will be implemented (also prescribed fire on Davy Crockett NF)

0945 Compartment breakouts (Comp 50/51 and Comp 9)

1000 Hailei and Daniel arrive at Huntsville Airport (Helibase)

1036 RX (Prescribed Fire) 50/51 test fire

1039 PSD machine loaded and ready in Helicopter

1108 RX 9 test fire

1117 Baseline fully lit on west side of Compartment 9

1145 RX 50/51 requests Helicopter

1150 Helicopter en route to Comp 50/51

1321 Aerial Ignition complete on RX 50/51, Helicopter en route to Comp 9

1328 Helicopter committed to RX 9

1340 Aerial Ignition on West Side RX 9

1355 Helicopter radioed in "Ops Normal"

1404 Comment made over radio: "Don't burn up Robbie's hauling unit" (referring to when Robbie joked with Hailei about not dropping PSD balls on his transport)

1408 Mayday "we're going d...
"thud" is heard

1410 Sam takes snapshot of GPS tracking device coordinates and sends to FMO John
John calls 911

1412 Hailei calls John from Matthew's phone

1414 John notifies Lufkin Dispatch that Fire/EMS en route

1416 Hailei uses personal phone to call boyfriend
Hailei calls Robbie
John notifies Lufkin Dispatch that he talked to Hailei by phone

1420 Lowell notified

1421 James calls Lufkin Dispatch to confirm which helicopter went down

1422 Ethan, NFGT Forest Supervisor notified

1426 John calls Dispatch that Helicopter was found 5 minutes prior and that they are going in with the dozer

1429 RO notified

¹⁹ For a video on bench testing the PSD machine and a further explanation of its use, [click here](#).

- 1430 First media report of crash (with fatality) via phone alert
Closed Sam Houston front office from visitors
- 1440 Texas Department of Public Safety (DPS) and media helicopter on scene
- 1507 Matthew transported from Helicopter site to Forest Service Road 211-A
- 1517 Matthew loaded in 2nd ambulance and departs to Huntsville Hospital
- 1524 Justice of the Peace en route to accident
- 1526 Susan, Front Desk employee on Sam Houston NF, acquired ASC Case #
- 1532 SO gives RO name of Daniel Laird
- 1552 David transitions as RXB2 from John on Comp 9
- 1608 Justice of the Peace enters site of accident
- 1622 Justice of the Peace orders autopsy
- 1630 USFS LEO clears ground media from scene
- 1654 Richard transitions to RXB2 from David
- 1710 Forensics/funeral vehicle arrives at Drop Point F
- 1737 Hailei's Hospital Liaison arrives at hospital
- 1740 Daniel transported via UTV to Drop Point F draped by U.S. Flag
- 1755 Daniel loaded in the forensics vehicle and in route to Montgomery County Forensics Center
- 1756 AAR on site: informed individuals to take notes and stay off social media
- 1849 Hailei is discharged
- 1900 FAA arrives at staging area
- 1922 FAA led into accident site
- 1930 RO call with Ethan and Lowell

- National Transportation Safety Board (NTSB) arrives in the morning the next day
