



Est. 2002

## Wildland Fire Lessons Learned Center



## 2019 Incident Review Summary

*“No one ever made a decision because of a number. They need a story.”*

**Daniel Kahneman**

Psychologist and professor known for his work on the psychology of judgment and decision-making.

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### 1. Introduction

The information in this report comes from wildland fire incidents—from various agencies—submitted to and gathered by the Wildland Fire Lessons Learned Center (LLC) in 2019. The primary source of data is accident reports (FLA, RLS, SAI, etc.). Most of these reports have been posted to the LCC’s Incident Reviews Database. SAFENETs and other data sources have been included when no actual report could be located.

This year we collected information on 95 incidents. We have combed through these reports and extracted specific lessons and compiled a few numbers. Use this information to inform your future operations. Turn these lessons into learning.



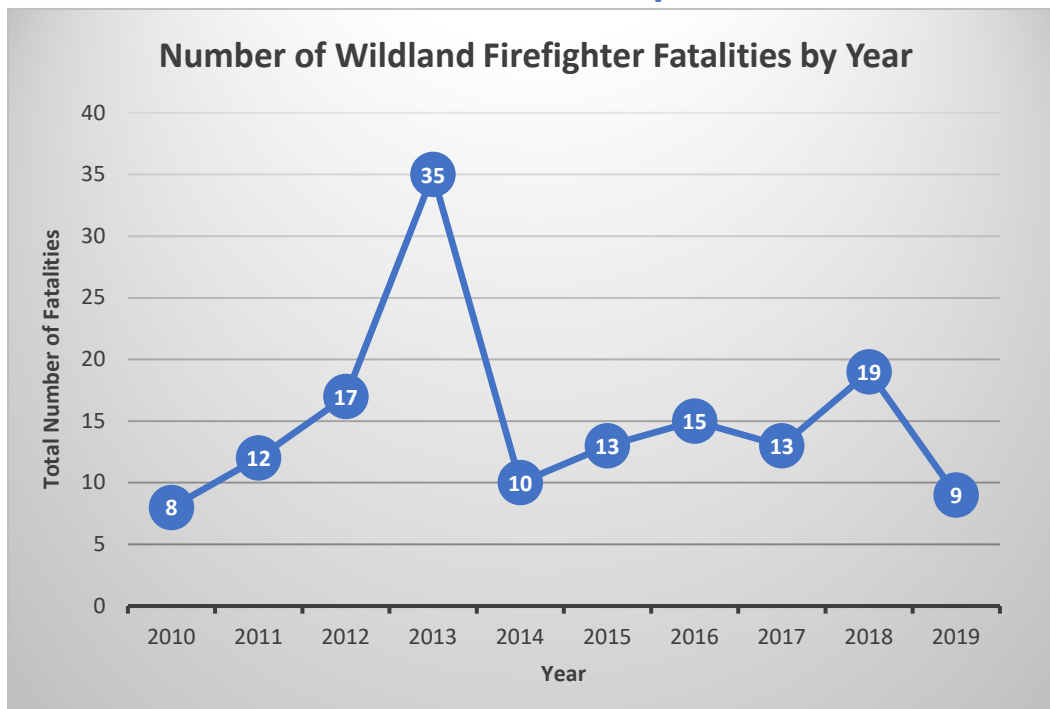
**Throughout this report, this Action Icon identifies training curriculum related to the topic. If you are an instructor, you will need to look at each exercise ahead of time to pull up videos or to print reading material.**

## 2. Fatalities

In 2019 there were **nine** wildland fire-related fatalities reported, ten fewer than 2018. There were no multiple-fatality events.

<a href="#"><u>Fort Jackson Prescribed Fire Fatality</u></a>	Occurred on a prescribed fire during ATV firing operations.
<a href="#"><u>Spring Coulee Fire Entrapment Fatality</u></a>	Entrapment, severe burn injuries. Occurred during initial attack Type 6 Engine operations.
<a href="#"><u>Sam Houston NF Prescribed Fire Helicopter Fatality</u></a>	Helicopter crash. Occurred on a prescribed fire during helicopter firing operations.
<a href="#"><u>Doster Incident Fatality</u></a>	Hit by log. Occurred during vegetation removal project when a log rolled down, striking victim.
<a href="#"><u>Sun Country FD Fatality</u></a>	Medical emergency. Occurred at the station one day after a wildfire response.
<a href="#"><u>Northeast Lakeside FD Fatality</u></a>	Heart attack. Occurred while responding to a wildfire.
<a href="#"><u>Argyle VFD Response Fatality</u></a>	Medical emergency. Occurred during a response to a wildfire.
<a href="#"><u>CalFire Training Hike Fatality (De Luz Incident)</u></a>	Medical emergency. Occurred during a physical training hike.
<a href="#"><u>Equality VFD Tender Rollover Fatality</u></a>	Vehicle accident. Water Tender rollover. Occurred during response to a wildfire.

### Ten-Year Graph



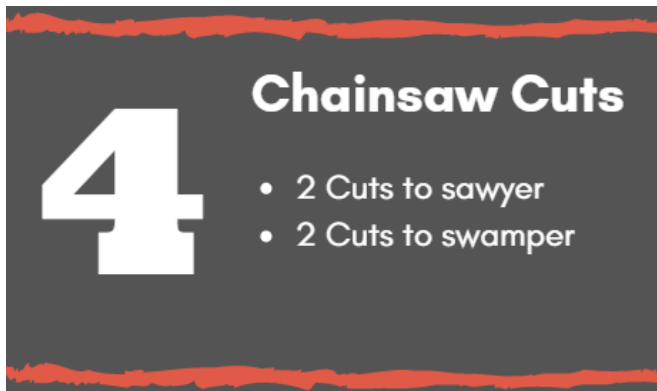
*“The chainsaw contacted the chaps and pulled the chaps away, exposing the Firefighter’s calf.”*

[Kootenai NF Chainsaw Cut](#)

### 3. Stop the Bleed

Chainsaw cuts. They happen. At least 4 times in 2019. In addition to the four flesh cuts, there were 2 SAFENETS about cut chaps ([Project Work, Mosquito Lakes](#)). In 2018 we had 6 chainsaw cuts. So, it does happen—probably always will if we run saws. So what?

Some folks are prepared.



**4 Chainsaw Cuts**

- 2 Cuts to sawyer
- 2 Cuts to swamper

Engine 641 personnel had also undergone a **locally developed** “Stop the Bleed” training in the spring of 2019 and had been extensively trained in tourniquet use and placement, as well as Israeli Bandage use and placement.

[Prescribed Fire Chainsaw Cut](#)



Firefighter B (who is medically trained through the Army National Guard) remembered that he had a personal tourniquet in his line gear and ran to the truck and grabbed it. At 1000, two minutes after the incident happened, the tourniquet was applied, and gauze and triangle bandages were applied to the wound.

[South Dakota Fire Chainsaw Cut](#)

The saw came off the cut and into the left outside of Sawyer #4’s saw chaps. The spinning chain rolled the chaps up and then quickly sliced into his left leg above the calf before it finally stopped.

[Beeskov Fire Chainsaw Cut](#)



#### Discussion Time:

Are you ready to manage a major bleed on the fireline?

Make a Decision

Read this blog post to help you decide: [Tourniquet Anyone?](#)

## 4. Horizontal Hazards

Just because a tree is on the ground doesn't mean the threat is gone. The only fatal tree incident in 2019 occurred during a bucking and limbing operation.

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## Hit by Tree Incidents

- 6 Struck by fire-weakened trees
- 2 During limbing/bucking
- 2 During felling operations
- 3 Tree/log dislodged above them
- 1 Branch broke during rope/pulley ops



During the project, a large log released from its position upslope of the county road. As the log rolled downhill onto the road, it struck a Calaveras County employee and CAL FIRE handcrew member. The handcrew member suffered minor injuries while the county employee suffered **fatal** traumatic injuries.

[Doster Incident Fatality](#)

He hears a "WHOOOSH", then sees a 10-inch diameter tree coming from the rocks above, striking the EMT and CAPT on the head. The two fall backwards facedown into the water. The momentum of the helicopter's fly-by may have dislodged the downed tree from the slope above.

[Engine Incident Within an Incident](#)

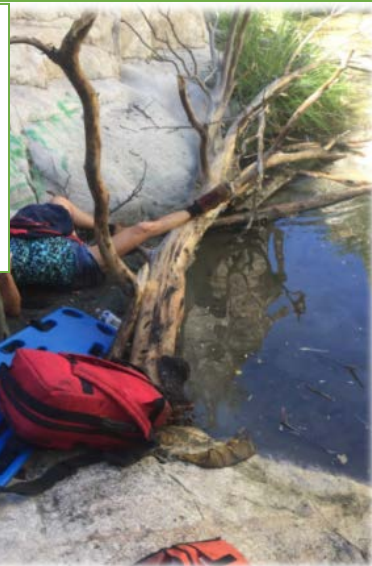


Fig 3. Actual tree that struck the firefighters

Location of wishboned Firs where tree originally settled

Distance tree traveled upward and westward toward cutter; approximately 6-8'



As he began cutting down through the top of the log, he got about two inches down through the remaining top tension wood when the log violently exploded with an audible "pop" springing into the air and back toward the sawyer. This instantly moved the log approximately 6-8 feet both laterally and vertically, breaking an internal mass of wood that was roughly the size of a 6" X 8" Douglas-fir construction beam.

[Western Oregon Bucking Incident](#)



### Discussion Time:

When you see trees on the ground – do you see the danger?

How can you improve your risk assessment?

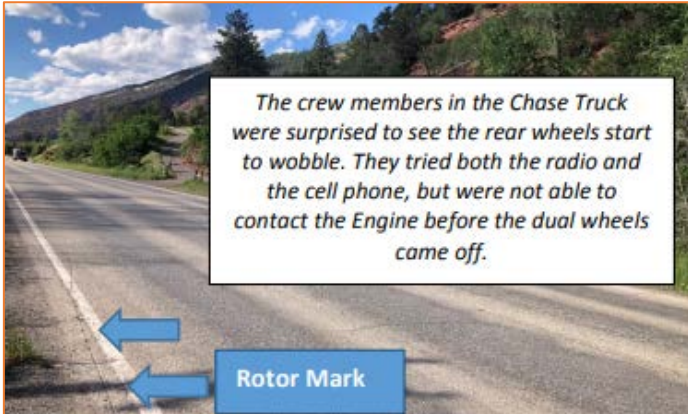
## 5. Wheels Up

Look out for drifters (into your lane).  
Keep the lug nuts tight.  
Use a backer.

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### Vehicle Accidents

- 5 Rollovers
- 3 Collisions
- 2 Backing
- 2 Sliding off road
- 2 Loose Lugnuts
- 1 Tree through window



*The crew members in the Chase Truck were surprised to see the rear wheels start to wobble. They tried both the radio and the cell phone, but were not able to contact the Engine before the dual wheels came off.*

Loose lug nut indicators will be installed on some Engines to evaluate their usefulness. For more information, watch the video found here: <https://youtu.be/sfgf ps4ouGU>.



Rotor resting on pavement. Notice bent studs on the left.

Torque specifications will be posted on vehicle dashboards.

### Rocky Mountain Region Engine Lug Nut Incidents



#### **Discussion Time:**

- Lug Nuts
- Backers
- Drifters

**What are the lessons and how do you put them into action?**

They thought they had avoided the oncoming sedan. Then they felt a jarring impact to the buggy. Then they felt the skid, and they started to roll. Just the week before they had gone through extensive medical training. It included every kind of field medical scenario you can imagine, from tree strikes to burnovers to vehicle crashes. Universally, the crew credited their training with their successful response to the emergency. The medical training they had taken on was critical.

### IHC Buggy Rollover



The crew decided to back up ~50 feet to flag the intersection. The crew relied on mirrors and a backup camera and did not use a spotter. While backing up, the driver was following the contour of road using his passenger side mirror, unaware of the sharp turn and steep slope on the passenger side. This resulted in the engine backing off the road near the intersection.

### Montana Engine Backing Incident

## 6. Entrapments

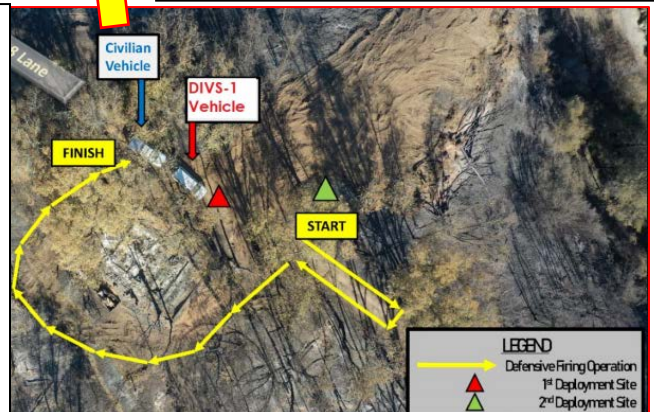


While Engineer 1 tried to disengage the pump, FC1 observed heavy fire conditions engulfing the fire engine on all sides. At that time, FC1 recalled a fire engine survivability study reporting the window mechanisms failing due to heat, resulting in the windows lowering. FC1 re-located to the rear driver's side jump seat and deployed a fire shelter in preparation of the window mechanism's failing. Engineer 1 continued attempts, however the transfer case would not engage.

"If frequent equipment issues (such as overheating) are experienced during suppression operations, they should be addressed appropriately. Cooling the engine temperature by continually stopping and starting operations is not adequate."



DIVS1 turned around and began to drive out of the area. Approximately 200 yards east of the cabin, egress was cut off by fire burning downslope across the road. As DIVS1 began to back up, fire crossed the road behind DIVS1's vehicle. At approximately 4:14 p.m., as DIVS1 completed the firing operation, a pick-up truck with two civilians arrived at DIVS1's location. DIVS1 informed them that their way out was cut off. At approximately 4:16 p.m., DIVS1 deployed the fire shelter on the road in front of the two vehicles and directed the civilians into the shelter. For approximately ten minutes, all three of them remained covered by the fire shelter.



# 7 Entrapments

- 3 During Engine Ops
- 2 While Scouting
- 1 During Dozer Ops
- 1 During Firing Ops

6 During initial attack  
1 During extended attack



- [Spring Coulee](#)
- [Country Fire Engine Burnover](#)
- [Corta Fire Engine Burnover](#)
- [Thorne Fire Burn Injuries](#)
- [Pothole Dozer Entrapment](#)
- [Oklahoma Entrapment Burn Injuries](#)
- [Kincadee Shelter Deployment](#)



**Discussion Time:**  
Talk about all the ways LCES can fail.



Captain 47 exited the driver's seat and both he and the crewmember went to the rear of the engine to diagnose the loss of pressure. While both engine personnel were at the rear of the engine, the fire increased in intensity. Fire impacted the engine on the front passenger side and quickly swept underneath the engine. The crewmember escaped the heat to the northwest while the Captain climbed to the top of the engine. The heat on top of the engine increased and the Captain jumped from the engine and ran through flames in the direction of the escaped crewmember.

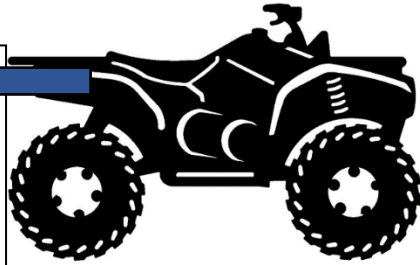
## 7. The Point Is . . .

Why does anyone bother to write these accident reports? Because we all believe in the idea that somebody somewhere can learn from the LESSONS collected and shared in the reports. You are the somebody somewhere.

### Backing = Broken Leg

It is recommended to spend time going over backing. ATV training from the ATV Safety Institute (ASI) and the U.S. Forest Service supplement does not address backing in training. Some other ATV trainings do.

#### [ATV Backing Accident](#)



### Little Big Bind

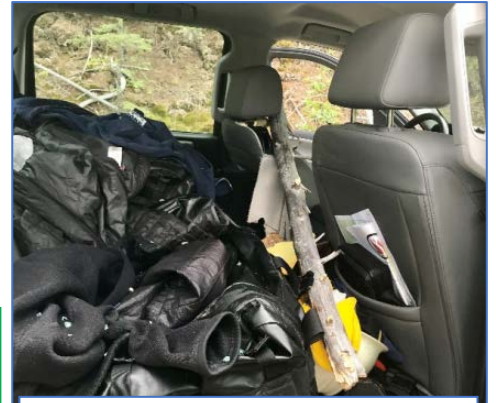
Larger timber doesn't get the bind like smaller timber. Smaller timber is more dangerous because it is limber and springy, but some people think it is easier to cut.

#### [Western Oregon Bucking Incident](#)

Bottom area of tree that was compressed heavily and saw chain was still turning as it was withdrawn from a quickly closing first cut



Top tensioned area where final release cut proceeded for 2" before it violently exploded.



### Joe Poke

A 9-foot piece of lodgepole pine came through the driver's window.

- Drive at a slower speed.
- Move farther away from the brushy cut bank.

#### [Beeskov Vehicle Incident](#)

### STOP!

Concern for the folks following in the UTV having to breathe that smoke and belief that clearer air was just ahead prompted continued travel.

If you can't see the road, STOP. (Turn on all vehicle lights, notify others by radio if possible.)

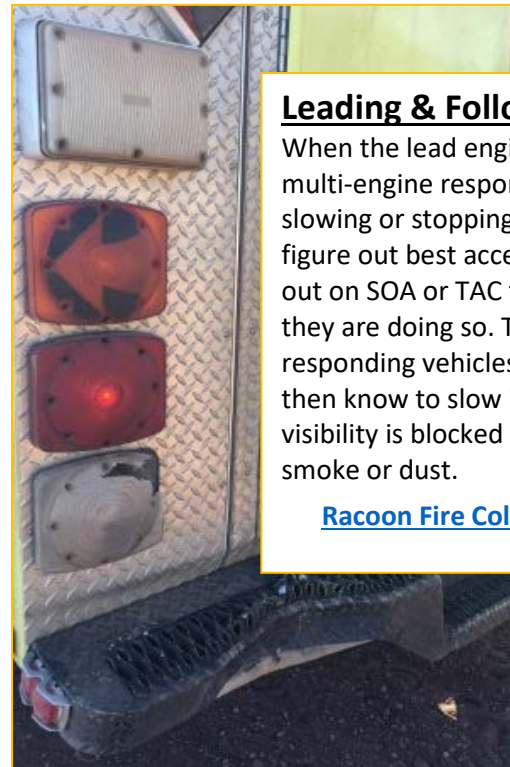
#### [Canyon 66 Rollover](#)

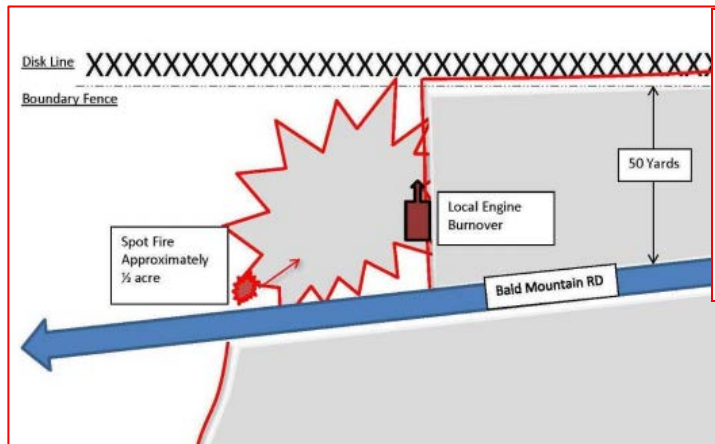


### Leading & Following

When the lead engine in a multi-engine response is slowing or stopping to figure out best access, air out on SOA or TAC that they are doing so. The responding vehicles will then know to slow if visibility is blocked by smoke or dust.

#### [Racoon Fire Collision](#)





**Gimme Shelter**

Fire resources should not rely upon vehicles as safety zones. Resources should consider using a web belt to carry a fire shelter when performing engine operations and/or have fire shelters readily available on the exterior of the vehicle.

**Bald Mountain Incident**



**Not User Friendly**

It would be valuable to expand scenario training to include some different types of rescue equipment. The strapping on a stokes litter isn't what one would consider "user friendly".

**Milepost 97 Incident**

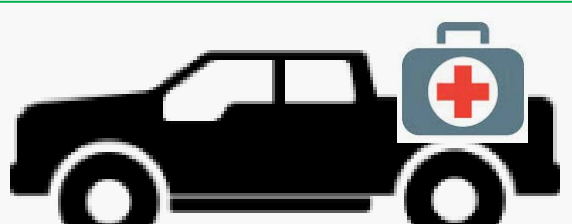
**Soft Stretcher**

The soft stretcher is not the correct tool for every extraction scenario, but in this instance, it proved to be valuable. It is very lightweight, folds down to a compact size, and can be carried in a line pack.

**East Evans Tree Strike**



Figure 6 – Example of a soft stretcher like the one used in this incident's extraction.



**Not Back at the Truck**

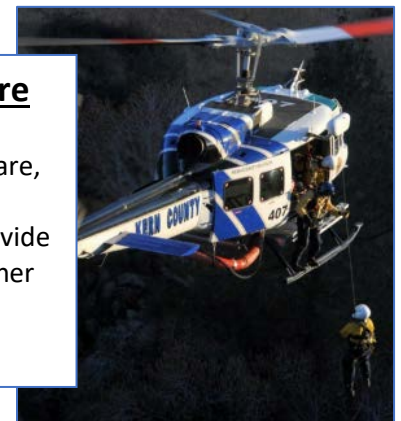
All crewmembers discussed the importance of always having life-saving trauma bandages and equipment on their person. It's one thing to have gear on the truck, but it's another thing to have the gear on your pack right there at the work site.

**Prescribed Fire Chainsaw Cut**

**Bring Higher Level Care**

Don't rely on your transport method for a higher level of care, order line medics at the same time. They may be able to provide an advanced level of care sooner and serve as a backup.

**Lime Fire Hit by Tree**



**The Danger is Real**

The individual was admitted to the hospital unconscious with a body temperature of 107. The fast response and training of the fire crew probably saved this individual's life and prevented any long-term medical effects.

**Pack Test Heat Stroke/Rhabdo**



## 8. Ash Pit Burn Injuries

There were quite a few burn injuries in 2019 as the result of firefighters stepping or falling into ash pits. These instances occurred during mop-up, saw operations, and scouting. Take some time with this section—the lessons could keep you out of the burn center.

# 16 Burn Injuries

- 10 Stepping or falling into an ash pit
- 4 During pile burning
- 1 While driving a UTV past active fire
- 1 While cooking a meal in spike camp



Rapid  
Lesson  
Sharing

**Event Type:** Ash Pit Burn Injury  
**Date:** August 23, 2019  
**Location:** Swan Lake Fire  
Southcentral Alaska's Kenai Peninsula

When the swamper stepped and reached for a chunk of birch tree on the black side of the dozer line, his foot sunk into a hot ash pit, approximately 18 inches deep. As the swamper attempted to extricate himself, the sawyer stepped toward and reached for the swamper to help pull him out. They both sustained burn injuries to their lower legs.

[Swan Lake Burn Injuries](#)



A firefighter assigned to the Martinez 3 Fire received 2nd and 3rd degree burn injuries below both knees. The firefighter, assigned to a type 3 engine on the incident, was performing suppression duties in an area of deep vegetation (duff) material, when he stepped into an ash pit, sunk to his waist, and received injuries.

[Martinez 3 Burn Injury](#)

"Tom was moving carefully through the ash, spraying water. He paused for 15-20 seconds scanning the area for heat when his right leg sunk to his knee through the crust."

### Mulch Fire Ash Pit Burn FLA



### LESSONS

- When setting work priorities, ask yourself if you really need to be there – is it worth the risk?
- Be aware that the risks with ash pits are often not visible and may extend well beyond the immediate area.
- Scout areas and use probes to test for extent and depth of ash beds.

[Alaska Ash Pit Burn Injuries](#)



Firefighter showing the depth of an ash pit that was found on the line.