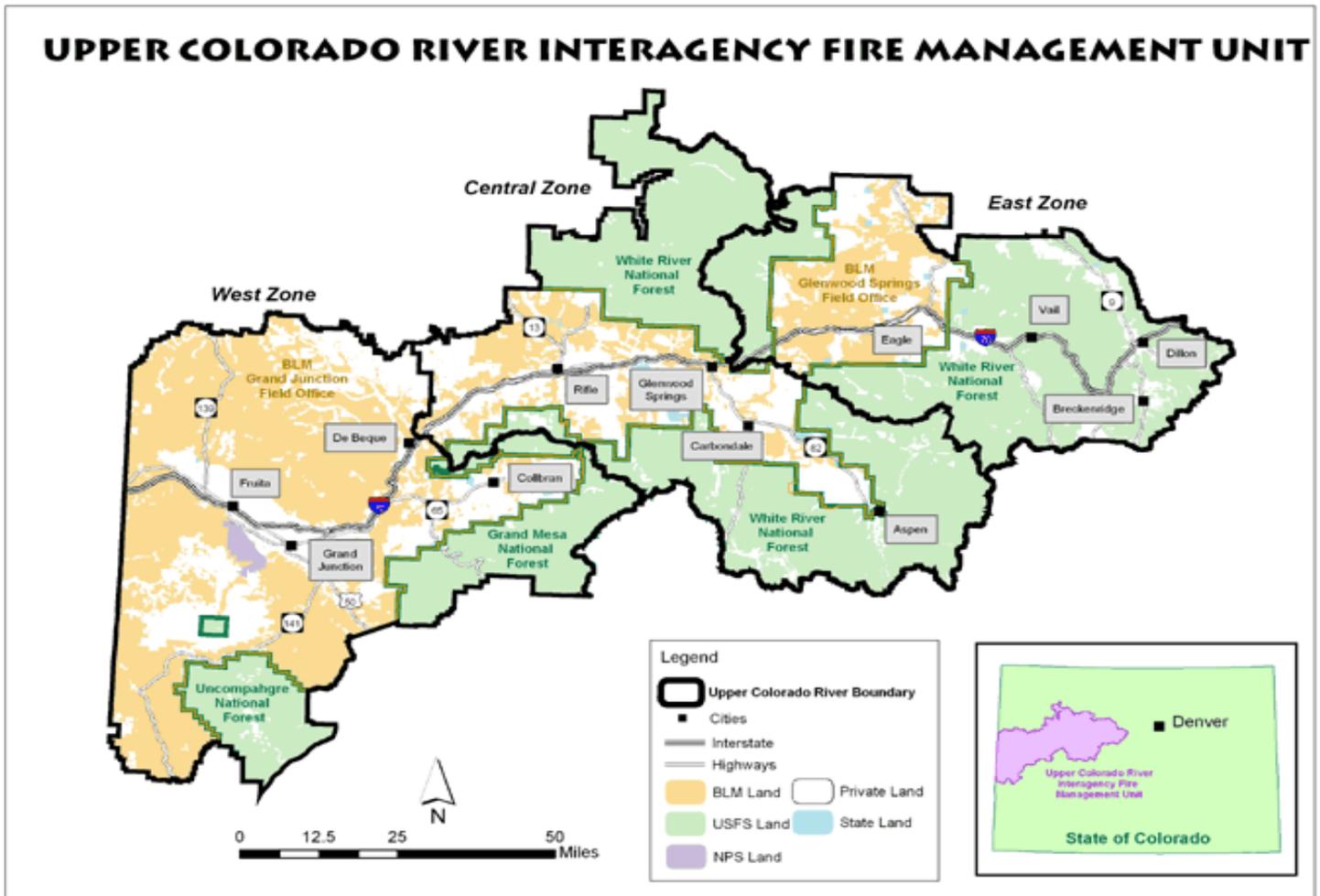


Carson Hole Wildfire Smoke Jumper Injury – July 3, 2010 Facilitated Learning Analysis



US Forest Service, Rocky Mountain Region,
Grand Mesa, Uncompahgre, and Gunnison National Forest

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Executive Summary

On July 3, 2010, at 12:54 PM, a Bureau of Land Management smokejumper was injured during initial response of the Carson Hole Wildland Fire on the Grand Valley Ranger District of the Grand Mesa, Uncompahgre, and Gunnison National Forests (GMUG) in Colorado. The injuries sustained include a fractured left fibula and a sprained right ankle. The employee was released from the hospital on July 3rd and is currently recovering at his home unit.

A Facilitated Learning Analysis (FLA) was initiated on July 8th, 2010 by Charlie Richmond, GMUG Forest Supervisor and a technical accident review was completed by the Boise BLM Smokejumpers. The focus of an FLA is to facilitate a learning environment and identify those conditions that either enhanced or detracted the management from risks related to the accident.

It is hoped that both firefighters and managers will use this report in a learning environment. This FLA has been made possible by the cooperation and support of the parties involved; the Grand Junction Air Center, Upper Colorado River Fire Management organization, the Boise Smokejumpers, and the GMUG National Forest. The FLA team would like to express our deep appreciation of their willingness and honesty in sharing their story.

Setting

The Upper Colorado River Interagency Fire Management Unit (UCR) is composed of the Glenwood Springs and Grand Junction Field Offices of the Bureau of Land Management; Grand Valley Ranger District of the Grand Mesa, Uncompahgre and Gunnison National Forests; White River National Forest, and the Colorado National Monument. The UCR also cooperates with state agencies, local communities and fire departments in western Colorado on a wide range of activities including fuel treatments, fire prevention and fire suppression. The UCR is responsible to twelve line officers. There are over 100 interagency fire and aviation positions listed on the organization chart for the UCR.

Encompassing over 4.5 million acres of land managed by participating Federal agencies, the UCR is oriented along the Interstate 70 corridor from the Continental Divide on the east to the Utah state line on the west. Vegetation types in the area range from those typifying high desert species such as native bunchgrasses, sagebrush and various types of brush, to woodland species such as pinyon-juniper, aspen and mixed conifer species at higher elevations.

The UCR is divided into three management zones with offices in Grand Junction, Rifle, Eagle, and Minturn. The ground resources include 9 engines, 2 initial attack squads, and a helitack crew.

The Grand Junction Interagency Dispatch Center is located at the Grand Junction Airtanker Base, and is referred to as the *Grand Junction Air Center*. The Interagency Dispatch Center provides incident support to the following interagency partners:

Upper Colorado River Fire Management Unit, Grand Junction BLM Field Office, Glenwood Springs BLM Field Office, White River National Forest, Grand Valley District of the Grand Mesa, Uncompahgre, and Gunnison National Forests.

Colorado National Monument, National Park Service.

Colorado State Forest Service, Grand Junction and Granby Districts representing Eagle, Mesa, Garfield, Summit, Pitkin, and Rio Blanco counties.

The Grand Junction Air Center provides tactical aircraft resources (airtankers, smokejumpers, lead planes, and air attack) for initial attack and large incident support to dispatch centers in western Colorado and eastern Utah, as well as supporting national requests for resources.

Fire Weather - Accident Day.

The fire weather forecast on July 3rd for the Grand Junction forecast area was partly cloudy with isolated showers and thunderstorms. Maximum temperatures were expected to range between 74 and 84 degrees Fahrenheit and winds southwest 15 to 20 mps in the afternoon with localized gusts up to 30 mph. The Haines index was 6 - high.

Chronology of Events

- *Important risk management decisions are included in shaded boxes* -

Time	Event
11:40	Fire was reported to Grand Junction Interagency Dispatch Center (GJIDC).
11:42	<p>GJIDC, while in contact with the West Zone Duty Officer, diverted a type 6 engine (in route to a different fire) and a smokejumper aircraft with three jumpers and one spotter (plus pilot) to the fire. The engine reported an estimated time in route of one hour, while the smokejumper aircraft reported an estimated time of 10 minutes.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Because of limited resources, the Upper Colorado River Interagency Fire Management Unit uses but does not rely on run cards for dispatch. Their standard operating procedure (after receiving a smoke report) is to contact the Duty Officer. The Duty Officer in accordance with standard procedures used a deliberative risk management process to select the combination of resources to respond. Risks and considerations included:</p> <ul style="list-style-type: none"> - this was the 4th of July weekend which indicated risk of human caused ignitions was very high in the area - particularly from fireworks. - the location of the of the smoke indicated a threat to campgrounds and dispersed recreation areas, - the location of the smoke report indicated a threat to the upper reaches of Dominguez Canyon as well as the Divide Road which, if involved, would become a complex incident. <p>The Duty Officer determined that it was necessary to quickly evaluate the fire and determine the response needed prior to the heat of the day and prior to anticipated additional fires. Therefore the Smokejumper plane was launched immediately. One engine was diverted from a lower priority fire to the Carson Hole incident to provide an additional resource option. The Duty Officer was concerned about deploying the engine in a remote location on this particular day but concerns over the fire burning into Dominguez Canyon posed a higher risk.</p> </div>
12:27	The Spotter on the jumper aircraft provided a fire size-up to GJIDC that estimated the size to be 1/10 of an acre in size, burning in ponderosa pine and pinyon-juniper. Spread potential was considered moderate with a SW wind of 5 to 15 mph. Good jump spots were identified approximately ¼ mile from the fire and a road was identified adjacent to the fire. The aircraft was asked to remain over the fire while dispatch contacted the Zone Duty Officer.
12:27	The Zone Duty Officer acknowledged the fire size-up and indicated that he would contact the Forest Service District Ranger to discuss the situation and decide on the type of action to be taken on the fire.
12:35	The Spotter reported to GJIDC that they were in contact with the type 6 engine. The engine was at the forest boundary and continuing towards the fire. This put the engine 45 minutes to 1 hour from the fire.
12:38	After consulting with the District Ranger, the Zone Duty Officer requested the Smokejumpers “jump the fire” but determine the fire cause and report to GJIDC prior to taking any actions on the fire.

Again, the Duty Officer used a deliberative risk management process to decide upon deploying the smokejumpers. The risk factors included:

- the engine had still not found the fire and travel to the location could be difficult and time consuming.
- consideration that it was highly likely the Ranger would decide to suppress this fire immediately and so therefore it would be better to free the engine up as fast as possible in the event of additional fires.
- consideration that it might be better to quickly get eyes on the ground to either begin action on the fire or begin to develop a plan for longer term management of the fire utilizing resource management objectives.
- the suspicion that this was a human caused fire because of the proximity to the road and camping area as well as the fact that it was a holiday weekend.
- the report from the jumper aircraft of good jump spots within close proximity of the fire, indicating that the smokejumpers felt comfortable and safe in deploying.
- the trust the Duty Officer had in the skill and judgment of these particular jumpers.
- the knowledge based upon past experience with these jumpers that they routinely turn down requests if weather or ground conditions are too hazardous to jump.
- consideration that if the fire spilled into Dominguez Canyon the complexity would be high and he would need the high level of expertise available with the jumpers.

12:51

The spotter reported to GJIDC that all jumpers were on the ground but one was injured. The other two jumpers made an initial assessment of the injuries and rendered first-aid. The GJIDC began implementation of the Upper Colorado River Unit's Interagency Serious Injury or Fatality Guide. The guide outlines contacts and procedures to be implemented during this type of event. The guide was based on and designed to replace the national Agency Administrators Guide to Critical Incident Management PMS926.

12:54

The smokejumper first on the ground was now the Incident Commander (also referred to as Jumper-in-Charge). The Jumper-in-Charge reported to GJIDC that a jumper's legs were injured. The Spotter requested a medivac helicopter and reported that they were in the process of dropping the medical trauma kit to the jumpers on the ground.

12:59

The Jumper-in-Charge called GJICD on via cell phone and indicated that the injuries were not life threatening and were limited to the lower leg. The injured jumper was sitting up and additional injuries were unknown. The Jumper-in-Charge requested that the medivac helicopter be put on hold while they considered other options for transporting the injured jumper back to Grand Junction. The two jumpers continued to assess the injured jumper and took appropriate first-aid actions.

13:12

Upon further evaluation of the injuries, location, and the available options of transporting the injured jumper, the Jumper-in-Charge reordered the medivac helicopter from St. Mary's Medical Center in Grand Junction. While waiting for the medivac helicopter to arrive, the smokejumpers continued to provide care to their injured comrade and prepared the landing zone for the helicopter's arrival.

The Jumper-in-Charge and the uninjured jumper, along with the staff at the GJIDC,

performed a risk management analysis to determine the best course of action for transporting the injured jumper. Ground transportation is typically the preferred option since there are high costs and often high risks associated with life flights. However the risks associated with unknown injuries, a two hour drive to the emergency room (half of which would be on a very rough road) plus the need to utilize the only source of transportation (the engine) to suppress the fire, led to the decision to fly the injured jumper out. They also considered the use of an agency, exclusive-use helicopter located in the town of Rifle about 50 air miles to the northeast. This helicopter offered a more skilled backcountry air crew and a pilot who was familiar with agency flight mission (less risk associated with landing off pavement). This option was eliminated due to the increased flight time of 30 to 45 minutes and the lack of advanced medical capabilities. The decision to utilize the St. Mary's medivac helicopter provided the highest level of medical care in the quickest time frame and was determined to be an acceptable risk considering the benefits gained. Additional aviation risks were mitigated by the jumpers improving the quality of the landing zone and the use of the jumper aircraft to control airspace and provide oversight for the medivac helicopter.

13:47	The type 6 engine arrived at the fire and the Engine Captain assumed command as the Type V Incident Commander (IC). Minutes later, the medivac helicopter landed at the landing zone and shut down. The helicopter medical crew, with help from the jumpers, prepared the patient for transport and continued to administer first-aid.
14:01	The jumper aircraft departed the fire area and returned to Grand Junction Air Center. The aircraft reported that the injured jumper was being loaded at this time. The medivac helicopter soon departed for St. Mary's Medical Center in Grand Junction. The two remaining jumpers assembled their equipment, packed up, and walked to the fire.
14:36	The IC called in a size-up to GJIDC. The fire was determined to be human-caused at this point.
14:38	Following the size-up from the IC, the Duty Officer contacted the District Ranger and reported the fire to be human-caused. The ranger's decision was relayed to the IC to "put the fire out". <p>The decision to immediately suppress the fire was made by the District Ranger. The decision was based primarily on the fact that the fire was human caused and the belief that policy required immediate suppression.</p>
15:49	The IC reported the fire contained and estimated full control at 1800.
19:17	The IC reported the fire to be controlled and released the jumpers. The engine continued to monitor the fire.
20:00	The engine departed the fire in route to the station.

Lessons Learned and Lessons Shared

It should be noted that for the past several years the UCR Fire Team has embraced and worked to emulate the five principles of a High Reliability Organization (HRO). These principles: *Preoccupation with Failure, Reluctance to Simplify, Sensitivity to Operations, Deference to Expertise, and Commitment to Resilience*, are defined in the text by Karl E. Weick and Kathleen M. Sutcliffe, *Managing the Unexpected: Assuring High Performance in an Age of Complexity*. The work this unit has done towards this effort is evident in their vocabulary, their approach to risk management and in how they reflect upon lessons learned in the wake of an accident.

The smoke jumping/parachuting - technical/mechanical side of this accident was investigated by smoke jumper subject matter experts resulting in the linked report. ([See Appendix A, Technical Report of Carson Hole Parachute Landing Injury](#)).

The focus of the FLA was not on the technical aspects of the aviation operation but rather on the management of risk by the UCR fire team and Line Officers involved. To that end, the FLA Team asked those involved in the management of the incident and management of the UCR Fire organization to share the lessons they learned from the Carson Hole incident. They were specifically asked what they learned from this incident and what they thought could be shared with others to help prevent a similar accident. The lessons shared have been categorized by how they best fit into the principles of a HRO.

Lessons Learned - Shared by the FLA Participants

Preoccupation with Failure

We have developed plans to handle the types of emergencies we might have to deal with. You need that when something unexpected happens. You need to have thought through who you need to call and what to do beforehand. You need to be able to just pull it off the shelf and implement it. We also test these plans with simulations to find their holes and weaknesses. When we needed the emergency response plan, we had it and we knew it was sound.

Very bad things have happened here in the past. The crosses of Battlement Creek and South Canyon are a constant shadow over this unit and over how we train, what we do, and what we think about.

We brought in St. Mary's medivac helicopter crew to do an orientation for us earlier this year. They were glad to do it. The value of this was that it gave us a good understanding of their capabilities, limitations, and operational needs. It also gave them an understanding and a comfort level in our capabilities in selecting good landing zones, identifying hazards to helicopters, use of coordinates, etc. This also helped build a relationship so that when we called them, they already knew the people they were dealing with.

We keep reminders and pictures and memorials of our lost firefighters everywhere. They are on the walls of our offices and hallways. This reminds us of the consequences of mistakes made and the risks we face.

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We've learned to trust the medivac operations, they know what they're doing and they are professionals at it. We support them, but we let them do what they do best.

Deference to Expertise

Because our fire organization is a shared service function that works for an interagency board of line officers, we've learned that we need to work very hard on developing personal relationships between line officers and duty officers. We want line officers to be able to trust the decisions made by the duty officers and we want them to be able to question each other freely. We need to ensure the incident commanders and the duty officers support the line officers, but are also given the support they need to make time-critical decisions.

The size of our organization gives us the capacity to be thorough. On a lot of units people are wearing multiple hats, like "part-time" aviation officers or training officers. We are big enough and have enough agencies contributing to the UCR Fire Team that we have full-time people in these positions and enough money to bring on dispatchers in the shoulder seasons to write contingency plans and help in other preparedness related activities.

We teach and talk in HRO terminology but we don't ever think of ourselves as an HRO. No HRO should ever think of themselves as an HRO. Being an HRO isn't an end-state, it's a constant effort. There is no checklist on being a HRO.

Our emergency and contingency plans are very detailed. We put a lot of time into them and then test them to show where they are lacking. For example we have taken the serious accident guide and customized it for our needs. We have a detailed training plan, do complex simulations, and have clear Standard Operating Procedures. We also have a complex and in-depth chart of people available to serve as Duty Officer, Zone FMO etc. We make sure we have qualified leadership on deck and everyone knows who's on. ([See Link to UCR Serious Injury or Fatality Guide](#)).

We work on developing trust throughout the fire organization and in our relationships with line officers and other agencies. We do this by letting each other know mistakes are okay. We expect people to make mistakes and we try not to beat each other up over them. We also expect folks to look out for each other. We expect folks are doing the best they can. Trust makes everything run smoother. It is the key to developing relationships, but you have to work on it.

We worked on developing a relationship with the meteorologist at NOAA. They know us as people, not just firefighters, so they think about us when things pop up on their radar.

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Learn the Risk Management process and practice it and practice it- even outside of fire or work related activities. Then it becomes intuitive and it becomes how you think.

Because the fire organization on the UCR is a shared service function that works for an interagency board of line officers, we are organized to be operationally focused. While there is good and bad to the way we are organized, it is streamlined and efficient. But we know we are here to provide a service to the line officers. To make this work we have to constantly work on relationships and work on developing trust between line and fire so that line officers feel comfortable giving decision space to firefighters to make time-critical and sometimes risky decisions.

Our agency administrators trust us to make on-the-ground decisions.

There are several things about the Upper Colorado River area that are unique, dangerous, and different from other areas of the country. We have a Situational Local Operational Working (SLOW) guide chart that is like a local watch-out or heads-up for situational awareness. ([See Link to SLOW Poster and Incoming Resource Guide](#)). We give this out to all incoming resources such as the jumpers who used it on the Carson Hole incident.

We work on using the concepts and terminology of HRO in our day-to-day work to make it a reality on the ground.

We use an HRO poster as a constant reminder and refer to it frequently ([See Link to UCR HRO Poster](#)).

Keep testing your contingency plans and keep improving them.

We work a lot on skill development and take advantage of detail opportunities to keep the well of experience deep. We have developed a large pool of qualified leadership available to fill in as acting Duty Officers and FMOs. We rotate them in and out so they all feel comfortable in the positions they might have to fill. As in the Carson Hole Fire, almost all the fire leadership positions were acting but that didn't interfere with operations at all or in the handling of the emergency. You're so much more flexible when you have a lot of back-up; a lot of people that have been proven and tested and can step in when needed. It is a lot of work to keep this going. We're never one vacancy away from competent leadership.

The Upper Colorado River Fire Management Team deals with more agencies, acres and fires than almost anywhere else. It is about as complex as it gets. To reduce the complexity we streamline operations where we can. For example, by making everything we do totally interagency. You won't see individual uniforms or agency symbols on shirts or vehicles, etc. The only way you can know who works for what agency is by looking up an org-chart. Being a shared service function that works for an interagency board of Line Officers also helps streamline the operations.

FLA Team Lessons Learned and Recommendations

1. Risk management at the appropriate level through value alignment.

Because the UCR Fire Team operates as a shared service function to multiple agencies and a board of Line Officers, the FLA team noted numerous concerns that Duty Officers and Line Officers may not share the same values regarding the acceptability of risk with respect to exposing firefighters to the hazards of wildland fire. For example the decision to deploy smokejumpers on the Carson Hole Incident was a consequential risk management decision that was made by the Duty Officer and the smokejumpers, but did not directly involve the Line Officer.

In contrast, the decision to suppress the fire immediately was made by the Line Officer. This was also a consequential risk management decision. Moreover, the administrative policy of deferring suppression actions (until a Line Officer can make a suppress/manage decision) also has risk and safety consequences to firefighters. While Line Officers must continue to defer to the operational expertise of their Duty Officers facing time-critical decision points, Duty Officers should work to meet the risk management expectations of their Line Officers.

The FLA team recommends the UCR Line Officers meet with their Duty Officers routinely *after* incidents and discuss the risks faced and the risk management actions taken. These discussions should focus on aligning the values of risk acceptability between Duty Officers and Line Officers.

2. Ambiguity in national and regional policy and terminology

The FLA team noted confusion and frustration over the perceived changes in the national and regional fire policy. For example, the national direction promulgated this past spring to *not use* the term “fire use” resulted in the creation of the a locally used equivalent term, “MMO fires” (short for a fire management strategy intended to achieve Multiple Management Objectives). As another example, the local line officer did not believe any decision space was available in the management of trespass fires except for the decision to immediately (but safely) suppress the fire at the smallest size. And finally, the nexus between firefighter exposure and risk management is perceived as abstract. The direction to line officers to reduce exposure could have the unintended consequence of increasing risks to firefighters by delaying or complicating time-critical decisions and constricting the array of response options.

One firefighter felt that if the rules of engagement are unidentified, they will cause injury and confusion at the ground level and another framed the issue metaphorically saying, “the fog surrounding the national policy on fire use and risk management is clouding the decisions of firefighters.”

The FLA team recommends the Region continue to work with Forests and fire cooperators to clarify mission, policy and an effective understanding of the risk management.

3. Accident reporting and investigation.

The FLA team learned there was considerable confusion and frustration over the handling of the 24 and 72 hour notifications

The FLA team recommends UCR Line Officers meet and agree on how accident notifications shall be handled, particularly for accidents involving interagency personnel. Consider revising the UCR serious accident response guide to include a reference to this policy.

4. Sharing Lessons Learned.

The FLA team recommends sharing this document on Wildland Fire Lessons Learned Center website and other appropriate sites to draw attention to the excellent examples of High Reliability Organizing provided by the UCR. Some of their work can easily be replicated, improving operations across the country. To that end, the following documents should also be posted on the website for ease of distribution:

- [UCR's SLOW Poster](#)
 - o http://www.wildfirelessons.net/documents/SLOW_Guide_May_2010.pdf
- [UCR's HRO Poster](#)
 - o http://www.wildfirelessons.net/documents/HRO_Poster_Upper_Colorado.pdf
- [UCR's Incoming Resources Briefing Guide](#)
 - o http://www.wildfirelessons.net/documents/2010_Upper_CO_River_Incoming_Resource_Briefing_Guide.pdf
- [UCR's Serious Injury or Fatality Response Guide](#)
 - o http://www.wildfirelessons.net/documents/2010_Serious_Injury_or_Fatality_Guide_Template_Gr_and_Junction_Air_Center.pdf

Summary

The Upper Colorado River Interagency Fire Management Team consciously and deliberately works towards organizing for high reliability. This was evident in the risk management process they used throughout the management of the Carson Hole Wildland Fire and in the seamless transition to managing the medical emergency. While the outcome was unintended and the accident serious, the FLA team found the unit's focus on high reliability organizing gave them the resilience to continue operations and make timely adjustments to emerging priorities.

The FLA team applauded the unit's application of sound risk management procedures.

The Carson Hole Facilitated Learning Analysis team included the following personnel:
Ruth Spradling, Grand Mesa, Uncompahgre, and Gunnison National Forests
Gary Brown, Payette National Forest

