

# **Reservoir Road Fire**

## **Non-Serious Wildland Fire**

### **Accident Investigation**



Prepared by:  
**Joe Snyder, Safety Officer Type 2 (T)**

For:  
**Thomas's Great Basin Type 1  
National Incident Management Team**

## **Introduction**

On September 13, 2010, at approximately 1524 hours, while performing hot line construction during extended attack on the Reservoir Road Fire, a member of the Bonneville Hotshots was injured as a result of a fall from a rock face. The crew member slid down, feet first, while facing the rock and then landed on his feet, rotated 180 degrees, lost his footing, and came to rest in a seated position facing downhill. The right front side of his hard hat impacted an approximately 6-inch diameter Douglas-fir tree, causing the injury.

The purpose of the Non-Serious Accident Investigation (NSAI) is to:

1. Identify facts of the events and develop a chronological narrative of the event;
2. Identify what was learned and what should/or could be done differently in the future; and
3. Identify any recommendations that would prevent similar occurrences.

## **Investigation Process**

Due to the low complexity of the accident, the Great Basin Incident Management Team decided to utilize an on-site After Action Review (AAR) approach to gather pertinent information from witnesses and crew supervisor to establish chronology of the event, what happened, lessons that were learned, and recommendations for improvement or prevention of future similar accidents.

## **Background**

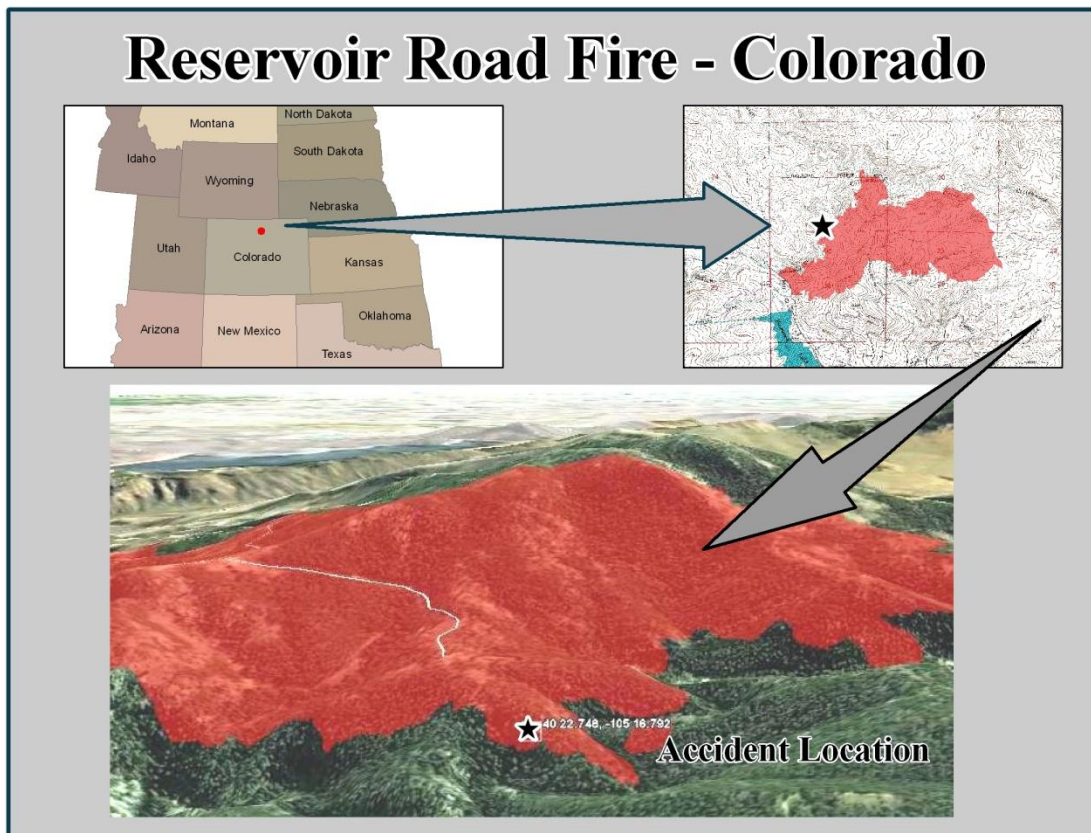
The Reservoir Road Fire started on September 12, 2010, in Larimer County, Colorado, in the foothills west of Loveland. A local Type 3 Incident Management Team assumed command of the incident. A request was made to the Great Basin National Incident Management Team, which was managing the Four Mile Canyon Fire west of Boulder, Colorado, for resources to assist with the new start. A Delegation of Authority was issued to the Great Basin National Incident Management Team, and the team assumed command at 1800 hours on September 13, 2010.

## Fuels and Predicted Fire Behavior

The area had experienced drier and warmer than average conditions for the previous 30 days. Continuous grasses interspersed with Bitterbrush transitioned to ponderosa pine with a grass understory (Fuel Model 2). Douglas-fir was also interspersed in certain areas within the fire perimeter. Heavy fuel loading was present throughout the fire area. Projected weather for the burning period was as follows: temperatures in the mid '80s, relative humidity 12-15%, and southeast winds of 5 to 9 mph with gusts to 14 mph. The Haines Index was 6.

During initial attack, surface fire activity was high to extreme in the grass and shrub fuel models, with flame lengths exceeding 15 feet and rates of spread exceeding 30 chains per hour. Backing and flanking rates of spread were 5-10 chains per hour with flame lengths up to 6 feet. Crown fire in timber produced flame lengths of greater than 80 feet with rates of spread near 30 chains per hour.

A majority of the fire growth occurred during initial attack on the previous day and overnight. As of 0700 hours on September 13, 2010, an infrared flight mapped the fire at 651 acres. The Incident Status Summary (ICS-209) showed containment at 20%. Final fire size was 750 acres.



## **Chronology of Events – September 13, 2010**

The following chronology is provided to set the stage and describe the actions taken by parties involved in the incident.

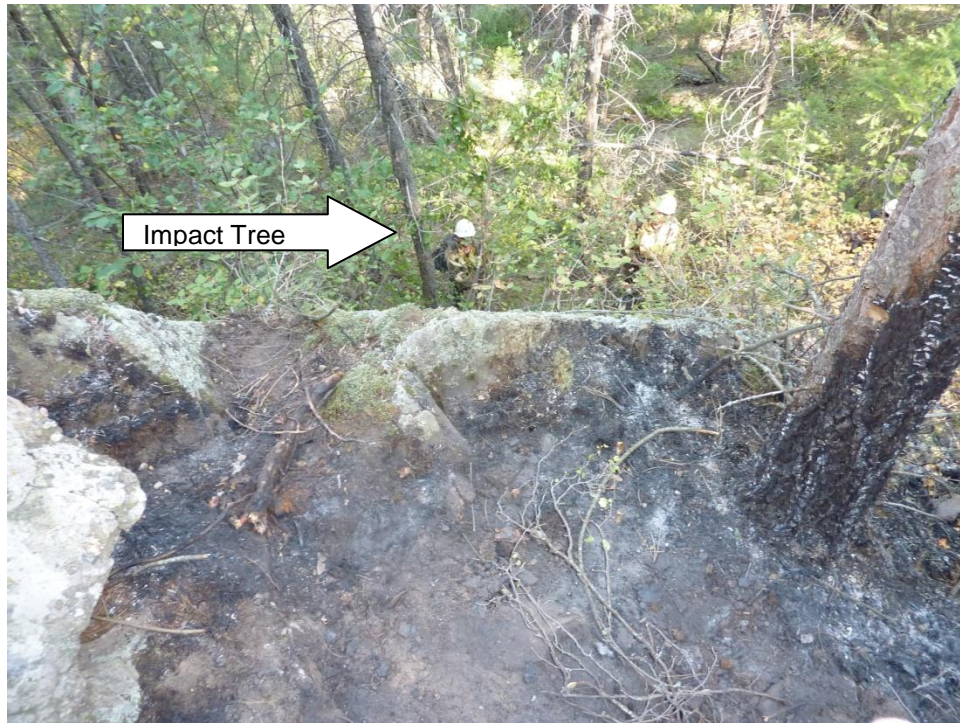
- 1524:** Report by Bonneville Hotshots crew superintendent to Division/Group Supervisor on Division X of an injured crewmember. Division X calls Operations Section Chief to inform him of the injury.
- 1524:** Patient evaluated by crew EMT, and the decision was made to assist patient to hike out of the work area and up to the crew carriers.
- 1529:** Operations Section Chief orders ambulance from ICP to proceed to Bonneville crew carriers. Division X Division/Group Supervisor informed by Communications that ambulance arrival at crew carriers would be “30-40 minutes.” The approximate distance from the Incident Command Post to crew carriers was 5 miles of winding paved and dirt roads along the fire perimeter then through the fire interior.
- 1550:** Injured crew member and crew EMT arrive at crew carriers.
- 1555:** Ambulance arrival to patient location at Bonneville crew trucks.
- 1607:** Ambulance transported patient to rendezvous point for patient transfer to another paramedic ambulance dispatched from Loveland.
- 1624:** Patient transfer completed and ambulance en route to hospital.
- 1646:** Ambulance arrival at hospital.

Total time elapsed from report of injury to arrival at hospital = 1 hour 22 minutes.

## Discussion

This section will discuss in further detail circumstances surrounding the event and its outcome. This represents information gathered through interviews and an After Action Review (AAR) conducted with witnesses to the accident and subsequent crew member extraction. Information was also obtained from the crew superintendent and Line Safety Officer who arrived on scene shortly after the accident. The injured crewmember and other crew members also participated in the AAR.

Crew member's position on rock face immediately prior to the fall was witnessed by crew EMT. The crew member's fall and final resting location were also witnessed by the crew EMT. He fell approximately 8-10 feet from where his feet were positioned on the rock face. The overall height of the rock face was approximately 15 feet in the section where the crew member was positioned prior to the fall. The crew member's hard hat remained on his head during the fall and after having impacted the tree. The hard hat impacted the tree in the front right quarter area.



Looking downhill from top of rock face.



Looking down the rock face from which the crew member fell. Picture illustrates final resting location of crew member.



Postaccident illustration of crew member's approximate location on rock face prior to fall.



View from side of rock face.

The crew EMT immediately descended to the injured crew member's location and began assessment of his condition. The crew member was reportedly unresponsive for 20-30 seconds. Once responsive again, the crew member reported that he had "pain behind his eyes and that it felt like someone had punched him in the face." He then expressed to other crew members on scene that he "wanted to get back to work." After an evaluation of the crew member by the EMT, a decision was made to immediately escort him the approximate 1/8 mile uphill to the crew carriers. The crew member walked under his own power with another witness stating that he looked "a little wobbly."

Report of the injury was rapidly transmitted by the Division/Group Supervisor to the Incident Command Post regarding the nature of the injury and the immediate need for an ambulance. The dedicated ambulance was pre-positioned at Incident Command Post and went en route immediately.

The crew member's condition was stable, and terrain was steep with hazardous footing. Timber was dense, with a closed canopy, with no possibility to create an emergency helicopter extraction site in timely manner any closer than the location of the crew carriers. The extended travel time for other crew members and equipment to arrive on scene for patient extraction on a backboard and stokes litter would further delay the time until advanced care could be provided.

Due to the steep terrain with treacherous footing, any evacuation on a backboard would have required a litter carry method such as the "Conveyor Belt" method for a portion of the distance to the crew carriers. Because the crew member's condition was stable and he was able to physically walk without issue, the decision was made to walk him to the crew carrier, thereby not exposing other crew members to unnecessary risk.

Upon arrival of the crew member at the crew carrier, the crew trauma kit was opened so the crew EMT could administer oxygen. The oxygen cylinder was found to be empty. Upon arrival of the ambulance, care of patient was transferred, and he was "packaged"/and transported.

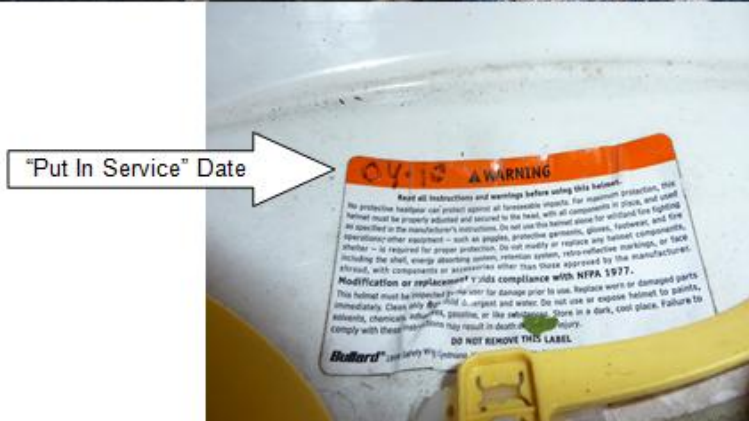
Patient was then transported to a predetermined rendezvous point and transferred to another ambulance for final transport to hospital.

As stated previously, the crew member's hard hat remained on his head throughout the fall, including during and after impact with the tree. It was removed by the crew EMT while performing his patient assessment.

The hard hat was inspected post accident, with the following notations:

1. No visible damage or deformation was noted to either the shell or suspension.
2. The date of manufacture stamp was: August 12, 2009.
3. The crew had written with black marker a "put in service" date of 4/10 on the decal inside the shell.





## Lessons Learned

1. Having a crew EMT with the squad that was working away from the remainder of the crew proved extremely valuable in terms of an immediate response and medical treatment of the injured crew member.
2. Rapid assessment allowed for prompt decision making, expediting the treatment and extraction of the patient in a manner most appropriate for the nature of injury and site limiting factors.
3. The medical emergency was managed by one on-scene point of contact that followed the chain of command through the Division/Group Supervisor and then to the Operations Section Chief, who then made the request for the incident ambulance. This followed the recommendations in the National Wildfire Coordinating Group Memorandum #025-2010 dated May 25, 2010.
4. The crew trauma kit's oxygen cylinder was empty. Interviews revealed it had not been used since it was last filled. It may have leaked due to a defect or been partially opened during transport.
5. The crew member's hard-hat performed to design specifications. The crew has a hard hat inspection/and replacement procedure in place as per head protection guidelines in the Interagency Standards for Fire and Fire Aviation Operations, also known as the "Red Book." Crew protocol mandates that all hard hats be replaced every 3 years, unless they have been damaged and retired prior to that time.

## Recommendations

1. Encourage the National Wildfire Coordinating Group (NWCG) to establish standards to incorporate higher level medical responders within crews, engines, and Initial Attack organizations to be more responsive and effective in emergency medical responses.
2. All Incident Management Teams should pre-position ambulance(s), and/or other appropriate resources, at strategic locations suitable to timely access all areas of the fire in a medical emergency. This information should be posted in the ICS-206, Block 8, to adhere to the protocols established in NWCG #025-2010 Memorandum (<http://www.nwcg.gov/general/memos/nwcg-025-2010.html>).
3. Institute a periodic inspection schedule for trauma kits.
4. Implement a hard-hat inspection and replacement schedule to ensure compliance with the design specifications and guidance in *Interagency Standards for Fire and Fire Aviation Operations*, Chapter 7.
5. Encourage hand crews, engine crews, Incident Management Teams, and Dispatch Centers to simulate medical emergencies to enhance proficiency. These simulations should also include the use of various evacuation techniques to accommodate factors such as limited personnel/or equipment, topography, weather, fire behavior, and time constraints.

## **Members of the Non-Serious Accident Investigation Team**

Shannon Theall, GIS Specialist – Bureau of Land Management, Lakeview District, Oregon

Tyler Doggett, Fire Behavior Analyst – Bureau of Land Management, National Interagency Fire Center, Boise, Idaho

Tony Beitia, Subject Matter Expert – Bureau of Indian Affairs, National Interagency Fire Center, Boise, Idaho

## **Acknowledgements**

Thanks to members of the Bonneville Hotshots for sharing details of this incident through an onsite AAR process. This investigation would not have been possible without their commitment to safety and learning.

Thanks to Brian Oliver and Greg Toll, Safety Officers from Boulder County, for their input to timelines and other details of the incident.

Thanks to Jim Thomas and the Great Basin Type 1 National Incident Management Team for support of this investigation.