2010

USDA Forest Service

Intermountain Region

Salmon-Challis National Forest

"If I had to change one thing about this fire, it would be the accident."

"Fighting fires on the Salmon-Challis is a red flag in itself. It has steep terrain; active fire behavior and bug kill with flashy fuels."

Jesse Fire – Stump of forked snag that struck firefighter. Person in photo is standing at the approximate strike location

Banner Fire – Snag that struck firefighter

BANNER AND JESSE FIRES

Facilitated Learning Analysis Snag Incidents – August 26 and 27, 2010

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Executive Summary

On August 26 and 27, 2010 two wildland firefighters were struck by falling snags on the Salmon-Challis National Forest. Both firefighters were engaged in fire management activities; the firefighter on the Banner Fire was involved in extended attack under the management of a type 2 IMT and the firefighter on the Jesse Fire was constructing line during initial attack under the management of a type 4 incident commander.

A Facilitated Learning Analysis (FLA) was initiated on August 30 with the goal of identifying opportunities to strengthen the agency safety culture by identifying any lessons learned associated with the incidents and sharing those lessons with employees engaged in firefighting activities. The lessons learned through this process have applicability to any employee that routinely works in forested environments. While there are similarities between these two incidents, there are differences.

The firefighter on the Banner Fire was a part of a 20 person IA crew and was involved in brushing and fuels reduction work outside the fire perimeter during extended attack on August 26, 2010. While walking through the area to resume work following a break, the firefighter was struck by a 3" diameter leaning snag. The firefighter appeared to be fine, with the exception of experiencing some dizziness. The injured firefighter was transported by ground ambulance to a local hospital following an evaluation by line paramedics. The injured firefighter was subsequently released for "light duty" work by the hospital with a diagnosis of a mild concussion. The following day, the injured firefighter was assigned as a look out on the line, and again experienced dizziness and head pressure. The firefighter was evaluated by line paramedics and transported by air ambulance to a trauma center for a thorough evaluation and was then released to recover at home.

The snag strike on the Jesse Fire occurred during initial attack operations on the morning of August 27, 2010. Following a briefing by the ICT4, in which snags were identified as a threat to firefighter safety, the crew began falling snags and direct line construction. Approximately one hour into suppression activities, a burned out snag fell from within the fire perimeter striking a firefighter who was involved in brushing operations ahead of other firefighters constructing line. The injured firefighter was extracted from the fire by an agency helicopter and taken to a local hospital for treatment. Diagnosis was two broken vertebrae, a sprained ankle and a torn MCL in the knee.

The following report provides some lessons learned as well as recommendations that agency leadership should consider in an effort to minimize employee exposure to falling snags. More importantly, the recommendations in this report address several other issues related to the medical care of our employees injured in the line of duty as well as the extraction of those employees to the appropriate medical facilities. The objective is to focus on lessons learned that will enhance future management actions.

The review team visited with Forest leadership in regards to their approach to managing firefighter exposure and risk management. On both incidents, the Jesse and Banner Fires, the team felt that leadership assessed the risks in relation to the values at risk before deciding on the appropriate suppression strategies. In the case of the Banner Fire, to minimize firefighter exposure the suppression strategy was to hold the fire north of Highway 21 and allow the fire to burn into the wilderness. It was a successful strategy and resulted in minimizing firefighter exposure.

Resource values at risk and firefighter exposure were also significant considerations with the development of a suppression strategy on the Jesse Fire. When the fire was first reported on the evening of August 26, 2010 following a significant thunderstorm event and other reported fire starts, a determination was made by Forest leadership that it would be a full suppression fire due to the resources at risk within the Jesse watershed, the municipal watershed for the city of Salmon. Rather than initiate action after dark, the decision was made to engage early in the morning of August 27, 2010. The decision was also made to utilize the Smokejumpers in order to bolster resources on the Forest to assist with other fire starts. It was evident from our interviews that all employees on the Salmon-Challis NF that are engaged in suppression activities understand the importance of assessing risk in relation to the values at risk prior to engaging in suppression activities. It was mentioned by the firefighters we interviewed, that assessing risk in relation to resources values at risk is stressed by Forest leadership and they routinely do not engage in suppression activities when the exposure to firefighters is too high.

The FLA team would like to express appreciation for the willingness of all employees involved to "share" their story. We would also like to acknowledge that employees on the Salmon-Challis are routinely engaged in assessing risk and employee exposure to hazards. Notably, the successful extraction of the injured firefighter from the Jesse Fire is a testament to the quality of the employees involved in the suppression activities.

Narrative

Banner Fire

The Banner Fire began on August 20, 2010, 18 miles northwest of Stanley, Idaho from a lightning strike. On August 23, a Type II Incident Management Team assumed operations of the fire. On August 26, 2010, while brushing out a highway right-of-way outside the fire perimeter, a firefighter from a Type II hand crew was hit on the right side of hard hat and on right side of forehead by a small diameter leaning snag. The injury was evaluated by paramedics from an ambulance assigned to the fire and based on the fact that the firefighter had previously suffered multiple concussions, was transported to a local emergency room for further evaluation. The injured firefighter was diagnosed with a mild concussion and released by the physician for light duty work.

The next day, August 27, 2010, the firefighter returned to the line as a lookout. At approximately 1617, the firefighter complained of dizziness, lightheadedness and jaw pain and head pressure. An ambulance assigned to the fire arrived on scene at 1626. Paramedics evaluated and transported the firefighter to the helibase for transfer to an air ambulance and then to a nearby trauma center. The firefighter was diagnosed with a concussion, soft tissue damage and slight swelling, and was released later that day to recover at home.

Jesse Fire

On the evening of Thursday August 26, 2010, the Jesse Fire was reported in the upper reaches of Jesse Creek, which is the municipal watershed for the town of Salmon, Idaho. The lightning strike fire was visible from town. Management decided that suppression resources would be dispatched the following morning based on the estimated fire size, recent lightning activity, availability of resources and firefighter safety in the steep, snag infested terrain. The importance of this watershed led to the decision to fully suppress the fire. On the morning of Friday, August 27, 2010, while the ICT4 and three firefighters were en route, fire activity increased noticeably from town and eleven Smokejumpers were dispatched to the fire.

At 1127 hours, while constructing line around the fire perimeter, a sawyer was struck by a dead fork of a subalpine fir located within the fire. From the fireline, it was not apparent that the snag was burning. First aid was quickly administered by firefighters on the incident and emergency evacuation resources were ordered, including a local ground ambulance, air ambulance and an agency helicopter that had been dropping water and was returning to the helibase to refuel. Upon landing, a backboard platform was installed in the agency helicopter. A firefighter at the helibase with EMT qualifications was alerted and additional emergency medical equipment was prepared in anticipation of assisting in the evacuation.

Improvised litter – Jesse Fire

The injured firefighter was moved to a landing zone in a wet meadow below the fire on a litter that was crafted from a cot, ratchet straps, chaps, fiber tape, tool handles and a piece of plywood gathered from the vehicles and engine located at the top of the ridge (up a very steep slope). Ground personnel on the fire decided to use the agency contract helicopter standing by at the Salmon helibase due to changing fire conditions, the type of landing zone, experience of pilot, and timing. The agency helicopter landed

in the landing zone and the injured firefighter was loaded on the platform. In less than 10 minutes the agency helicopter and the injured firefighter landed at the local hospital. Injuries sustained include two broken vertebrae, a sprained ankle and a torn MCL in the knee. The firefighter remained at the hospital for two days and was released to recover at home.

> *"All the resources involved in the incident stayed calm and worked together well, whether they were Dispatchers, Jumpers, Engine Crews, Fuels Crews, Helitack or Managers."*

Chronology of Events – Banner Fire

Area where hand crew was brushing out along highway

August 26, 2010

1916 – A member of a type 2 hand crew is hit/side-swiped on right side of hard hat and in the forehead by a leaning snag approximately 3" in diameter and 20 pounds. The injured firefighter is conscious but dizzy. Paramedics from an incident ground ambulance administer first-aid.

1933 – After initial evaluation by line paramedics, the injured firefighter is taken to ICP medical unit for further evaluation in a ground ambulance assigned to the incident.

Unk – Injured firefighter is transported by ground ambulance to a local hospital. A cat scan is not performed during the evaluation. Diagnosis is a mild concussion.

2300 – The injured firefighter is released for light duty work.

Typical snag component of stand

August 27, 2010

0700 – The injured firefighter returns to the fire and is assigned as a lookout.

1617 – The injured firefighter complains of being dizzy and light headed.

1618 – Medical personnel are requested on scene.

1626 – A ground ambulance assigned to the fire arrives on scene and assesses the injured firefighter.

1635 – The ground ambulance transports the injured firefighter to the helibase. An air ambulance is requested.

1636 – 1645 – Fire personnel are unable to establish radio communication with the air ambulance.

1647 – Phone communications are established and the air ambulance's estimated time of arrival at the helibase is 27-29 minutes.

1714 – The air ambulance lands at the helibase.

1729 – The air ambulance leaves the helibase en route to a regional trauma center with the injured firefighter.

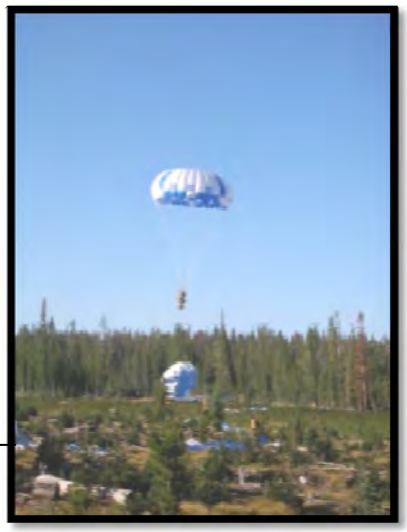
1830 – The injured firefighter arrives at the regional trauma center, is diagnosed to have a concussion, soft tissue damage and slight swelling, but not a life threatening condition and is released home.

Chronology of Events – Jesse Fire

August 26, 2010

2102 – A lightning caused fire was reported in Jesse Creek on the Salmon-Cobalt Ranger District. The initial size up was a single tree torching near the ridgetop.

2119 – Management decided to staff the fire in the morning based on fire size-up, firefighter safety (steep slope and snags), time of day, the availability of resources and the importance of the municipal watershed.



August 27, 2010

0634 – An ICT4 and three firefighters are dispatched to the fire.

0707 – The fire can been seen from the supervisor's office and is no longer a single snag fire.

0730 – A plane load of smokejumpers is ordered to the fire.

0811 – ICT4 and three firefighters arrive on scene.

0837 – ICT4 completed initial size up of the fire as 2-3 acres, 80% active, 90% slope, group tree torching. A type 3 helicopter with bucket and engine were requested.

0946 – Eleven jumpers are on the ground.

1000 – Type 3 helicopter is en route to fire for bucket drops.

1022 – Following a briefing by ICT4, crews began fireline construction.

> *"The ICT4 conducted one of the best briefings that we have had and he made sure all resources had arrived before giving it."*

1055 – A local engine arrives on scene with an operator and three firefighters.

1126 – A firefighter is struck by a snag while constructing line. First-aid is administered by firefighters on scene.

1126 – All radio traffic is cleared for emergency communications.

1128 – Agency helicopter is put on standby to assist.

1132 – An air ambulance and a local ground ambulance are ordered through the county to respond to the incident.

1135 – ICT4 requests the agency helicopter with backboard for medical evacuation.

1151 – Information is relayed to dispatch that the injured firefighter is conscious and in severe pain. Injured firefighter being carried in an improvised litter to the landing zone.

1201 – The air ambulance is 45 minutes from the incident.

1204 – The agency helicopter is en route to the incident.

1211 – The agency helicopter is at the landing zone and shutting down.

1217 – The injured firefighter is transferred to a backboard at the landing zone. The ground ambulance is seven miles from the incident.

1226 – State Com reported via phone that the air ambulance is 15-20 minutes out. The injured firefighter is being loaded on the agency helicopter.

1235 – The agency helicopter with the injured firefighter is en route to the local hospital.

1241 – The agency helicopter arrives at the local hospital.

1245 – Ground personnel and air ambulance are unable to establish radio communication.

Fire behavior increased after evacuation

Lessons Learned

The FLA Team had dialogue with key players involved in the Banner and Jesse incidents. During these conversations the participants shared lessons they learned from the incident that they felt would reduce the likelihood or the severity of a similar accident. The FLA team collected and summarized these lessons learned, some of which are common to both incidents. The lessons learned are applicable not just to the fire community, but to all field going Forest Service employees.

"After the patient is out, it is a good time to step back and chill out"

Communications

Communication with non- agency medical ambulances (both ground and aerial based) has been and continues to be a critical life safety issue. In the case of these two incidents, and several other recent wildland fire incidents, the inability to make ground to air contact with non agency medical helicopters has not only caused great frustration for all parties involved, it has also caused delays and unsafe working environments for personnel on the ground and in the air. Radio frequencies, equipment incompatibilities, lack of preplanning, misunderstandings regarding wide and narrow band frequencies, and the inability to program the variety of radios in use have all been noted in previous FLA's and SAIT's. Multiple solutions have been suggested in the past but little positive results have occurred, especially when considering the need to solve this issue on a national basis for all parties involved. Once again this critical life safety issue can extend to all employees engaged in land and resource use activities other than fire and fuels management.

Recommendations:

This is an issue that needs to be solved nationally for the benefit of all land and resource management agencies and their employees. Therefore, we recommend that the Regional Forester request that the Fire Director at NIFC develop a plan which could be implemented on a geographical or a state by state basis that allows for direct communication between Regional Aviation Officers and State EMS Directors. The overall goal of this plan will be to establish a dedicated frequency which will serve as the communication link between EMS ambulances (both ground and air) and on the ground resources. Once this is accomplished, a channel on which this frequency is programmed should be published in resources readily available to both EMS services and on the ground resources, such as mobilization guides and the incident response pocket guide (IRPG). The involvement of State EMS Directors is critical to solving this issue in a fashion that meets their needs and results in a simple solution that can be implemented on a state by state basis but yet consistent across the nation.

"Our EMS radios are unable to be programmed in flight and we are unable to view numerical frequencies."
-EMS Pilot

In the interim, agency units need to coordinate with commonly used offsite medical evacuation organizations to insure that radio communications are established and functioning. By coordinating and communicating with organizations that provide medical support, and rehearsing prior to fire season, the efficiency and effectiveness of operations will be greatly enhanced when an evacuation is required.

All aircraft have VHF capabilities, therefore an air attack or other agency aircraft should be considered to provide the communication link during an emergency evacuation.

Snag Hazards - Management and Mitigation

Hazardous snags, caused by mortality from recent insect and disease infestations as well as previous burns were very prevalent on these two incidents. Snags are not just concentrated on the Salmon-Challis National Forest. This hazard exists throughout the western United States and a national effort to raise the awareness and develop management and mitigation training is warranted. Snags are not just a hazard to wildland firefighters during fire and fuels management activities, but the hazard extends to activities including but not limited to timber management, road and trail maintenance, recreation management, and other land and resource use activities.

Recommendations:

We recommend that the National Wildfire Coordinating Group(NWCG), through the Risk Management Committee, update existing training material in order to develop a comprehensive presentation that highlights hazard snag recognition, management and mitigation; as well as lessons learned from recent hazard snag accidents. This material can be used throughout the wildand fire community at such events as Geographic IMT meetings, regional/state/local fire meetings and safety briefings. It should also be adaptable to other similar meetings and briefings for all other land and resource use activities.

We also recommend that this NWCG committee develop a new module on hazard snags for the Annual Critical Fire Refresher video.

The 2010 edition of the Incident Response Pocket Guide (IRPG) includes a page about Hazard Tree Safety (page 20, gold colored text). We recommend that the NWCG Operations and Workforce Development Committee review this text for possible expansion as they prepare the 2011 edition. A possible expansion could emphasize the extent and severity of this recognized hazard.

The Salmon-Challis NF Forest Supervisor asked the FLA team for recommendations that aid in bringing local Forest attention to hazardous snag issues. We suggest National Forests consider the following possible actions:

1. Develop a risk assessment/job hazard analysis for working in landscapes that have a large snag component.
2. Develop several standard Incident Action Plan (IAP) cover sheets that specifically cover this hazard and request that incoming Incident Management Teams (IMT) use these on a recurring basis throughout the life of an extended incident.
3. Consider the development of a hardhat sticker that draws attention to this hazard and encourage all Forest employees to affix them to their hardhats.
4. Consider adding a specific item to the incident organizers used by initial attack resources that emphasizes snag recognition, management and mitigation, above and beyond what is now in the incident organizers being used.
5. Consider supplementing the Annual Critical Fire Refresher text for 2011 and future years showing specific areas of concern on the Salmon-Challis NF for this snag hazard.

Emergency Medical Treatment

The Interim NWCG Minimum Standards for Medical Units, published in January 2010, outlines the minimum qualifications for medical units on an incident management team (IMT). However, guidance does not currently exist for smaller fires where an IMT has not been established. The Jesse Fire identified several issues associated with medical emergencies during initial attack. It is a common practice to utilize agency personnel who maintain their EMT qualifications without agency support to provide emergency medical services in these situations. Most of these individuals have obtained the training, at their own expense, to insure a higher level of first aid expertise on their crew. Interviews of employees identified a concern that the agency should do more to support advanced medical/first aid training and certification. There was a feeling that incentives should be provided by the agency to insure qualified and fully equipped EMT's are available on every crew in the event of a serious accident. In addition, those involved on the Jesse Fire believed that it was the best option to use the agency helicopter and were relieved that it was available and able to be configured to provide for the extraction of the seriously injured fire fighter on a backboard. The Banner Fire incident also emphasized the need for a greater understanding of the term "light duty."

> *"We were really surprised that the only medical supplies we could find were a 10-person first-aid kit."*

Recommendations:

The Agency should support advanced medical and first aid training, certification and medical control to ensure adequately trained and equipped personnel are on the fireline.

Agency contract helicopters should be configured to provide for extraction of seriously injured personnel. This should be a contractual specification. When agency contract helicopters are properly configured and flown by experienced backcountry pilots they should be considered for transporting patients to advanced medical care. This would give the agency additional options in the extraction of seriously injured employees and could provide for more timely patient care.

Protocol should be developed for head injuries. The recent protocols established for burn injuries have been very successful. The current snag components on wildlands in the western United States could increase the potential for head injuries. At a minimum, firefighters who suffer head injuries should be transported to a trauma center for a full and thorough evaluation.

> *Light Duty:*
> *Do not assign to fireline duty a worker who has any injury, illness, or emotional problem, or who is fatigued or otherwise not fit for duty.*
> *FSH 6709.11 25.11*

A search for guidance regarding appropriate duty for injured firefighters who are released for "light duty" was conducted by the FLA team. Contact was also made with the risk management group at NIFC. The current best definition of duty for injured firefighters can be found in the Forest Service's Health and Safety Code Handbook. This definition should be published in a resource more commonly used by on the ground firefighters, such as the Incident Response Pocket Guide (IRPG).

Additionally, it is the team's recommendation that FLAs be initiated as soon as possible after an incident in order for team members to attend any after action review (AAR).

Links:

Snag Poster - http://www.nwcg.gov/branches/pre/rmc/httf/snags.pdf

NWCG Minimum Standards for Medical Units - http://www.nwcg.gov/branches/pre/rmc/iems/policyguides/minimum_stds_for_medical_units.pdf

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